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ECOLOGY OF EUROPEAN UNION

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Article review:

Summary: The ecological environment is the main challenge for the accession of European countries to join the European Union. Ecology is at the heart of the policy-making process of European countries, respecting the interests of companies and consumers. Due to the low level of environmental awareness of European countries, which are not members of the European Union, enlargement with new members can slow down or even set the European Union back when it comes to ecology. The reasons are: underdeveloped environmental policy, low gross domestic product. The European Union invests its funds for the environment, but countries are obliged to allocate most of the funds from their gross domestic product. Therefore, special taxes are introduced on the consumption of certain products for the protection and preservation of nature. Taking significant environmental measures will have an impact on protection against ozone depletion and global warming. A healthy environment creates the conditions for a healthy life. Therefore, an appropriate ecological awareness is necessary, which is a pattern of life, harmonizing behavior with the natural laws of the circulation of matter, energy expended and the renewal of life, which encourages taking from nature as much as necessary. Ecological ethics is the ecological relationship of man to the environment, which establishes a moral relationship between the human / technosphere and the natural / biosphere. A new attitude towards the environment as well as a transformation of the spirit of the modern sphere of work is becoming an imperative, a concept of sustainable development with the harmony of different economic and social relations.

Keywords: Ecology, European Union, candidate countries, companies, consumers, awareness

Goal Setting

The European Union national and governments have set clear goals for shaping European environmental policy by 2020, linking a vision of what will be achieved by 2050 based on search engines, legislation and funding: Transition to a resource-friendly, green competitive low-carbon business, -Protecting citizens from pressures and threats to their health and environmental well-being. Much is being done in the European Union to protect endangered species and natural areas in the European Union, to guarantee the safety of drinking and bathing water, to improve air quality and waste disposal, and to reduce the participation of harmful chemicals. Environmental protection and eco-innovation help create new business opportunities and employment opportunities that encourage new investments in ecology. The basic foundation of the European Union's policy is green growth, because economic growth must be environmentally sustainable. The European Union also has a key role to play in promoting sustainable development at the global level.

Environmental protection is one of the key conditions for joining the European Union. The European Union deals with water, air and soil quality in a special chapter. Success requires a collective effort to meet all the goals set in that chapter. That is why the "look around" campaign was launched.

European Union standards in environmental protection are the highest in the world. The directive banning the most commonly used disposable plastic products in order to dispose of plastic waste, which pollutes hundreds of tons of European seas every day. Approximation to the environmental standards of the European Union requires the harmonization of the regulations of the nation states with the regulations of the European Union, but also to change the practice. The demands are numerous and require diligence, perseverance and legality. The issue of waste must be resolved and its disposal in appropriate places that will not endanger the air, land and water to citizens. Wastewater and air are added to that. Measures in this area will especially include industrializations and businessmen.

Obligations are important in education, not only for citizens but also for those who will be in charge of implementing and controlling what obliges us to achieve environmental goals. Harmonization of legal acts is an obligation, and negotiations on deadlines for the application of these regulations can take decades after accession to the European Union.

Achieving the set environmental goals is done through appropriate professional and educated administrative staff and appropriate capacity with the necessary equipment. Appropriate staff of administrative and public companies must be trained to apply environmental legislation, but also to control their application.

The main goals of the European Union's environmental policy are the preservation of natural values, the promotion of a resourceefficient economy and the care of public health. Environmental policy is multisectoral, it needs to be integrated in the creation and implementation of all policies and activities of the Union, primarily in promoting the principles of sustainable development.

The European Union pays special attention to the issue of combating climate change and has allocated about 20% of the Union's budget for this area for the period 2014-2020. The goals for achieving the New Framework for Climate and Energy Policy by 2030 have been set. reduction of greenhouse gas emissions by 40% compared to 1990. The main instruments for combating climate change are decarbonisation, increasing the use of renewable energy sources and energy Decarbonisation implies efficiency. а substantial change of the practical-political paradigm, a decisive reduction of fossil fuels and an increase of the energy independence of the European Union in relation to the base year 1990. Climate change policy has been accompanied by the improvement of standards related to the work of industry, especially in sectors that provide a significant source of pollution.

Ecological programs

The first environmental project of the European Union (1973 - 1976) defined the principles and goals of environmental policy. The goals were based on reducing pollution, improving the quality of life and improving

international cooperation to protect the environment. In addition to the objectives, the principles determine the direction of action to protect the environment on the basis of which pollution and the negative consequences of pollution should be prevented at the source by predicting environmental effects. negative To encourage research that activity in one Member State cannot cause environmental damage to another Member State, the public must be informed and educated about environmental protection.

In the period from 1977 to 1981, the operation of the first program was continued by the Second Environmental Program. It places special emphasis on the rational management of resources and focuses more on preventing water, air and forest pollution. The third environmental program (1982-1986) also established cooperation with developing countries with the aim of solving emerging problems in environmental protection, noise reduction, waste management and the promotion of environmental technology.

The Fourth Environmental Program (1987-1992) strengthened the field of environmental protection in the field of agriculture and transport, creating conditions for the production of healthy food and the reduction of air pollution by means of transport.

The fifth environmental program (1993-2000) for the first time defines the concept of state development that must take place in the direction of nature protection (man, land, water, air, forest). Excessive pollution of nature in the process of creation of material goods must be stopped, even by banning the production of these material goods. The means for the production of material goods must be of such a technological level that they automatically stop working if they catch a part of a man or his clothes, which would endanger his life or injure him.

The Sixth Environmental Program (2001-2010) defined future priorities in strategic activities such as: improvement of existing laws, closer cooperation on the market, integration of bodies or institutions involved in environmental policy, assistance to citizens in changing behavior and environmental protection planning.

For the current state of environmental protection in the European Union, the most important is the Seventh Environmental Program, which included a series of programs for action until 2020. The goals are:

- The European Union must be transformed into a green economy (low-value production) with low CO 2 emissions (carbon dioxide or carbon IV oxide), - Protecting Union citizens from environmental pressures and threats to their health and well-being, - Increasing the benefits of Union legal acts in the field of nature protection, - Increasing environmental knowledge and expanding the evidence base for better policy coherence, - Securing investments for nature protection and climate change, - Increasing issues and their involvement in environmental protection, -Improving the sustainability of cities in the area - Increase the effectiveness of the Union in addressing international environmental climate challenges. The seventh and environmental program gives priorities to: -Increasing the growth of production with a low percentage of CO 2, - Reducing the danger to human health and well-being, principles Climate change. The of environmental policy are based primarily on anticipatory measures. elimination of obstacles to prevention, payment for ecology (tax increase) as well as incentives to avoid nature pollution, active action and taking preventive measures, and preparation of action programs.

Legal Regulations

The European Union has adopted a number of legal acts and programs aimed at protecting the environment (water, land, air and health).¹

The Large Combustion Plants Directive and the Industrial Emissions Directive contribute significantly to reducing air pollutant emissions.

¹ Analysts mention 200 legal acts that each member must apply to protect the environment.

In the process of creating environmental policy, the European Union takes into account the latest scientific achievements and available policies, supports the use of the best available technologies, taking into account the regular differences and specifics of different regions.

The basic policies of the European Union are: precaution, prevention, suppression of pollution at the source in principle, "polluter pays". Environmental policy-making implies respect for fundamental rights and the right of the public to participate in this process. The European Union is a signatory to the Archives Convention, the implementation of which is achieved through the secondary legislation of the European Union.²

The EU environmental acquis includes horizontal legislation, air quality, climate change, waste management, water management, nature and biodiversity protection, industrial pollution control, chemical control, genetically modified organisms (GMOs), noise management, civil protection and cooperation with third countries. Therefore, the process from the aspect of environmental protection must be realized by the right to access information, public participation in decision-making, responsibility through judicial protection.

Member States are not prevented from introducing measures that are stricter than those established by European Union legislation as long as they are contagious with its overall objectives and the principles of the single market. Such an approach in creating and implementing this policy is a special challenge for a country preparing for membership in the European Union.

In 2005, the European Parliament adopted the Energy - Uising Producte - EuP Directive, which aims to encourage the prevention of the negative impacts of complex industrial products in the development phase. It represents а framework for setting criteria from the domain of ecological orientation of designing products that consume energy in

the experiment phase. The content of the Directive is a real legal space for the elimination of unsuitable elements and the creation of conditions for suitable ecological design of certain types of production. The Directive has defined the conditions and criteria for the establishment of appropriate implementing measures and requirements relating to the environmentally relevant properties of products (energy consumption) and the possibility of their effective improvement. The Directive affects the improvement of production quality, environmental protection and the activation of market mechanisms as a guarantor of the sustainability of the concept it promotes. The immediate objectives of the Directive are: - Exemption of free distribution of products that use energy on the territory of the European Union, - Improvement of ecocharacteristics of products and quality of the environment, - Rational use of energy.

The directive encourages producers to have a long-term impact on energy protection, leaving room for active implementation of measures for specific product groups and specific aspects of environmental load (energy consumption, waste generation, water consumption, extension of product life) according to environmental impact assessment.

The process of effective implementation of the Directive is assessed on the basis of a stakeholder consultation that brought together representatives of industry, Member States and non-governmental organizations. implementation measures Specific are adopted for each specific type of product under the control of panel experts from all EU member states. The measures to be decided define the energy characteristics of each product, as well as the marking of the quality of the market for which the manufacturer opts.

The product covered by the implementing measures must be marked with the CE mark which is placed on the market. This mark

² There is a landfill on the bank of the Lim in Serbia, whose waste reaches the river Lim, through the river Lim dirty water from the waste penetrates into the river Drina, and then into the Sava. Therefore, in order to be able to change in ecology, it is necessary to

educate citizens at the beginning of preschool age, to introduce the subject of ecology, ie environmental protection, in educational institutions, and then severe penalties for violating environmental regulations.

confirms that the product complies with European Union regulations.

The Restriction of Hazardous Substances Directive (RoHS 1) was adopted in February 2003 with the aim of harmonizing the regulations for the use of hazardous substances in the European Union. In implementation and application it is complete with the WETEE directive. The RoHS 1 Directive restricts the use of toxic substances, primarily heavy metals, in all electrical and electronic devices that came on the market after 1 July 2006, ie with the entry into force of this Directive. The directive restricted the use of six hazardous substances in the production of different types of electronic and electrical equipment. Each Member State, whether it has adopted executive implementation mechanisms, will use the Directive as a guideline and platform. Directive 2011/656 RoHS 2 represents the evolution of the RoHS Directive 1. Namely, the RoHS Directive 1 did not apply to medical equipment monitoring equipment. The new RoHS2 Directive puts this exception out of force. It applies to the same substances as the original Directive with more precise regulatory requirements and a clearer interpretation of the requirements. Periodic reevaluations are prescribed to facilitate the gradual coverage of additional electronic equipment, cables and spare parts. The compliance of the product with the RoHS 2 Directive is shown by the CE mark on the product, and the key document entitled "Declaration of Conformity" is precisely defined by the new Directive. From the beginning of the application of RoHS 2, all member states of the European Union are obliged to comply with the new regulations. The difference between the basic and the revised Directive is in the proof of compliance with the requirements and the lack of conditions for the application of the requirements in production prescribed according to the provisions of the new Directive. The RoHS Directive does not apply to static industrial tool installations, but it does apply to all relevant products on the European Union market, whether they are manufactured within the single market or imported.

Products covered by the RoHS Directive must keep the manufacturer's address and the

corresponding serial number in addition to the CE mark. Detailed information on the conformity of products with the Directive can be obtained from the "European Union Directorate for Conformity for Product". Participants in the supply chain must keep documentation showing compliance with the requirements - technical documentation or technical file.

WEEE Directive The Weste Electrical and Electronic Equipment Directive entered into force in 2003, obliging Member States to establish a system for the collection of obsolete electrical equipment by 13 August 2005, which includes the collection, recovery and recycling of relevant products. . From the consumer's point of view, the established system implies access to public recycling services in specially designated centers where they can hand over their obsolete and unusable devices without paying a deposit fee. The WEEE Directive has been supported by manufacturers in their efforts to design and manufacture appliances, and in addition to facilitating circulation, it achieves and promotes the extension of the service life.

The primary objective of the Directive is to minimize the disposal of electrical appliance residues as unsorted municipal waste and to achieve a high level of separate collection. The members of the European Union are obliged to establish a system for the separate collection of appropriate devices from end users. The European Commission has prescribed the initial amount of collected electrical waste (4 kg per capita per year).

The Energy Liberation Directive was adopted in 1992. It was first audited in 2010. with the basic goal of improving efficiency and reducing energy and reducing gas emissions. It is only with the amendment of Directive 20014 that energy efficiency in the European Union has improved, and by 2030 it must be 27%, reducing greenhouse gas emissions by 40%.

Increased energy use contributes to the protection of the human environment and the achievement of an affordable price, which requires a review of the regulatory framework for energy infrastructure, including the TEH - E Regulation (Trans -European Energy Network Regulation). This framework should encourage the increase of innovative technologies and infrastructure.

Candidate Countries for membership in the European Union

The process of integration of new European countries into the membership of the European Union is very complex and longlasting, especially countries that have a lower gross domestic product, and even habits for preserving the environment. The previously stated regulations of the economic character of the European Union confirm that. The issue of social policy among the members of the European Union is of great importance. The question is how to prevent the relocation of labor from poorer members and the search for jobs in richer members. The Amsterdam Treaty agreed to include a chapter on social policy, followed by a chapter aimed at "high levels of employment and social protection". The Maastricht Treaty gave foreign policy in much stronger contours, joining the security segment, which the member states are obliged to actively and unreservedly support in the spirit of loyalty and mutual solidarity. cooperation is Systematic based on consulting and taking common positions and coordinated action. Joint action may be taken when the Council of the European Union decides, on the basis of guidelines from the European Parliament, that an issue should be resolved by joint action. Joint actions can also be taken by engaging a rapid reaction force as a separate wing of NATO forces. Bosnia and Herzegovina has not been legally barred from joining NATO forces as Austria has been.

The process of integration in the field of environment takes place in three areas: harmonization of regulations, building of administrative capacities and capacities in the field of environmental protection institutions, as well as provision of financial resources. Therefore, this chapter is extremely demanding in financial and administrative terms, especially in terms of a well-equipped and trained judicial and administrative profession. European Union legal acts for the Western Balkans:

- European Green Agreement, - European Investment Plan, - Guidelines for the implementation of the Green Agenda, - Sofia Declaration on the Green Agenda for the Western Balkans.

Prior to joining the European Union, candidate countries are obliged to: Strengthen the Environmental Protection Agency by improving administrative and financial capacity, - Provide adequate resources for the Green Agreement, -Improve coordination between institutions at central and local level, - Strengthen law (landfill closure) enforcement noncompliant), - Invest in waste separation and quality recycling, _ Strengthen air monitoring, - Improve riverbed management, Prepare for the European Ecological Network, - Implement the Paris Treaty, which includes the adoption of а comprehensive strategy to tackle climate change which will be in line with the European Union framework for climate and energy policies, - Achieve good integration in all relevant sectors.

Global environmental problem and participation of the European Union

The global environmental problem requires a solution at the international level. Dissemination of environmental awareness has a general approach everywhere in the The European Union actively world. participates by adopting its regulations and implementing international ones in the environmental field. The Green Agreement for the European Union and its citizens confirms its commitment to facing the challenges of climate and the environment, which is the main task of this generation. Every year the atmosphere becomes more and more polluted and the climate changes. Of the eight million species on the planet, one million are endangered. Forests and oceans are being polluted.³

natural resources for the future we want; European Environment Agency - State and Outlook 2020; Knowledge and transition to a sustainable Europe by introducing the concept of clean energy within the economy, industry, production and consumption, large infrastructure, transport, food and agriculture,

³ Sources: Intergovernmental Panel on Climate Change (IPCC). Special report on global pollution up to 1.5 degrees Celsius. Intergovernmental Scientific-Political Platform for Biological Equality in Ecosystem Services for 2019; International Resource Panel; Outlook in terms of global resources for 2019,

The European Green Agreement provides solutions to many issues from the ecosystem. It represents a new growth strategy that seeks to transform the European Union into a just and promising society with a modern competitive economy based on efficient and economical consumption of resources, where in 2050. there will be no net greenhouse gas emissions and where economic growth is not linked to resource consumption. The new strategy seeks to preserve, increase and protect natural capital and the health and well-being of citizens from environmental risks and the impact of the environment on them. That transition must be fair and inclusive. In the first place, the citizen must pay attention to the regions, industry and workers who will face the biggest challenges. As significant changes take place, active public participation and confidence in the transition are crucial for policies to be successful and acceptable. The European Union has a collective ability to transform its economy and society to make them sustainable. It can have a significant impact on climate and environmental measures, consumer protection and workers' rights. Large public investments require that private capital be directed to action in the field of climate and environment. The European Union must be at the forefront of coordinating international efforts to build and harmonize a financial system that fosters sustainable European Green Agreement solutions by accelerating the process and providing the basis for the transition needed in all sectors.

The causes of climate change and the loss of biodiversity have a global character and therefore go beyond national borders. The European Union can use its resources to regionally accept environmental protection and adapt national legislation to European Union standards. The Green Agreement is an integral part of the strategy of the Commission of the European Union for the implementation of the United Nations Program until 2030 with the aim of sustainable development and other priorities announced in the political guidelines of President Ursula von der Lejen.⁴

Through the Green Agreement, the Commission will reorient the macroeconomic coordination process within the European Semester to integrate the United Nations Sustainable Development Goals, and place the center of economic policy and sustainable development goals at the heart of United Nations policy-making and action.

In achieving the goals of the Green Agreement (plan), it is necessary to invest effort and activities to avoid discrepancies between economic and social goals and environmental goals. It is crucial to give greater importance to the protection and restoration of natural ecosystems, sustainable use of resources and better health of citizens. In order for the European Union to maintain its competitive advantage in the global ecosystem, it needs to increase the widespread use and representation of new technologies in all sectors of the single market, and create new innovative value chains. This challenge goes beyond the capabilities of individual nation-states. Horizon Europe, in synergy with other European Union programs, will play a key role in aligning national public and economic investments. At least 35% of the Horizon Europe budget will be used to finance new solutions to combat climate change that are important for the implementation of the European Green Plan.

The complete package of instruments available under Horizon Europe will support the necessary research activities and innovations of the Green Agreement Mission in order to achieve large-scale changes in the field of adaptation to changing climatic conditions. Partnerships with industries and Member States will support research and innovation in the field of transport including carbon content, cycling sectors, clean hydrogen power, low carbon steel

construction, taxation and social benefits. In order to achieve these goals, unity is needed in giving greater importance to the protection and restoration of natural ecosystems, sustainable use of resources and better health of citizens. In this area, transformation is the most needed and potential beneficiary for the

economy of the European Union, the natural environment, digital transformation.

⁴ Political guidelines for the next Commission (2019-2024) "A more ambitious Union: My plan for Europe".

production, bioenergy based energy sectors. The knowledge and innovation communities within the European Institute of Innovation and Technology will continue to deepen cooperation between higher education institutions, research organizations, companies in the field of climate change, sustainable energy, food for the future.

Educational activities

The European Commission is preparing European Competence Frameworks to help develop and change knowledge, skills and attitudes and climate change in sustainable development. Schools, training institutions and universities are in a position to work together on the changes that need to be made in order to achieve a successful transition. The European Commission is providing new funding to make school buildings and work schools sustainable under in the environmental protection program. To this end. cooperation with the European Investment Bank has been strengthened, stronger links have been created between the Structural Funds and new financial instruments in order to provide sufficient funds for investment in school infrastructure. Investments in educational institutions for the purpose of training on the importance of nature protection are returned many times over (green areas, clean air, unpolluted land, clean water ensure a healthy life for citizens). The invested funds will not be important for the protection of the ecosystem if each person is not personally engaged in changing their consciousness, especially in developing countries, where there is great relaxation and indolent behavior towards nature.

If we investigate the issue of environmental protection in Bosnia and Herzegovina, we will see that it is at the bottom of the scale in terms of awareness and behavior of citizens. Research shows that excessive deforestation in the Amazon Basin could lead the region into new climatic conditions by turning tropical forests into savannas. Education does not include training of citizens on the protection of the human environment and all resources that exist in that environment, but also training on the consequences if the ecosystem is disrupted, followed by severe penalties for violating the rules of conduct towards the ecosystem.

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THE RULE OF LAW - A DETERMINANT OF GREATER SECURITY OF CITIZENS AND BUSINESSES

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Original scientific work

Abstract: Today, it can be emphasized with certainty that the rule of law is the foundation of modern economics, politics, culture, education, etc. There is no area of the social system that is not dependent on and protected by the implementation of the rule of law. According to the criterion of whether this principle is applied, states are classified as totalitarian and democratic. There are differences in the understanding, meaning and implementation of the rule of law in different countries. There are also differences in the normative regulation of this fundamental principle. In the Republic of North Macedonia, the rule of law is a constitutional principle. It's application is protected by the highest norms in the hierarchy of the legal order. However, in practice there are cases that represent a classic derogation of this principle. The danger is evident if we take into account that the violation of this principle occurs in the institutions of the system, by the holders of the system of power. Although these may be isolated cases, their impact on citizens' perceptions of the application of this principle is enormous. Therefore, it is necessary to overcome the discrepancy between the declared and the factual, between the normative and the real. The actual application of the rule of law will largely depend on how much this discrepancy will be overcome.

Keywords: constitutional principle, totalitarian and democratic states, freedoms and rights, institutions of the system.

Introduction

Today, after several decades of state independence, it can be noted with certainty that there is no issue more exposed to the public than the rule of law. This constitutional principle, in its meaning, occupies the focus of interest of politicians, sociologists, economists. experts and ordinary citizens. The media report with all zeal on cases where the rule of law has been violated; in their articles they link the realization of Euro-Atlantic aspirations to the rule of law; respect for human rights and freedoms is determined by the rule of law. Numerous graduate, master's and doctoral theses are dedicated to the essence and application of the rule of law. However, all this activity in reality does not reduce the conflict between the normative and the factual, between the declared and the implemented, between the constitutional concept of the rule of law and its concrete application in practice. Critics of the government regularly call for blatant violations of the rule of law. But their criticism exists only when they are in opposition. The moment they are in power, in a position where they appear as violators of the rule of law for some higher party or personal goals! Therefore, on a scientific basis, there is a need to explain the theoretical design of the constitutional principle - the rule of law through the prism of its reality, ie application in practice.

It should be noted that there is no area of the socio-political system that is not determined by the basic postulates of the rule of law. The police, educational institutions, business systems, health care, as well as everyone else in their work are committed to the consistent application of the rule of law. This commitment of the institutions to this principle implies a state in which:

- No entity has the right to violate certain rules, including the one that adopts them;

- The minority has certain rights and freedoms guaranteed

- The rules themselves were adopted in accordance with certain principles in democratic institutions.⁵

The rule of law is a constitutional imperative for the development of democracy in the global world. V. Vasović points out that the issue of the relationship between law and democracy, ie the rule of law, is undoubtedly much more complex and difficult than it seems or points out. Namely, it is not entirely clear which law is in question. Is it some kind of natural law or is it a positive law? If it is the first, then it is known that there are great hesitations and disagreements about what is a natural right. It is not uncommon for different authors to understand and cite different human rights in a closer definition of natural law. Some, in the group of natural rights, include certain human, civil and political rights and give the same status to economic and social rights; some private property consider it a natural right and others do not, and so on. Therefore, it is indisputable that the rule of law has a fundamental meaning in the functioning of the entire system of government, which in our country is based on the principle of separation of powers.

1.Theoretical design of the rule of law

A society governed by the rule of law is like a huge machine in which, in achieving its goals, all parts, without interfering with each other, function in harmony. Such a flawless functioning of the legal order is hardly noticed by people, which is not surprising at all. Order as a legal value, in terms of peace and security, has an instrumental value. In general, the existence of order in society is its immanent need. Social order, as a whole, ie. The system of established social relations in reality, even in its spontaneous dimension, cannot be realized without any order, without certain rules, even if they are purely social. In the normatively organized segment, the social order acts as a dialectical set of several constituent parts, ie. Private order. These

"Suppressed Civil Society", Eco Center, Belgrade, 1995, p. 121-122.

⁵ Stanovčić V., Civil Society and the Rule of Law in Multinational Communities, Proceedings:

parts of the overall social order are: legal, economic. moral and other orders. Normative social order as a whole maintains the stability and permanence of society, which gives people a sense of security and personal belief that by respecting and applying the norms of the legal order can safely achieve the desired desires, goals and interests.⁶

The principle of the rule of law includes three particularly relevant factors: first, the rule of law, ie. The Constitution as a constitutional order; second, the inviolability of certain individual rights and third, the independence of the court or judiciary.⁷

Raz adds that the rule of law is only one of the characteristics that the legal system can possess and with the help of which it should be assessed. Institutions may or may not be based on proper organization, but their essence is more the establishment of a certain formal structure and rules of behavior and interaction between individuals. Institutions structure social life, defining clear roles of the individual, rules of conduct, mutual within relations the institution and interaction between institutions, ie. Roles of individuals in each institution. Today's society cannot be imagined without such a formal institutional structure, based on legal, economic and other rules and norms or conventions. The rules that determine the role of the individual and his behavior in institutions and towards institutions are largely defined as legal norms. Institutionalization, as a basic characteristic of modern society, goes hand in hand with regulation, because only legal norms, behind which the state and its coercion, guarantee the certainty of expectations regarding the social role of individuals and institutions, as well as their mutual relations. But the problem of regulation - deregulation is not reduced to the question of the existence of rules of conduct, because they have a constitutive meaning and without such rules there are no institutions, but whether such

rules are set and sanctioned by the state or they are autonomous, conventional social norms, supported by morality. religion, customs or other illegal normative systems.⁸

The Macedonian Constitution, in Article 8, paragraph 1, line 3, determines the principle of the rule of law as the fundamental value of the constitutional order of the Republic of Macedonia. This in the broadest sense means that all holders of public office, all bodies and institutions in the exercise of their responsibilities and in the adoption of appropriate acts must adhere to the letters of the Constitution, laws and other bylaws.

2. Implementation of the rule of law problems and challenges in practice

The democratic processes that have occupied our country since 1990 have undoubtedly increased the curiosity and interest of the scientific and academic community in researching phenomena that were perceived as a phenomenon or a challenge for practice at the beginning of its establishment. One of these phenomena is the concept of the rule of law as a general, generative principle, which has a long practice and significance in developed democracies. It is indisputable that in the conditions of the initial democracy, the concept of the rule of law was introduced into the Macedonian constitutional order in our country, an introduction that can be metaphorically explained by the phrase "growth after rain". However, at an accelerated pace, this principle began to be associated with legal, economic, cultural and other subsystems of the social. Therefore, there is a danger of overuse, fetishization or glorification. This has been confirmed in science, with the view that there is a resemblance between words and objects; Constant and frequent use makes them pleasant, like any habit, but sometimes they are exaggerated by overuse and lead to fatigue and satiety. Therefore, both in life and in theory, there are continuous cycles of changing the way of

⁶ D. Bajaldzhiev, On the concept of (legal) value and security, peace and order (order), as essential values in the current moment of the Republic of Macedonia, Proceedings of the International Symposium, Faculty of Law Skopje, 2004, p. 109-110.

⁷ V. Vasović, Contemporary Democracies I, Official Gazette, Belgrade, 2006, p. 73.
⁸ V, Kambovski, Preface, Proceedings of the Scientific Discussion, no. 5, MANU, Skopje, 2008, p. 11-16.

expression. As ways of dressing and behaving change, so the vocabulary of social theory cannot resist the dictates of new changes.9

The rule of law in our constitutional and socio-political system is embedded in complex social conditions: almost fifty years of living in an "original" and incomparable society - the transition to communism! It ended unhappily in the 1990s. We have entered the transition again. Now to capitalism, that is, to liberal democracy, market economy, political pluralism, rule of law, civil society. how long will it take? Has it ended in an act of legal overthrow of the one-party authoritarian system or does it involve a process of consolidating democracy and the emerging economy that is still ongoing? But norms and institutions are not enough for democracy. Democracy grows from below, and civil society develops from within. Both at the bottom and inside. the picture was and remains as follows: exhausted economy, weak and dysfunctional dependent institutions, and inefficient judiciary, poor middle class, submissive political culture, oligarchic and unethical underdeveloped public opinion, elite. politicized and party administration, lack of democracy, a fragile and inauthentic civil society.¹⁰

It can be said that one of the limiting factors for the implementation of the rule of law are shortcomings or shortcomings in the Therefore, normative framework. the following weaknesses can be cited: The Constitution is not perfect, just as no constitution is perfect. It has weaknesses in the following relations: a) the balance of legislative and executive power and the independence of the judiciary. These relations are not an insurmountable obstacle, with the help of the law, to reach for constitutional changes and the introduction of new chaos. Frequent changes in laws and regulations also destabilize the legal system. The Assembly adopts unconstitutional laws, and if necessary, they will be changed once a month. And what is the quality of the solutions contained in the regulations? Illegal regulations are passed by the Government with its ministries and everyone else in the hierarchical scale of regulations, following the example of the powerful (Parliament and Government). No one is responsible for the irresponsible construction and functioning of the legal order and no one is responsible for the legal consequences for the freedoms. rights and property of citizens, except themselves, to suffer the consequences first, and then to turn to the Constitutional Court. "11

The problems of the rule of law in our society are related to the realization of protection against discrimination, ie the realization of equality of citizens, which in many cases has been called into question. Namely, "the right to equality, above all, covers the political and legal equality of citizens and refers to the denial of any discrimination of citizens according to the law and in the enjoyment of political rights. The most consistent confirmation of this right of citizens is in principle according to which "everyone is equal before the law". The principle contained in almost all constitutions in the world is in fact an affirmation of the principle of human freedom from all discrimination. principle especially obliges This the legislator with an explicit constitutional prohibition in laws to introduce provisions that differentiate people, as well as the obligation for all bodies that apply the law and other regulations, to apply it equally to all, which means to make the same decisions in the same cases. case and its individualization according to the character, not according to the participants. " Equality implies diversity, ie. It means the existence of different people who should be treated Cases of discrimination equally. that essentially mean a direct or indirect restriction of freedoms and rights by circumventing legal norms are one of the

⁹ V. Pavlović, Civil Society and Democracy, Official

Gazette, Belgrade, 2009, p. 10. ¹⁰ G. Siljanovska-Davkova, Proceedings of the Scientific Discussion, MANU, Skopje, 2007, p. 234-235.

¹¹ B. Gagovska, Constitutionality and Legality in the Republic of Macedonia, Skopje.

factors that negatively affect the implementation of the rule of law.

Finally, the undemocratic practice of the government and the opposition is a factor hindering process the of concrete implementation of the rule of law. Namely, democratic institutions are as delicate as flowers. They must be guarded and nurtured, because democracy bears the seeds of selfdestruction by giving its citizens freedoms, some of which will be abused. A democratic police system exists to protect those freedoms, and only when citizens realize that the police really protect their security and freedom will they have confidence in its Liberal democracy system. protects individuals and minorities from potential excesses of power. Authorities are generally stable and moderate in avoiding extremism in political activities, as consensus is needed for legislation to work on fundamental issues. The development of democracy in the Republic of Northern Macedonia and the concept of the rule of law are linked to the realization of Euro-Atlantic aspirations. Confirmation of this is the fact that the European Union together follows the known political criteria in order to acquire a better idea of the country's progress.

The rule of law as a determinant of the security of citizens and the business community

The security of citizens, their property and business entities is inconceivable without the consistent application of the basic elements of the constitutional principle of the rule of law. The concept of the rule of law obliges the police to respect the legal order in the country in their work, but also to protect it from criminal and other harmful phenomena and acts. It achieves this by procedures and procedures prescribed by a legal norm and in the spirit of the principles of legality and legitimacy. Application of the concept of rule rights is recognized by the wording in the Law on Police "defined by the law of measure", "protection of freedoms and rights", etc. The Code of Police Ethics contains a special section - Legal basis of the police function, which predicts:

- The competencies of the police and its organization are determined by law and bylaws (Article 3);

- Police interventions are always carried out in accordance with ratified international agreements (Article 5);

- Police officers perform their duties in accordance with the law and are subject to regular legal procedures and sanctions (Article 6)

- Police officers are subject to legal regulations that apply to all citizens of the Republic of Macedonia, except in cases provided by law, in the interest of proper performance of the police function.

When it comes to the rule of law, no less important are the provisions relating to police interventions to which certain general principles apply, which in fact ensure the legality and legitimacy of those interventions. Therefore, both their taking over and exceptions must be prescribed by law, ie the norm: police officers will not use firearms, unless it is necessary and in accordance with the law; police officers perform police duties in accordance with the law and ratified international treaties; police officers always check the legality of their planned actions; police officers should respect the written and oral orders of their superiors, in accordance with the law and bylaws; a police officer, without fear of sanctions, will refrain from carrying out the illegal orders they make commiting a crime and others.

The rule of law is a condition for the development of the national economy. Foreign investors are encouraged to invest in our country provided there are strong

guarantees of the rule of law and to secure their business interests. The business community often points out that "investor confidence has been undermined, which is another great challenge for our countries. "We are all facing the same challenges that are part of the European Union's requirements that need to be regulated, and those are problems with the rule of law, corruption and non-transparent and rapid change of legislation." Therefore, the rule of law in the country is "the subject of consideration by the business community, as an important precondition that needs to be fully met, so that we can further address issues related to the economy, economic growth and better bussines environment"¹²

These states of light emphasize the crucial importance of the rule of law in relation to the functioning of enterprises, business development on the one hand and the security of citizens, their lives and property on the other.

Conclusion

The process of applying the rule of law as a constitutional principle, principle and basic value in the practical functioning of political, economic, cultural and other institutions is complex and difficult. For its implementation, only a formal proclamation, provisions in the Constitution, laws and other normative acts of the state are not enough. His political marketing or prominence in leadership speeches, party campaigns and documents is not enough. On the contrary, concrete implementation is needed, its real revival, daily integration into the decisions of the institutions that decide on the freedoms, rights and interests of citizens and legal entities. The past years of independence are a period of testing the basic postulates of democracy and democratic values, in which the rule of law has a special place

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BOSNIA AND HERZEGOVINA IN THE COMMON EUROPEAN RESEARCH AND DEVELOPMENT AREA IN THE FIELD OF TRANSPORT AND TRANSPORT TECHNOLOGY

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Original scientific work

Summary: The European Union directs a significant part of its financial resources to research and innovation projects. Transport and transport in terms of channeling funds is a priority area of the European Union. Development trends are geared towards the application of artificial intelligence and the fourth industrial revolution. Bosnia and Herzegovina is territorially positioned in the European transport area, ie with its geographical position it participates in several main European transport corridors. In terms of research and development in the field of transport and transport technology, Bosnia and Herzegovina cannot be viewed as a separate entity. The paper describes the general guidelines for harmonization around a common architecture for intelligent transport systems, ie the development of innovative technologies in the field of transport and transport sector of Bosnia and Herzegovina. The paper describes the general main Herzegovina, taking into account the individual requirements and needs of the transport and transport sector of Bosnia and Herzegovina. The paper describes the methodological guidelines for the development of intelligent transport and transport sector of Bosnia and Herzegovina. The paper describes the methodological guidelines for the development of intelligent transport systems based on artificial intelligence and industry 4.0. The aim of this scientific research is to provide a conceptual basis for launching joint research and development projects of the European Union and Bosnia and Herzegovina based on a unique architecture.

Keywords: Research, development, ITS architecture, artificial intelligence, industry 4.0

basic conditions for successful economic growth.

1. Introduction

Bosnia and Herzegovina is territorially positioned in the European transport area and based on this fact, there is a need to follow the European Union in terms of research and development, which directs a significant part of financial resources to research and innovation projects. In this way, it is possible to ensure that, together with the EU, it is always up to date with technological advances in transport. Research, development and application of intelligent transport systems to improve the use of existing infrastructure and ensure connections between different types of travel will enable the creation of cleaner, safer and more efficient traffic in Bosnia and Herzegovina.

This scientific paper proposes guidelines for the inclusion of Bosnia and Herzegovina in the common EU research area based on intelligent transport systems. In terms of research and innovation, Intelligent Transport **Systems** integrates telecommunications, electronics and information technologies with transport artificial intelligence engineering, and industry 4.0 concepts for the purpose of planning, designing, managing and maintaining transport systems. The application of robotic technologies and artificial intelligence in the road transport sector and its interfaces with other modes of transport makes a significant contribution to improving environmental protection. efficiency, including energy efficiency, and road safety, including the transport of dangerous goods, public safety and passenger and freight mobility. while at the same time ensuring an increase in the level of competitiveness and employment.

2.Guidelines for the inclusion of Bosnia and Herzegovina in the common EU research area

A modern and functionally designed transport system is inconceivable without research and innovation and is one of the Remaining competitive and using science and technology to contribute to a more efficient transport system and economic growth is a challenge facing not only Bosnia and Herzegovina but most European countries. The lower level of spending on research and development by the state and the private sector is a key reason for the lack of significant economic growth. The noninvestment of the business sector in research and development is also a threat in the European Union.

Guidelines for the inclusion of Bosnia and Herzegovina in the common EU research area can be found in various EU initiatives. One such initiative in which Bosnia and Herzegovina should look for its space is the Joint Research Center (JRC), which is a scientific and professional component of the European Commission, whose main role is to provide scientific and professional support to European Union policies. The direct actions of the Joint Research Center focus on EU policy priorities in accordance with the strategic documents.

The mission of the Joint Research Center as a scientific-professional service at the European Commission is to provide independent and evidence-based scientific and technical support to European Union policies throughout the policy cycle. Thanks to close cooperation with Directorates-General, the JRC addresses key societal challenges by stimulating innovation by developing new methods, tools and standards and sharing its knowledge and skills with Member States, the scientific community and international partners, open and potential cooperation with Bosnia and Herzegovina as an international partner. Scientific and professional cooperation with the Joint Research Center can be achieved through the participation of Bosnian scientists in professional courses and workshops of the JRC, joint research projects, networking of institutions, cooperation agreements, access to the JRC infrastructure and through employment opportunities and job creation.

places in the Joint Research Center, ie its institutes.

Through specialized workshops, conferences and advanced trainings in the field of its competencies, the Joint Research Center offers the possibility of insight into scientific and technical methods that form the basis for the implementation of EU policies. This technical and scientific assistance within the Enlargement and Integration Activities is intended primarily for organizations from the new EU Member States and candidate countries, potential candidate countries and the like. One of the priority areas of the JRC is a low-carbon economy and efficient management of resources such as the environment, climate change, energy and transport.

Transport is a major driver of European economic competitiveness and growth and ensures the mobility of people and goods needed to establish a complete European single market and open society. It is also one of Europe's greatest strengths in terms of industrial capability and quality of service, and has a leading role in many world markets. The transport industry and the production of transport equipment together account for 6.3% of the Union's GDP. At the same time, the European transport industry is facing fierce competition from other parts of the world. The development of technology will be needed to secure Europe's future and achieve a competitive advantage and alleviate the shortcomings of the current transport system.

4.European research projects in the field of intelligent transport systems, application of artificial intelligence and industry concepts

The aim of European research projects in the field of transport in general and intelligent transport systems, the application of artificial intelligence and industry 4.0 concepts is to develop a safer, more environmentally friendly and "smarter" pan-European transport system.

Research and innovation are aimed at benefiting all citizens and are in line with environmental standards and contribute to increasing the competitiveness of the European transport industry. Also, the goal is to achieve sustainable mobility through radical changes in the transport system through innovation and the implementation of greener, safer and smarter transport solutions. Research and innovation are expected to drive progress that will help achieve key EU transport policy goals. Significant determinants of EU projects in the field of intelligent transport systems, application of artificial intelligence and industry concepts 4.0 can be reduced to the following objectives [1], [2], [3].

• For efficient, environmentally friendly transport, the goal is to reduce the impact of transport on the climate and the environment by improving the efficiency of the use of natural resources and reducing dependence on fossil fuels. The focus of activities will be to reduce resource consumption and greenhouse gas emissions and improve efficiency, accelerate vehicle the development and implementation of a new generation of electric vehicles and propulsion systems on alternative fuels.

• For greater mobility, less congestion, greater safety, the goal is to reconcile the growing needs of mobility with improved traffic fluidity, through innovative solutions for a better, inclusive and safe transport system. The focus of the activities will be on reducing congestion, increasing accessibility and user needs by promoting an integrated approach to door-to-door traffic to improve intermodality and the deployment of smart planning and solution management to reduce accidents and achieve greater safety.

• In order to achieve the global leadership of the European transport industry, the goal is to strengthen competitiveness

• and the performance of the European transport industry and related services. The focus of the activities will be to develop a new generation of innovative means of transport and prepare the ground for the next, working on new concepts and designs for a smart management and production system.

• In the area of socio-economic research and future-oriented transport policy-making activities, the aim is to support the improved creation of transport policies needed to promote innovation and respond to transport challenges and related societal needs. The focus of the activities will be to improve the understanding of socio-economic trends in the field of transport and to provide decision makers with evidence-based and analytical data..

5.Establishment of an EU harmonized architecture for intelligent transport systems in Bosnia and Herzegovina

The establishment of ITS architectures in Bosnia and Herzegovina is a precondition for more serious involvement of Bosnia and Herzegovina and EU researchers and development space in the field of transport, ie intelligent transport systems. It is a complex technological and research development project whose purpose is to explore and define a coherent, open and usable system platform for the beginning of the complete development and implementation of numerous ITS services in Bosnia and Herzegovina. The national ITS architecture in Bosnia and Herzegovina enable EU-compatible, would faster. harmonized and efficient development of ITS subsystems and applications with significant benefits for users, service providers, equipment manufacturers and other actors such as telecom operators, tourism companies, information providers and dr.

The initial elements of the introduction of ITS already exist in Bosnia and Herzegovina and are mainly related to the new highway infrastructure such as:

• electronic toll collection (without stopping the vehicle)

• variable sign system (according to road conditions)

• harmonization of traffic flow on the motorway

• detection of violators in road traffic, etc.

However, there is an almost complete absence of innovative technologies in urban areas in Bosnia and Herzegovina. The costs of waiting and congestion in urban and suburban transport in the EU today are estimated at around 1.5% of GDP. Reducing these costs and increasing traffic flow and transport efficiency is approximately 20-30%, depending on specific conditions. Reducing noise and environmental pollution by introducing ITS can also have greater benefits for the wider community in Bosnia and Herzegovina.

The initial steps in defining the ITS architecture in Bosnia and Herzegovina should start from defining and harmonizing user requirements and based on functional processes with higher-level ITS functions adapted to the context of Bosnia and Herzegovina. According to the preliminary analyzes of the authors of this paper and the consultation of experts in the field of ITS, the primary processes in Bosnia and Herzegovina could be:

• pre-trip information for passengers in public transport,

• travel information for drivers,

• P&R (park & ride) system with remote payment,

- electronic payment of tolls and tickets,
- road traffic management,
- management of city distribution of goods,

• management of transport of dangerous goods,

• management and resolution of incidents and traffic accidents,

• administrative (customs) procedures,

• protection in the public transport system, etc.

The identified processes include a number of actors who exchange data and harmonize their processes according to the templates developed in the ITS architecture of Bosnia and Herzegovina. The logical model needs to define structures that meet the set requirements of integration and enable the performance of functional processes with appropriate interfaces, data warehouses, etc. Higher level functions and the relationships between them need to be set up to ensure compatibility, cost savings and a high level of service quality for the end user. Openness, flexibility and faster implementation of new ITS services would benefit ITS service providers and other actors on the supply side. Physical entities in which functional processes and communication links between vehicles, centers, roadside equipment and other subsystems are realized would follow the establishment of the ITS architecture in Bosnia and Herzegovina.

Conclusion

Orienting Bosnia and Herzegovina towards research and innovation in the field of intelligent transport systems, application of artificial intelligence and industry concepts 4.0 means adapting the principles, measures and instruments to guide the development of transport infrastructure and technology in line with economic goals. In the 21st century, the application of ITS solutions marks a step towards sustainable development.

The transport development strategy in Bosnia and Herzegovina should be in close interaction with research and innovation projects. As an explanation of the previous statement, it is enough to look at the current programs and guidelines for the development of European transport infrastructure. The existing trans-European network (TEN) in the EU and the pan-European corridors are adapting to the ITS criteria and some of them pass through Bosnia and Herzegovina. The emphasis is on the modernization of the road mode of transport with more environmentally energy-efficient and procedures for the transport of passengers and goods, with a complete transport service from end to end.

The advanced effects of the ITS solution include reducing waiting times and losses, saving fuel and energy, increasing the safety and protection of passengers and cargo, better information for service users, better integration, etc. In rail and air transport, there have long been technical and organizational solutions that can be integrated into ITS as a transmodal system. Since ITS is a key determinant of the development of transport, transport and logistics in the first half of the 21st century, it is to be expected that increased innovation and research activities in this area and more agile involvement of Bosnia and Herzegovina in the common European research area.

6. Literature

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EXCEL'S CALCULATION OF BASIC ASSETS AMORTISATION VALUES

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Original scientific work

Abstract : For Excel's calculation of basic (fixed) assets amortisation values, the investigated economic and mathematical foundation with required values and their relations were used. The investigated and introduced theory is adapted to Excel's calculations of fixed assets amoritisation based on today's needs. All values for Excel's calculations are sorted into input and output, and input to main and nested. Two methods for calculating fixed assets amortisation were introduced using Excel. The first method is based on a linear decreasing function, G(t) = G0(1-pt), which presents the simple interest calculation of the reduced equities for equal periodic amortisationvalues. The second method is based on the exponential degrading function, G(t) = G0qt, which presents a complex interest calculation of the reduced equities for periodic amortisation amounts in a descending sequence. The continuity of the introduced functions stems from the continuity of: the life of the fixed asset, periodic amortisation, accumulated amortisation and non-amortized amount (residual value) of the fixed asset. It is particularly important to introduce dates with the exact time, for the beginning and the end of each amortisation period of the fixed asset. The theory for Excel's calculation of the fixed asset output values for an arbitrary (planned or unplanned) term has also been explored and introduced. Such calculations relate mainly to terms of alienation, permanent damage, permanent loss of the process function of a fixed asset and periodic accounting reporting.

Key words: Asset, values, amortisation, amortisation.

INTRODUCTION

The aim of this paper is to introduce the researched economic, mathematical and Excel basis for calculating the amortization of fixed assets of a work process in accordance with International Accounting Standards (IAS). In the general theoretical part of the paper there are definitions of basic concepts.

A fixed asset is tangible or intangible assets of a work process that are not intended for the market. Examples of tangible assets are: buildings, ships with a carrying capacity of over 1000 GRT, motor vehicles, various equipment and machinery and the like. Intangible assets include: investments in research and development, patents, licenses, copyrights, work promotions, goodwill and the like. The book value of a fixed asset is the purchase value increased by costs until the date of its introduction into the work process.

Depreciation of a fixed asset is the gradual loss of its use value in the predicted time interval due to its wear, stagnation or obsolescence. Thus, the amortization of a fixed asset depends on: the intensity of its consumption, the passage of time and technological progress. International Accounting Standards prescribe annual amortization rates by fixed asset category.

For some fixed assets, the annual amortization rates for 2018 have the prescribed amounts:

(1) buildings and vessels with a carrying capacity exceeding $1\ 000\ \text{GRT},\ 5\% = 0.05$

(2) basic herd and passenger cars, 20% = 0.2

(3) intangible assets, vehicles, mechanization equipment, etc., 25% = 0.25

(4) computers and computer equipment, programs and computer networks, 50% = 0.5

They are prescribed; annual, semester, quarterly, monthly, weekly (weekly) and daily time intervals, ie periods expressed in days, hours, minutes and seconds, depending on the type of fixed asset and its shelf life. The known regular relations between the stated time intervals are: 1 year = 365 days, 1 semester = 182.5 days = 182 days and 12hours, 1 quarter = 91.25 days = 91 days and 6 hours, 1 month = 30.41 (6) days = 30 days and 10 hours. Some term (T) of the time interval has a date and time expressed in hours minutes and seconds, or in Excel form, T = dd.mm.yyyy hh: mm: ss. The length of the fixed asset's useful life is determined by the number of amortization periods from the date of introduction into the work process. The number of amortization periods of a fixed asset depends on the periodic amortization rate. Among other things, IASs prescribe 1 year as the shortest useful life and the lowest carrying amount of a fixed asset expressed in US dollars. Based on IAS, the amortization rate of a fixed asset is inversely proportional to its useful life. To extend the useful life of a fixed asset, it is allowed to reduce its amortization rate. To shorten the useful life of a fixed asset, it is allowed to increase its amortization rate to twice its amount.

1. OLD METHODS OF CALCULATING THE AMOUNT OF DEPRECIATION OF FIXED ASSETS

There are mainly two methods of calculating the amortization of fixed assets, known as: (1) Linear method and (2) Functional method.

According to the Linear Method, the calculation of amortization is mostly annual, with equal annual amounts of amortization over the life of the fixed asset. In this case, the basis for calculating amortization is the carrying amount of the fixed asset for all amortization periods. For some fixed assets, periodic residual values of the fixed asset are used as the basis for calculating amortization.

According to the Functional Method for some fixed assets, the basis for calculating amortization is: number of products, volume of production, degree of capacity utilization, number of kilometers traveled, volume of transport performed, number of working hours and the like. For the calculations,

mainly a calculator and a simple interest account with annual amortization periods were used. The date of introduction of the fixed asset into the work process is the first day of the month of the current year in relation to the regular term from the previous month. The term of accounting reporting on the amounts of amortization of fixed assets is (December 31) of the current year. These methods, based on today's needs, do not have an appropriate economic and mathematical basis for calculating the amount of quantities related to the amortization of fixed assets. The authors of the paper investigated and introduced two new methods with a new economic and mathematical basis, using Excel. to calculate the amount of amortization of fixed assets.

2. ECONOMIC AND MATHEMATICAL BASIS FOR EXCEL'S CALCULATION OF THE AMOUNT OF DEPRECIATION OF FIXED ASSETS

The authors of the paper investigated and introduced a new economic, mathematical and Excel basis for calculating the amortization of fixed assets.

The introduced values of the economic base are: book value of fixed assets, annual amortization rate, number of amortization periods shorter than 1 year, length of one amortization period, periodic amortization rate, periodic unamortized amount of fixed assets, periodic amortization amount, accumulated amortization amount, start dates and the end of each amortization period of the fixed asset.



pt) i G(t)=Goq^t

The mathematical basis for equal amounts of amortization of fixed assets is presented by a linear decreasing (descending) function and a simple interest calculation in the form, G (t) = G_0 (1-pt), for t \in [0, t₁], Figure 2.1 Function G (t) is the non-amortizated value of the fixed asset, (G₀) the book value, (p) the periodic amortization rate and (t) the number of the amortization period of the fixed asset.

The mathematical basis for the decreasing series of amortization of fixed assets is presented by an exponential, decreasing function and a complex interest calculus in the form, $G(t) = G_0q^t$, for t> 0 and (0 <q <1), Figure 2.1. The function G (t) is the non-amortizated value of the fixed asset, (G₀) the book value, (q) the periodic amortization factor and (t) the number of the amortization period of the fixed asset.

Adequate Excel calculations are derived from the economic and mathematical basis for the amortization of fixed assets; equal periodic amounts of amortization and amounts that are in descending order. During the calculation, it is not allowed to change the amortization rate of the fixed asset. Depreciation of all fixed assets is an intangible cost of each registered activity and affects the balance sheet and income statement.

This is followed by the introduction of the first new method for Excel's calculation of

the amount of quantities for equal amounts of amortization of fixed assets.

3. EXCEL CALCULATION OF THE AMOUNT OF OUTPUTS FOR EQUAL AMOUNTS OF DEPRECIATION OF FIXED ASSETS

In the calculations, Excel will use: default amounts of input quantities, introduced formulas of nested quantities and introduced formulas for output quantities of amortization of fixed assets.

Default input sizes:

(1) the carrying amount of the fixed asset (G_0) ,

(2) annual amortization rate (p₁),

(3) the lengths of equal amortization periods in days (D),

(4) the amortization start date of the fixed asset ($T_0 = dd.mm.yyyy$ hh: mm: ss), and

(5) coefficient of correction of the lifetime of total amortization of fixed assets ($0 < k \le 1$).

The correction coefficient (k) for the duration of the total amortization of the fixed asset is determined by the percentage rate (P) for (0% $\leq P < 100\%$) $\Leftrightarrow (0 \leq P < 1)$, where (k = 1-P)

The required nested sizes are:

(1) number of amortization periods in the year, m = 365 / D,

(2) periodic, relative amortization rate, $p = p_1 / m$,

(3) the useful life of the fixed asset of its total amortization, $t_1 = 1 / p$; from G (t) = G₀ (1-pt) = 0 and t = t₁, Figure 2.1.

(4) planned amortization life of fixed assets, $t_2 = t_1 * k$, for $t_2 \le t_1$

(5) term of completion of the planned duration of amortization, $Tt_2 = T_0 + D * t_2$

(6) term of end of total amortization duration, $Tt_1 = T_0 + D \, * \, t_1$

Required output sizes are:

(1) terms of amortization calculation, $T_i = T_0$ + i * D, for (k = 1) i $\in \{0^+, 1, ..., t_1\}$, for (0 <k <1) i $\in \{0^+, 1, ..., t_2\}$,

(2) the unamortized amount (residual value) of the fixed asset, $G_i = G_0 * (1-p*i)$,

(3) the amount of amortization at the end of the current period, a_i = G $_{(i\mathbf{-}1)}\mbox{-}G_i$

(4) the amount of accumulated amortization until the end of the current period, $A_i = i * a_1$

Fixed asset amortization periods have ordinal numbers, $i \in \{0^+, 1, ..., t_2, ..., t_1\}$, where (t_2) and (t_1) are real numbers in decimal notation, and (0^+) is the right environment (0). Thus, a linear, decreasing function, G (t) = G₀ (1-pt) is continuous, for $t \in [0^+, t_1]$ and G (t) $\in [G_0,$ 0]. For automatic expression of ordinal numbers, $i \in \{0^+, 1, ..., t_2, ..., t_1\}$, the period of amortization of the fixed asset, in the creation of the example will be used Excel function (IF) with introduced conditional transitions.

During the amortization in the term (T_z) the fixed asset can be alienated or for some reason permanently damaged, with the need to calculate the output values for the term (T_z) . Thus, the term (T_z) can be any arbitrary, unplanned or planned financial reporting term for calculating the amortization output of a fixed asset.

The authors of the paper investigated and introduced the economic, mathematical and Excel basis for calculating the amount of output amortization of fixed assets for the term (T_z) .

For the term $(T_z = dd.mm.yyyy hh: mm: ss)$ from $(T_0 \le T_z \le Tt_2)$, it follows:

(1) number of fixed asset amortization period, $z = (T_z-T_0) / D$,

(2) integer number of amortization periods, Z = INT (z),

(3) unamortized value of fixed asset, for t = Z, $G_Z = G_0 * (1-p * Z)$,

(4) unamortized value of fixed asset, for t = z, $G_z = G_0 * (1-p * z)$,

(5) accumulated amortization amount, for t = z, $A_z = G_0 * p * z$,

(6) the amount of amortization for the current period, $a_z = G_Z - G_z$

Example 3.1.

The book value of one fixed asset is 11,500 KM, and the beginning of its working process is 04/17/2018 09:28:15. The annual amortization rate is 15.2% linearly on the carrying amount of the fixed asset. The length of the amortization period is 1 year. The correction coefficient is 0.825 in relation to the useful life of the total amortization of the fixed asset. Using Excel, calculate the periodic amounts of output values of amortization of fixed assets and especially for the planned period of financial reporting, 31.12.2020 23:59:59.

Default input sizes:

 $G_0 = 11,500$ KM (book value of fixed assets),

 $p_1 = 15, 2\% = 0,152$ (annual amortization rate of fixed assets),

 $T_0 = 17.04.2018 \ 09:28:15$ (date of the beginning of the working process of the fixed asset),

D = 1 year = 365 days (lengths of equal amortization periods),

k = 0.825 (total amortization life adjustment coefficient), i

 $T_z = 31.12.2020 \ 23:59:59$ (planned term of accounting reporting).

Calculation of amortization for the life of a fixed asset, using a simpl with equal amounts of amortization for equal periods, Exar	e interest account, nple 5.1.1.
Table 1: Amounts of input quantities	
The carrying amount of a fixed asset, GO=	11.500,000
Amortization start date, T0=dd.mm.yyyy hhommos	17.04.2018 09:28:15
Annual amortization rate, p1=	0,152 000 000
Length of the amortization period in days, D=	365,000 000 000
Number of amortization periods in one year, m=365/D=	1,000 000 000
Periodic amortization rate, p+p1/m+	0,152 000 000
The useful life of a fixed asset in total, linear amortization, t1=1/p=	6,578 947 358
Fixed life expectancy correction factor, (D <k<1) (k="1)," i="" k="</td"><td>0,825 000 000</td></k<1)>	0,825 000 000
Planned life of fixed assets, t2=t1*k=	5,427 631 579
Deadline for completion of planned amortization, Tt2=T0+D*t2=	19.09.2023 11:31:24
The term total, linear amortization of a fixed asset, Tt1=T0+D*t1=	12.11.2024 17:02:59
Table 2: Amounts of output values of the 1st row of amortizatio	n Table 4
Term 1. Amortization period, T1=T0+D=	17.04.2019 09:28:15
Amount of non - amortizated part of fixed assets, for t=1, G1=G0*(1-p*1)=	9,752,000
Amount of accumulated amortization of fixed assets, for t=1, A1=1*a1=	1.748,000
Amortization amount for the current period, a1=G0-G1=	1.748,000
Table 3: Amounts of size for any term amortization of an a	sset
Amortization period required (T05 Tz5 Tt2), Tz+dd.mm.yyyy hhommos=	31.12.2020 23:59:59
Number of amortization periods from the term (T0) do (Tz), z=(Tz-T0)/D=	2,711 247 590
Integer units of number (z), Z=INT(z)=	2
Amount of non - amortizated part of fixed assets, for t=Z, GZ=G0*(1-p*Z)=	8.004,000
Amount of non -amortizated part of fixed assets, for t=z, Gz=G0*(1-p*z)=	6.760.739
Amount of accumulated amortization of fixed assets, for t=z, Az=G0*p*z=	4,739,261
Amortization amount for the surrent period, az-67, 61-	7 143 263

Figure 3.1. Spreadsheets 1, 2 and 3 from Excel List1

The introduced economic and mathematical basis was used for Excel calculations of the amount of output values of amortization of fixed assets, Excel List1 (Figures 3.1 and 3.2). Figure 3.1. contains spreadsheets 1, 2 and 3 from Excel List1. Figure 3.2. contains spreadsheet 4 and histogram overview of the amount of output values of amortization of fixed assets. Figures 3.1. and 3.2. are a static variant of Excel's dynamic construction of Example 3.1..Excel's List1 (1) was created by copying List1 and is used for amortization calculations of other fixed assets. On Excel sheets, cells with input size amounts are yellow, and cells for output size amounts are green. Excel List1 (1) is reserved for application. Users in the application can change the amounts of input sizes in all combinations (column (E), yellow cells).

Ordinal number of the amortization period (I)	Amortization calculation terms (TI)	Unamortized cost of fixed assets (Gi)	Amount of accumulated amortization (AI)	Amortization amount in the current period (al)
0	17.04.2018 09:28:15	11.506,000	0.000	
1	17.04.2019 09:28:15	9.752,000	1,748,000	1.748,000
2	16.04.2020.09:28:15	8.004,900	3.496,000	1,748,000
3	16.04.2021 09:28:15	6.256,000	5.244,000	1.748,000
-4	16.04.2022.09:28:15	4,508,000	6.992,000	1.748,000
3	16.04.2023 09:28:15	2,780,000	8.740,000	1.748,000
5,427 631 579	19.09.2023 11:31:24	2.012.500	9,487,500	747,500
0	15.04.2024 09:28:15	1.012.000	10.488,000	1.000,500
6,578 947 368	12.11.2024 17:02:59	6.000	11.500.000	1.012.000





Figure 3.2. Spreadsheet 4 and histogram from Excel List1

This is followed by the introduction of another new method of Excel calculation of the amount of output quantities with the amounts of amortization of fixed assets in descending order.

4. EXCEL CALCULATION OF THE AMOUNT OF OUTPUT SIZES WITH THE AMOUNTS OF DEPRECIATION OF FIXED ASSETS IN DECREASE

The mathematical basis for Excel's calculation of the amount of amortization in descending order is a descending exponential function, G (t) = G_0q^t for t> 0 and 0 <q <1 which presents a complex interest account for reduced principal.

Applied to the continuous and periodic amortization of fixed assets, from G (t) = G_0q^t derive the names and designations of quantities:

(1) G_0 (amount of book value of fixed asset),

(2) G (t) (amount of unamortized cost of fixed asset),

(3) q (periodic amortization factor of the fixed asset), i

(4) t (elapsed amortization time for periods $i \in \{0^+, 1, ...\}$).

The previous quantities are the basis for the introduction of other required quantities and their relations. To calculate the amount of required output values, Excel will use the amounts of the main and nested sizes.

Major sizes:

 G₀ (iznos knjigovodstvene vrijednosti osnovnog sredstva),
 T₀=dd.mm.yyyy hh:mm:ss (termin početka amortizacije osnovnog sredstva),
 p₁ (godišnja stopa amortizacije osnovnog sredstva),

(4) D (dužina perioda amortizacije iskazana u danima), i
(5) k (koeficijent korekcije vijeka trajanja osnovnog sredstva).

The correction factor (k) for the life of the fixed asset depends on the percentage rate (P) from the interval $(0\% \le P < 100\%) \Leftrightarrow (0 \le P < 1)$. The correction factor (k) may have the following amounts:

(1) k = 1 (for the optimal life of the fixed asset),

(2) k = 1-P (to shorten the optimal life of the fixed asset), and

(3) k = 1 + P (to extend the optimal life of the fixed asset).

To extend the optimal life of the fixed asset, the percentage rate (P) may have the amount (P>100%) \Leftrightarrow (P>1), if the fixed asset is in the planned process function.

Nested sizes:

(1) m = 365 / D (number of fixed asset amortization periods in a year),

(2) $q_1 = 1-p_1$ (annual amortization factor of fixed assets),

(3) $q = q_1 \wedge (1 / m)$ (periodic amortization factor of fixed asset),

(4) p = 1-q (periodic amortization rate of fixed assets),

(5) $t_1 = 1 / p$ (optimal service life of fixed assets, for k = 1),

(6) $t_2 = t_1 * k$ (planned life of the fixed asset, for 0 <k <1 $\Leftrightarrow t_2 < t_1$, for $k = 1 \Leftrightarrow t_2 = t_1$ and for $k > 1 \Leftrightarrow t_2 > t_1$),

(7) $Tt_1 = T_0 + t_1 * D$ (term of optimal end of life of fixed assets), and

(8) $Tt_2 = T_0 + t_2 * D$ (term of the planned end of the life of the fixed asset).

Excel uses the amounts of the main quantities to calculate the amounts of nested quantities, and based on the introduced formulas performs calculations of the amounts of the required output quantities.

Required output sizes with introduced formulas:

(1) $T_i = T_0 + i * D$, for $i \in \{0^+, 1, \dots, t_2\}$ (terms of fixed asset amortization period),

(2) $G_i = G_0 * q \wedge i$ (amounts of unamortized part of fixed assets),

(3) $A_i = G_0 * (1-q \land i)$ (amounts of accumulated amortization of fixed assets), and

(4) $a_i = G_{i-1}$ -G_i (amounts of amortization of fixed assets in the current period).

For any term (T_z) from the interval $(T_0 \le T_z \le Tt_2)$ the following quantities were investigated and introduced:

(1) $T_z = dd.mm.yyyy hh: mm: ss$ (any term as input quantity),

(2) $z = (T_z-T_0) / D$ (interval length (T_z-T_0) in days; (z) decimal number),

(3) Z = INT (z) (integer units of number (z)),

(4) $G_Z = G_0 * q \wedge Z$ (unamortized value of fixed asset, for (i = Z)),

(5) $G_z = G_0 * q \wedge z$ (unamortized value of fixed asset, for (i = z)),

(6) $A_z = G_0 * (1-q \land z)$ (amount of accumulated amortization of fixed assets, for (i = z)), and

(7) $a_z = G_z - G_Z$ (amount of amortization of fixed assets for the current period).

The amounts of input quantities from Example 3.1 will be used for Excel calculations. with the aim of comparing the amount of output quantities for the two introduced calculation methods.

Example 4.1.

The book value of one fixed asset is 11,500 KM, and the beginning of its working process is 04/17/2018 09:28:15. The annual amortization rate is 15.2% exponentially in relation to the book value of the fixed asset. The length of the amortization period is 1 year. The correction factor is 0.825 in relation to the life of the optimal amortization of the fixed asset. Using Excel, calculate the periodic amounts of output values of amortization of fixed assets and especially for the planned period of financial reporting, 12.31.2020 23:59:59.

Default input sizes:

 $G_0 = 11,500 \text{ KM}$ (book value of fixed assets),

 $p_1 = 15.2\% = 0.152$ (annual amortization rate of fixed assets),

T0 = 04.17.2018 09:28:15 (date of the beginning of the working process of the fixed asset),

D = 1 year = 365 days (lengths of equal amortization periods),

k = 0.825 (optimal amortization life correction coefficient), and

 $T_z = 12.31.2020 \ 23:59:59$ (planned term of financial reporting).

The introduced economic and mathematical basis was used for Excel calculations of the amount of output values of amortization of fixed assets, Excel List2 (Figures 4.1 and 4.2). Figure 4.1. contains spreadsheets 1, 2 and 3 from Excel List2. Figure 4.2. contains spreadsheet 4 and a histogram overview of the amount of output values of amortization of fixed assets.

Excel's List2 (1) was created by copying Lsta2 and is used for amortization calculations of other fixed assets. On Excel sheets, the cells with the amounts of the input sizes are yellow, and the cells for the amounts of the output sizes are green. Figures 4.1. and 4.2. Excel's List2 presents a static version of Excel's creation of Example 4.1. Excel's List2 (1) is intended for use, where users can change the amounts of input sizes in all combinations (column (E), yellow cells).

Amortization calculation for the life of a fixed asset, using a complex interest account, with convexly decreasing amortization amounts, Example 4.1.		
Table 1: Amounts of input quantities		
The carrying amount of a fixed asset, G0=	11.500,000	
The carrying amount of a fixed asset, T0=dd.mm.yyyy hh:mm:ss	17.04.2018 09:28:15	
Annual amortization rate, p1=	0,152 000 000	
Annual amortization factor, q1=1-p1=	0,848 000 000	
Length of the amortization period in days, D=	365,000 000 000	
Number of amortization periods in one year, m=365/D=	1,000 000 000	
Periodic amortization factor, q=q1^(1/m)=	0,848 000 000	
Periodic amortization rate, p=1-q=	0,152 000 000	
The life of the fixed asset of optimal amortization, t1=1/p=	6,578 947 368	
Fixed life expectancy correction factor ,0 <k<1, i="" k="">1, k=</k<1,>	0,825 000 000	
Adjusted fixed asset life, t2=t1*k=	5,427 631 579	
The date of completion of the planned amortization of fixed assets, Tt2=T0+D*t2=	19.09.2023 11:31:24	
The term of optimal amortization of fixed assets, Tt1=T0+D*t1=	12.11.2024 17:02:59	
Table 2: Amounts of output values of the 1st row of amortization Table 4		
Term the first period of amortization, T1=T0+1*D=	17.04.2019 09:28:15	
Amount of unamortized part of fixed assets, for t=1, G1=G0*q^1=	9.752,000	
Amount of accumulated amortization of fixed assets, for t=1, A1=G0*(1-q^1)=	1.748,000	
Amortization amount for the current period, a1=G0-G1=	1.748,000	
Table 3: Amounts of values for any fixed asset amortization period		
Amortization period required (T0≤ Tz≤ Tt2), Tz=dd.mm.yyyy hh:mm:ss=	31.12.2020 23:59:59	
Number of amortization periods from the term (T0) do (Tz), z=(Tz-T0)/D=	2,711 247 590	
Integer units of number (z), Z=INT(z)=	2	
Amount of unamortized part of fixed assets, for t=Z, GZ=G0*q^Z=	8.269,696	
Amount of unamortized part of fixed assets, for t=z, Gz=G0*q^z=	7.354,637	
Amount of accumulated amortization of fixed assets, for t=z, Az=G0*(1-q^z)=	4.145,363	
Amortization amount for the current period, az=GZ-Gz=	915,059	

Figure 4.1. Spreadsheets 1, 2 and 3 from Excel List2

Table 4: Overview of the amount of output values by periods of amortization of fixed assets				
Ordinal number of the amortization period (i)	Amortization calculation terms (Ti)	Unamortized cost of fixed assets	Amount of accumulated amortization (Ai)	Amortization amount in the current period (ai)
0	17.04.2018 09:28:15	11.500,000		
1	17.04.2019 09:28:15	9.752,000	1.748,000	1.748,000
2	16.04.2020 09:28:15	8.269,696	3.230,304	1.482,304
3	16.04.2021 09:28:15	7.012,702	4.487,298	1.256,994
4	16.04.2022 09:28:15	5.946,771	5.553,229	1.065,931
5	16.04.2023 09:28:15	5.042,862	6.457,138	903,909
5,427631579	19.09.2023 11:31:24	4.699,557	6.800,443	343,305
6	15.04.2024 09:28:15	4.276,347	7.223,653	423,210
6,578947368	12.11.2024 17:02:59	3.887,030	7.612,970	389,317



Figure 4.2. Spreadsheet 4 and histogram from Excel List2

CONCLUSION

The choice of method for calculating the amount of output values of amortization of fixed assets is made by the legal entity as their owner. The authors of the paper recommend the application of the first method of Excel calculations for the amortization of buildings, furniture, white goods, intangible fixed assets and the like. By applying this method, the useful life of the fixed asset, in addition to the amortization rate (p) is affected by the correction coefficient (k) of the amortization life (t_2) and the unamortized amount (G (t₂) ≥ 0) of the fixed asset. For (k = 1) is the useful life of total amortization $(t_2 = t_1)$ and the unamortized amount of fixed assets (G $(t_2) =$ G (t₁) = 0). For (0 < k < 1) is the planned amortization period (t₂) and the unamortized amount of fixed assets (G $(t_2) > 0$). In this case, the amounts of periodic amortization are equal for equal periods.

By applying the second method, the periodic amounts of residual values and the periodic amounts of amortization of the fixed asset decrease exponentially. The amortization life (t₂) of a fixed asset depends on the amount of its correction coefficient (k>0), in relation to the optimal amortization life (t_1) , for (k = 1)and $(t_2 = t_1)$. By applying this method, the unamortized amount of the value of a fixed asset always has a value greater than zero (G $(t_2) > 0$). If the fixed asset does not have a planned use function, then a special commission writes off its unamortized amount. If the fixed asset has a planned use function, then the commission determines the new amount of its book value. This method is useful for Excel calculations of amortization output values of all fixed asset categories.

Of particular importance is the researched and introduced economic and mathematical basis for Excel's calculation of the amount of output values of amortization of fixed assets, for any planned or unplanned term (T_z) from the life of the fixed asset.

The introduced Excel calculation has, among other things, application:

- (1) after the alienation of the fixed asset,
- (2) after permanent damage,
- (3) after an unplanned loss of use function,
- (4) for periodic financial reporting, and

(5) for unplanned reporting of fixed asset amortization amounts.

Thus, the introduced two new methods of Excel calculations of the amount of output values of amortization of fixed assets, can mainly meet today's needs of users

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PROBLEMS AND RESPONSES OF SMALL AND MEDIUM ENTERPRISES IN BOSNIA AND HERZEGOVINA TO COVID-19 RELATED TO THE MANAGEMENT OF KEY STAKEHOLDERS

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Original scientific work

Abstract: The Covid-19 global pandemic posed a number of unexpected challenges to companies of all sizes and business activities to combat the spread of the virus, which reflected not only on internal changes in employee management, but also changes in the management of external stakeholders - such as customers and suppliers. The purpose of this paper is to investigate and present the specific problems encountered by small and medium enterprises in BiH regarding the management of key stakeholders, as well as to summarize taken solutions of these companies to the difficulties caused by the coronavirus. The results of the research showed that small and medium enterprises in BiH have managed to adapt to the new situation caused by the corona and continue to successfully manage key stakeholders. The contribution of the work is reflected in a clear presentation of problems, measures and guidelines for the management of key stakeholders in times of pandemic crisis.

Keywords: SMEs, Covid-19, employee management, customer management, key stakeholder management

Introduction

The globally notorious COVID-19 pandemic has brought numerous shocks and changes within economies and the health sector worldwide, with more than 2.4 million deaths worldwide (Worldometers, 2021). Losses in working hours in 2020 were approximately four times higher than during the global financial crisis in 2009 (ILO, 2021). The global recession growth for 2020 is estimated at -3.5%, which is 0.9% more than projected in previous forecasts (IMF, 2021). The COVID-19 pandemic pointed to the absolute unwillingness of governments, societies and companies to react quickly to this type of crisis, as well as the lack of appropriate and effective measures to combat the spread of the virus and further stabilize the situation. In BiH, in the first half of March 2021, over 140,900 cases of coronavirus infection were recorded, while the number of deaths from COVID-19 reached a number higher than 5400 deaths (Worldometers, 2021). COVID-19 has hit sectors in BiH the hardest in terms of service activities, such as accommodation, trade, food, and storage services (UN BiH, 2020). Data related to tourism in 2020 show a significant decrease in tourist visits (-69.7%) and overnight stays (-63.4%) compared to the same period in 2019 (BiH Agency for Statistics, 2021a). The pandemic also greatly affected foreign trade in BiH, reducing the volume of trade in all economic sectors, which ultimately led to a decline in total imports and exports. Comparing the data on imports of goods in BiH for 2019 and 2020 for the first nine months, it is evident that there was a large decline in imports in all sectors, with the largest decline in imports of mineral fuels (-41.62%), while the smallest decrease was present in imports of agricultural products and food (-4.71%) and pharmaceutical / chemical products (-6.45%) (Foreign Trade Chamber of BiH, 2020). The situation is similar with exports from BiH, with a decline in almost all sectors, except in the agricultural industry, where growth of 5.23% was achieved in 2020 compared to 2019 (Foreign Trade Chamber of BiH, 2020)

Micro, small and medium-sized enterprises, as collectively often the largest employers, were hardest hit by the COVID-19 pandemic (WEF, 2021). Observed by entities in BiH, the pandemic affected 71% of firms in the RS and 46% of firms in the FBiH due to the suspension of regular business activities of enterprises by their business partners (UN BiH, 2020). A huge number of small and medium-sized enterprises (SMEs) in services and manufacturing, which managed to initial pandemic survive the closure measures, remained dependent on state aid due to continued business restrictions and by reduced customer demand caused declining total inflows. In addition, the pandemic has posed a number of other challenges to SMEs, such as liquidity problems, higher health and safety requirements, labor problems (layoffs, pay cuts) and procurement / delivery problems. Given all the above difficulties for SMEs, the purpose of this paper was to investigate and present the problems of SMEs in managing key stakeholders (employees, customers, suppliers) during the COVID-19 crisis, as well as how they responded to growing problems caused by the pandemic.

Challenges for companies in employee management during Covid-19

The pandemic, as to an unprecedented extent, affected the urgent and necessary changes in the management of employees in companies (accelerated changes in established work practices) and caused changes in the employees themselves. The transformation of firms and industries requires an agile and distributed workforce, hybrid work options (i.e., division of time spent in the office and teleworking), comprehensive acquisition of new skills, and upgrading of the same among employees (WEF and Mercer, 2020). In accordance with the rule that "the workplace is never so well organized that it is not organize it even possible to better" (Jusufranić, 2018), companies should constantly think about how to improve the physical workspace and design of the organization to move employees to new roles. and automation, which should not be blamed only on COVID-19 (WEF, 2021).

Accelerated changes in work practices due to the pandemic are primarily related to the accelerated introduction of work from home. A survey conducted by Gartner (2020) in 229 human resources departments shows that approximately half of the surveyed firms sent 80% of their workers to work from home in the early stages of a pandemic, while at the same time estimating a significant long-term telecommuting after increase in the pandemic. With the introduction of work from home, in response to stopping the spread of coronavirus, there has been a rapid increase in the use of connection and communication technologies. Overnight, employees changed and embraced different means of communicating with teams, managers, customers. and other kev stakeholders (such as Skype, Zoom, WhatsApp). The pandemic emphasized the need for employees to learn new skills in the digital field and the use of more advanced information technologies that will increase the possibility of their further employment (Sheppard, 2020). To this end, online training sessions for employees took the lead during the COVID-19 crisis (Narayandas et al., 2020). Teleworking, which includes working from home, in addition to the challenges of mastering new information technologies and digitalization, brings with it other challenges such as the fundamental problems of lack of space in the home to do work; sharing that space with other household members; disruption due to small children; and very often leads to overtime due to loss of notion of normal working hours. Prior to the pandemic, employers and managers avoided the option of approving work from home for employees and due to concerns about the lack of control / supervision of employee work.

Some of the more pronounced changes in employees in most companies relate to temporary measures of dismissal and reduction of salaries; new requirements for social distancing; increased focus on health and mental stability. COVID-19 was the cause of a large increase in unemployment in the whole of BiH in 2020 compared to 2019. After the introduction of closure measures for many companies, there was an increase in unemployment among registered persons from April 2020 compared to the previous year, with the difference being highest in the summer months (in July there was a jump in unemployment by 4.7%, while in August, unemployment jumped by 5.1% compared to the same period in 2019) (BiH Agency for Statistics, 2020, 2021b). Through the loss of wages or inflows, unemployed individuals can also experience a range of stressful consequences, such as depression, anxiety and various illnesses (Wanberg, 2012). It is important to emphasize that higher layoffs have a negative effect on employees who continue to work in these companies, by causing high levels of psychological stress, fear, demotivation and insecurity, which performance, provides poorer reduces quality services, products and ultimately leads to customer loss, and weaker overall corporate performance (Gigauri, 2020). The loss of social connections through the social distance caused by the dismissal of workers, compulsory isolation and switching to work from home also had a negative impact on employees. Previous research has shown that social interactions (formal and informal conversations between employees) are key to mental and physical health (Mogilner et al., 2018). Many common social connections such as handshakes; sitting, talking and eating at the same table during the break, suddenly became greatly limited during the pandemic.

Challenges for companies in customer relationship management

Since the outbreak of the pandemic, consumer behavior has deviated significantly from the usual, through an orientation towards panicky shopping or accumulation of products (especially flour, oil, pasta, rice, medicines / vitamins, hygiene / sanitary products and toilet paper), which has led to completely sold out products. As social distances, home isolation and the closure of a huge number of service businesses followed, while consumer health concerns increased, so did visits to company websites, mobile apps and an increase in demand for online shopping - such as shopping on the Zara web. pages or ordering food through korpa.ba. Globally, there was a jump in the number of active users of social networks by 13.2% or 490 million people observed for the period from January 2020 to January 2021; where the average time to use social networks is 2 hours and 25 minutes: that is, 3 hours and 39 minutes in the use of the Internet on mobile phones - data taken in January 2021 (Datareportal, 2021). Accordingly, investments in social media marketing are also increasing, with those investments in the US jumping 74% during the pandemic (observed for the period from February 2020 to June 2020) (The CMO Survey, 2020). Many clothing / footwear retailers have shifted their focus during the pandemic emergency to providing much greater customer support by texting or emailing home deliveries, while wanting them to stay safe and healthy. It is important to emphasize that many manufacturers in the world, as well as in BiH, saw the pandemic as an opportunity to adapt to the new needs of customers, which is why they began to produce masks, hand sanitizers, medical clothing, fans, respirators and other hospital instruments. Some of the many manufacturers of masks during the pandemic in BiH are: Sanitex dd Velika Kladuša, Sana Linea d.o.o. Kostajnica, Willona d.o.o. Sarajevo, Alma Ras d.o.o. Lead. As far as disinfectants are concerned, many companies in this field have adapted their production to the growing needs for disinfection, such as: DITA d.o.o. Tuzla, Belif d.o.o. Jelah-Tešanj, Interact d.o.o. High, Livi d.o.o. Ilijaš, Semikem d.o.o. Vogošća, Eurolab d.o.o. Banja Luka.

An interesting trend that occurred during the pandemic is a strong focus on consuming healthier products (foods rich in vitamins and multivitamin tablets as dietary supplements) and a healthier lifestyle (going to the mountains or hiking, exercise / training at home). O'Connor (2020) pointed out that there is strong evidence that healthier and fit people are less likely to become seriously ill due to the virus. For these reasons, it is to be expected that there will be a greater shift health-oriented consumption towards (healthier and more nutrient-rich foods), as well as towards the fitness and wellness area.

Challenges for companies in managing relationships with suppliers and other actors in the supply chain Supply chain management, viewed as an "umbrella concept", includes from suppliers / network sources, demand, value chain to integrated logistics management (Fonseca and Lima, 2015). The modern supply chain management approach, as an interdependence of firms working together on cross-functional collaboration to improve the efficiency and effectiveness of the entire procurement and integrate all actors in the value chain (as a set of activities to produce value for the customer), was severely disrupted during pandemics. Firms have heavily relied on suppliers and manufacturers with globally dispersed production systems, driven by cost optimization, cheap labor, and "just-in-time" production (Javorcik 2020). Consequently, SMEs experienced a number of logistical problems during the pandemic due to transport disruptions (congestion at border crossings, border closures, airport closures, increased measures for COVID tests) and labor shortages. In addition to disruptions in the supply chain, numerous production lines were closed and production capacities across Europe were reduced, resulting in a simultaneous drop in supply and demand. This has led to an orientation towards local supply chains, created as a result of both the pandemic and the earlier onset of global supply chains and trade wars (such as between the US and China; US and EU). The pandemic highlighted the need to create more resilient global value chains through diversification of supply chains (rather than over-reliance on a small number of suppliers), focusing on close proximity to suppliers, returning production from

suppliers), focusing on close proximity to suppliers, returning production from overseas to their countries, and smarter inventory management. A major obstacle to achieving the necessary changes is the lack of specialization, which currently has participants in modern value chains, which in turn requires large investments of money and time for all new members, business reorganization and a high degree of coordination with other participants. In addition to the above, a great challenge and opportunity for a large number of SMEs across Europe is the need to introduce digital technologies (known as Industry 4.0) and automated processes in both local production innovation and supply chain management. Greater digitalization, expected after COVID-19, leads to better and greater customer interactions, which can also enable more flexible and stable supply chains (McKinsey 2020). Despite all the benefits of digitalisation, the limited financial resources available to many SMEs can be a major obstacle to implementing digitalisation in everyday business.

Objectives, research methodology and sample description

The main goal of this research study was twofold: (1) to identify the main problems / challenges in the management of key stakeholders in small and medium enterprises in BiH (which have 10-49 employees (small companies) or 50 - 249 employees) enterprises) according to the BiH Agency for Statistics); and (2) present the responses / solutions of the surveyed companies to management problems during the COVID-19 pandemic.

This research used a quantitative methodology that included a questionnaire compiled by the authors on the main problems and company responses when it comes to managing employees, customers suppliers during the COVID-19 and pandemic. The sample of the research is random, which included 57 managers of small and medium enterprises in BiH. Of the total number of managers, 58% were men, while 42% were women; and in terms of age - the largest number of managers - 75% of them were between 31-50 years old. The collected data were analyzed in the paper: descriptive statistics and exploratory factor analysis.

Measures used in the research

Scales for measuring problem / challenge factors and responses / solutions in the management of key stakeholders (employees; customers; suppliers and other participants in the supply chain) were formulated by the authors for the purpose of this paper, based on a detailed theoretical review of previous papers on impact Covid on the business of firms. The questions in the questionnaires are presented through a fivepoint Likert scale, in the form of statements about problems / challenges for management managing relationships with in key stakeholders during a pandemic (1-no problem; 2-small problem; 3-medium problem; 4-quite big problem; 5-huge problem). A list of problem / challenge variables in key stakeholder management is provided in Table 1.

Table 1. Indications for challenges / problems of managing key stakeholders (employees, customers and suppliers) during COVID-19

Switching to hybrid work options	P1
(splitting office and home hours)	
Accelerated introduction of work from	P2
home	
Increased hygiene requirements for all	P3
employees in companies	
Reorganization of jobs for employees	P4
in the company while respecting the	
new measures of social distance	
Accelerated transition to the use of new	P5
means of communication and	
networking with employees / teams	
(Skype, Zoom ()	
Control the work of employees when	P6
working from home	
Possible misuse of confidential data	P7
from the company and clients when	
working from home	
Temporary wage cuts and layoffs	P8
Declining demand for products /	P9
services	
New ways of connecting and	P10
communicating with customers	
Requirements for providing customers	P11
with safer shopping conditions in stores	
(keeping physical distance; limiting the	
number of customers within the store	
)	
Redirection to online sales (via	P12
websites, social networks, mobile	
applications)	
Adapting product manufacturing and	P13
service delivery to meet new customer	
needs during a pandemic	
Cancellation of contracts by large	P14
customers during a pandemic	
Change in input prices in procurement	P15
(price increases)	
Closure of numerous production lines	P16
---	-----
and business outlets due to strict	
measures in the country, the region and	
the world	
Problems in logistics due to transport	P17
disruptions (delays in deliveries)	
Lack of workers in the supply chain	P18
during a pandemic	
The need to introduce digital	P19
technologies and automated processes	
in supply chain management and local	
production innovation	
Distance of suppliers from whom it is	P20
procured	
	•

Source: Research work of the author

Firm responses / solutions to management problems / challenges during a pandemic were also measured by the Likert scale (where: 1-absolutely disagree; 5-absolutely disagree). Examples of measures for possible firm responses to a pandemic include: "New hygiene standards in the firm and sufficient hygiene resources"; and "Employee support (increased communication and new ways to connect with employees".

Research results

Factor analysis in this research study aimed both to reduce a number of variables to several factors and to provide significant explanations for the results obtained. The "Principal Components Varimax" rotation method was used in factor analysis to identify the main dimensions of the problem in managing key stakeholders during a pandemic in BiH firms. Table 2 shows the results of a rotating matrix for 19 variables, with four factor solutions with a factor load greater than 0.5 within each factor; and with Eigen values greater than one. It is important to emphasize that the variable "Temporary reduction of salaries and dismissal of workers" was excluded from further consideration due to the weak factor load (which was far below 4). The described four factors (dimensions) explain 70.20% of the observed variance:

Table 2. Problem / challenge analysis factor in the management of key stakeholders during a pandemic

Dimensio	Vari Components				
ns	ables	1	2	3	4

Problems working from home	P1 P2 P6 P7	$\begin{array}{c} 0.7 \\ 41 \\ 0.6 \\ 34 \\ 0.6 \\ 51 \\ 0.7 \\ 65 \end{array}$			
Safety issues	P3 P4 P11 P16		0.58 2 0.61 0 0.71 3 0.70 2		
Problems in the value chain	P9 P13 P14 P15 P17 P18 P20			$\begin{array}{c} 0.78 \\ 8 \\ 0.56 \\ 3 \\ 0.51 \\ 4 \\ 0.62 \\ 2 \\ 0.76 \\ 6 \\ 0.51 \\ 0 \\ 0.67 \\ 5 \end{array}$	
Problems of introducti on of digitalizati on and IT	P5 P10 P12 P19				$\begin{array}{c} 0.62 \\ 0 \\ 0.51 \\ 8 \\ 0.54 \\ 7 \\ 0.63 \\ 4 \end{array}$
Eigen		5.2	3.47	2.18	1.38
values %		26	16 5	10.2	6.23
Explained variances		225	10.5	24	1
Cumulativ		37.	53.7	63.9	70.1
e% of explained variance		225	40	64	95
Extraction n	nethod:	Norma	alizatio	n of the	;
Principal Co	mpone	nts Rot	tated M	ethod	
(Varimax with Kaiser). a. The rotation					
converged into / iterations					
Source: Research work of the author					

Dimension 1. (Cronbach Alpha=0.821; arithmetic mean=3,36) called "Problems from work from home" includes four components (problems) related to employee management: P1 (Switching to hybrid work options (division of working time from office

and from home)); P2 (Accelerated introduction of work from home); P6 (Control of work of employees when working from home); and P7 (Possible misuse of confidential information from the company and clients when working from home).

Dimension 2. (Cronbach Alpha=0.830; arithmetic mean=3,42) called "Safety Problems" includes four components (problems) during a pandemic for all key stakeholders: (Increased P3 hygiene requirements for all company employees); P4 (Reorganization of jobs for employees in the company in compliance with the new social measures of distance); P11 (Requirements for providing customers with safer shopping conditions in stores (keeping physical distance; limiting the number of customers within the store ...)); P16 (Closure of numerous production lines and sales outlets due to strict measures in the country, the region and the world).

Dimension 3. (Cronbach Alpha=0.804; arithmetic mean=3,61) called "Value chain problems" includes seven problems for management during a pandemic: P9 (Decline in demand for products / services); P13 (Adjusting product production and service delivery to meet new customer needs during a pandemic); P14 (Cancellation of contracts by large customers during a pandemic); P15 (Change in input prices in procurement (price increases)); P17 (Problems in logistics due to disruptions transport (delays in deliveries...)); P18 (Lack of workers in the supply chain during the pandemic); P20 (Distance of suppliers from which it is procured).

Dimension 4. (Cronbach Alpha=0.815; arithmetic mean=3,67) called "Problems of digitalization and IT implementation" includes four problems for management COVID-19: during P5 (Accelerated transition to the use of new means of communication and connection with employees / teams (Skype, Zoom...)); P10 of connecting (New ways and communicating with customers); P12 (Redirection to online sales (via websites, social networks, mobile applications)); P19 (Need for introduction of digital technologies and automated processes in supply chain

management and innovation of local production).

All the above-mentioned problems of managing key stakeholders during the pandemic range from medium-to-large to quite large problems for small and mediumsized enterprises, with the biggest problems being: "Problems of digitalization and IT implementation"; values "). Regarding the most common answers / solutions to all the above problems in the management of key stakeholders, the surveyed managers stated the following:

Table	3.	Answers	/	solutions	in	key
stakeho	olde	r managem	ent			

stakenolaer management	
ANSWERS / SOLUTIONS IN	$\overline{\mathbf{X}}$ (ar.
PANDEMIC MANAGEMENT	sredina)
New hygiene standards in the	4.58
company and enough hygienic	
resources	
The company's focus on	4.35
diversification of customers and	
suppliers (reliance on a larger	
number of customers / sources of	
supply)	
Transition to a more flexible	4.11
organizational structure	
Instructions / discussions with	4.11
team leaders on how to manage a	
pandemic	
New ways to connect, listen and	3.89
get feedback from customers	
Turning to a shorter supply chain	3.78
(increasing proximity to	
suppliers)	
Customized content for customers	3.59
on social networks / web in line	
with the pandemic	
Engagement with other firms in	3.48
making joint plans in a pandemic	
Employee support (increased	3.37
communication and new ways to	
connect with employees)	

Source: Research work of the author

As can be seen from Table 3, the largest number of SMEs responded to problems in managing key stakeholders during the pandemic through: (1) the introduction of new hygiene standards and sufficient hygiene resources in the firm; (2) focus on diversification of customers and suppliers; (3) transition to a more flexible organizational structure; and instructions /

conversations with team leaders on how to manage a pandemic. The focus on improving safety and health measures to prevent infection (not only employees, but also customers and other associates) has rightly become the most common response of SMEs to the pandemic, which also shows the focus **SMEs** greater of on social responsibility. In addition to these measures, SMEs have shown a strong focus on change and adaptation to the new situation through the transition to a more flexible organizational structure (through a greater focus on the introduction and use of IT in business; providing employment and work regardless of geographical distance of employees / associates); as well as new strategies for reaching and connecting with customers, suppliers and other participants in the supply chain. Given that the least attention is paid to the support of employees, some of the recommendations for SMEs in the pandemic and after COVID-19 are to consider: (a) adopting a change in working standards for teleworking, or to make work as practical and simple as possible; (b) introduction of assistance / counseling programs for employees; therapy and online training programs; (c) applying new ways of motivation, more efficient communication, devising innovations (such as virtual socializing - which can reduce the feeling of loneliness when working from home); and (d) improving the skills of its employees and key players in the supply chain to work on digitization, the use of new IT technologies (which can be launched as a joint project with partners - as there is a significant lack of specialization in this field).

CONCLUSION

Small and medium-sized enterprises (SMEs) encountered a number of macro and micro difficulties during the COVID-19 pandemic, which tested their resilience too rigorously and imposed the need for change in many aspects of business and management. The main objectives of this paper were to explore the basic problems in the management of key stakeholders (employees, customers, suppliers and other actors in the supply chain) in SMEs in BiH; as well as to summarize the answers / solutions of companies to the mentioned problems. The results of the research, through factor analysis, showed that four groups of problems in the management of key stakeholders stand out: (1) problems from work from home; (2) security issues; (3) problems in the value chain; and (4) problems with the introduction of digitization and IT. SMEs' responses to growing management problems focused on both internal initiatives and changes (introduction of new hygiene standards / sufficient hygiene resources; transition to a more flexible organizational structure; greater support for employees), as well as changes in customer and supplier business strategies. (through diversification of customers and suppliers; new ways of communicating with customers with a special focus on adapting content to customers on social networks / web). The contribution of the work is reflected in a clear presentation of problems, responses and recommendations for improving the management of key stakeholders in SMEs in times of pandemic crisis.

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DEVELOPMENT OF DIGITAL COMPETENCIES WITH TEACHERS IN ELEMENTARY SCHOOL "EDHEM MULABDIĆ" DUE TO THE COVID PANDEMIC 19

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Original scientific work

Abstract: The world is facing an atypical way of life during the pandemic period of Covid 19. The department of education, especially, was one of the departments that had to meet the challenge of a completely new living and teaching style. Having determined this, the purpose of this study aims to develop and complete the teachers' digital competence at Elementary School Edhem Mulabdic in Opara during the pandemic period of Covid 19. The goal of the study, in general, is to present how a current situation, highly affecting the education system, has helped to develop and complete the teachers' digital competence in the education system. The collected data indicate that the education system was not completely ready to answer the challenges, but the adequate organization has had specific positive effects. The study fully acknowledges the significance of determining the level of human resources' eloquence in the aspect of digital competence at school, in addition to the further guidelines that would continuously develop and be upgraded.

Key words: information and communication technologies, digital competencies, distance learning, lifelong learning.

1. Introduction

In late 2019 and early 2020, the world faces an invisible enemy and adapts to a special way of life. World officials had an important task, how to respond to the current situation and how to organize the lives of citizens due to the pandemic called Covid 19. The entire social system fell into a great crisis. One of the most important sectors of society that faced the challenge was certainly the education sector. The key issue was related to the adequate establishment of the teaching process, how to choose the most adequate model of work, and to achieve the best result. In addition to all the above, it was imperative to choose a model of work that will put the health of students in the forefront, and that the teaching content is realized.

In this regard, the aim of this paper is to present the way in which the new situation in the education system has developed and completed the digital competencies of teachers on the example of the Elementary School "Edhem Mulabdić" Opara.

In March 2020, there was a complete suspension of the teaching process in schools in the Central Bosnia Canton. According to the instructions of the Ministry of Education, Science, Youth, Culture and Sports, it was necessary to organize the teaching process. The organization of the teaching process was approached carefully, and information and communication technologies were put in the forefront with the aim of developing digital competencies of employees. Then the organization of distance learning was approached, which was an innovation in the teaching process. All of the above was in fact a new approach that is certainly on the line of lifelong learning where every employee in the educational process should monitor and upgrade the acquired knowledge.

2. INFORMATION AND COMMUNICATION TECHNOLOGIES AND DEVELOPMENT OF DIGITAL COMPETENCIES IN THE FUNCTION OF LIFELONG LEARNING

According to Semenov (2005), the concept information and communication of technology, which is applied in education, has expanded from the previous concept of information technology and represents a huge area of rapid change and rapid growth. The term IT (information technology) primarily refers to technologies that use computers to collect, process, store, protect and transmit information (Čelebić and Rendulić, 2011). What is important to emphasize in ICT (information and communication technology) is that it encompasses dimension the of communication, as the name suggests, and thus expands the basic information technology, given that today working with a computer is unthinkable if it is not connected to the network. The term ICT is actually a collective term by which we mean new technologies intended for communication, learning, acquiring knowledge, obtaining and exchanging data, games and entertainment (Čelebić and Rendulić, 2011). The use of information communication and technologies in teaching has become a primary activity since the advent of Covid 19. It is necessary to set adequate learning goals that must be reached, and the application of methods and procedures, and how the goal will be reached, is the choice of the teacher. It is generally desirable to acquaint the teacher with the existence and possibilities of teaching technique, and to instruct him on how to creatively apply the technique for involving students in all phases of the teaching process. Objectively, the material factors of teaching are extremely important, everything that serves the teacher and the student to achieve quality teaching should be used to achieve the goal of

teaching. Using these technologies, teachers participate in the lifelong learning program and develop and complement key learning competencies.

2.1. Digital competence

Digital competence was recognized in 2010 as one of the key competences in the Europe 2020 strategy (European Commission, 2010). The UNESCO ICT Competency Framework for Teachers (UNESCO, 2011) points out that the use of ICT in education includes an innovative approach to the application of technologies in education. With the development of technology, digital competence becomes a universal and basic need of all citizens for work, life and learning knowledge in the society. Digital competence implies the safe and critical use of information and the use of communication technologies for work, recreation and communication in the world. This competence includes the possession of certain skills such as knowledge of the use of computers and information and communication technologies in the modern information society. The individual must have knowledge in performing computer operations (databases, data storage, Internet, information handling, etc.). This includes knowledge and skills of using computers for searching. collecting and processing information, using information, exchanging information. handling information, communicating on networks via the Internet, understanding the possible dangers of the Internet and the like. Digital competence is participation achieved through and communication with the use of information and communication technology and the use of tools for creating e-content, and they can be said to be simply life skills that include human knowledge, skills and attitudes of modern man (Tatković, N. , Močinić, S. 2012).

3.2. Distance learning

Morrison (2003) defines distance learning as the continuous assimilation of knowledge and skills stimulated by synchronous and asynchronous learning activities that are created, delivered, supported, and managed by Internet technologies. One of the most well-known definitions of e-learning in higher education in the UK came from Turvey (2009): "E-learning is flexible learning as well as distance learning, and can be seen as an application of ICT to provide communication and support among individuals and groups, all to provide better support learning student and better management.

3. METODS

In this paper, an online survey was used during the research, and the aim was to examine the attitudes and opinions of employees at the Elementary School "Edhem Mulabdić" related to the development of digital competencies due to the Covid 19 pandemic. to 02/18/2021 years. An online survey is a survey that consists of one or a small number of questions, is posted on the website in addition to other content and is filled at the discretion of the respondents in order to examine public opinion (or part of it) on a particular topic. The questions are simple, short and clear with the offered answers (Zelenika, 2000). In addition to the online survey, the interview method was used. An interview is a method in which, through a scientific conversation between the examiner and the examinee. data relevant to the research are obtained. It should be a faceto-face meeting and there should be a specific purpose that should be known (Alihodžić, 1999). In addition to the survey, interviews were conducted with professional associates employed at the school. An interview is nothing more than a conversation with a respondent about a circle of questions, and its goal is to give us information about what a respondent knows about a question that is important for science.

It is important for each interview that it is given under the conditions that the interviewee knows what he will be asked about, that he freely agrees to the interview, that he is protected by secrecy and that an accurate record is kept of the content of the interview. It is important that the interviewers are able to create a pleasant atmosphere during the interview to reduce the tension of the respondents.

4. Kakvo je stanje u Valoj škoti na aspekta IKT (informaciono komunikacijske tehnologije)?

4. Discussion

The analysis of the collected data was performed after the survey and interviews. A total of 31 employees of direct participants in the educational process were interviewed, and interviews were conducted with professional associates.



Graph 1. Gender structure (Source: author's review)

Of the total number of respondents, 64.5% are female, while 35.5% are male.



Graph 2. Age structure (Source: author's review)

Of the total number of respondents, 38.7% are over the age of 45, followed by respondents aged 36 to 45, a total of 35.5%, while 25.8% of respondents are aged 26 to 35.



Graph 3. Work in the education sector (Source: author's review)

Of the total number of respondents, 38.7% work from 21 to 30 years in the education sector, followed by employees working up to 10 years, 35.5%, a percentage of 12.9% have employees working from 11 to 20 years and they working 31 to 40 years in the education sector.



Graph 4. Condition of ICT equipment in school (Source: author's review)

Of the total number of respondents, 51.6% believe that the condition of ICT equipment in the school is excellent, 45.2% of respondents believe that the condition is good, while only 3.2% of respondents believe that the condition is bad.



Graph 5. Knowledge of digital technology terms (Source: author's review)

Out of the total number of respondents, 96.8% were familiar with the term digital technology, while 3.2% of respondents said



Graph 6. Method of developing digital competencies in work (Source: author's review)

The largest number of respondents developed digital competencies independently, as well as through schoolorganized programs, while a smaller number of employees participated in trainings organized by the Ministry of Education and the non-governmental sector.



Graph 7. Influence of previous knowledge on the development of digital competencies in work (Source: author's review)

Based previous knowledge on and experience in the field of developing digital competencies in 83.9% of respondents it greatly facilitated the process of distance learning, while in 12.9% of respondents completely previous knowledge facilitated the process of distance learning, a small percentage of respondents who did not previous knowledge was facilitating them by 3.2%.



11 odgiver

Graph 8. **Development** digital of competencies in work due to the Covid pandemic19 (Source:author's review)

Due to the Covid 19 pandemic, respondents have quite developed digital competencies, a total of 77.4% of them, 12.9% have fully developed digital competencies, while 9.7% have developed little digital competencies.

Table 1 - Commonly used digital tools perfected during the Covid 19 pandemic

4.1. **Interviews** with professional associates

During the interviews with professional associates, they described the situation in the educational process since the beginning of the Covid pandemic 19.

The education system at the time of the pandemic gave teachers a difficult task. Although most of our teachers had the opportunity to teach in a more modern way even before the pandemic, using certain ICTs, leaving behind the traditional approach to teaching, they faced a serious challenge. They were given the opportunity to learn

about new tools and use platforms they had not used before. However, most coped well, understanding this as a form of learning, personal development and professional advancement, and the period they have to go through during lifelong learning. A smaller proportion of teachers are those with many years of experience and a more traditional approach, but who have also responded to the challenge. In addition to the written word, every day students had the opportunity to learn through certain videos, presentations, quizzes and the like. The biggest drawback in this learning process is the social aspect. Children of this age have a need for daily exchange of socializing, experiences, practical work, sports games, etc. The team, competitions, group work is what motivates students, and gives teachers satisfaction with their work. Distance learning has developed and supplemented digital competencies in teachers, forced them to learn a lot of new things, helped in everyday work at a time of dizzying progress in information technology, however, deprived teachers of what is indispensable in their work, and that is a living word. The feedback of students in the moment, the reaction with a look, a touch, a hug and through the expression of empathy, is what is missing and makes our generations "robots".

Google classro om	Google Forms	Google patterns	Google draws	Google presentat ion
Edmod o	Google disk	Google Meet	Piktocha rt	Quizlet Live
Zoom	Powtoon	Animot o	Blocksit e	Quizizz
Wordw all	Padlet	ThingLi nk	Flipgrid	Kidblog
Moovl y	Linoit	Bubble	Recap	Buncee
Wizer. me	Canva	One Drive	Tripline	Formati ve
	1			
Kahoot s	Storyjum per	Testmo z	Sokrativ e	QR Kodovi

4. CONCLUSION

Based on the conducted research and processed results, we can conclude that employees during their work in education directly or indirectly participated in trainings that were in line with the development of digital competencies. Since the school where they work is equipped with information and communication equipment, most respondents developed digital competencies independently either using installed equipment or through some of the programs organized by the school, while a small number of teachers participated in such trainings organized by the relevant ministry. and NGOs. Due to the outbreak of the pandemic called Covid 19. teachers developed and completed digital competencies with the previously acquired knowledge, and they worked efficiently in the educational process. They organized the classes in such a way that, using digital tools, they presented the teaching contents in the best possible ways that will facilitate the students' processes of adopting the teaching material. Distance learning will be an important segment of education in the future, so teachers are committed to further work of acquiring knowledge and improving the necessary skills. In the proposal for more efficient educational work, they stated additional education of teachers, students and parents, as well as support from the relevant Ministry.

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DISTANCE EDUCATION DURING THE COVID-19 PANDEMIC

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Original scientific work

Apstract: We live in a world of massively use of social networks, which are gradually taking a central place in modern communication, replacing forums, e-mail and sms. However, what needs to be pointed out is that the use of social networks has changed not only the way of spending free time, communication, business, but also the way of learning and the way of organizing the curriculum. Primary and secondary data sources were taken as well as statistics dana and research conducted on the impact of the pandemic on education. The result of the research is technology that creates subtle advances in education, however the global COVID-19 pandemic has created a strong need for destructive innovation in education. In education as in other industries, technological advances represent constant opportunities for new innovations, including learning management systems. Viewed through a new perspective, social networks provide teachers with new opportunities for increased student engagement in an online learning environment. In the new reality, online solutions have become almost the only way of business communication between people, including online conferences and lectures. The aim of the research is to determine the use of information and communication technology (ICT) with regard to the new situation with the COVID-19 pandemic.

Keywords: COVID-19 pandemic, social networks, information, education system, technology

Choice of marketing in education

The amount of knowledge is huge, and it doubles almost every two years. New scientific and professional knowledge is coming that is replacing existing or new technologies. The time of formal education is limited and the world is getting closer, communications between experts in various societies and countries are intensifying. Computers and programs are becoming the most important tools in everyday work. The Internet as such is becoming the dominant source of information. There is a need for new knowledge, skills and abilities. The labor market should clearly define which occupations are needed, but also which knowledge a particular occupation should have.

Knowledge and competencies become the greatest competitive advantage of an organization, and the result is learning organizations. Only organizations based on knowledge and continuous learning have a secure and predictable future. These are, above all, business organizations in the field information and communication of technology, but not only those for whom knowledge is a key resource and are more than any other organization synonymous with learning organizations. It is common knowledge that globalization processes also encourage the globalization of education. The purpose of education is not only to provide new knowledge and skills but also to develop educational and socializing content and values. The field of marketing requires broad knowledge, adequate education and readiness for lifelong learning.

A common feature of marketing and education as service activities is the satisfaction and development of human needs. Every individual has the right to upbringing and education and the need for acquired knowledge and education must be met regardless of the social status and material condition of individuals. Modern trends in the digital world require investment in new knowledge, technologies and professional staff. With the development of the Internet, social networks have also developed, free online services that enable communication and connecting users. As this is a scientific discipline that is increasingly needed and sought after, quality education is needed that includes many areas; from knowledge of the social sciences to technical knowledge. The learning process is focused on new knowledge that is in demand in the labor market.

Student communication as the way of learning itself has changed significantly with the advent of social networks. Access to information is possible in a matter of minutes using smartphones and websites, and group conversations are simplified by forming online groups and conversations on social networks. This is just one of the opportunities that social networks can provide as an advantage in teaching. Students and pupils mostly use social networks to communicate, collaborate and share information. It is from this that the need for the application of social networks in education arises.

1.1. Distance learning through *Facebook* and *Instagram* platform

The founder of Facebook started from the assumption that users of this social network perform communication and Internet activities exclusively through Facebook, and this is the direction in which this network has developed in recent years. In addition to changing Facebook the way we communicate, it has also changed the way we follow everyday events.

Photo 1: *Facebook*: Class

School Books



Source:Facebook; https://www.facebook.com/Razrednanastava-%C5%A0kolske-knjige-293857354095462/?ref=py_c, (02.02.2021.)

Picture 1 shows the Facebook page of the School Classroom, where there are new video lessons every week, regardless of which book the student works on. For the purpose of monitoring and learning new teaching contents. Facebook is a powerful social network used in education because it allows easy connection with other teachers and students, collecting and publishing content, discussing and monitoring student activities. Professors and students are interconnected and can make good use of this type of platform to work in their education. Social networks help professors to connect with their students outside of university as well as with alumni. Professors use social networks as a way of learning, creating university groups for students where information can be accessed, they can also share ideas and direct students to other social networks. One of the main reasons teachers adapt to social media in the classroom is that they can do marketing through social media. Not only can they make business easier but they can also grow their business in the domain of social network.

As a consequence of the availability of education to every member of society, collective knowledge spreads more easily among members of society, resulting in a more efficient labor market, increased efficiency of existing businesses and, ultimately, a more competitive economy. Likewise, distance learning is the only way to reach a large number of workers in a way that is effective and adaptable to everyone.¹³

Visual content causes much more user involvement and connectivity than plain text or links, and for this reason Instagram is the

¹³ Smiljičić, I., Livaja, I., Acalin, J. (2017): ICT in education, *University in Sibenik*, Sibenik 2017., p. 157 - 170, UDK: 007:37 perfect platform to show business-related content and connect with users. An interesting setting offered by Instagram is Instagram Stories, what is posted within Stories or stories to users is visible until 24 hours after the post when the post is deleted. It is possible to take or take a photo or video, upload an image from a mobile phone, edit it and write text or even draw. This setting is useful if you want to highlight a specific offer that will only be available in the next 24 hours or if you want to document certain things and offer certain information to consumers. There is also the option of live streaming via Instagram story where various conferences can be broadcast or a popular question / answer session can be held.

" I've been hearing about the popularization of science for years, so I decided to take matters into my own hands and combine something popular - social networks, memes, fun videos with biology and chemistry material. I generally find that there is no boring material but it is a matter of perceiving and connecting the material with something that students find interesting and fun. I also think that social networks are a great tool and I noticed a lack of quality educational and entertaining content on the Croatian YouTube and Instagram scene. I think that all those handbags and eyelashes, as well as the unrealistic standards of beauty that social networks push under the nose of the younger generations, will not help you as much in life as "brain training" and developing curiosity can help you. Specifically, I set quizzes with the topic of the state graduation exam because I think that it is useful for most graduates in this strange time that has befallen us, and I am very happy to see that they are solved by both older and younger generations. Reactions and response are even better than I expected. I am very glad to see the messages that come to me directly from students, but also older friends and colleagues who approve of my initiative. " (Marković S., 2020).¹⁴

 ¹⁴ Marković S., Instagram as a new way of learning?,
 <u>https://kisobran.uniri.hr/2020/05/05/instagram-kao-novi-oblik-ucenja/</u>, 10.02.2021

Science and technology

The COVID-19 disease pandemic is greatly affecting society as a whole. Higher education institutions had to react quickly and make strong and innovative decisions on how to reorganize teaching, learning, research and other activities. In addition, their role in shaping a better and fairer world after a pandemic is also very significant. ¹⁵

Photo 2: Quiz via social network Instagram



Source:

https://kisobran.uniri.hr/2020/05/05/instagra m-kao-novi-oblik-ucenja/, 03.02.2021.

Photo 2. shows designed quizzes via the social network Instagram, designed by Professor Katarina Rodek, in order to motivate high school graduates during the COVID-19 pandemic, when the school system felt significant changes in the teaching process and the way of learning.

We live in a world of mass use of social networks, which are gradually taking a central place in modern communication, replacing forums, e-mail and SMS. The use of social networks in leisure time has become generally accepted, and is also becoming mandatory in business as a constant source of information. However, what needs to be pointed out is that the use of social networks has changed not only the way of spending free time, communication, business, but also the way of learning and the way of organizing the curriculum. The tendency of people to take advantage of the opportunities provided by social networks is increasingly used in education, in order to adapt the learning process to the needs of students and make it more interesting and attractive to them.

2.Distance learning in different countries for the purpose of a continuous chain of education

The COVID-19 pandemic is a major stressor for educational institutions around the world. As a result of the crisis, 190 countries faced the complete or partial closure of schools, and as a result more than 1.7 billion students were affected, and they were forced to stay at home, where education policy makers are working to continue teaching. With different approaches from countries around the world. the crisis with COVID-19 is an opportunity for teachers and professors to learn from each other and work together to mitigate the effects of the pandemic. The OECD states that there are large differences between socio-economic groups of pupils and students. During the first quarantine, Afghanistan had distance learning combining multimedia, video and radio, where educational content was broadcast 14 hours a day via television content and 7 hours a day through radio content. Austria has used learning platforms such as Moodle and WebCT, as well as the Cloud (cloud) owned by Microsoft and Google. Vienna has offered free tuition for children aged 10 to 14 via the internet that includes support for German, math and English for high school. Distance learning in Bangladesh was broadcast on television for students daily from nine o'clock in the morning until noon. The Government of Bangladesh has established cooperation with UNICEF to conduct and improve distance learning using mobile

¹⁵ Najava webinara "Odgovor visokog obrazovanja na pandemiju COVID-19: izgradnja održivije i demokratičnije budućnosti, preuzeto s: <u>https://mzo.gov.hr/vijesti/najava-webinara-odgovor-</u> visokog-obrazovanja-na-pandemiju-covid-19-

izgradnja-odrzivije-i-demokraticnijebuducnosti/4227, 10.02.2021.

phones and Internet platforms. Brazil conducts similar distance education, while Bolivia conducts workshops for parents in collaboration with UNICEF with the aim of promoting children's healthy habits. Chile uses the Aptus platform where learning materials are available to students. During the first two weeks of closing schools, China organized telephone and video conversations with education agencies, course service providers, and setup planning service providers. The possibility of psychological support was also provided. In Croatia, classes for lower grades took place on public television in combination with additional tasks and exercises by teachers, and later classes took place in school. Ecuador did not implement a system of assessment during distance learning, while Finland continued examinations and assessment during distance learning, and organized a flexible way of learning, including games and simulations in teaching. Madagascar held distance learning through public television and radio. Mexico provided support to teachers in digital education through courses and video conferencing. Russia has used various platforms in the distance education system.

3. Curriculum and education in Croatia during the pandemic *COVID-19*

Technology is creating subtle shifts in education, however the global COVID-19 pandemic has created a sharp need for destructive innovation in education. In education in other industries. as technological advances represent constant opportunities for new innovations, including learning management systems. Social networks like Facebook. Instagram, YouTube and WhatsApp can be used to message and encourage motivation with creative ideas in education. Viewed through a new perspective, social networks provide teachers with new opportunities for increased student engagement in an online learning

environment. The digital revolution has caused the IT sectors to be the center of attention of school and higher education managers. The COVID-19 crisis has removed the former thinking of higher education institutions that distance learning is a real possibility only for technologically skilled professors. The training of all professors and students is now being encouraged.

The survey was conducted in mid-2020 using survey questionnaires for higher education institutions and questionnaires for students and staff of higher education institutions during the first wave of the COVID-19 pandemic. The survey questions were designed in several short thematic units aimed at exploring the current situation in terms of technological conditions of studying in the online environment during social distance, distance learning, support for students in the online environment, student assessment system, student stress, socio psychological teaching segments and support from higher education institutions. 764 employees participated in the questionnaire for employees, of which 102 members of the management of higher education institutions, 96 heads of organizational units, 540 26 employees teachers and of the professional service of higher education institutions.¹⁶

Research results :



Graph 1: Internet access - students

¹⁶ Challenges in higher education during the pandemic of COVID-19 disease and social isolation: experiences and needs of students and staff of higher education institutions,

Source:<u>https://www.azvo.hr/images/stories/</u> novosti/Rezultati_istra%C5%BEivanja_Iza zovi_u_visokom_obrazovanju_za_vrijeme_ pandemije_bolesti_COVID19_i_socijalne_i zolacije.pdf, 02.02.2021.

https://www.azvo.hr/images/stories/novosti/Rezultati_istra %C5%BEivanja_Izazovi_u_visokom_obrazovanju_z a_vrijeme_pandemije_bolesti_COVID19_i_socijalne_izol acije.pdf, 02.02.2021.

The data from Chart 1 show that students are satisfied and very satisfied with Internet access during challenging circumstances (69%), while 9% of them are very dissatisfied and dissatisfied. Technological changes affect everyday business in a way that companies and individuals want to be competitive should be ready to do business in the digital world...



Doing business in the digital world no longer means just an online presence but also encompasses concepts on online platforms.

Graph 2: Internet access - employees

Source:<u>https://www.azvo.hr/images/stories/n</u> ovosti/Rezultati_istra%C5%BEivanja_Izazov i u_visokom_obrazovanju_za_vrijeme_pand emije_bolesti_COVID19_i_socijalne_izolacij e.pdf, 02.02.2021.

Graph 2 shows that employees are satisfied with Internet access (77%), while 4% of them are dissatisfied and very dissatisfied.

The ability of individuals to adapt in today's rapidly changing professional environment depends less and less on his professional knowledge, and more and more on traits such as curiosity, agile mind and desire and ability to learn quickly. The education system should focus on encouraging these qualities from the earliest age to higher education, and this means moving away from traditional methods of teaching only

theoretical knowledge to a format that requires greater involvement of students, and the end result is the development of the right way of thinking.

emphasize both positive and Students experiences. negative Satisfaction is provided by those students who work and study, since in addition to online classes they did not have to physically attend, where they saved on travel and going to college, their biggest contribution was that they could record a lecture and review them again. Some students stated that they like online lectures, but when it comes to exercises or seminars, they prefer live classes. At the same time, they believe that not all teachers are equally trained to use the necessary applications for distance learning.

Graph 3 shows the digital competencies of students, 82% of students expressed their satisfaction with their own level of digital competencies, only 4% of them expressed dissatisfaction with knowing the digital competencies that were needed for *online* lectures.



Graph 3: Level of digital competencies in students

Source:<u>https://www.azvo.hr/images/stories/n</u> ovosti/Rezultati_istra%C5%BEivanja_Izazov i_u_visokom_obrazovanju_za_vrijeme_pand emije_bolesti_COVID19_i_socijalne_izolacij e.pdf, 02.02.2021.

The data from Graph 4 show the quality of online teaching performance through lectures, where half of the students 50% of them think that the quality is much worse and worse than the lectures before quarantine. 23% think that the quality is the same as before, and 24% think that it is better and much better than before the quarantine.



Graph No. 4: Quality of online teaching performance through lectures - students

Source:<u>https://www.azvo.hr/images/stories/</u> novosti/Rezultati_istra%C5%BEivanja_Iza zovi_u_visokom_obrazovanju_za_vrijeme pandemije_bolesti_COVID19_i_socijalne_i zolacije.pdf, 02.02.2021.

Graph 5 shows the quality of online teaching through lectures, 38% of employees think that the quality was the same as before quarantine, 27% think that it is to some extent worse than before quarantine, 39% of employees think that such teaching is better than before quarantine.



Graph 5: Quality of online teaching performance through lectures – employees

Source:<u>https://www.azvo.hr/images/stories/</u> novosti/Rezultati_istra%C5%BEivanja_Iza zovi_u_visokom_obrazovanju_za_vrijeme_ pandemije_bolesti_COVID19_i_socijalne_i zolacije.pdf, 02.02.2021.

Students believe that the quality of teaching is not uniform, the performance depends on the teacher / professor. Part of the professors were praised by the students as enthusiasm, accessibility and adaptation to new circumstances, in the second case online teaching was not or was not properly organized and conducted. Some research participants believe that exams and colloquia are not properly organized and the literature was not sufficiently available. They also stated that the quality was affected by the overall atmosphere of quarantine, also a big role is played by the challenge of motivation, but also the conditions that students have at home (own computer, internet access, etc.). Colleges are presented as a meeting place, and study as one of the significant periods of life in which acquaintances are made and networks are created that remain for a lifetime. University education is based on a critical. cooperative and confidential exchange between students, where one lives from live chat. There are fears that these important elements may disappear through the digital shift.¹⁷

4. The impact of the COVID-19 pandemic on student mental health

¹⁷ Universities in the Corona Age: The Digital Trap,<u>https://www.dw.com/hr/sveu%C4%8Dili%</u> C5%A1ta-u-doba-korone-digitalna-klopka/a-54849498, pristup: 02.02. 2021.

Distance learning is a series of challenges for teachers and professors because the learning process takes place at home and it is necessary to provide the prerequisites for learning, but also to determine how much you actually need to learn. Education is considered a development of modern society. The COVID-19 pandemic changed all aspects of life in all social groups and brought numerous economic and social consequences. For students, the pandemic additional difficulties has caused in education, learning, employment and maintaining mental health. Quality assurance and the relationship between distance learning are becoming a global problem of the current education system. Lack of physical contact, social support of professors and students, can lead to student inadequacy, lack of motivation and to the final withdrawal from education.



Graph 6: Student workload in an online environment during emergencies - student assessment

Source:<u>https://www.azvo.hr/images/stories/</u> novosti/Rezultati_istra%C5%BEivanja_Iza zovi_u_visokom_obrazovanju_za_vrijeme_ pandemije_bolesti_COVID19_i_socijalne_ izolacije.pdf, 02.02.2021.

Graph 6 shows the workload of students in the online environment during quarantine, half of the students who participated in the study (56%) believe that the workload was higher and much higher than before, that it was the same, 23% of them, and much less 18% consider them less.

Most students believe that they needed significantly more independent work during

quarantine, while some pointed out that distance learning provided additional time that would normally be spent on travel and the like, and therefore could cope with the additional burden caused by conducting distance learning.

According to Graph No. 7, it can be seen that higher education staff assessed the workload of students during quarantine, 38% of staff believe that students were burdened to the same extent as before quarantine, while 20% believe that they were less burdened, and 34% considers that they were more and much more burdened.



Graph 7: Workload of students in the online environment during extraordinary circumstances - assessment of higher education staff.

Source:<u>https://www.azvo.hr/images/stories/</u> novosti/Rezultati_istra%C5%BEivanja_Iza zovi_u_visokom_obrazovanju_za_vrijeme_ pandemije_bolesti_COVID19_i_socijalne_i zolacije.pdf, 02.02.2021.

Some teachers state that due to the increased exposure of students to stressful circumstances, they tried to ensure the continuity and continuity of the study process and to maintain the student workload and scope of work as similar as possible to teaching and knowledge tests that students are used to in the previous environment.

CONCLUSION

"New Normal "means continuing business activities and maintaining regular

communication with employees working in remote locations, with clients and with the target audience in general. For years, the trend of organizing virtual and hybrid conferences, education and teaching has been growing, but the primary reason for using this type of technology was the lack of financial resources. In the new reality, online solutions have become almost the only way of business communication between people, including online conferences and lectures. Social networks were created for communication that began to be increasingly used for educational purposes. They improve communication between students, but also between students and teachers. Social networks allow students to seek the help of their friends. Students can also create a learning group, which encourages interaction between them. Students can get information about the latest events in just a few minutes spent on social media. I can search for relevant information and speed up my learning. The ability to get key information at the right time is one of the most important reasons why social media should be used in education.

Different social networks have different tools to help users easily find the right topic. Social networks are a challenge in the teaching process of education, because they are an almost indispensable part of free time for pupils and students. From a technological point of view, they are online services that offer users free communication. There are a significant number of social networks on the Internet, from those used only to connect with friends, family through informational, all the way to academic social networks that allow scientists to share their research. Social networks are an increasingly important space for cooperation and exchange of ideas in everyday life situations. It is desirable to direct the education of new generations in the direction that will meet their needs and motivate pupils and students to actively participate in the teaching process. Social networks have the opportunity to make changes in the model of the teaching process. Such an environment, whether primary, secondary or higher education, improves communication and problem solving by connecting different opinions, knowledge

and attitudes of students and teachers. The fact is that social networks are increasingly used and are gradually taking center stage in the modern educational process.

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THE IMPACT OF THE COVID-19 VIRUS ON THE OPERATION OF TRANSPORT COMPANIES AND THE DEVELOPMENT OF TOURISM IN THE WESTERN BALKAN COUNTRIES

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Original scientific work

Summary: The pandemic of the COVID-19 virus begin to spread at the end of 2019. and in the countries od the Western Balkans at the beginning of 2020. Immediately after the declaration of the pandemic, measures to close the borders and a ban on movement followed. These measures have had a significant impact on the operations of almost all branches of the economy. The activities of transport ane tourism company were particularly, which determined the economic trends in these two areas. The business of transport and tourism companies has a declining revenue trend, both in the world and in the countries of the Western Balkans. Interest in tourist travel has especially declined. This paper discusses measures to halt further declines in transport and tourism revenues, opportunities and prospects for recovery and development, projected foreign tourist traffic and the impact of the Covid-19 virus od both global economic development and the Westwrn Balkans. The paper will also present statistical data on trends in tourism in the city of Pristina, with an emphasis on reducing revenues from transport services, reducing the number of visitours for the seven-month period 2020, compared to the period in 2019.

Keywords: Pandemic, Virus Covid-19, transport, business transport companies, tourist destinations, number of trips, turistic trips.

1. Introduction

In the modern world, human civilization has advanced in development to the greatest power of achievement on planet Earth. Over time, human civilization has reached in technology where a large amount of information and choices as well as a large number of means of transport, machines that help people achieve their goals faster. Massive means of transport have been built by which transport companies develop faster economic development of tourism, transport companies that operate on tourist trips that transport in different directions around the world. A man in the very beauty of life and the luxury of a large selection of transport and tourist beauties, wanting to last forever and thrive in business, unconsciously did not realize that it can stop all at once, he was stopped today by the Covid virus - 19. who once stopped the business of transport companies and the economic development of tourism, and in a few months stopped everything that man had invented for years and during his creation of business and tourist travel thought there was never an end, but today the Covid-19 virus stopped all dreams of mankind tourist travel planning. Today, it is more important to preserve immunity and health compared to the now disinfected and closed Huanan Seafood Market in Wuhan City, where doctors have noticed an initial group of diseases similar to the inflammatory virus. When it was announced in December 2019 that the Covid-19 virus was present on the market, although later research suggested that it may have started somewhere else. And since these first observations were recorded outside the Western Balkans region, air pollution and effects could have negative these consequences on mortality in the region. Without an effective vaccine or treatment, the COVID-19 pandemic may continue or recur. These public announcements discuss possible links between air pollution and COVID-19 that could also occur in the Western Balkans. Given the way the virus is spreading and fighting, many links are also still uncertain, especially in the Western Balkans. The last months of crisis and uncertainty from the COVID-19 virus have not only severely endangered infected people

but also their families and their very weak economic resilience. The higher the number of infected people, the more strict measures of freedom of movement are applied, which is immediately transferred to business and economic development, and transport companies, transport and tourism development are financially endangered.

2. CORONA VIRUSES COVID-19

2.1. Viruses such as SARS, MERS and COVID-19 can be deadly

The name "coronavirus" comes from the Latin word corona, whose meaning is "crown" or "halo", and refers to the characteristic appearance of viral particles (virions): they have a rim resembling the crown or corona of the Sun. Coronaviruses are large pleomorphic spherical particles with spherical surface protrusions. The average particle diameter of the virus is about 120 nm (.12 µm). The diameter of the envelope is ~ 80 nm (.08 μ m), and the peplomers are ~ 20 nm (.02 µm) long. The envelope of the virus in electron micrographs appears as a special pair of electron-dense shells. Inside the envelope is a nucleocapsid, which is formed from multiple copies of the nucleocapsid (N) protein, which are linked to a single-stranded RNA genome in a continuous bead-on-string conformation. The lipid bilayer envelope, membrane proteins, and nucleocapsid protect the virus when it is outside the host cell.

Since 2006, the spread of SARS has come to a complete halt, with the last case observed in June 2003 (although the last case was a laboratory infection in 2004). However, SARS is not considered extinct because it may still be present among animal species and may return to the human population in the future.

2.2 PCR detects virus genetic material

PCR detects the genetic material of the virus in blood, mucus, tissue samples and stool. PCR proved to be extremely accurate but not sensitive. This means that a positive test means an infection with SARS, while a negative one does not mean that the patient does not have SARS. White blood cells are often elevated. Early reports reported neutrophilia and lymphopenia - but relative, as the total number was reduced. without being aware of their own health situation. Infection of the disease, ie the period from infection to the first appearance of symptoms can last up to 14 days, but on average it is a period of three to six days.



Photo 1. Virus Covid -19, Infectious_bronchitis_virus¹⁸

Table 1. Frequency symptoms in Covid-19 virus

Source : Autor research

Based on the table, it can be concluded that the most common symptoms that affect most infected people are: headache, loss of smell, muscle pain and sore throat. Symptoms affecting a small group of infected people, mostly the elderly, are nausea and diarrhea. Covid-19 virus is transmitted by airborne droplets, contact, through droplets of saliva or mucus when coughing, sneezing, speech of an infected person near others, except direct contact, the virus can be transmitted indirectly from the surface to which the particles survive for some time. The problem lies in the fact that people who do not show symptoms of infection and are anv considered healthy can potentially be infected and thus spread the infection further

Tuesday February 2nd	Monday, February 8th	Registered in 6 days
Latest number	Latest number	Recent cases
Global cases	Global cases	Infected
103,499,063	106,220,644	2 ,721,581
Global deaths	Global deaths	Death
2,240,726	2,318,566	77,840
Cases in USA	Cases in USA	Infected in USA
26,322,212	27,008,096	685,884

Table 2. Recent numbers of global cases within six days of infection and mortality and differences in U.S. cases

Source : By Eliza Mackintosh, CNN¹⁹

Version B.1.351 has been identified in at least 41 countries, including the United States, according to the World Health Organization (WHO). Other variants first observed in the United Kingdom and Brazil have been discovered in dozens more. And

¹⁸ 220px-Infectious_bronchitis_virus

¹⁹ CNN Coronavirus Update : 01.02.2021. 12:32, By <u>Eliza Mackintosh.</u>

they are spreading fast. From the study, which has not yet been reviewed, it was not clear whether the Oxford-AstraZeneca vaccine protected against severe disease from variant B.1.351. The 2,000 participants in the clinical trial were mostly young healthy adults, who were unlikely to become seriously ill. But based on immune responses discovered in blood samples, the scientists said there was "still some hope" that the vaccine could protect against more severe cases. Several other manufacturers have said they are trying to solve the variant problem by developing amplified shots. The WHO Independent Vaccine Committee will meet on Monday to discuss the AstraZeneca vaccine and what the new study means for future vaccines..²⁰

At this stage of development, national methodologies are not sufficiently harmonized to make the data fully comparable across countries. However, even in the absence of quality official statistics, the results provide useful insights on the state of TSA implementation and on assessments of the economic and tourism dimension of tourism at EU and national level.²¹

3. Tourism in the countries of the western balkans

Tourism plays an important role in the economies of many countries, as is certainly the case in the Western Balkans and then in the European Union. For the countries of the Western Balkans, the development of tourism due to the development of the economy and the development of the labor market and the activation of a large number of employees in their territories who would not look for jobs in other EU countries due to the impact of the crisis. For the member states of the European Union, tourism has been very important for the development of the national economy and labor market, which also includes transport companies that contribute not only to economic development social, social but also and cultural development of tourist destinations for the benefit of all Western Balkan countries. Most countries of the Western Balkans have a well-established system of statistics for tracking tourist destinations and conditions of incoming and outgoing travel, transport lines as well as tourist accommodation and services. The reason for the income of the broad economic sector lies in the fact that a large number of people participate in maintaining strategically sustainable living in the tourism market:

• participation of people in the establishment and review of a tourist destination with a protected natural area

• participation of local communities in the design of tourist destinations,

• participates in the management and protection of certain areas of nature,

• makes a profit by participating through protected areas of nature,

• by participating in investments related to the management of the area and to support local communities

• manages protected nature areas through participation

• participation of national interest by the local community and private organizations

3.1. Tourism as a factor in the development of economically underdeveloped areas

Tourism mainly developed in parts of the country where people were primarily engaged in livestock, fishing, viticulture and others. These were mostly small places away from shopping and urban centers where the rural population lived worse than the population of the urbanized part of the country. Peace, uncleaned air, good climate and beautiful scenery is exactly what the weary city population needed. It is for these reasons that the process of transferring money from the city population to the

²⁰ CNN Coronavirus Update, By Eliza Mackintosh.

²¹ <u>https://ec.europa.eu/eurostat/web/products-</u> statistical-reports/-/KS-FT-17-002

treasury of the economically underdeveloped part of the country is being launched. Material income was ultimately used to improve these parts of the country and improve life in them. The consequence of this tourism factor is a positive redistribution of capital. But some tourist destinations began to develop a long time ago, so today they employ workers from the rest of the country or the world.

3.2. The impact of tourism on employment

Human labor in tourism has a major value, unlike other industries, tourism craves workers in tertiary activities (catering, utilities, transport). The advantage of tourism is that it constantly demands and creates new jobs, it does not robotize people's work. a) Direct employment in tourism - catering, tourist mediation, retail trade, etc. b) Indirect employment in tourism - water supply, construction, IT support, etc.

European countries, statistics In are extremely relevant, they do not measure the overall contribution of tourism to the economy. To this end, the World Tourism Organization (UNWTO), the United Nations Statistics Division (UNSD), the Organization **Co-operation** for Economic and Development (OECD) and the Statistical Office of the European Union (Eurostat) have developed a harmonized tourist satellite accounts system (TSA).²²

Planned Transports as a destination benefit used concept and classifications as well as international accounts and is an internationally recognized program for activity measuring tourism and the importance of tourism to national or regional economies. While the statistics of the western Balkan countries are more used on tourism destinations. traditional they primarily focus on the number of passengers

(number of visitors, number of nights, number of filled capacity of one market, etc.), where we can say creates one tourist destination.

4. TOURIST DESTINATIOS IN PRIŠTINA

Pristina is a major tourist destination as well as the capital of Kosovo, known as a for students university center from neighboring countries such as Albania, Macedonia and Montenegro. In 2012, tourism in Pristina attracted 36,186 foreign visitors. Most foreign tourists come from Albania, Turkey, Germany, the United Slovenia. Montenegro States. and Macedonia, and the number of visitors from other places is growing every year. The city has a large number of luxury hotels, modern restaurants, bars, pubs and very large nightclubs. Coffee bars are a representative icon of Pristina and can be found almost everywhere. The largest hotels in the city are the Swiss Diamond and the Grand Hotel Pristina located in the heart of the city. Other major hotels present in Pristina include the Emerald Hotel, Sirius Hotel and the Garden Hotel. Some of the most visited sights near the city include Batlav Lake and the Marble Cave, which are also among the most visited tourist destinations..23

Photo 2. Swiss International Hotel in Priština

Tourism in Kosovo offers a rich tourist offer that is divided into five tourist regions - the central region of Pristina, the tourist region of the Albanian Alps, or Prokletije, and the region of Shara, Pomoravlje, Mitrovica and Bajgorska Shala. The Sharr Mountains and the Prokletije region stand out in particular.

²² 2008 Tourism Satellite Account: Recommended Methodological Framework (TSA:RMF 2008); United Nations Statistics Division (UNSD), Statistical Office of the European Communities (Eurostat), Organisation for Economic Cooperation and Development (OECD) and World Tourism Organisation (UNWTO). The document is available on the Eurostat website (see footnote 1).

²³ "12 thousand foreign tourists visited Kosovo (alb. 12 mijë turistë të huaj e vizituan Kosovën)". 2013.
Arhivirano iz <u>originala</u> na datum 3. 12. 2018.
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Science and technology

Kosovo offers a lot to tourists, and some of the more attractive destinations are the Prokletije and Shara National Parks. When we are in the countries of the Western Balkans and on the map, most of the tourists are from Asia who visit the cultural heritage that is under the protection of UNESCO. We hope that this year we will fight the virus and be able to continue future planning for the development of the economy in transport and tourism.

Among the main natural attractions are the Marble Cave in Gadimlje, the source of Beli Drim, the Miruša waterfall, the Rugova gorge, and natural and artificial lakes and springs of thermo-mineral waters. Among the cultural and historical monuments in Kosovo, tourists can visit the monasteries of Gracanica near Pristina, Visoka Decani between Gjakova and Peja, and the Sinan Pasha Mosque in Prizren, and there is also an archeological site of the Roman and early Byzantine city of Ulpiana near the capital of Kosovo. .

4.1. Number of tourist visitors for the period 2008 – 2013

	NUMBER C TOURIST VISITORS)F	NIG	НТ STAY
TIME				
PERIO				
D	Domest ic	Foreig n	Domest ic	Foreig n
TM1 2008	4.104	4.982	4.994	10.41 9

We will show the number of tourist visitors

114,1111		Seier		motosy
TM2 2008	5.142	6.380	5.824	12.42 8
TM3 2008	5.663	6.519	6.542	11.62 9
TM4 2008	4.769	6.735	5.242	12.43 4
TM3 2009	13.183	11.44 5	13.426	20.52 5
TM4 2009	17.925	8.017	18.026	23.54 6
TM3 2010	8.648	8.775	8.664	18.43 3
TM4 2010	5.556	7.807	5.561	20.18 0
TM3 2011	7.806	8.249	8.746	16.01 7
TM4 2011	11.141	6.676	11.859	15.73 0
TM3 2012	13.613	16.117	13.657	28.01 6
TM4 2012	12.172	12.683	13.196	27.05 5
TM3 2013	12.421	12.673	14.065	22.42 6

Table 2. Number of visitors (domestic and foreign) and overnight stays, for the period TM1 2008 - TM3 2013

Period number of visitors and overnight stay in TM3 2013. number of visitors is 25 094 visitors,of which 49.5% are domestic visitors and 50.5% foreign visitors, and the number of overnight stays in TM3 2013 is 36 491 overnight stays, where 38.57% of overnight stays are from the local population and 61.46% are foreigners.²⁴

²⁴ Agjencia E Statistikave Të Kosovës, Ueb-Faqe: Http://Esk.Rks-Gov.Net

4.2. Number of monthly visitors for the period 2018 – 2019 4.3.

NUMBER OF VISITORS OF THE YEAR

Month	2018	2019
January	6357	8219
February	8472	6285
March	6701	7305
April	7675	9393
May	6790	8886
June	5973	7357
July	5195	8593
August	9268	7203
September	10837	8445
October	11603	9375
November	7842	8175
December	7505	9705
Total	94218	98941

Tabela 1. Broj posetilaca, 2018-2019²⁵

4.3. Number of monthly visitors for the period 2018 – 2019

The number of visitors in 2018 is 94218, the number of visitors in 2019 is 98941, the difference between 2018 and 2019 is 4 723 higher number of visitors in 2019. We will graph the difference in the number of visitors.



Graph 1. Number of visitors, 2018-2019, graphic presentation 26

5. CONCLUSION

The Agency for Statistics of Kosovo (KAS) published the Statistics of Hospitality in Kosovo for the third quarter (Q3) in 2020. In Q3 2020, 206 hotels operating in Kosovo were part of the survey. In Q3 2020, there were 40,272 visitors (foreign and domestic), of which 47.14% were domestic and 52.86% were foreign. While the number of overnight stays was 80,980, of this number 45.32% of overnight stays were from domestic and 54.68% from foreign visitors. The region of Peja has the largest number of visitors and its overnight stays with 13,885 visitors and 38,188 overnight stays. The largest number of foreign visitors is concentrated in Pristina, Peja, Prizren, etc. As for foreign visitors, the largest number of them were from Albania, Germany, Turkey, etc. In the first seven months of 2019, the number of visitors in

²⁵ https://ask.rks-gov.net/media/5421/godisnjiizvestaj-2019-srb.pdf

²⁶ https://ask.rks-gov.net/media/5421/godisnjiizvestaj-2019-srb.pdf

Kosovo was about half a million tourists, and in the same period in 2020, only 50 thousand tourists requested private accommodation. The Tourist Union of Kosovo states that tourism has started to develop in Kosovo, even if the COVID-19 virus destroyed everything. And when the story of the economy and the story of money are in euros, then it is a 20 million euro deficit, unlike the previous year, and only when it comes to data on accommodation.

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IMPACTS OF COVID-19 PANDEMIC ON GLOBAL SUPPLY CHAINS

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Original scientific work

Abstract: The primary motive of this research is determining the impact of the Covid-19 pandemic on the highly complex structures such as global supply chains. The research draws conclusions about the current situation and challenges that global supply chains will face in the near future. Therefore, primary and secondary data sources, statistical indicators and researches about the effects of the pandemic on global organizational structures were consulted. The main fact is that Covid-19 pandemic is not only driver of change, but an essential accelerator of the need to restructure global supply chains. Global supply chains that want to maintain or expand their market shares in rapidly changing market conditions are forced to adapt extremely quickly their overall business concepts at all levels of these complex structures. The essential feature of this research is the definition of basic strategic guidelines for efficient adaptation to current and future needs of the global market.

Keywords: Supply Chain Managament, Covid-19, Global Supply Networks, Economic Integration

The products we use are mainly the product of complex supply chains spread over many highly developed and specialized markets. The Global Supply Chain (GSC) is a crossnetwork border of manufacturers, corporations, information and other resources involved in the production and movement of semi-finished and finished products. For many years, supply chains have been created according to what comparative advantages can be achieved in countries with lower levels of costs (wages, wages, transport) or with which favorable trade agreements have been concluded. This has resulted in an increase in the relocation of certain activities to "cheaper" locations around the world. The effects of economies of scale in supply chains have been achieved through the allocation of low value-added production activities to cheaper labor markets (and as close as possible to endcustomer markets), while high value-added activities (such as research and development) are located in home, highly developed holdings. In this way, home markets generated a higher share of profits with lower operating costs. The formation of global supply chains took off at the end of the 20th century, aided, among other things, by improvements in the management of global trade flows (establishment of the World Trade Organization - WTO, 1995), reduction of customs rates and minimization or even complete elimination of other non-trade barriers. and innovation in the field of information and communication technologies. All of the above contributed to the development of intercontinental transport routes for the supply of necessary materials, greater complexity of the final product, increased the importance of operational efficiency, but also contributed to China's establishment as the world's largest supplier of raw materials in global supply chains. It is the increasingly rapid development and implementation of advanced IT solutions that is transforming the supply chain from the concept of linear supplier integration into complex globally configured digital supply networks. In such digital supply networks, functional silos are broken down within organizations, allowing organizations to connect to the entire supply network to enable transparency from the beginning to

the end of the chain, as well as better stakeholder cooperation, flexibility and optimization at all levels. Digital supply networks are designed to prevent possible interference. Kilpatrick and Barter (2020) state that, if interference occurs, they are designed so that they can be adequately reconfigured in order to minimize the impact of the resulting interference as soon as possible.

1.1. China's importance for global supply chains

In 2019, China generated a nominal GDP of \$ 14.34 trillion, ranking second behind the United States in the ranking of the world's developed economic most powers. generating \$ 21.43 trillion (see Chart 1). China in 2019 realizes 13.71% of total world exports compared to the second-ranked US with a share of world exports of 9.02%. On the import side, the USA leads with a share of 13.95% in total world imports, in contrast to China, whose share is 11.24% (see Chart 2). While in the past China was considered a producer of low value-added products, today it acts in the supply chains of many top products. Over the years, China has established itself as the world's largest manufacturing hub for the production of raw materials and semi-finished products, or as the second strongest economy in the world, generating 60% of global exports of consumer goods and 41% of global exports of technology, media and communications. The literature cites large capital investments (financed by large domestic savings and foreign investment) and rapid productivity growth as key causes of China's rapid economic growth. Productivity growth is another key factor in China's rapid economic growth. Increased efficiency is the result of reallocating resources for more productive use, especially in sectors previously heavily controlled by the central government, such as agriculture, trade and services. Not to be overlooked is the fact that foreign direct investment in China has brought new technologies and processes that have contributed to efficiency gains.

Chart 1: 20 largest global economies in 2019 (nominal GDP in trillions of USD)



Source: Adapted to www.trendeconomy.com

It is possible to conclude that any slowdown in economic activity in China directly affects the global economy. Delays or disruptions in supply chains in China mean a reduction in production capacity and material output, which in turn affects exports and production opportunities in many other markets with which China cooperates. Given that China is the second largest global consumer. this fact represents an additional vulnerability for supply chains of which China is a stakeholder, as it is precisely China's reduced demand for certain goods that can result in complications and / or delays at many levels of the chain.





Source: Adapted to www.trendeconomy.com

Based on the above indicators and the fact that China and the USA are global economic rivals, a logical assumption arises that the relations between these two economic superpowers have been strained. Admittedly, we have witnessed growing tensions between the US and China in recent years. Tensions have been fueled by the introduction of punitive tariffs imposed by the United States in 2018. ordered the import of goods from China and Kineks countermeasures imposed on imports of goods from the United States. Huawei's listing on the U.S. List of Entities and issues in restricting trade practices with the U.S. further fueled the rift, while the outbreak of the Covid-19 virus pandemic in the Chinese city of Wuhan was an additional motive for the U.S. to criticize China. With June 2020. the Chinese security law for Hong Kong enters into force, which provides for penalties for separatist activities or interference by foreign forces. The United States immediately in July 2020. reacted by passing a law providing for the punishment of persons and institutions that extinguish the freedom of Hong Kong, and the property of these persons may be frozen in the United States and those persons may be barred from entering the United States. In addition, the United States has abolished Hong Kong's special trade status and treats it as part of China in terms of customs procedures and visa regime. China's reaction to this is reflected in the ban on entry to China for certain American politicians and through threats to tighten the visa regime for US citizens. How bilateral relations between the United States and China will develop remains to be seen in the coming period. It can be established with certainty that a trade war between these two global superpowers would have a great impact on the entire world economy, and especially on the possible formation of two world trade fronts and the reshuffling of the world economic order.

Drivers of change in global supply chains

Complex structures such as global supply chains respond dynamically to changes caused by economic and / or non-economic factors, to geopolitical tensions, and to changes in socio-economic values and norms. The global financial crisis in the period 2008-2009. it has mitigated the momentum of globalization. Globalization itself has encouraged economic inequalities in advanced economies, so many

governments have pursued protectionist policies in the form of the introduction of non-tariff barriers (quantitative restrictions, price restrictions, regulatory restrictions such as licensing, etc.). Increased levels of US-China tensions have heightened concerns among organizations and countries that are stakeholders in global supply chains. Declining production benefits in lower wage markets. increasing natural disasters (causing costly supply chain downtime), and development of new disruptive the technologies (which can simplify and shorten supply chains) have further encouraged global actors to reconsider their procurement strategies. Reducing . flexibility and calling into question the sustainability of supply chains, spurred by the Covid-19 crisis facing the world since early 2020, have certainly further accelerated the trend of declining globalization activities in supply chains. Fan, Holzheu, and Wong (2020) point out that it is very likely that global supply chains will undergo numerous transformations and restructurings of both the modus operandi and their very structure in the coming years.

Research conducted by experts from SwissRe, Fan, Holzheu and Wong (2020) provides five fundamental drivers for the accelerated restructuring of global supply chains: (1) reducing cost leadership, (2) increasing the level of political risks, (3) social values, 4) increase in costs caused by business disruptions and (5) development of new technologies. The development of new technologies such as Artificial Intelligence (AI), additive manufacturing, Machine Learning (ML) or advanced robotics are already transforming supply chains. A good overview of all levels of the supply chain is key to developing a resilient supply chain. When it comes to highly complex global supply networks, it is very difficult to determine all the data on suppliers in the depth of supply chains. Therefore, many organizations turn precisely to technology to support them in achieving chain transparency. The issue of China as a world economic power is closely related to the transformation of supply chains. One of the reasons why China has grown into the largest

things, its demographic dividend. When the level of working age population reached its peak and in 2011. began to decline, the Chinese government raised minimum wage levels to support income growth and boost consumption. At the same time, Southeast Asian countries with a better demographic dividend (Thailand, Malaysia, Vietnam, among others) profited in terms of labor costs. As a result, global supply chains began to expand into other ASEAN markets. The capacity of the above countries to attract foreign investment in the manufacturing sector has increased, in particular in terms of providing quality infrastructure for investors, raising logistics competencies and the availability of local suppliers. Increase in the level of political risks from 2018. further resulted in a decrease in China's market share in the US in 2019, while at the same time some other countries (e.g. Mexico, Vietnam, Thailand) increased their market shares there.

manufacturing hub over time is, among other

Graph 4. Imports to the USA 2018/2019 (share in total global imports)



Source: Adapted to www.trendeconomy.com

But while exports from China to the US declined, exports from China to other countries rose sharply, resulting in an increase in China's share of global exports by 0.8% in the 2017-2019 period. (see Charts 4 and 5). For example, China has lost market share in the U.S. semiconductor sector due to tariff barriers, but at the same time has established itself in the global semiconductor market to the detriment of traditional suppliers such as South Korea, Singapore and Taiwan, among others. Chinese exports,

therefore, are increasingly competing with products from more advanced industries such as South Korea, Germany, Japan, Singapore and Taiwan.

Graph 5. Exports from China 2018/2019 (share in total global exports)



Source: Adapted to www.trendeconomy.com

3. The impact of the Covid-19 pandemic on global supply chains

Supply chains have been created with the intention of making individual materials more easily accessible through channels of this type of integration. However, as the COVID-19 virus pandemic has shown, unexpected events can break this basic premise. Supply chains should therefore be flexible. dynamic, responsible and interconnected with the ecosystem and chain stakeholder processes. Lee and Wright point that (2020)out this requires transparency from the beginning to the end of the chain, accurate real-time information and decisive action — especially in escalating situations. As the COVID-19 pandemic erupted around the world, in early 2020. some states have declared closure measures to prevent the spread of the virus. This meant disruptions in global supply chains so that demand for many everyday products disappeared almost overnight, while demand for other (unexpected) products exploded, leading to supply constraints and shortages. Organizations face significant business and operational disruptions and challenges, from mitigating the effects of reduced

discontinued supply, through managing disruptions in relationships with suppliers to a number of barriers to meeting their own contractual obligations to customers. The realization of deliveries and the shock caused by the almost complete closure of the economy at the beginning of 2020 are becoming increasingly difficult. highlighted the many vulnerabilities of global supply chain management strategies. Although there were intentions to shorten supply chains even before the pandemic, the pandemic has forced many organizations to reconsider the ways in which their supply chains function extremely quickly. Thus, the pandemic is an accelerator of the already announced changes and an incentive to find innovative ways to achieve resilience to crisis situations and maximum efficiency at all levels of supply chains.

The BCI Institute from Great Britain spent 2020. a study of the impact of the Covid-19 pandemic on the functioning of supply chains in a sample of a total of 353 organizations from 77 countries and 19 different sectors. One of the conclusions made by Elliot (2020) is that 50.50% of the surveyed organizations were not ready for a pandemic outbreak. It also profiles the three most prominent streams of thinking of organizations operating within global supply chains: (1) those that fully want to revise and adjust their business strategies, (2) those that consider diversifying the supplier portfolio and reducing dependence on the Chinese market, and (3) those considering holding additional (safety) stocks in the future. The research also found that many organizations were faced with delays in the delivery of necessary raw materials or individual deliveries could not be realized at all, precisely because of the individual locations where suppliers produced certain products. Given that many countries are still facing some degree of restrictions due to the pandemic, this is also manifested through changes in demand. Elliot (2020) points out that almost half of organizations (48.9%) record a decrease in

customer demand, while a quarter of respondents (23.8%) recorded a significant drop in demand. However, it is significant that 18.2% of organizations point out that during the pandemic they recorded an increase in demand, while 14.7% of organizations recorded a significant increase Thus, for example, in demand. the organization Zoom (which offers a platform for video conferencing), in the period from February to April 2020. recorded revenue growth of 169% and a share price increase of 152% compared to 2019.

If the overall situation caused by the Covid-19 virus pandemic is generalized, the fact is that the majority of organizations directly exposed to the limitations of the pandemic have acted according to similar patterns of behavior. The transport of goods from the quarantined area to locations near trade hubs has been intensified, in order to facilitate the availability of goods for shipment. Demand for stocks of certain raw materials and intermediate goods increased significantly as these goods became more inaccessible. As a result, many organizations procured larger quantities of necessary raw materials in advance in order to ensure the smooth production of their products. Organizations have included additional suppliers in their supply chains where possible, especially in cases where key suppliers are located in areas where quarantine and closure measures have been imposed. In addition, stopping transit in many supply chains has manifested itself in disruptions and delays in various parts of the supply chain. According to Doerfler (2021), the average time of realization of transport of goods has increased many times over: 222% in China, 217% in Korea, 209% in Japan, 201% in Europe and 200% in the USA. In order to level oscillations of this type, it is necessary to set priorities and meet the urgent requirements of the market as much as possible within the "new normal". Thus, it is possible to profile the key challenges facing supply chains since the outbreak of the Covid-19 virus pandemic: closure and social distancing, restrictions on the movement of goods. changes in demand, and the importance increasing of e-commerce channels.

4. Strategic guidelines for supply chain competitiveness

In order to achieve a higher level of supply chain resilience, organizations should. following the above facts, focus on the following key areas in order to strengthen the competitive advantage of the supply chains in which they operate: defining structural risks, ensuring flexibility, achieving global transparency and rapid response and problems. resolution. Under these assumptions, it is possible to define key strategic guidelines for the successful creation of efficient global supply networks: (1)conducting reevaluation and diversification of supply strategies, (2)maintaining optimal inventory levels, and (3) using advanced technological solutions as tools for smart global supply modeling. network.

4.1. Reevaluation and diversification of supply strategies

Organizations should conduct a thorough assessment of their suppliers, partners and all supply chain stakeholders. Lee and Wright (2020) point out that special attention should be paid to determining the level of impact of potential risks that an individual organization can tolerate in relation to the level of operational flexibility it wants to achieve. Manufacturers in most industrial segments have created networks of their suppliers in recent years, starting primarily from the criteria of the level of specialization of suppliers. This meant ensuring a high level of flexibility in terms of the elements they incorporate into the final product, as well as the ability to integrate the latest technological solutions into these elements. However, the failure of such a supplier (which produces a key component or material for the final product somewhere deep within the supply chain structure) can cause many delays and disruptions in the final product manufacturing process, as well as the potential inability to deliver the final product to the customer. Willy and Shih (2020) emphasize that the risk of not being able to deliver raw materials for the final product is even higher when a narrowly specialized supplier manufactures its product in only one plant or in only one country and / or region. In order to resort to the emergence of such risks, or to make organizations aware of them, they necessarily need to conduct a mapping of all their suppliers. Supplier mapping involves identification. their classification and categorization into low, medium or high risk suppliers. The supplier map of a global supply chain is extremely complex and, above all, opaque, given the various modalities of engagement of individual stakeholders. Therefore, the application of advanced information technologies is crucial for the targeted collection, processing and visualization of chain stakeholder data. High dependence on a single medium or high risk source can be reduced by adding multiple sources to sites that are not subject to the same types of risk. In recent years, more and more organizations are considering the "China + 1" strategy, ie avoiding investing exclusively in China and diversifying business into other markets. However, activating the "China + 1" strategy also carries certain difficulties, such as initiating in new markets business with new (unknown) legal frameworks and relocating business to multiple locations. Reducing the level of dependence on China will be easier with products such as clothing or furniture because this type of product is relatively easy to produce in some other locations as raw materials are generally readily available. It is more difficult to find adequate markets for the relocation of production facilities for sophisticated machinery, electronics and other goods containing high-tech components. To ensure the continuity of production of the latter products, it is necessary to find a location that, among other adequate things, has infrastructure, competent staff and a secured supply of necessary raw materials under competitive relocation market conditions. The of production capacities from China also calls into question the smooth functioning of logistics activities. The fact is that apart from

China, the countries of Southeast Asia do not have enough competitive ports to perform transport. maritime Thus, relocating production capacity to other locations would certainly mean more transhipment through ports such as Singapore or Hong Kong and a longer transit time to the final market, which ultimately means an additional cost burden. On the other hand, the "China + 1" strategy for the Chinese economy has no negative connotations. On the contrary, the strategy does not mean reducing the number of plants or employees in the manufacturing sector in China, it only reduces their growth rate, and at the same time allows China to develop other economic sectors. China will thus be able to maintain the production of low valueadded goods, but at the same time will be able to encourage sectors in which a high level of value added is generated. It is deep integrated supplier networks, an efficient and flexible workforce, highly efficient large trading ports and transport infrastructure that will give China a place among the leading global economies in the future, so in the long run it would be completely wrong to eliminate China from global supply chains.

4.2. Maintaining adequate levels of intermediate stocks or safety stocks

Organizations that do not have alternative suppliers in their portfolio as soon as the need arises, should define a plan of measures to ensure uninterrupted production until the engagement of alternative suppliers. This implies determining the required level of additional stocks, defining in what form it is necessary to keep these additional stocks and ultimately deciding where along the supply chain these stocks will be created. It should be borne in mind that the holding of safety stocks (especially for goods for which there is less demand or goods with shorter shelf life), carries a certain risk of obsolescence of stocks, but also the fact that stocks bind capital. This is certainly not in line with the principles of JIT and / or JIS delivery of goods and keeping stock levels low along the supply chain. But instructed by the latest developments caused by the Covid-19 pandemic, organizations should thoroughly examine the potential negative and positive impacts on their business in order to maintain a successful business in the coming period of high risk. This specifically means that the savings that organizations would generate through holding minimum inventories need to be put in relation to all the costs that may result from the disruption. The costs that may result from disruptions must include lower revenues, higher prices that organizations should pay for materials that suddenly become unavailable, and certainly quantify the time and effort required to supply the necessary maintenance materials. continuity of goods.

4.4 Smart modeling of supply chains

The reevaluation and new configuration of the supplier portfolio requires an adequate review of the supply network, in order to be able to make concrete and informed decisions about changes in the constellation of supply chains. Therefore, organizations need to engage in smarter supply chain modeling, in order to be able to instantly but continuously assess the balance between lean business and mitigating potential risks. Technological progress and continuous innovation have enabled the availability of state-of-the-art technologies wider to economic structures, so that many organizations within global supply chains in recent years have been automating and computerizing large parts of their processes. The application of new technological advances allows organizations to minimize the level of production costs and guarantees a higher level of flexibility to produce more variants of the required product without affecting productivity. The outbreak of the Covid-19 pandemic has made the application of automation even more necessary, given that maintaining social distance is one of the fundamental measures in the fight against the spread of the pandemic. Precisely this kind of encourages economic thinking nationalization, ie the return of productive activities to their home countries, which are in turn highly developed economies with a higher level of costs. However, lower labor costs at remote locations are compensated

precisely by the application of automated robotic solutions in the home countries, ie less required labor force with a higher level of process efficiency.

The application of artificial intelligence in supply chains enables numerous optimizations in terms of capacity planning, improving productivity, achieving top product quality, reducing costs and increasing production volumes. McSweeney (2020) points out that artificial intelligence is processing useful for supply chain information and allows people to better focus on control, management, and decisionmaking tasks. In addition, Chan et al. (2018) further point out that the application of 3D printing allows for rapid prototyping, easier product differentiation and the production of small series of orders without negative impacts on product quality. The application of 3D printing can simplify production processes and drastically reduce the number of suppliers required. Less mass production reduces the need for offshoring, while production can be realized very close to end customers. The application of 3D printing also allows for less workforce, which consequently means lower costs, bearing in mind the fact that human capital makes up a significant share of production costs. In addition to the above, the application of artificial intelligence contributes to the rapid planning of possible scenarios and provides inputs that increase the ability of supply chain creators to identify potential hazards and opportunities, and take appropriate measures to eliminate threats and make positive business decisions. Organizations can use artificial intelligence tools to transform unstructured data in real time into knowledge that helps predict interference and vulnerabilities For success in today's global, rapidly changing environment, it is the timely availability of information that is crucial for making adequate business decisions. organizations Thus, should implement data exchange platforms with stakeholders of their supply chains so that strategic partners are able to cooperate and understand the impact of potential risks and disruptions along the supply chain. Tools such as integrated control towers (CTs) can
provide complete transparency of different flows within the supply chain. Control towers are not physical objects, but centralized hubs that contain all the organizational technology, tools. and processes needed to collect data from all levels and stages of the supply chain from supplier to end customer. The benefit of the control tower is that it can be used to collect and analyze data in real time and make informed decisions about stocks, production needs and storage centers to alleviate uncertainties, all with a high level of accuracy and efficiency. Combining the potential of a control tower with connected intelligence IoT tools. artificial and blockchain technology, allows organizations to see where their products are around the world, in real time. This helps not only to possible vulnerabilities anticipate and disorders, but also to understand their impacts, thus enabling a faster response if needed. Lee and Wright (2020) point out that data exchange platforms, such as control towers, help strategic partners quickly come together to detect, understand, and address the impacts of disruptions in their shared supply chains.

CONCLUSION

Radically changing the existing supply chain is not as easy as it may sound, as creating a solid and secure chain will still need to balance the demands for economy. The primary challenge posed by the pandemic to logistics operations is certainly the question of how to maintain the level of service to end customers, taking into account the new safety and health requirements of social distancing. The impact of the pandemic and the impact of urgently defined measures to ensure business continuity, trade and economic flows will only be visible over time, but today it is necessary to take measures to build a smarter global supply chain, extremely flexible and resistant to risks and

contingencies. In any case, future-oriented organizations will recognize and take advantage of the available advanced technological advances in order to be able to resort to a general shift from unforeseen to possible business scenarios.

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ANALYSIS OF THE IMPACT OF THE SARS COV-2 VIRUS PANDEMIC ON SELECTED INDICATORS IN THE REPUBLIC OF CROATIA

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Abstract: The SARS CoV-2 pandemic during 2020 left repercussions on a large number of countries and their economic, health and social systems. National pandemic headquarters tried to limit the spread of the virus which resulted in a reduction of economic activity. The consequence of such measures is an increase in unemployment and the creation of a new paradigm of work. One of the countries affected by the pandemic is the Republic of Croatia. This paper aims to identify the impact of the pandemic on the Republic of Croatia using selected indicators such as economic indicators, population indicators, traffic and mobility indicators and Internet use indicators. The paper is based on secondary research of statistical data and their comparison with other countries. The research identified tourism as most affected sector. The results of the research are the basis for research of a similar type in other countries affected by the pandemic.

Key words: pandemic, Republic of Croatia, unemployment, tourism, economic system.

1. INTRODUCTION

Shereen, Khan, Kazmi, Bashir and Siddique (2020) state that the SARS CoV-2 virus appeared in late 2019 in China in Wuhan Province. It is a virus that attacks the respiratory organs and can cause significant damage to the respiratory system, and in some cases result in death. The virus is spread by droplets and direct contact with an infected person who may be infected but shows no signs of infection. Given the nature of the virus and its properties, as well as the high rate of spread due to human turnover through countries, countries have begun to define measures to combat the pandemic, or reduce the possibility of virus fluctuation among the population. However, Maria et al. (2020) state that the consequences of the adoption of measures are often related to the ban on movement outside the place of residence as well as the interruption of the flow of goods, ie the ban on performing certain activities such as catering, resulted in a slowdown. According to Shibata (2020), the slowdown in the economy has resulted in a decline in the GDP of some countries, which has resulted in a recession in those countries, ie an economic crisis. In other words, the impact of the SARS CoV-2 virus pandemic has resulted in a decline in economic activity, which is caused by a reduced volume of international trade as well as a reduced volume of business operations within individual economies. Likewise, research conducted during 2020 by He, Liu, Wang, and Yu (2020) also identified a correlation between the SARS CoV-2 pandemic and stock values. In other words, an increase in the number of infected and the number of fatal outcomes results in a decrease in stock prices, ie a decline in stock market movements. However, in addition to the impact on economic trends, there is also a significant impact on society, ie the population, and especially on the mortality of the population. Research conducted by Donthu and Gustafsson (2020) also speaks of a significant impact on the mental and physical condition of individuals who may develop symptoms of depression.

Pojavom pandemije, države stvaraju nacionalna tijela tj. organe koji su usredotočeni na borbu sa SARS CoV-2 pandemijom koji donose mjere usmjerene prema smanjenju fluktuacije virusa u populaciji. To je rezultiralo potpunim zatvaranjem koje kao posljedicu ima smanjenje broja prevoženih putnika, odnosno tereta u pojedinim zemljama. Samim time dolazi i do porasta online trgovine kao i rasta logističkog sektora, a posebice gradske distribucije. Osim toga, Loske (2020) navodi kako u nekim slučajevima dolazi i do povećanja potražnje za pojedinim dobrima kao što su to konzervirani prehrambeni proizvodi.

Qian and Fan (2020) in a study conducted in China in the Hubei region identified that the pandemic resulted in a significantly higher risk of revenue loss. This is particularly true for the part of the population living in the rural areas of the Hubei region that has been particularly affected by the virus as well as for the part of the population whose family members have been infected with the virus. However, in addition to a significant impact on income, there is also an impact on the decline in employment, which can be related to the measures that resulted in the closure of less tourist restaurants. or activity. Chakraborty and Maity (2020) emphasize that due to the transition of the health system to crisis functioning, larger waiting lists can occur, which in the long run can result in more illnesses from various diseases that could not be treated due to a different way of functioning of the health system. Developed economies such as Germany, Great Britain, the United States, China, France and others are recording a significant decline in gross domestic product. Haryanto (2020) says that the reason for this is the decline in certain activities such as international trade. passenger and freight transport, in some cases there is a decline in personal consumption, or a decline in revenue from tourist services. However, as the number of people infected with the SARS CoV-2 virus continues to rise in early 2021, or as a significant problem has been identified in vaccine distribution population and

vaccination itself, the consequences of the pandemic have not yet been finally recorded as sectors such as tourism , ie services in general are still subject to the risk of further revenue decline. However, in order to be able to define measures that will be aimed at recovery from the consequences of the pandemic, it is necessary to analyze the impact on individual sectors of the economy and, based on the analysis, define measures for recovery.

2. METHODOLOGY

The paper is based on a conducted secondary survey of data available in the database of the Central Bureau of Statistics, ie data available in the European body in charge of statistics, Eurostat. The data collected were divided into four categories: economic indicators, population indicators, traffic and mobility, and the use of the Internet was defined as the last indicator. The collected data were processed in MS Excell 365 where the program was used to format the tables as well as the analysis of the collected data by analyzing the percentage change. Data related to the Republic of Croatia were collected from the database of the Central Bureau of Statistics for the period from the first three quarters of 2019, ie the first three quarters in 2020. For the collected data, the analysis of the percentage change was used, which is shown in the table. The data for other European Union countries were presented and compared using the compilation method, ie the comparison method. Data for other European Union countries were taken from the Eurostat database in such a way that the highest and lowest percentage values were compared for each indicator in order to be able to define the context, ie. the position of the Republic of Croatia in relation to the Member State of the European Union that recorded the largest change, ie the smallest change. Furthermore, the compilation method provides an overview of the relevant conclusions reached by the authors who analyzed the impact of the SARS CoV-2 pandemic on indicators such as population, economy, transport, tourism, health and transport, ie. mobility.

2.1. Aim of the research

The aim of the research is to identify the impact that the SARS CoV-2 pandemic has on the Republic of Croatia with the help of economic indicators, population movement indicators, traffic and mobility indicators, ie internet use described in the chapter on methodologies. The results of the research can be used to review the movement of individual analyzed areas during the SARS CoV-2 pandemic during 2020, as well as to determine the correlation between individual indicators.

3. **RESULTS OF THE RESEARCH**

The results of the research are divided according to the indicators explained in the chapter

2. The results of the research describe the percentage change per indicator for each indicator, as well as the individual indicator compared with the percentage changes in the countries of the European Union.

3.1 Economic indicators

Table 1 shows the results of the conducted research. Table 1 shows that the SARS CoV-2 virus pandemic had the greatest impact on tourism, especially on arriving tourists, as it decreased in the first quarter of 2020 compared to 2019 by a total of 52.90%, while in second quarter recorded a decline of 549.30%. The largest decline was recorded during the tourist season in the third quarter and amounted to 1266%. On the other hand, compared to 2019, the number of overnight stays of domestic tourists increased by 76%. If we draw a parallel with other research, Škare, Soriano and Porada-Rochon (2020) state that it is clear that tourism is one of the most affected branches, as forecasts say that the loss of GDP worldwide due to the pandemic will be between 411 to 12.8 trillion US dollars. Sigala (2020) states that one of the most affected countries in the European Union by the SARS CoV-2 pandemic is Spain, which recorded a 75% drop in the tourism sector in 2020 compared to 2019, which indicates that the tourism sector is affected by the pandemic in other European countries. Union, without Spain being one of the most affected. On the other hand, in parallel with the decline in tourism activities, there is a decline in employment. A significant particularly increase in unemployment is visible for men, since in the second quarter of 2020, compared to 2019, unemployment among men increased by 13.56%, while in the third quarter of 2020, unemployment increased by 24.5% compared to 2019., 32%. On the other hand, unemployment for women increased by 24.59% in the third quarter of 2020 compared to 2019. Basically, when it comes to total unemployment in the third quarter of 2020 in Croatia, it is 8.4%. When it comes to unemployment at the European Union level, a significant increase in unemployment is visible as in the fourth quarter of 2019 at the EU-28 level unemployment was 6.5% while in the second quarter of 2020 during the largest wave of SARS CoV-2 virus unemployment rose to 7.5%. Looking at the Member States of the European Union, the countries with the highest unemployment rate due to the SARS CoV-2 pandemic are Spain and France, and Italy, respectively, and these are also the countries most severely affected by the pandemic. A particularly important parameter of the comparison are prices, ie price indices.

The results of the research indicated that there is no significant difference in price indices in 2020 compared to 2019. The largest increase in the price index was recorded in food and non-alcoholic beverages in the first quarter of 2020, where there is a visible increase of 3.09% compared to 2019. On the other hand, tobacco and tobacco products also recorded a significant growth compared to 2019 by 8.59%. Furthermore, there is a decline in exports in the second and third quarters of 2020 compared to the second and third quarters of 2019 in the second quarter of 2020, exports fell by 8.10% while in the third quarter fell by 7.7% compared to 2019 in the same period. If we are talking about the countries of the European Union, according to Eurostat (2020) data, a significant decline in exports in the period from mid-January 2020 to mid-April 2020 in the amount of 29% is visible.

The member of the European Union most affected by the decline in exports is France, whose exports fell by 17% in the period from January to October compared to the same period in 2019. The least affected EU member state is Latvia, whose exports have not changed by a single percentage point.

Table 1: Analysis of selected indicators for the Republic of Croatia

		Observed period (in thousands) 2019. 2020. year year						R az lik a			
		I- III	III- VI	VI- IX	I- III	III- VI	VI- IX		III- VI	V - X	
	Total	90 7	92 1	91 1	89 5	91 4	91 4	- 1,3 4%	- 0,7 7%	0,33 %	
2 are Muskanci	Active	96 7	97 2	96 7	95 6	97 3	98 8	- 1,1 5%	0,1 0%	2,13 %	
	Emplo yed	77 0	77 9	76 9	76 6	77 2	75 9	- 0,5 2%	- 0,9 1%	- 1,32 %	
	Unem ployed	60	51	56	62	59	74	3,2 3%	13,5 6%	24,3 2%	
	Unacti ve	71 6	710	71 4	72 3	70 6	69 0	0,9 7%	- 0,57 %	- 3,48 %	
	Total	75 4	757	79 3	75 4	75 5	76 4	0,0 0%	- 0,26 %	- 3,80 %	
	Active	83 0	814	84 0	81 6	81 0	82 5	- 1,7 2%	- 0,49 %	- 1,82 %	
		68 8	679	71 7	69 3	68 5	69 9	0,7 2%	0,88 %	- 2,58 %	
	Emplo yed	75	57	46	62	55	61	- 20,	- 3,64 %	24,5 9%	

International University Travnik

									97 %		
		Unem ployed	1.0 10	1.0 24	99 7	1.0 18	1.0 23	1.0 07	0,7 9%	- 0,10 %	0,99 %
MCM1	q	Total	92 2	5.5 97	63. 660	60 3	86 2	5.2 02	- 52, 90 %	- 549, 30%	- 112 3,76 %
	NoćenjaDol	Dome stic	31 3	636	3.8 20	24 7	18 8	82 3	- 26, 72 %	- 238, 30%	- 364, 16%
		Foreig n	60 9	4.9 61	59. 839	35 6	67 4	4.3 79	- 71, 07 %	- 636, 05%	- 126 6,50 %
		Total	1.9 98	20. 909	11. 208	1.4 45	3.7 90	34. 489	- 38, 27 %	- 451 <i>,</i> 69%	67,5 0%
		Dome stic	67 2	1.6 90	81 5	54 4	53 1	3.9 05	- 23, 53 %	- 218, 27%	79,1 3%
		Foreig n	1.3 26	19. 219	10. 394	90 1	3.2 59	30. 584	- 47, 17 %	- 489, 72%	66,0 1%
	Cor inde pric tota	isumer ex :e - al	30 3,3	308 ,1	30 6,8	30 7,4	30 7,2	30 6,5	1,3 3%	- 0,29 %	- 0,10 %
	Foc nor alco bev	od and h- oholic verages	30 8,1	310 ,0	31 1,3	31 7,9	31 8,6	31 5,2	3,0 8%	2,70 %	1,24 %
	Alco bev anc tob	oholic verages I aco	30 3,3	330 ,9	33 1,2	33 1,8	34 5,4	34 6,9	8,5 9%	4,20 %	4,53 %
	Clo and foo	athing I twear	27 8,3	308 ,4	27 6,1	27 6,9	30 5,8	27 6,7	- 0,5 1%	- 0,85 %	0,22 %

	Housing, water electric energy ,gas and other fuels									
cijena)		29 7,5	302 ,5	30 2,8	30 0,7	28 9,4	29 7,6	1,0 6%	- 4,53 %	- 1,75 %
indeksu	Furniture House equipmen t and	30	304	30	30	30	30	0.8	0.49	0.39
(izražene u	regular household maintena nce	3,2	,1	4,3	5,8	5,6	5,5	5%	%	%
	Health	30 9,2	309 ,5	31 0,4	31 2,7	31 3,5	31 3,6	1,1 2%	1,28 %	1,02 %
ш	Transport ation	29 9,7	310 ,2	30 7,0	30 2,3	28 3,5	29 2,1	0,8 6%	- 9,42 %	- 5,10 %
CIJEN	Comunica tion	28 7,1	286 ,0	28 7,7	28 9,6	29 0,4	29 1,8	0,8 6%	1,52 %	1,41 %
	Culture and recreation	30 4,9	306 ,4	30 9,0	30 3,2	30 4,2	31 0,0	- 0,5 6%	- 0,72 %	0,32 %
	Education	30 5, 4	30 5, 6	30 5, 5	30 5, 8	30 3, 3	30 3, 7	0,1 3%	- 0,7 6%	- 0,59 %
	Hotels and restourant s	33 2, 0	33 7, 4	34 4, 4	34 1, 2	34 2, 5	34 7, 1	2,7 0%	1,4 9%	0,78 %
	Various goods and services	30 3, 9	30 4, 3	30 5, 2	30 8, 2	31 1, 4	31 2, 4	1,4 0%	2,2 8%	2,30 %

Goods	2,	8,	5,	6,	5,	3,	1,2	1,0	0,76
	5	5	6	3	2	3	4%	8%	%
Services	30 5, 6	30 7, 5	31 0, 7	31 1, 0	31 2, 8	31 5, 4	1,7 4%	1,6 9%	1,49 %

Source: Adapted by the author according to the Central Bureau of

Statistics.<u>https://www.dzs.hr/</u>(27.02.2021)

When it comes to gross domestic product (GDP), in parallel with the decline in activity, there is a decline in GDP. In the Republic of Croatia, GDP fell by 9.6%. Compared to other European Union countries according to Eurostat (2020), the largest decline in GDP was recorded in Spain at 18%, followed by Portugal, which recorded a decline in GDP of 14%. The Member States of the European Union that recorded the smallest decline in GDP are Lithuania, whose GDP fell by 5.9% in the third quarter of 2020, while growth was recorded in other quarters.

3.2. Population

In addition to economic indicators of the impact of SARS CoV-2 virus on the Republic of Croatia, it is necessary to analyze social indicators, and one of the indicators that is taken into account is the natural movement of the population. In the context of the Republic of Croatia, there was an increase in mortality in the third quarter of 2020 by 2.54% compared to the third quarter of 2019. On the other hand, there is a slight decline in mortality in the second quarter of 2020 compared to 2019 and amounts to -0.19%, while in the first quarter of 2020 compared to 2019, mortality increased by 2.38%. When it comes to the total number of deaths after the declaration of a pandemic in the Republic of Croatia in March 2020, by December 2020 there is a visible increase for the same period in 2019 in the amount of 13.2%. In other words, the number of deaths per million inhabitants is 1242 as of February 2, 2021. years. Compared to other countries, according to Eurostat (2020), Serbia recorded a total of 581 deaths per million inhabitants in the same period, while

Belgium is one of the most affected countries in terms of deaths per million inhabitants with a total of 1839 deaths, and Slovenia with a total of 1686 deaths. million inhabitants.

3.3. Traffic and mobility

When talking about the impact of the pandemic on traffic and mobility, given the measures adopted by the National Headquarters to Combat SARS CoV-2, there is a significant decline in the number of transported passengers, ie freight. Table 2 shows the difference between the period of the first three quarters of 2019 and the realized passenger transport in the first three quarters of 2020. The table shows that the largest decline in passengers was in international maritime transport, since in 2020 compared to the same period in 2019, a decline of 778% is visible. The second most affected branch of transport is international bus transport, which recorded a decline of 177% in 2020 for the same period in 2019. A significant decline in transported passengers in all European Union countries was also identified. The country with the largest decline in passenger traffic according to Eurostat (2020) is Ireland, which recorded a decline of 94% for the observed period, while the country with the lowest decline in rail passenger transport was the Netherlands, which recorded a decline of 0.2%. On the other hand, there was a decrease in the number of passengers transported by air. The country that recorded the largest decline in the number of passengers carried was Spain, which recorded a decline of 99%, while the least affected country was Norway, which recorded a decline of 90% for the observed period.

Table 2: Analysis of passenger transport by branches in the Republic of Croatia for the period from January to October 2019 and for the period from January to October 2020



2019 (in 2020 in 0	eren	
	ce	
Branch Type thousan thousan		
ds) ds)		
I-IX I-IX I-	·IX	
Rail Internal 14151 9471 -49,4	1%	
Internation al 240 135 -77,7	-77,78%	
Road transp ort Internal 33947 18202 -86,5	0%	
By busses al 1084 390 -	95	
Road transp	1.0/	
ort in Bus 1278 1269 -0,7.	1%	
city Trams 346 345 -0,29	9%	
Martim e and coastal Internal 12898 7465 -72,7	'8%	
transp ort al 202 23 *	26	
Air Internal 408 148 %	68	
Internation al 1368 431 %	40	

Source: Adapted by the author according to the Central Bureau of Statistics. <u>https://www.dzs.hr/</u> (27.02.2021)

Table 3 shows the analysis of freight transport by branches in the Republic of Croatia in the period from the first three quarters of 2019 to the first three quarters of 2020. There is an evident decline in domestic air transport, which for the same period in 2020 compared to 2019 fell by 330%.

However, a significant increase in tons of oil transported by pipelines is also visible. For the same period in 2020 compared to 2019, an increase of 15.25% is visible.

Table 3: Analysis of freight transport by branches in the Republic of Croatia for the period from January to October 2019 and for the period from January to October 2020

		Р	eriod	
Branch	Τνρε	2019 (in	2020 (in	Razlika
		tons)	tons)	
		I-IX	I-IX	I-IX
	Domestic			
	transport	2065	2002	-3,15%
	International transport -			
Railway traffic	loading	4870	4357	- 11,77%
	International transport –			
	unloaded	939	1108	15,25%
	Domestic	5020	4904	
	transport	1	9	-2,35%
	Went to			
	foreign			-
Road traffic	countries	4203	3509	19,78%
	Came from a			
	foreign			
	country	3613	3429	-5,37%
	Transport			
Pipeline transport	nafte	4054	5080	20,20%
	Gass			
	Transportatio n	1688	1735	2,71%

Maritime and coastal	Internal transport	1350 1	1236 6	-9.18%
transportatio	International	1291	1174	-
n	transport	8	2	10,02%
	Internal			- 330,00
Air traffic	transport	301	70	%
	International transport	1201	1029	- 16,72%

Izvor: Prilagodio autor prema Državni zavod za statistiku. <u>https://www.dzs.hr/</u> (27.02.2021)

Basically, a significant decline in international transport has been identified, whether it is international passenger transport or international freight transport, except for international unloading rail transport, which shows an increase of 15.25% for the same period in 2020 compared to 2019. year.

3.4. Use of the internet

When it comes to other indicators, one of the important indicators is the use of the Internet, ie online shopping. It was identified that in the Republic of Croatia during 2019, 80% of individuals aged 16 to 74 used the Internet, and 45% of individuals used the Internet for online shopping. On the other hand, during 2020, the number of individuals aged 16 to 74 who used the Internet is 80% while the number of individuals who used the Internet to shop online is 55%. In other words, there is a visible increase in the use of the Internet for online shopping in 2020 by 27%. Compared to other EU Member States, Eurostat (2020) identified that in Belgium in the same period in 2019, the Internet was used by 91% of individuals aged 16 to 74, and in 2020 there is a visible increase of 1%. In terms of online commerce, Belgium recorded a growth of 9.5% during 2020 compared to 2019.

4. **DISCUSSION**

The SARS CoV-2 virus pandemic resulted in significant losses in selected indicators in the study. The Republic of Croatia recorded the largest loss in the tourism sector, ie there was an increase in the number of unemployed in the observed period. This can be related to the adopted measures, which resulted in the closure of catering facilities, ie service organizations. A similar trend has been identified in other European Union countries, especially countries that have a significant share of service activities such as Spain within their GDP structure. However, Sazmaz, Ozkok, Simsek and Gulseven (2021) state that despite the increase in the number of unemployed in some EU countries, such as Spain, it was identified that countries such as Estonia and Ireland recorded a decline in unemployment in the fourth quarter of 2020 compared to the same period in 2019. The same authors identified how countries whose governments defined job preservation measures in a timely manner as well as made a good allocation of resources preserved jobs and encouraged new employment. The reason for this, according to Mangan (2020), is a measure that covered 70% of the salaries of employees who worked from home during the pandemic, which resulted in significant relief for the employer, but on the other hand reduced human turnover and the risk of further spread of the virus.

Furthermore, one of the branches particularly affected by the SARS CoV-2 pandemic is tourism, which in the GDP of the Republic of Croatia accounts for a total of 11.4%, and which was significantly reduced due to the pandemic, ie fell by 1123% in 2020 compared to for the same period in 2019. Looking at the GDP of countries where tourism has a significant share in GDP, it was identified that the GDP of such countries, such as Spain, where tourism has a 14% share of GDP, and Portugal, where tourism has a 10% share of GDP, and which do not have a well-developed manufacturing industry, dropped significantly. In other words, the GDP of Germany, which has a 4.5% share of tourism in GDP, fell by 5% during the pandemic, while the GDP of Spain, which has a 14% share of tourism in GDP, fell by 11%. For comparison, the GDP of the Republic of Croatia also fell significantly due to the high share of tourism in it. However, countries with a significant share of production or manufacturing are not exclusive given the impact of a pandemic but due to the seasonality of tourism may have significantly less negative implications of a pandemic. Given the decline in economic activity, there is a decline in imports and exports. In addition to the decline in economic activity, the reason for the decline imports, according to Vidya and in Prabheesh (2020), and exports are measures, ie quarantine due to which motor vehicle drivers, as well as all crews directly involved in the transport process had to be quarantined. a significant slowdown in imports and exports. In parallel with the decline in imports and exports, there is also a decline in the quantity of goods transported, which is especially evident in air transport. Also, the travel ban resulted in a reduction in the number of flights, which had a negative impact on passenger air transport. Suau-Sanchez, Voltes-Dorta and Cuguero-Escofet (2020) state that due to the decline in the number of transported passengers, there is an increase in the risk of bankruptcy of organizations engaged in air transport of passengers, which is also the case in Croatia. As such organizations were particularly exposed to the negative impact of the SARS CoV-2 pandemic, the governments of the countries adopted measures to help airlines, ie passenger carriers in general, in the form of co-financing of salaries as well as cofinancing of leasing for vehicles. When it comes to mortality, it is evident that different countries have recorded different numbers of fatal outcomes due to SARS CoV-2 infection. One of the variables that could affect fatal outcomes is the quality and availability of health care and nursing. A study conducted by Ji, Ma, Peppelenbosch, and Pan (2020) identified how the number of deaths caused by SARS CoV-2 infection may be related to the availability of resources in hospital organizations. In other words, the

high mortality rate from infection may be the result of an insufficiently well-organized health system, ie a lack of medical and medical capacities. Measures taken by the national authorities to combat the SARS CoV-2 virus pandemic have resulted in the closure of shops and other organizations, which has led to an increase in the use of the Internet, which is particularly evident through increased purchases through online stores. Furthermore, since the closure of educational institutions, changes in the education system as well as the development of models of work from home are evident. All of the above resulted in higher Internet traffic. Basically, it can be seen that the countries of the European Union are affected by the SARS CoV-2 pandemic, and the consequences that the pandemic has on economies are determined by the type of dominant activity in the share of GDP. However, to mitigate the effects of a pandemic, it is necessary to analyze for each country the negative impact that the pandemic has left in order to be able to define the measures by which the economy will recover.

5. CONCLUSION

The research analyzed the impact of the SARS CoV-2 pandemic on individual activities, ie segments of society, using selected indicators. In the context of the Republic of Croatia, it was identified that the greatest negative impact was recorded in tourism, which can be associated with the closure of borders, ie measures aimed at reducing human turnover. Since tourism as such has a significant share in the GDP of the Republic of Croatia, there has been a significant decline in GDP. Among other indicators, it is necessary to point out turnover and unemployment, since they also recorded a significant decline, ie an increase when it comes to unemployment. Based on the conducted research and analyzed selected indicators, it can be concluded that the

Republic of Croatia is significantly affected by the SARS CoV-2 pandemic and that it is necessary to develop measures to help businesses as extending closure measures may result in new losses for businesses. and the occurrence of the risk of their bankruptcy. Also, since the Republic of Croatia is a tourist country, without adequate preparation of measures for the tourist season in 2021 there is a risk of further decline in GDP as the fluctuation of SARS CoV-2 virus and the emergence of new strains may accelerate resulting in the need for by additional closure.

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THE IMPACT OF THE COVID-19 ACADEMY ON THE HIGHER EDUCATION SYSTEM: THE EXAMPLE OF THE UNIVERSITY OF DONJA GORICA

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Original scietific work

Abstract: COVID-19 pandemic brought a series of changes in all spheres of human life. The context of education, business, movement, socialization and daily life has completely changed, which posed a challenge to almost the entire population – both in the world and in Montenegro. During 2020, over 190 countries were forced to temporarily close educational institutions and start applying the online teaching model, which affected almost 97% of the world's student population. The aim of this paper is to identify the processes and challenges faced by the Montenegrin higher education system during the COVID-19 pandemic. The paper describes the implementation of a hybrid model of curriculum implementation at the University of Donja Gorica, as well as the implementation of additional extracurricular activities in changed conditions. The achieved research results are presented in the form of proposals and examples of good practice in the implementation of teaching activities, which can affect the redefinition and improvement of the curriculum.

Keywords: education, pandemic, redefinition, hybrid teachin

Introduction

According to UNESCO, on April 24, 2020, nearly 1.5 billion students across the planet, at all levels of education (from preschool to college age), faced the closure of their educational institutions due to the COVID pandemic19. That number accounted for approximately 85% of the total number of pupils and students at all levels of education worldwide. If we add to that the number of those pupils and students whose institutions functioned in a semi-open regime, we come to the conclusion that on that day almost 94% of the total student population in the world was exposed to changes in the educational process caused by the COVID19 pandemic (UNESCO, 2020). The closure of university buildings or the transition to a semi-open mode of operation did not mean the suspension of the educational process. Higher education institutions continued to carry out their core business trying to adapt to new circumstances and challenges. The transition of teaching from a traditional exchair or face-to-face model to one that is predominantly based on remote mode and digital technologies is the most obvious change in the higher education system in almost all countries of the world (Perrotta, 2020).

Although some predict that the COVID19 pandemic will end in 2021 (Powell, 2020), it is already clear that changes in higher education will "outlive" its life. From UNESCO data for 9.3.2021. year we can see dominant tendency is that the that educational institutions in all countries of the world are moving from closed to semi-open and open mode of operation. Thus, today 8.3% of the total student population attends classes at institutions that operate in a closed mode, while as many as 65% of them have switched to a semi-open mode of operation (UNESCO, 2021). The remaining 27% of this population, although they switched to open mode, continued to use the advantages of modern technologies in the educational process (Chaka, 2020). The tendency to gradually integrate new technologies into the educational process at higher education institutions existed even before the outbreak of the pandemic, but it was the pandemic that

imposed the need for a quick and agile response to which higher education institutions responded with varying degrees of success.

The challenges facing higher education institutions during the COVID19 pandemic have already been the subject of special scientific studies and research ventures by individual authors (Bhagat and J. Kim, 2020; Houlden and Veletsianos, 2020; Kandri, 2020; Leung and Sharma, 2020) as well as relevant international institutions and organizations such as UNESCO and the International University Association (IAU Global Survey Report, 2020; IAU Regional / National Perspectives on the Impact of COVID-19 on Higher Education, 2020).

Our goal in this paper is to identify those challenges faced by the University of Donja Gorica (UDG) in Montenegro during the COVID19 pandemic and to define how and how successfully this university responded to them. Therefore, the subject of our paper will be the analysis of the measures applied by UDG in its work in order to successfully achieve its mission in the conditions of the COVID pandemic19.

The paper is divided into three parts: in the first, based on a review of the existing literature, we will identify the challenges faced by higher education institutions during the COVID pandemic19; in the second part, we aimed to determine what measures and activities UDG has taken to respond to them; and the third part is devoted to the analysis of the achieved results.

1. Key Challenges

In its two reports from 2020, the International University Association highlighted the challenges that universities faced during the COVID pandemic19. First, the COVID Pandemic Impact Report19 on higher education worldwide, classifies the impact of the pandemic into five areas that are further subdivided into subgroups, and key challenges are defined within the subgroups. This report is the result of a survey conducted by the International University Association in the form of a survey on a sample of 424 representatives of various universities from 111 countries. Surveys were mostly filled out by faculty members (20%), directors of institutions (17%), and persons in charge of international cooperation (16%). The challenges targeted by this study are the following:

General challenges: communication, enrollment in the new academic year, government support and partnership;

Teaching and learning: transition to remote work mode, quality of content, internationalization and student mobility, exam planning during the semester; Research activity: cancellation of scientific trips, cancellation of scientific conferences, started scientific projects are at risk of not being completed, complete cessation of research activity; Community engagement: degree of community engagement; Other challenges: financial, crisis management.

1.1. General challenges

This group includes those challenges related to communication, enrollment in the new academic year, government support as well as partnership with other higher education institutions during the pandemic. When it comes to communication, the survey found that although most universities had the infrastructure to enable communication between professors and students (91%), one of the most common challenges cited by respondents in open-ended questions was the problem of maintaining clear and effective communication between staff and students. This problem has a dual nature which is reflected in 1. Difficult communication of administrative and technical staff with students well 2. Difficult as as communication of professors with students (IAU Global Survey Report, 2020). In this case, these are usually problems that arise when students or professors do not respond to e-mails regularly or do not know who to contact in case they have a problem. Certain problems in communication in this case may also exist between the administrative staff of the university and the teaching staff. These

are most often cases when professors are not informed in time about the schedule of their lectures or the way in which classes, exam sessions, knowledge tests and the like will be realized.

When it comes to enrollment in the new academic year, almost 78% of respondents then (2020) predicted that the pandemic would negatively affect the number of enrolled students for the academic year 2020/2021. year. These predictions apply to both local and foreign students. Pacheco (2020) also states that some universities face a significant increase in the number of students (between 12 - 22%) who drop out. In this context, the lack of state aid during a pandemic can also be a significant challenge. According to the results of the survey, 48% of respondents said that their institutions expect help from their state, while the rest said that they do not expect (24%) or that they do not know whether they will have state support inovercoming the crisis (28%). The need to provide quality online teaching as well as to adapt the university premises for conducting such teaching, requires costs that universities are not always able to cover from their own sources (Pacheco, 2020).

More than half of those respondents who said the COVID19 pandemic had an impact on their partnerships with other higher education institutions said the impact was negative. Universities were forced to accumulate and concentrate their resources in order to perform the most necessary activities.

1.2. Teaching and learning

The first challenge from this group is definitely the transition to remote mode. Due to its complexity, this challenge is divided into three specific challenges:

a) technological infrastructure and accessibility,

b) The need for new competencies and a different pedagogical approach,

c) the specifics of the scientific field.

The fact that not all students have the same access to technological instruments as the Internet has led to online teaching not being available to everyone. This problem is most pronounced in poor countries as well as in developing countries while in developed countries universities have not reported this problem. Online teaching requires a different pedagogical approach as well as advanced abilities of the teaching staff in the use of modern technologies. However, universities did not have the opportunity to conduct special training for professors, so they were forced to learn and master new skills on the go. This circumstance created a difference between those professors who managed to adapt without difficulty and those who encounter greater difficulties in the process. In addition, online teaching has proven to be completely inapplicable in those scientific disciplines that require practical exercises. Thus, for example, studies of clinical medicine or veterinary medicine, where teaching depends on the possibility of conducting experiments in laboratories, are just some of the scientific disciplines that cannot be realized through online teaching. It is similar with studies in the field of art such as music, academic painting or design, where students need access to adequate equipment in order to improve their knowledge.

Bhagat and Kim (2020) would add to this the challenge of maintaining the quality of online lecture content. In their research, they find that students are less willing to attend online classes and that they believe that the benefits it brings do not match the price of these programs. Also, the conclusion of their study is that vulnerable categories of students have a problem taking exams in the remote mode, and there can be almost no talk of achieving significant success. This is primarily caused by the fact that only somewhere around 50% of the teaching staff has previous experience working in remote mode (Bhagat and Kim, 2020).

The challenge faced by almost 89% of all universities in the world is the limited internationalization and mobility of students. This challenge also had several aspects. The largest number of universities (47%) reported that a large number of foreign students found themselves in their dormitories without the opportunity to leave the country. On the other hand, a large number of students who participated in exchange programs remained trapped abroad and there were also those who chose to drop out (IAU Global Survey Report, 2020). Universities have tried to overcome this problem by using the concept of virtual mobility, which allowed students to follow some of their subjects online at other, foreign universities.

Exam planning during the semester was another challenge faced by universities. Switching to remote mode for many also meant postponing the set deadlines for taking the exam (IAU Global Survey Report, 2020).

1.3. Research activity

The cancellation of scientific conferences and trips is another significant handicap for the development of scientific research at universities during the COVID pandemic19. Many universities, however, have rapidly developed alternative channels of communication and exchange of scientific knowledge. Online platforms have enabled cheaper and more efficient communication between researchers around the world. However, a bigger problem has arisen with those projects that have already been started and which were threatened with permanent suspension due to the impact of the pandemic (IAU Global Survey Report, 2020). Some scientific projects, especially those of an international nature, require the physical cooperation of researchers. would be realized. In these cases, the transition to remote mode was significantly more complex.

1.4. Community engagement

Many universities have used the COVID19 pandemic to increase their involvement in local communities. The IAU survey (2020) shows that as many as 58% of universities were involved in some way in community activities during the COVID pandemic19. Those universities within which medical faculties operate also provided direct health services to citizens, some universities hired their medical students as auxiliary medical workers and students of other faculties as volunteers who had the task of delivering aid and food to the population during the period of isolation. In addition, scientific research at universities has in most cases focused on providing expert advice to policy makers during a pandemic. The challenge was to find the appropriate modality of university engagement during the COVID pandemic19.

1.5. Other challenges

According to the court of the largest number of respondents, the financial challenge was the most difficult challenge this time. The problem with finances comes from three directions. The first is that a reduced number of enrolled students is expected in the new academic year. This particularly affects private universities, which predominantly rely on this source of income. The second is indirect and refers to the inability of students to work during a pandemic, which can lead to their dropping out of further studies because they do not have the opportunity to be financed. And the third concerns the unpredictable future. The major economic recession currently affecting the world could have far-reaching consequences that are difficult to predict. In such conditions, it is significantly more difficult for universities to plan and organize their activities (IAU Global Survey Report, 2020).

2. University Donja Gorica

The University of Donja Gorica was founded in 2007 and currently has 12 faculties, a Center for Foreign Languages and 19 study programs. Six faculties are registered scientific research institutions for performing scientific research activities in the field of international economics, law, information systems and technologies, humanities, as well as technical-technological sciences such as polytechnics and food technology, food safety and ecology. This university currently has about 3,500 undergraduate, graduate and doctoral students from both the country and abroad. The University of Donja Gorica is a signatory of about 150 bilateral agreements on cooperation with universities from around

the world and an active participant in a large number of international projects. In the last few years, the "Entrepreneurial Nest" has been opened within the University - a business incubator established with the aim of helping students develop their skills during their studies business ideas and provide support to start their own business, as well as several laboratories for research work of students (Laboratory for Food Quality and Safety, Laboratory for Chemical Analysis, Laboratories, Computer 3D Laboratory ...).

All study programs at the University of Donja Gorica are realized in accordance with the principles of the Bologna Declaration, which through a wide range of elective courses allows students their own independent program profiling and the possibility of studying in accordance with personal interests.

2.1. UDG responses to general health crisis challenges

The University of Donja Gorica, as well as other universities in the world and in Montenegro, in March 2020 faced a challenge, which involved a rapid transition to an online mode of knowledge transfer. UDG has an advanced information system and human resources that can bring its use and introduce into its work the regular use of modern information technologies that have not been part of teaching practice so far.

Given that the research began with an analysis of the challenges faced by the higher education system, in further research we will list the processes that took place at UDG, in order to ensure the smooth continuation of the work of this higher education institution and to respond to the challenges which imposed the spread of COVID19.

We start from the general challenges faced by universities, which consist of the above: communication, new generation enrollment and government support, as well as partnership with other institutions.

1. Communication: At the University of Donja Gorica, Almanac of Studies, adopted

in 2014, recommendations and guidelines for student development are defined. According to this document, one of the preconditions for the successful application of the principles on which the life of a successful man is based is professionalism reflected in his dedication to work. This implies knowledge of the rules of business communication and their application. UDG students, upon enrollment, receive login information for the email address, within the platform used by both students and professors. From the first year of study, a rule was created that defines that "professors are not required to respond to emails from students who send them from their private addresses." This approach is especially demanding for first-year students, who face a completely different regime after high school. Thus, the communication third-year challenge of secondand undergraduate and graduate students had to be overcome during the first year of study. A serious challenge in terms of communication was the generation enrolled in 2019/20, which was still in the process of getting used to stricter working principles. In order to overcome this problem, "mentoring groups" have been created. Each UDG lecturer was given the names of 10 students, whom he had to contact and monitor during quarantine. Later, this practice continued with the enrollment of the new generation, which greatly reduced the workload of the University services, as students resolved minor ambiguities with their mentors.

2. Enrollment in the new academic year: For private universities, this event is a challenge every year. Universities are mostly working on creating enrollment campaigns from December to March, when the big promotion in high schools starts. The University of Donja Gorica organizes numerous events, which serve as a promotion of the educational system and study conditions offered by the University, such as: Winter School of Entrepreneurship and Innovation, Open Days of Science, numerous tribunes (depending on the topic of the enrollment campaign), round tables of current topics for that period) and visits of high school students. Also, the enrollment campaign is organized by the departure of associates, prominent students and partners to all high

schools in Montenegro, where on-site study programs and opportunities offered by the University are presented. The COVID19 pandemic marked the end of traditional marketing methods, which include sharing promotional materials, organizing face-to-face presentations, fairs and conversations. The University of Donja Gorica has also fully adapted its enrollment campaign to the online mode of operation. Thus, the use of social networks becomes one of the basic forms of communication with the target market.Activation of profiles on Instagram, Tick Tok, Facebook and LinkedIn is the basis of the University's worldwide marketing campaign, and UDG is not far behind. Another challenge arising from the time of the COVID19 pandemic relates to the cost of studying. In Montenegro, studying is free for all students of the State University of Considering Montenegro. the difficult economic situation in the country and in the region, it is clear that a serious obstacle in making a decision on the choice of faculty will be the financial factor

3. The last general challenge, defined in the first part of this paper, refers to the expectations of higher education institutions, and in this case - UDG, regarding state aid well strengthening measures. as as partnerships with other related institutions. Montenegro has undergone major changes since August 30, 2020, when the regime that ruled the state apparatus for thirty years was replaced. So far, private universities in Montenegro have not been funded in any part by state institutions - which has resulted in a change in government that will change this practice, especially during the global health crisis. However, assistance from state institutions did not follow. In addition, other institutions that form part of the higher education system have used their resources to overcome the challenges they themselves Numerous conferences, have faced. seminars, student and staff exchanges have been suspended, especially in 2020, without announcing their compensation in the next year, because new goals have already been created in it, which do not leave room for the old ones.

2.2. Fighting specific challenges

In the following, the problems and solutions that arose when facing the specific challenges defined in the first part of this paper will be highlighted.

1. Teaching and learning: The University of Donja Gorica has decided on a hybrid mode of operation. Given the number of students, it was not possible to conduct live classes, while respecting the measures to combat COVID19. Thus, it was decided that the faculties be divided into two groups (by number) and that one week one group of faculties (numbering about 1600 students) follow live lectures, while the other group follows online lectures and exercises. Then, the following weeks the groups take turns, to provide face-to-face contact with the students. This layout was feasible, taking into account the space capacities available to the University. Taking into account research that indicates that the online teaching regime is generally unsuitable for students, UDG has tried to make up for part of the lost quality with a hybrid model. The conduct of online lectures and exercises is monitored on a weekly basis - by controlling the publication of materials provided by the plan and program. This required greater engagement of the coordinators of individual study who ensured programs, the smooth functioning of the system according to previous standards. The university does not have its own platform for conducting online lectures and exercises, but alternative teaching methods have been used (Zoom, Microsoft Teams. Recorded Lectures. Webex, PPT with recorded voice, etc.). All online lectures were recorded and posted on a common cloud, in order to control the quality of the content. What UDG could not respond to in the short term is a challenge concerning specific cases

- for which he had to organize a permanent live performance. There are few such subjects and they are most often related to subjects that are performed in laboratories or under certain specific conditions or by using equipment located at the University. The Law on Higher Education of Montenegro does not allow taking colloquia and exams online, so all exams are organized in the building, under strictly controlled conditions, when the conditions for their implementation have been met.

2. Research activity: Within the University of Donja Gorica there are several separate research units, such as: Center of Excellence Food Hub, Entrepreneurial Nest, Laboratory for Food Quality and Safety, PRODE Laboratory for Product Design and others.

All these research units had to stop their work, and the research activity of the University itself was reduced to the individual work of researchers, who now have an organic choice of research methods. Scientific projects are facing the risk of delaying funding, but everything is still going according to plan. All conferences organized by the University and organized at the University in cooperation with partners have been canceled from March 2020 until further notice.

3. Community engagement: The University makes efforts through educating students about the importance of their role in the process of combating COVID19. Through his activities, he includes students in events that he organizes on social networks.

3. Research - presentation and discussion of results

At the University of Donja Gorica, during May and June 2020, a survey was conducted on a sample of 1746 students from all university units via an online questionnaire. The research examined student satisfaction with the way online classes are organized during the summer semester of the 2019/2020 academic year. due to the application of temporary measures against the spread of the COVID 19 pandemic and the transition to online teaching. The primary goal of this research was to determine the attitudes of students as well as to identify areas within which in the coming period should work to improve the organization of online teaching.

When asked if they were satisfied with the quality of online teaching, students had the opportunity to choose three offered answers (yes, partially and no) and thus evaluate the distance learning process organized during the summer semester (Table 1). Out of 1746 respondents, as many as 1036 answered that they were satisfied, 570 respondents partially and 140 that they were dissatisfied with the quality of online teaching organization. Based on the collected answers, we can conclude that the level of satisfaction is very high and that a large number of students assess that the quality of online teaching is at a satisfactory level.

Table 1: Results of the survey on the question of satisfaction with the quality of online teaching?

Ves			Partially	No	
105			I artially		
Year of study	1	303	199	57	559
	2	271	162	36	469
	3	358	157	32	547
	4	91	50	10	151
	5	13	2	5	20
Total		1036	570	140	1746

Source : Authors

As one of the questions, a question was offered if they are not satisfied with the realization of online teaching, what is the reason for dissatisfaction. Respondents singled out the lack of organization of lectures (11.23%) and inadequate material for online teaching (5.33%) as the main reasons. Then they pointed out the poor of the Internet network quality for monitoring online lectures (3.55%) and the inadequate attitude of lecturers towards online teaching (4.52%). In the open part of this question, where the respondents had the opportunity to state their personal reasons for dissatisfaction with the quality of online teaching, they mostly stated: weak internet connection, unclear content, inadequate

learning material. As the most suitable way to follow online classes, students consider that these are online platforms such as ZOOM, Webex and the like (36.54%), followed by videos with the voice of a lecturer using PPT, spreadsheet, Excel or some other program (32.65%)), and the use of PPT presentations with the recorded voice of the lecturer (26.96%). To a much lesser extent, there were answers that another type of teaching would be a more suitable solution (3.84%). When it comes to student workload and distance learning compared to the period when classes took place at the University, 39.92% of respondents pointed out that it was approximately the same as before while classes were held live in the amphitheater, while 34.99 % of respondents stated that the workload is higher and that they need more time and commitment to learn. It is interesting that 25.09% of students stated that they were more burdened during their classes at the University, and that distance learning is a relief for them.

Conclusion

Educational institutions around the world are facing new globalizing educational trends, such as the application of digital technologies. The rapid development of information and communication technology has affected all spheres of human life, including education, which in recent years has increasingly used the possibilities of organizing online distance learning. Faced with the COVID-19 pandemic during 2020, many educational institutions around the world were forced to organize classes and extracurricular activities through the use of a model for the organization of distance learning.

Guided by the need to overcome the crisis caused by the pandemic, the University of Donja Gorica, through the implementation of a hybrid model for the implementation of teaching that contains two components that complement each other, live lectures in the amphitheater and online lectures, maintained continuous teaching and thus ensured the implementation of teaching and preservation student health and teaching staff. It is believed that online learning will play a key role in education in the future, and that information technology will make it easier for students to access the necessary information, the learning process will be much faster and more interesting, and communication and teamwork among students will be facilitated. The University of the Future should provide the opportunity to study and acquire knowledge to all students who are considered to have their role in creating content in the future grow.

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ORGANIZATION OF TERTIARY HEALTH CARE INSTITUTION DURING THE COVID-19 PANDEMIC

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Original scientific work

Summary: The survival and organization of the tertiary health care institutions, which integrates a range of specialist and subspecialist activities, becomes a real challenge during the COVID 19 pandemic due to the weakening economic power of the state and the potential loss of standard sources of funding under voluntary and supplementary health insurance.

Aim of the research: To show the most optimal modality of providing services of a tertiary health care institution, which, in addition to tertiary and secondary B health care, expands its activity to secondary A health care, with the evaluation of parameters such as number of hospital days based on discharged patients and daily records, evaluations of groups of operations and number of diagnostic procedures **Results:** The tertiary level health institution in the period of the COVID 19 pandemic provides tertiary and secondary B health care, with the expansion of services to the secondary A health care, to optimize services and relieve the burden of institutions that provide this type of service. The number of services provided at the tertiary and secondary health care, in terms of the number of b.o. days, operations, examinations, and diagnostic procedures, shows a decrease in comparison with the previous two years, but also continuity despite working conditions in crisis.

Keywords: health care institution, tertiary level health, work organization, pandemic, COVID 19

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1. Introduction

The organization of the work of the tertiary level health institution represents a kind of challenge during the COVID 19 pandemic, due to the continuous pressure on all component health organizational structures with a larger influx of patients, which creates the need for adequate and efficient organization and formation of the structure (CCRI).). Mobilization of the capacity of health care institutions terms in of reorganization of work, mobilization of all available human and material resources in the service of adequate response to the increased influx of patients, their triage, hospitalization and treatment is mandatory. The organization of the work of a health institution during a pandemic should be based on the provision of health services at all levels of protection, which is an organizational challenge in extraordinary circumstances. The cooperation of health care institutions with the competent crisis headquarters is of crucial importance for defining guidelines and algorithms for the organization of work, treatment of infected patients and elective cases. Tertiary health care deals with the provision of medical care within the framework of specialist and subspecialist activities, ie sophisticated health care, which, in order to survive on the market, must continuously invest in staff, equipment, education, following world trends. Given the funding that is directly threatened by the disturbances of the world economy and the fall in GDP during the COVID 19 pandemic, cooperation and state assistance is essential. The organization of the work of a tertiary level health institution in crisis situations is based on the following settings:

a. reorganization of staff and capacity

b. formation of COVID 19 departments at clinics

c. expanding services to secondary A level to provide continuous health care

d. improved and effective diagnosis and treatment of infected patients

e. continuity of treatment of elective cases f. uninterrupted provision of services for all emergencies, traumatized patients, oncology and hemodialysis patients

1. Principles of operation of a tertiary type health institution during the COVID pandemic 19

Given the fact that in specific conditions such as the global pandemic, tertiary level health care institutions provide care services by providing additional staff and space capacity, the concept of pandemic management must be reduced to, on the one hand, providing a level of service appropriate to the institution's competencies. on the other, by repurposing the function of hospital capacities depending on current needs, provided that the protection of employees must be timely and continuous (3). With the appearance of a pandemic, all clinics are forced to reorganize their work according to the instructions of the competent crisis headquarters, which is necessary in crisis situations that affect every segment of society (4). The survival of health fatigue will be stable and sustainable, otherwise, the effects would be devastating for the community, and it is not necessary to emphasize the social dimension and importance. The availability and quality of health care must be provided to all users, which is important for the stability of society and the psychophysical health of the population. Crisis conditions, such as the COVID 19 pandemic, are affecting the functioning of the health system in all its segments, a large and unexpected influx of infected requires prompt reorganization at all levels (2).

1. Results

The range of services of the Clinic for Reconstructive and Plastic Surgery within the Clinical Center of the University of Sarajevo during the pandemic COVID 19 was presented. Covered period 01.01.-

31.12.2020. year, with the official start of the pandemic in March 2020. The results correlated with the period of two and a half months of work in changed conditions, ie the conditions of treatment of emergencies and malignancies, the so-called "lockdown" period (March-May 2020). In that period, the total number of treated patients was 680. By evaluating the distribution from individual cantons (Chart 1), the highest representation of patients from Sarajevo Canton (566 cases) and Zenica-Doboj Canton (39 cases) was determined. The complete absence of patients from Posavina (II), Tuzla (III), West Herzegovina (VIII) and Canton 10 is evident, which is also present in the evaluation of other assessed parameters. Results are expected given the reduced population movements, as well as the availability of nearby centers that provide tertiary level services.



Graph 1. Distribution of patients according to the corresponding cantons

The number of patients during the COVID19 pandemic in 2020 shows a decrease compared to 2019 and 2018. In all three evaluated periods, the largest number of patients was from Sarajevo Canton, 566 out of the total number of 680 patients. During 2019, Sarajevo Canton was represented in 874 cases out of 1039 hospitalized and treated patients, ie in 855 cases out of 1006 hospitalized in 2018 (Chart 2).



Graph 2. Number of patients presented according to estimated time periods

The number of sick days (b.o. days) has a variable distribution by cantons (Chart 3), Sarajevo Canton (X) with 2636 b.o. days, then Zenica-Doboj Canton with 324 b.o. days, and Central Bosnia Canton (VI) with 281 days.



Graph 3. Cantonal distribution b.o.dana

The number of points according to daily records is also variable according to cantonal distribution (Chart 4), the distribution of points based on daily records is identical according to canton representation as in Graph 2, Sarajevo Canton (X) 2746, Zenica-Doboj Canton (IV) 330, and Central Bosnia Canton (VI) 292 days.



Graph 4. Number of days according to daily records

Realized outpatient examinations, ie first and control specialist examinations, presented in Graph 5, with predominant representation of the three most frequent cantons, Sarajevo Canton (X) 4698, Zenica-Doboj Canton (IV) 188, and Central Bosnia Canton (VI) 181.



Graph 5. Outpatient examinations

Within the outpatient examinations, a different range of outpatient services was provided in terms of minor surgical interventions and standard postoperative interventions (Chart 6). The largest number of outpatient services realized in the Sarajevo Canton (X), 7017.



Graph 6. Outpatient services provided

Laboratory findings services presented in Graph 7. The largest number of analyzes performed in Sarajevo Canton (X), 1523, then in Herzegovina-Neretva Canton, 136. Other cantons with significantly smaller distribution, given the reduced admission due to the pandemic.



Graph 7. Laboratory analysis services

The number of conciliatory examinations correlated with the number of hospitalized patients, with the predominant representation of Sarajevo Canton (X), 307 examinations. Other cantons with lower participation, Zenica-Doboj Canton (IV) 17, and Central Bosnia Canton (VI) 12. Representation of the remaining two participating cantons is negligible (17 and 12 patients, respectively), as well as hospitalized patients from abroad, 6 cases.



Graph 8. Consular reviews of different specialties

During the pandemic in 2020, surgical services of different levels of complexity were provided, the results correlated with the complexity of the case, as well as the influx of patients from our and other cantons, the largest number of surgical procedures was provided from group III (563 patients) and group IV (281 patients). Group VIII, which includes the most complex surgical procedures in the field of microsurgery and treatment of burn trauma, represented in 15





2. Conclusion

During the pandemic period, the Clinic for Reconstructive and Plastic Surgery of the Clinical Center of the University of Sarajevo based its work on the following principles:

- Continuous provision of tertiary, secondary A and B level health services

During the so-called "lockdown" period, the treatment of all elective cases was suspended
Provided continuous service to all acute cases and malignancies

- Provided continuous outpatient work with specialist consultative examinations and services

- Distribution of operations according to complexity depending on the influx of patients from Sarajevo and other cantons, which is correlated with the movement of the pandemic

- Hospital capacities of the clinic partly made available to suspected and confirmed COVID 19 positive patients

The activity of the clinic in the evaluated period was based on the continuous provision of services, with a decrease in the number of patients compared to the compared 2018 and 2019, which is expected given the emergency
There is no decline in the quality of services

as a result of high competencies and excellence of surgical staff

Adequate response of tertiary level health institutions in the COVID 19 pandemic is reflected in the efficient mobilization of human and spatial capacities, as well as prevention of intrahospital transmission of infection, with the aim of optimizing and continuing health care to non-infected patients and patients with COVID 19 infection. priority algorithms (7). The health problems of the population do not show a tendency to decline even in emergencies such as a global pandemic, with other health services must be available to the population through coordination and engagement of all levels of health care, which is achieved by good organization and prediction of pandemic (5). Demand for specific and specific health services tends to grow during a pandemic and it is very important to provide or relocate health facilities that can respond to the challenge, as for elective cases, which are not urgent but are an indication for treatment (6). The COVID 19 pandemic is a kind of health and economic challenge, because it mobilizes all segments of society in order to overcome potentially long-term consequences, as well as to find ways to solve them (8). Cooperation of all health services must be of high quality and continuous in order to overcome all the challenges of the pandemic, which is a unique challenge for the state and health.

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Pandemic in View of Evolving Evidences: An Early Experience From a Tertiary CareTeaching Hospital

THE IMPACT OF COVID-19 PANDEMIC ON ACCELERATED DIGITIZATION OF THE ECONOMY

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Review article

Abstract: The main topic of this paper is the impact of COVID-19 pandemic on accelerated digitization of the economy. In order to facilitate understanding of the given topic, the goal of this paper is to explore the causal link and effects that COVID-19 pandemic had on accelerated digitalization of companies around the world. The outbreak of the global COVID-19 pandemic is an absolutely singular phenomenon in recent economic history that will leave deep impact on the economies around the globe. Almost all aspects of our lives have changed in just one year. Hence, today we depend heavily on digital tools, whether it's trade, education, working from home, or something else. Ultimately, this makes it even more difficult for companies to survive, as the expectations they have to meet are now higher than ever. The digital transformation certainly did not begin due to the COVID-19 pandemic, but it was accelerated by it - according to some experts, COVID-19 accelerated digital transformation strategies by an average of six years globally. Many companies recognized the importance of digitizing business processes long before the pandemic and began the digital transformation. However, the appearance of the coronavirus has forced companies to adapt to the new circumstances practically overnight. COVID-19 has turned digitization from a "nice to have" to a "must have" for many organizations, forcing them to adapt and modernize quickly in order to keep their operations running. Everything that could be digitized has been digitized, and what hasn't (and has no intention of doing so in the next few years) is doomed. Staying in the comfort zone, i.e. deciding that everything is going the old way, is no longer a business option. The value of digitization has become more evident than ever, and those who refused to think about it are now forced to do so. Changes that were brought upon practically overnight in many countries actually helped to drive a digital transformation that has impacted businesses across industries. Exploring how these changes have impacted the businesses can help people understand how organizations can embrace their digital transformation and what parts of these changes will likely be here to last.

Keywords: digitization, acceleration, COVID-19, pandemic, economy, technology

Introduction

The theme of this paper the impact of COVID-19 pandemic on accelerated digitization of the economy. The goal of this paper is to theoretically and practically explore how companies and economies embraced world around the digital technologies much sooner than they have planned, all due to the global pandemic that has put down whole societies and most of economies in a lockdown. On the basis of the topic and purpose of this paper, a working hypothesis has been set - It is possible to prove the causal link between accelerated digitalization as a response to the global pandemic caused by the COVID-19 virus.

The impact of digitalization is not new, the economies around the world entered a new age that presents unprecedented challenges for both public and private sector. Digital tools and technologies invaded the business environment, provoking significant changes in the way we live, travel and work. The spread of digital technologies in the past two decades did not only enable better communication between people but also had a strong impact on creating new business models, new products and new services. This has given rise to new opportunities and challenges - and has triggered the digital transformation of business. With a clear focus on (digital) customer experience and overall stakeholder experience, while optimizing costs, innovating and creating competitive differentiation. digital transformation is set to become the cornerstone of digital economy and forth industrial revolution (Industry 4.0).

The digitalization of business processes in companies and public institutions had an impact on the overall growth of productivity and has created additional value. The need for completely new professions and jobs appeared. Digitalization opened entirely new opportunities for distribution, especially in those industries that could digitalize their products and services and sell them by new distribution channels to unavailable markets. Digital technologies function as agents of change in digital transformation, revealing new capabilities in the business context. Technologies such as cloud, IoT and artificial intelligence are just some of the technologies that encourage changes in the organization. (Factory, 2020)

Last year as well as first months of this year have undoubtedly shown how important digitalization is for the survival of every company and the economy as a whole. The digitalization of the economy has significantly accelerated and moved to a higher place in the list of priorities, even for those companies that have not yet developed a concrete plan for adaptation to the digital age.

When the COVID-19 pandemic broke out, much of the world moved online. accelerating a digital transformation that has been underway for decades. Children with athome Internet access began attending class remotely; many employees started working from home; and numerous firms adopted models digital business to maintain operations and preserve some revenue flows. Internet traffic in some countries increased by up to 60% shortly after the virus outbreak, underscoring the digital acceleration that the pandemic sparked (OECD, 2020).

Pre-COVID-19, private and public organizations were on a journey towards a digital business model, travelling at varying speeds. But the scale of the pandemic has forced a dramatic acceleration, both in the speed of change and the required investment digital transformation (KPMG in International, 2020). Large number of didn't implement organizations these changes before the crisis caused by the COVID-19 pandemic mainly because it was not their top business priority. The crisis obviously removed this barrier.

The crisis caused by the COVID-19 pandemic is the most recent example of a crisis with far-reaching consequences for the global socio-economic environment and, consequently, many businesses, the causes of which can be found in factors outside the organizations themselves. On the other hand, there are business crises that arise as a result of internal causes, which relate to the manner and quality of business and are directly related management to the and implementation of business processes. In any case, a business crisis, caused by either external or internal factors, is an unexpected event or a series of related events that cause significant disruption to various aspects of business and consequently disrupt the sustainability stability and of the organization. It is for these reasons that many businesses have embraced digital technologies as an opportunity to manage the crisis more easily in the era of COVID-19 pandemic, but also to become more resilient to all future crises. Awareness of the importance of digitalization of business has become one of the key traits of every successful manager nowadays.

Accelerated digitization as a response to the crisis

When Covid-19 struck, it forced societal changes around the globe. Nearly overnight, governments issued orders that limited large gatherings of people, restricted in-person business operations, and encouraged people to work from home as much as possible. In response, businesses and schools alike began to look for ways to continue their operations remotely, thanks to the internet. They turned to various collaboration platforms and video conferencing capacities to remain engaged with their colleagues, clients, and students while working from home offices (EHL Insights, 2021). COVID-19 has caused leaders to rethink their priorities, with an emphasis on immediate challenges like falling revenues, security concerns and interrupted supply chains, which have focused minds on the here and now and demand immediate action. In addressing these concerns, they also realized that the inexorable shift to digital has become today's rather than tomorrow's priority.

In just a few months' time, the COVID-19 crisis has brought about years of change in the way companies in all sectors and regions do business. According to a new McKinsey Global Survey of executives, their companies have accelerated the digitization of their customer and supply-chain interactions and of their internal operations by three to four years. And the share of digital or digitally enabled products in their portfolios has accelerated by a shocking seven years. What's more, most of them expect most of these changes to be long lasting and are already making the kinds of investments that all but ensure they will stick. (LaBerge, O'Toole, Schneider, & Smaje, 2020).

During the pandemic, consumers have moved dramatically toward online channels, and companies and industries have responded in turn. There is a clear rapid shift toward interacting with customers through digital channels. The rates of adoption are years ahead of where they were before the COVID-19 pandemic, which is shown in the Graph 1 below.

Graph 1. Accelerated digitalization of customer interactions



The COVID-19 crisis has accelerated the digitization of customer interactions by several years.

Perhaps more surprising is the speedup in creating digital or digitally enhanced offerings. Across regions, the results of the McKinsey Global Survey suggest a sevenyear increase, on average, in the rate at which companies are developing these products and services. There is a similar mix of types of digital products in companies portfolios before and during the pandemic. This finding suggests that during the crisis, companies have probably refocused their offerings rather than made huge leaps in product development in the span of a few months (Graph 2). (LaBerge, O'Toole, Schneider, & Smaje, 2020)

Graph 2. The share of digital offerings

Source: (LaBerge, O'Toole, Schneider, & Smaje, 2020)

Across business areas, the largest leap in digitization is the share of offerings that are digital in nature.



Source: (LaBerge, O'Toole, Schneider, & Smaje, 2020)

The pandemic and the resulting economic crisis have accelerated the digitalization of economy and society as a whole, so we can see that many changes have taken place in a very short period of time - both the public and private sectors have begun to digitize rapidly.

The speed with which companies have responded to the COVID-19-related crisis & changes is, remarkably, even greater than anyone expected. McKinsey Global Survey results suggest that many of these changes were adopted 20 to 25 times faster than expected. In the case of remote working, companies moved 40 times more quickly than they thought possible before the pandemic. Before then, it would have taken more than a year to implement the level of remote working that took place during the crisis. In actuality, it took an average of 11 days to implement a workable solution, and nearly all of the companies have stood up workable solutions within a few months (Graph 3). (LaBerge, O'Toole, Schneider, & Smaje, 2020)

Graph 3. The speed of adoption of changes in COVID-19 pandemic

Executives say their companies responded to a range of COVID-19-related changes much more quickly than they thought possible before the crisis.

Time required to respond to or implement changes,' exp	pected va	actual,	number of days
	Coperto	alizzai che	nges Ehdenry-wille-th
	Expected	Actual	Acceleration factor, multa
Increase in remote working and/or collaboration	454	10.5	
Increasing customer demand for online purchasing/services	585	21.9	27
Increasing use of advanced technologies in operations.	672	28.5	25
Increasing use of advanced factorologies in business decision meking	g 835	25,4	25
Changing sustomer needs/expectations"	610	213	24
Increasing Inigration of assets to the cloud	547	23.2	24
Changing serverahip of last-risk delivery	673	24.4	29
Increase in rearshoring and/or insourcing practices	547	26.0	21
increased spending on data security	449	23.6	19
Build redundancies into supply chain	537	29.H	16

Source: (LaBerge, O'Toole, Schneider, & Smaje, 2020)

The COVID-19 pandemic and lockdown measures have introduced remote (home based) working and with it the use of digital tools – which was mostly forcefully adopted by most of the companies as well as public sector organizations in the affected countries. While some organizations have already practiced remote work, for many this was a completely new situation which, of course, brought many new challenges. One of the main questions was how to enable geographically dislocated employees to work in their usual way of working. For some companies, this issue is completely justified because they are primarily related to their physical location such as manufacturing companies which are bound to their manufacturing facilities and most of their employees, with the best of intentions, simply cannot take their standard job home and do it 'remotely'. However, for most of the companies out there, there was no such issue, mainly thanks to new digital technologies and tools which most companies adopted even earlier but fully utilized during the pandemic.

As mentioned before, digitalization was already high on most organizations' agendas even before the pandemic and has only risen in its importance since. According to the global consulting company KPMG Global survey into the impact of COVID-19 on digital transformation, 69% of respondents in that their the survev said digital transformation strategy was a 'high' or 'top' priority prior to the pandemic, but COVID-19 pandemic accelerated implementation of their digital transformation strategy in 67% of the companies under this survey. Also, 63% of the respondents said that they have increased their budget for digital transformation (KPMG International, 2020). It is clear that most companies have accelerated the speed of digitization to mitigate the impact of the pandemic on global economy.

The COVID-19 pandemic has brought massive and unexpected life twists, but it did not grind everything to a halt. While it is true the COVID-19 has caused catastrophic health, social and economic effects, we were fortunate that technology has advanced so we were able much that continue communicating and working with one another, albeit only virtually. The pandemic has shown just how internet consumption can drastically. overnight. change even According to the estimates of World Economic Forum, stay-at-home orders, compounded with increased dependence on digital services for both entertainment (for example, site streaming) and work (for example, videoconferencing), have led to a 20% surge in total internet usage. Vodafone, a telecommunications company in Europe, has recorded as much as a 50% increase in internet traffic during the pandemic (Crawford, 2021).

In this regard it is important to mention the role of the Internet and the importance of its stability and reliability in keeping our businesses and personal lives going on. For that, we have to thank the internet's early foundation and the high-tech organizations that have silently kept the worldwide web running. Connectivity is one of the pillars of digital transformation, it is the enabler of digitization which only goes to show the importance of the resilience of Internet.

COVID-19 has raised the stakes around digital access and engagement, reinforcing the fact that connectivity and use of digital technologies are dynamic goals. Although some online activity may decline as COVID-19 treatments begin to emerge and enable greater in-person interactions, it is likely to remain high in areas for which the pandemic has acted as a catalyst, including telework, ecommerce, e-health and e-payments. This maintains pressure on establishing highquality connectivity as well as boosting the ability of people and firms to use increasingly sophisticated digital solutions. (OECD, 2020)

Technology offers businesses across industries incredible potential to engage with people around the world at a moment's notice. Prior to the pandemic, many organizations were just beginning to see the potential that many of these capabilities offered their businesses. However, when inperson meetings and work was limited in response to COVID-19, they quickly realized just how powerful technology can be. The pandemic helped to accelerate the digital transformation and created a landscape that will continue to encourage innovation and technological adoption moving forward. As businesses begin to better understand the capabilities of these types of modern technology, they will also begin to understand the opportunities that lie before them, even after the pandemic is over. (EHL Insights, 2021)

Digitally transformed companies will likely have the edge in the COVID-19 recovery phase over other companies. This is because they will be able to respond with greater agility to customer, employee and supplier needs, because their decisions will be informed by data, while automation of their organizational processes will help them scale faster.

The support of the governments

The digitalization of public services has improved greatly in many countries of the European Union. A great number of member-countries have enabled access to almost all public services via digital technologies. Local development is now based on concepts of "smart city" and "smart village" in which digital technologies are used to create local digital ecosystems and to develop smart communal services and improvement of life standard. The digital transformation of economic systems and public sector is today considered as a huge opportunity for starting a new cycle of longterm sustainable economic development. It would, however, be wrong to expect from digital technologies to solve all unsolved problems of economic growth, threatened by stagnation. It's mandatory to integrate digital and physical systems and create an integrated economy that's going to create new opportunities for socio-economic development. (Factory, 2020)

Croatia as well has a significant amount of digital resources at disposal. Technologies are all around us, thanks to the speedy development of mobile networks of the fourth generation, and now even the fifth generation. However, digital technologies are still not being used enough in private and public sectors as tools for adapting to tectonic changes on global markets, especially in the context of a deep economic crisis caused by the pandemic of COVID-19. The creators of public politics and private economic actors should seize the opportunity of the digital transformation of both economy and society with the goal of elevating the overall social welfare.

The past year has shown the need for agile and flexible information and communication systems that can ensure the functioning of government bodies regardless of the location of the workplace. However, after the pandemic and as a consequence of protection measures, it is very likely that the government budgets will be significantly lower, so the question arises whether digital transformation will be a priority for the public sector.

In this regard and due to the crisis caused by the COVID-19 pandemic, the European Union has adopted a package of measures and entire new programs such as Next Generation EU worth a total of 750 billion euros and React EU worth 55 billion euros, which aim to speed up recovery of economics. This aims to address the reforms in public sectors, namely digitization in order to build sustainable, agile, flexible and more resilient public administration.

Many governments had strengthened their strategic approach to the digital transformation prior to the COVID-19 pandemic. Governments are also devoting attention emerging digital more to technologies such as AI, blockchain and 5G infrastructure, the latter of which is critical to support enhanced mobile broadband, Internet of Things (IoT) devices and AI applications. By mid-2020, 60 countries had a national AI strategy, and in the last couple of years several countries have issued national 5G Blockchain and strategies. quantum computing are also attracting increasing policy attention. This circle between digital innovation and digital transformation is a fundamental driver of new business models and markets, and digital technologies hold the potential to strengthen the science and research systems that are proving so critical

to countries' COVID-19 response and recovery. This strategic trend is encouraging, but it may not be enough to ensure a resilient and more inclusive digital future. The COVID-19 crisis reinforces the need for a coordinated, whole-of-government policy approach to digital transformation. This requires a balancing act that will not be the same for all countries, as cultural, social and economic factors influence the most suitable policy environment. As governments reevaluate existing digital policies in light of the COVID-19 crisis, they will face complex, inter-related issues that demand concerted international co-ordination, co-operation and dialogue (OECD, 2020).

In this period of intense economic, sociological and cultural changes in the global economy it is necessary to identify and integrate new technologies in the implementation of the structural reforms in the public sector. The governments across the globe have recognized the positive impacts that digital transformation has on reforms in public sector and on economy in general. They see it as a necessary step for greater competitiveness of their economies and survival in the post COVID-19 digital age, as well as the key factor for building resilience, agility and further economic growth.

Digitalization after the pandemic - next steps in the digital age

During the pandemic, we learned to cope; in the post pandemic world, we need to learn to thrive. Companies emerging from the crisis are realizing that workforces require new capabilities to face the digital and environmental future. Since the onset of the COVID-19 pandemic, digitization processes have sped up due to an increase in demand to work remotely and access information from different locations. Generally, many organizations have undergone a renegotiation of their relationship to and use of technology because of the pandemic.

As the world looks forward hopefully towards an end of the pandemic, many wonder about the future of many of the changes businesses have made in response to the pandemic. It is likely that many of these

changes are here to stay. Since the pandemic forced brands to eliminate many of the barriers that once stood in their way of digital adoption, such as network security to allow employees to work remotely, it will be significantly easier for companies to operate on a remote basis. Companies have already made key investments to help them protect their digital security while also building a technology stack that allows employees to work from their home office. It is likely that many of these changes will last, with capabilities such as flexible scheduling to allow people to work from home when needed. Businesses have also begun to see the power and potential of digital adoption. Particularly as it comes to business innovation, adopting technology is not only about saving money, but also gaining an edge competitors and seizing over new opportunities in the industry. As businesses realize these advantages, they will be positioned to keep employing technology and taking advantage of what it has to offer. (EHL Insights, 2021)

Working from home and the need to use digital technologies, such as data stored in the cloud and other digital business tools, make it particularly clear that digital business transformation are necessary for survival of economy. Better use of digital business tools and development of internal digital competencies of employees (upscaling) should be the focus of every company today in the times of reduced business intensity. Although this is unlikely to lead to short-term results, we can say with certainty that in the post-COVID-19 crisis period it will be one of the key success factors and the necessity to achieve long-term business sustainability, competitiveness and resilience. But. replacing compulsory office attendance completely with working from home cannot be the goal of our new working world. Yet, the aim should be to develop hybrid working models that optimally combine the advantages of both worlds. This includes, on the one hand, finding ways to promote digital skills for productive working from home and ensuring that employees are motivated despite reduced social interaction. On the other hand, it must become clear when being at the office is necessary.

To compete in the digital, post-COVID-19 age, organizations must attain the capability to connect digitally with customers, suppliers and employees. This means addressing five key challenges:

- i. **Digital acceleration** Rapidly build a digital technology infrastructure, to connect front, middle and back offices.
- ii. **Customer behavior** Create customer-centric business, digital commerce-driven models where customers buy and engage through integrated digital channels – increasingly with little or no physical contact.
- iii. **Supply chain and operations** By digitally connecting with suppliers and service providers, and investing in analytics, companies gain resilience and flexibility, to respond to customer needs and market dynamics.
- iv. Ways of working Organizations must become more nimble, by accessing the skills they need both internally and via external resources, and combining a physical and a virtual footprint.
- v. **Resilience** Digitally enabled organizations have the capabilities to withstand the impact of pandemics (and other shocks) and should be far more agile on their path to recovery. (KPMG International, 2020)

While we can expect Covid-19 to continue changing the way we use and rely on the internet. the prevalence of digital technologies and connected devices will continue helping organizations remain afloat, an unthinkable feat 20 years ago. In a post-Covid-19 world, many companies will likely continue operating remotely to reduce real estate costs and boost productivity. After all, why would a company require employees to commute for hours when they could use that time more efficiently? The remote work trend began well before the pandemic, but Covid-19 has accelerated it multifold. The work-from-home model opens expansive opportunities for economic growth, global talent recruitment, job creation and, eventually, improved human prosperity and well-being. However, the inherent risk of this model is that those who are not able to access the internet (today, approximately half of the world's population) will be even more disenfranchised than before, and the issue of universal internet access will become even more important than it is now. After 2020, there is hardly a chance we will ever return to doing business the old-fashioned way (Crawford, 2021).

A McKinsey survey of 100 executives found that 90% of them envision a future with some combination of remote and on-site work, but most (68%) have no detailed plan for how it will work (Graph 4). We know the COVIDpandemic has changed consumer 19 behavior, attitudes toward office work, and even some views about society itself. But knowing something and knowing what to do about it are two different things. One of the most obvious pandemic takeaways is that workplaces will never be the same, and companies that want to lure workers back to the office in will probably have to find hybrid model. As economies reopen, many companies plan to combine remote work with time in the office to get the best mix of productivity and collaboration. But with employees feeling anxious and burned out, getting the balance of the new hybrid model right is critical. Also, some experts predict the rise of co-working spaces/hubs which can help companies reduce their costs significantly in the years to come

Graph 4. Return to office planning in the post COVID-19 age



Source: (McKinsey & Company, 2021)

In this regard it is also important to mention productivity, which has long been a weak spot in global growth, but the COVID-19 crisis might have kick-started a rise in productivity. As companies shifted rapidly to online channels, automated production tasks, increased operational efficiency, and sped up decision making and innovation of operating models, productivity also rose. New McKinsey research finds that there is potential to accelerate annual productivity growth by about one percentage point in the period to 2024. The stakes are high. One percentage point of additional productivity growth per year in every country to 2024 would imply an increase in per capita GDP ranging from about \$1,500 in Spain to about \$3,500 in the United States (McKinsey & Company, 2021).

Furthermore, many companies recognize the need to radically change their shape, size, and structure, and to acquire a range of new skills. Through strategic reskilling initiatives, and by embracing the professional 'gig' economy, they can benefit both workers and employers. Additionally, shared services, partnerships, alliances and strategic use of retired staff, brings access to vital talent on a short-to-medium term basis. The 'workforce of the future ecosystem' is becoming more and more digital, increasingly augmented by automation as well as contingent workers (KPMG International, 2020).

Conclusion

Almost all aspects of our lives have changed in just one year. Today, we depend heavily on digital tools, whether it's trade, education, working from home, or something else. Ultimately, this makes it even more difficult for companies to survive, as the expectations they have to meet are now higher than ever. There will be no "return back to old normal". The pandemic is permanently reshaping the way we live and work. Some of the behaviors developed in crisis including wide-scale digital adoption will outlast the pandemic, well after restrictions on activity are lifted. To stay competitive, companies must respond to these behavioral changes and meet emerging customer demands. Savvy organizations will focus now on leveraging advanced analytics to extract insights from their customer data and continue internal and external data integration efforts to develop a more holistic view.

Even prior to the pandemic, technology had become an increasingly important part of the business. Companies were looking at technology as a helpful mean of engaging with customers, for workplace flexibility, and for a way to introduce automation and faster business processes. However, the spread of the COVID-19 virus and the lockdown measures accelerated these adoptions immensely. It actually forced companies to look into creative digital solutions so that their employees could continue to function and work remotely and continue to serve their client base (EHL Insights, 2021). The pandemic significantly accelerated the adoption of digital products and services as businesses had to quickly pivot, moving operations online and staff to work remotely.

The pace and the degree of digitalization is accelerating in the wake of COVID-19 pandemic, with ever greater pressure to meet customers wherever they are. This calls for flexible, 'commerce everywhere' business models, and a renewed focus on employee experience and purpose, to drive an enhanced customer experience.

Companies and organizations around the world are investing heavily in technology to address immediate concerns like falling revenue and interrupted supply chains in order to build longer-term competitiveness and resilience. Regardless of how this crisis and its aftermath unfold, there is no doubt that digital technologies will continue to transform the way we live and work.

On the positive side, organizations have (to some extent) recognized the importance of digitalization digital and business transformation, but on the other hand, the negative side is that the "means of coercion" - COVID-19 - served as an incentive and catalyst of change. We only hope that relaxation of anti-virus measures will not mean relaxation of accelerated digitalization. technology awareness and the introduction of new opportunities that are easily accessible and easy to implement so that economies around the world will be ready for all future crises.

The results and information obtained from the theoretical research and conducted analysis provide a great insight about the impact of the COVID-19 pandemic on accelerated digitization of economy. Therefore, it is clear that the hypothesis of this paper can be accepted as follows: *It is possible to prove the causal link between accelerated digitalization as a response to the global pandemic caused by the COVID-19 virus*

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SELECTION OF THE OPTIMAL TOLL COLLECTION SYSTEM FOR THE PURPOSES OF SUSTAINABLE DEVELOPMENT OF TRANSPORT IN THE REPUBLIC OF SRPSKA

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> Original scientific work

Abstract: Transport system has multiple interactions and multidimensional effects on the environment, by way of, amongst other, land acquisition and urban pollution; on economic development with regard to the GDP growth; as well as on social equity in terms of access, quality of life and health of population. This paper considers the possibility of introducing toll collection in the Republic of Srpska. The goal of the developed model is to increase revenue, which could be directed to the sustainable development of transport in the Republic of Srpska. The selection of a toll collection system has been made taking account of: economic, traffic, technical, organizational and exploitation criteria. Multiple-criteria approach has been applied together with the Analytic Hierarchy Process.

Keywords: Toll collection systems, Multi-criteria approach, Analytic Hierarchy Process

Introduction

The concept of sustainability, which is widely used in the field of planning, has been present since several decades ago. Sustainability has its general criteria and principles. As a rule, within a specific strategy or policy of sustainable development, several general and special principles and criteria are combined, the number of which depends on the level of decision-making and the specific problem to which they are applied. In order to make concrete decisions, it is necessary to define these criteria and principles, as well as to define the specific values and goals to which they refer. Development planning should be scientific knowledge on based and rationalism. It is logical that planning solutions must be sought through the examination of variants, which enables a wider offer in order to choose the best way of sustainable development for a certain geographical area, ie enables the choice between alternatives in order to achieve the desired goal.

Groups of people see the use of a certain space and the proposal of its development in different ways. Nevertheless, it is possible to form a set of values, which can be considered objective. The goal is to avoid decisionmaking according to intuition as much as possible, ie to rationalize the evaluation process as much as possible. This brings us to the idea of applying a popular approach to decision-making, multi-criteria the application of the Analytical Hierarchy Process (AHP) when considering the possibility of toll collection and choosing the optimal toll system for sustainable transport development in Republika Srpska.

Recently, highways, which represent a specific type of road transport, large capacity, intended exclusively for motor vehicle traffic, also form part of the Republika Srpska transport system. While highways as a creation, in the world, are present for a relatively short time (the first highway was built in 1924 in Italy), toll collection has been known since ancient

times and was widespread in the Roman Empire..

Decision making is often a complex problem due to the presence of competitive and conflicting criteria among the available alternatives. Analytical hierarchical process as an approach was developed by Thomas Saaty in the 1980s in order to solve multicriteria decision-making problems.

The paper is conceived as follows. After the Introduction, the basic concept of the applied approach, Analytical Hierarchical Approach, is presented. Then, in the third chapter, the existing toll collection systems are defined. In the next chapter, a model for the selection of toll collection systems in the Republic of Srpska was developed. Also, part of this chapter are the results of the applied multicriteria model, ie recommendations for the introduction of a certain toll collection system in the Republic of Srpska. Finally, the last chapter is devoted to concluding remarks.

1. Analytical hierarchical process - basic concept of approach

The AHP approach treats the problem of decision making as a hierarchy of elements important for decision making [5,6,7]. At the top is the goal, below are the criteria, at the bottom are the alternatives. If at least one of the criteria is decomposed into sub-criteria, a new hierarchical level is formed below the level of the criteria and above the level of alternatives.



Photo 1. Scheme of the analyticalhierarchical process

The AHP requires that the criteria be compared first and that their relative weights be calculated in relation to the target. The alternatives are then compared in pairs with respect to each criterion and their relative weights with respect to the criteria are determined by an analogous procedure. The result is vectors of relative weights of criteria and alternatives. Finally, the synthesis is performed and the final composite vector of the weight values of the alternative in relation to the target is determined. Apart from the hierarchical structuring of the problem, AHP differs methodologically from other methods in that the comparison is made in pairs of elements of the System, at a given level of hierarchy in relation to the elements of a higher level.

Analytical hierarchical approach has a number of advantages, such as: relative simplicity, intuitive approach, the possibility of using both qualitative and quantitative information in the decision-making process, matrices for comparing system elements by pairs, the possibility of group decision the possibility of calculating making, inconsistency index, the existence of useroriented software, as well as a simple interpretation of the results. The biggest advantage of the AHP approach is its ability to identify and analyze the inconsistency of decision makers in the process of evaluating system elements. Of course, in addition to many advantages, this approach has some disadvantages, among which are the difficulties in applying this approach in the case of a large number of system elements (criteria and alternatives), due to the generation of a large number of comparison matrices by pairs.

2. Existing toll collection systems

Existing toll systems applied in European countries are heterogeneous and vary from country to country (Figure 2). The European Commission is trying to introduce more directives in this area with certain directives, both in terms of the type and system of collection, and in other non-harmonized issues. The main goal of the EU is interoperability, which is to be achieved by the policy "one market - one billing system"

²⁷ http://www.vecernji.hr/naplata-autocestarina-ueuropi-632250 through harmonized prices and vehicle categories.



Photo 2. Overview of highway tolls in Europe ²⁷

It should be noted that the toll collection system at the national or regional level is analyzed, and not at the urban or separate infrastructure toll collection system. All these different systems are based on five basic characteristics, namely:

• Toll collection method (Multi-lane toll collection system with free flow of vehicles and Toll-based toll collection system)

• Billing Scheme (Distance Based and Time Based)

• System organization (Closed and Open billing system)

• Control (Control of collection based on ramps, Control of collection based on recognition of license plates and Control by authorized service - police)

• Billing technology (Manual billing and Electronic billing)

Model for selection of toll collection system in Republika Srpska

The highway is a public road specially built and intended exclusively for motor vehicle traffic, which is marked as a highway with the prescribed traffic sign, has two physically separate lanes for traffic from opposite directions with at least two lanes and a lane for forced stopping of vehicles, without intersection with transverse roads and railways or tram lines at the same level and in whose traffic can be included or excluded only by a certain and specially built connecting public road to the appropriate lane of the highway.

Highways are used to connect large cities and important economic areas of the country or region, are intended mainly for long-distance traffic, and are connected to the system of European highways. Highways meet the requirements related to the prescribed traffictechnical elements, or are being built in phases.

In Republika Srpska, the highway network consists of the following sections:

- Banja Luka Gradiška (33 km);
- Banja Luka Doboj (75 km), under construction.

Also, the plan for the development of the highway network for the next 20 years, the following sections are planned:

- Doboj Modriča (47 km);
- Banja Luka Mlinište (92 km);
- Modrica Bijeljina border with Serbia (91 km);
- Banja Luka Prijedor Novi Grad (72 km);
- Bijeljina Zvornik Foča Trebinje (350 km);
- Pale Rogatica Visegrad Vardiste (91 km);
- Ljubinje Trebinje border with Montenegro (71 km).

Elements of the developed model

When considering the criteria for the possibility of introducing toll collection in the Republic of Srpska and choosing the optimal toll system for the sustainable development of transport, the following groups of criteria should be taken into account: economic (total toll revenue, investment costs, operating costs), technical (toll system adaptability). interoperability of the billing system, modernity of the solution, possibility of control of the billing procedure, vulnerability of the billing system) and organizational criteria (organizational effort in exploitation and level of possible abuses).

From all the above, considering the possibility of introducing toll collection on the highway network in the Republic of Srpska, we come to a certain division of criteria in the process of multi-criteria decision-making, according to the following:

- K1 implementation cost
 K2 operating costs
- K3 maintenance costs
- K4 total income
- •K5 revenue dynamics (advance,
- continuous, cash-flow)
- K6 risks (level of abuse, vulnerability)

Potentially, four different toll collection systems can be applied in the Republik aSrpska and they will be discussed below, and can be presented as follows:

- A1 free system (current status)
- A2 closed toll collection system
- A3 open toll collection system
- A4 vignette system

Model formation and results

The first hierarchical level contains only the goal, the second the criteria and the third the alternatives. In the Super Decisions program, the basic levels are formed first, with a description of the name. Then, we approach the creation of nodes in levels, their connection, or the creation of models. The next step is to compare the pairs of elements in the completed model.



Photo 3. Model appearance

First, we compare the importance of individual criteria in relation to the set goal. The goal of the developed model is to

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increase revenues that could be directed to the sustainable development of transport in the Republic of Srpska. The comparison of criteria, ie the definition of their relative importance, was performed on the basis of the fundamental Saaty scale [7], with grades from 1 to 9 (Table 1).

Table	1.	Evaluation	of	crit	teria
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K1	K2	K3	K4	K5	K6
1,00	0,20	3,00	0,14	5,00	5,00
	1,00	5,00	0,14	5,00	5,00
		1,00	0,11	1,00	3,00
			1,00	9,00	9,00
				1,00	3,00
					1,00
	K1 1,00	K1 K2 1,00 0,20 1,00 1,00	K1 K2 K3 1,00 0,20 3,00 1,00 5,00 1,00	K1 K2 K3 K4 1,00 0,20 3,00 0,14 1,00 5,00 0,14 1,00 5,00 0,11 1,00 1,00 1,00	K1 K2 K3 K4 K5 1,00 0,20 3,00 0,14 5,00 1,00 5,00 0,14 5,00 1,00 5,00 0,14 5,00 1,00 5,00 0,11 1,00 1,00 1,00 1,00 1,00

The final ranking of alternatives is presented in Table 2.

Table 2. Rank list					
RANK	TOLL SYSTEMS	WEIGHT			
1	A4 – VIGNETTE SYSTEM	0.321			
2	A2 – CLOSED SYSTEM	0.270			
3	A1 – CURRENT BALANCE FREE OF CHARGE	0.237			
4	A3 – OPEN SYSTEM	0.172			

Super Decision software for AHP analysis made it easy to obtain and verify results, as well as present it in a clear and legible way. In other words, it provides elements to support decision-making, by processing data in the process of multi-criteria evaluation of variant solutions.

Therefore, based on this analysis and simulations conducted by data processing, considering the possibility of introducing a toll collection system in the Republic of Srpska, a solution is imposed that it is necessary to introduce a toll collection system, and as an optimal solution offers alternative A4, which is a toll collection system using the VIGNETTE. Also, by checking the consistency, it can be concluded that the obtained result is completely consistent.

3. Conclusion

The problem of choosing the toll collection system in the Republika Srpska was treated as a task of multi-criteria ranking of four alternatives, by considering six criteria, using the Analytical Hierarchical Process.

Each toll collection system is scored according to defined criteria, taking into account the importance of each of the different evaluation factors, in order to obtain a ranking of results that is least sensitive to changes in the weight of the criteria.

As a result of applying this method in considering the possibility of introducing toll collection in Republika Srpska and choosing the optimal toll system for sustainable transport development, ranking alternatives shows that the vignette is the best solution when taking into account economic, traffic, technical, organizational and operational criteria.

The vignette as a toll collection system is a very simple model, which is why they were introduced by almost all smaller European countries. Also, they have a certain advantage over other collection systems, first due to the simplicity of raising funds, which provides certain benefits for the budgets of each country through advance payments, then avoids possible congestion and delays due to collection, and achieves greater traffic safety.

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