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INNOVATION AS A FACTOR OF ECONOMIC DEVELOPMENT IN THE CONDITIONS OF COVID-19 HEALTH CRISIS

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Abstract: Given the great importance of innovation for economic development, each country strives to adapt its business environment to the continuous development of innovation. At the beginning of the Covid-19 health crisis, the question was what the impact on innovation would be. Investments in innovations have shown great resilience in the conditions of the pandemic, especially in the field of modern information and communication technologies and scientific research activities. North America and Europe continue to be ahead of other regions in terms of innovation. The aim of this paper is to point out the importance of innovation as a factor of economic development in the conditions of the Covid-19 health crisis. The first part of the paper points out the role of innovation as a factor of economic development. The second part of the paper is dedicated to the analysis of the Global Innovation Index for 2021 and the impact of the Covid-19 health crisis on innovation. The third part of the paper analyzes the innovation in the Republic of Serbia and gives recommendations for improving the innovativeness of the economy of the Republic of Serbia in the conditions of the Covid-19 health crisis. After a comprehensive analysis of the available literature, relevant conclusions are presented.

Keywords: innovation, economics, health crisis, Covid-19, global innovation index

1. Introduction

Innovation is very important as a response to global challenges and rapid technological change and changing consumer preferences. Modern knowledge-based economy stimulates innovation, so it can be seen as an innovative economy. In modern business conditions, traditional sources of growth are losing importance and are being replaced by education, knowledge, innovation and entrepreneurship. Innovative companies and economies are open to new ideas and are more willing to change and adapt to emerging market trends and technologies. Given the great importance of innovation for economic development, each country strives to adapt its business environment to the continuous development of innovation.

The aim of this paper is to point out the importance of innovation as a factor of economic development in the conditions of the Covid-19 health crisis. The first part of the paper points out the role of innovation as a factor of economic develop-ment. The second part of the paper is dedicated to the analysis of the Global Innovation Index for 2021 and the impact of the Covid-19 health crisis on innovation. The third part of the paper analyzes the innovation in the Republic of Serbia and gives recommendations for improving the innovativeness of the economy of the Republic of Serbia in the conditions of the Covid-19 health crisis. After a comprehensive analysis of the available literature, relevant conclusions are presented.

2. Innovation as a Factor of Economic Development

In a dynamic and uncertain environment, innovations are the leading drivers of economic growth, generators of new jobs and a prerequisite for creating smart and sustainable development. [Beraha, 2019: Balšić, 2016] The innovation-driven economy in the global market acquires a competitive position through constant innovation. [Afuah, 2003, 15: Stanković & Stojanović, 2020] In the world market, competitive advantage means relatively greater power of one company, one product or one economy compared to another. [Gligović et al., 2020] Raising the level of competitiveness of the national economy is the basic premise of stable growth, ie increasing employment and quality of life of the population. [Mitrović & Mitrović, 2016: Mitrović & Mitrović, 2020] The key determinant of the competitiveness of the national economy is knowledge, ie the generally achieved level of education of its economic entities, their ability to accept modern technological achievements and

create innovations that lead to further progress. The national economy cannot be competitive without the competitiveness of its economic entities, just as economic entities cannot be competitive without an appropriate business environment. The growth of the national competitiveness is based on the constant growth of the competitiveness of the companies that operate within it. [Kovačević, 2019]

The process of globalization and the development of new technologies have conditioned that the competitiveness of national economies can no longer be based on traditional factors of production such as land, labor and capital, but on economic activities based on knowledge. At the same time, innovation is no longer reserved only for high-tech companies, but for all companies and all sectors. [Malik et al., 2003] In the new era, the era of the knowledge-based economy, innovation is becoming an imperative, and the main goal is to turn ideas into innovation. It is no longer considered that knowledge is power, but that power is in the exchange of knowledge and ideas. [Milićević et al., 2015] Modern business based on the knowledge economy lays the foundations of new economic progress and the possibility of creating a new future. Investing in knowledge, as the most important and most valuable resource of the 21st century is the smartest and most profitable investment. [Gavrić et al., 2015] Given the importance of innovation for economic development, each country strives to make its business environment conducive to the continuous development of innovation. [Dajić, 2017]

In the 1930s, Joseph Schumpeter [1934] recognized the importance of innovation, which is the primary driver of dynamic economic development. Innovation means any conversion of knowledge and ideas into new or improved products, services or processes [Marjanović et al., 2019]. Innovation is successful if it provides value, ie if the benefits after its realization are greater than the costs required for its development. The introduction and diffusion of an innovation is carried out with the aim of creating economic value. Innovations can be classified as radical and incremental innovations. Radical innovations refer to the introduction of completely new products and services and/or new production and distribution systems. On the other hand, incremental innovations include the adaptation, improvement and refinement of existing products and services and/or existing production and distribution systems. [Gligović et al., 2020]

Regarding innovation, it is necessary to mention three significant

changes. The first change concerns intense international competition. In most markets today, there are a large number of competitors that have excellent performance. Another change concerns increasingly demanding markets. Consumers are becoming more and more sensitive to subtle differences between products, so it is very difficult to meet their growing needs. The third change involves rapidly changing technology. Rapid change of technology requires companies to follow innovations and, by differentiating themselves from their competitors, to satisfy the demand of increasingly sophisticated consumers. [Stanković, 2021] An adequate combination of a well-formulated innovative strategy, system and business environment is crucial for the success of any innovation. [Afuah, 2003, 16] Economic policy has a great influence on the development of innovations, which through certain measures should encourage an innovative climate. Given the great importance of innovation for economic development, each country strives to improve its business environment so that it is conducive to the continuous development of innovation. This is not a big problem for developed countries, but developing countries often do not have adequate scientific and technological capacity that would encourage the creation of the necessary knowledge and innovation. [Dajić, 2017] The role of the state, which through innovation policy creates conditions for the development and application of innovations, becomes key to improving the innovation system and improving the innovative performance of national economies. [Beraha, 2019]

2. Global Innovation Index in the Conditions of Covid-19 Health Crisis

At the end of 2019, economic forecasts indicated a possible slowdown in the global economy, as well as the economies of leading countries during 2020. Uncertainties and risks related to conflict situations between the leading economies in the field of trade relations (USA-China), uncertainties related to the economic policy of these countries, tensions in EU-Russia relations, tensions within the EU due to Brexit as well as standard ecology-related topics that are intensifying are mentioned as the most important factors that will contribute to the economic slowdown. [UN, 2020] A special problem was the threat of new large-scale migration of the population with the war-affected areas towards Europe, ie the EU. [OECD, 2020] The global economic outlook worsened when the SARSCoV-2 virus appeared in

China, causing a disease called Covid-19. The announcement of the pandemic of the new disease Covid-19 indicated a significant impact on economic trends, primarily through the possible emergence of an economic recession. [Praščević, 2020] The outbreak of the Covid-19 pandemic has not only led to a global health crisis and a deep economic recession - deeper than the fall during the 2008-2009 financial crisis - but has also created a climate of deep uncertainty about the future. Since the outbreak of the pandemic, unemployment rates have risen sharply in most developing and advanced economies, and poverty rates have started to rise again, reversing the successes achieved over the past few decades. According to the latest estimates, the economic and health crisis caused by Covid-19 is expected to push between 88 million and 115 million people more into extreme poverty. [Schwab & Zahidi, 2020]

When the pandemic started, the big question was what its impact on innovation will be. From the aspect of innovation, it is important to mention that investments in innovation showed great resilience during the Covid-19 pandemic, but that they varied in different sectors and regions. Companies whose innovations were focused on tackling the pandemic and its consequences have increased their investments in innovation: companies in the field of information and communication technologies (ICT), ICT hardware and electrical equipment and pharmaceuticals and biotechnology. Companies in sectors severely affected by pandemic measures have reduced their spending on innovation (transport companies, travel agencies, etc.). However, despite such reductions, available data indicate that investment in innovation as a whole has proven to be pandemic-resistant. [Dutta et al., 2021]

So, despite the economic shock resulting from the Covid-19 pandemic, scientific results, research and development costs, intellectual property applications and venture capital (VC) business continued to grow in 2020. The data that support this are the following: [Dutta et al., 2021]:

- Publication of scientific articles worldwide increased by 7.6% in 2020.
- State budget allocations for research and development continued to grow in 2020.
- International patent applications have reached a new record in 2020. The 3.5% increase was caused by the development of medical technology, pharmaceutical products and biotechnology.
- Venture capital operations grew by 5.8% in 2020, exceeding the

average growth rate in the last 10 years.

Global Innovation Index (GII) is a project established in 2007 by the World Intellectual Property Organization (WIPO). Since then, the annual reports of the Global Innovation Index have been prepared annually on the basis of 82 indicators grouped in 7 areas. Over the past 14 years, the GII has established itself as a reference publication for innovation policy development around the world, providing a deeper understanding of the basic elements for innovation development that help promote economic growth and development. A significant number of countries now have innovation policy laws that designate GII as a "benchmark" for innovation performance. [ZIS, 2020]

North America and Europe continue to lead other regions in innovation. The innovation performance of Southeast Asia and Oceania has been the most dynamic in the past decade. North Africa and West Asia, Latin America and the Caribbean, Central and South Asia and sub-Saharan Africa follow innovations. North America is the most innovative region in the world. The United States retains its 3rd place in the GII rankings for 2021, and Canada is advancing by one place and reaching 16th place. The region has the greatest performance in all pillars of the GII compared to all other regions of the world. Europe is still the second most innovative region in the world. There are a lot of innovative European economies: 16 European economies are leaders in innovation (ie in the top 25). A total of 10 economies advanced in 2021: France (11th), Iceland (17th), Austria (18th), Estonia (21st), Hungary (34th), Bulgaria (35th), Slovakia (37th), Lithuania (39th), Russian Federation (45th) and Belarus (62nd). [Dutta et al., 2021]

The innovation performance in the region of Southeast Asia, East Asia and Oceania (SEAO) was the most dynamic in the past decade, thus reducing the gap between North America and Europe. The five SEAO economies are world leaders in innovation: the Republic of Korea (5th), Singapore (8th), China (12th), Japan (13th) and Hong Kong, China (14th). In North Africa and West Asia, the United Arab Emirates (UAE) remains in the top 35 and advances to the 33rd rank. Turkey makes a big leap in the top 50, reaching 41st place. In Latin America and the Caribbean, no economy enters the top 50. Chile (53rd), Mexico (55th), Costa Rica (56th) and Brazil (57th) are the only economies in the region in the top 60. Moreover, with the exception Mexico, the other listed

countries have not steadily improved their rankings in the last 10 years. However, Brazil has made strong progress this year, improving by five positions and achieving its best ranking since 2012. Brazil is the only economy in the region for which R&D expenditures are above 1 percent of GDP and comparable to some European economies, such as Croatia and Luxembourg. In Central and South Asia, India leads in 46th position, after persistently advancing in the rankings since 2015, when it was in 81st place. In sub-Saharan Africa, only Mauritius (52nd) and South Africa (61st) are in the top 65; and only Kenya (85) and the United Republic of Tanzania (90) remained in the top 100 and improved their performance over the past five years. [Dutta et al., 2021] (Table 1).

Table 1.: Top three most innovative economies by region

Northern America	1. USA 2. Canada
Europe	1. Switzerland 2. Sweden 3. United Kingdom
Northern Africa and Western Asia	1. Israel 2. UAE 3. Turkey
Latin America and the Carribbean	1. Chile 2. Mexico 3. Costa Rica
Sub-Saharian Africa	1. South Africa 2. Kenya 3. Tanzania
South East Asia, East Asia and Oceania	1. Republic of Korea 2. Singapore 3. China
Central and Southern Asia	1. India 2. Iran 3. Kazahstan

Source: [Dutta et al., 2021]

Switzerland, Sweden, the United States, the United Kingdom, and the Republic of Korea are the five most innovative nations in the world according to the Global Innovation Index for 2021. They are followed by the Netherlands, Finland, Singapore, Denmark and Germany. Only a few economies have exceptional innovative performance year after year. Switzerland, Sweden, the United States and the United Kingdom are ranked among the top 5 in the last three years, while the Republic of Korea joins the top 5 most innovative economies according to the Global Innovation Index for the first time in 2021 (Table 2). The largest number of countries ranked in the top 25 most innovative economies according to the Global Innovation Index is still from Europe. Five Asian economies are among the top 15: the Republic of Korea (5th) and Singapore (8th) are in the top 10, followed by China (12th), Japan (13th) and Hong Kong, China (14th). China remains the only middle-income economy among the 30 most innovative economies in the world. [Dutta et al., 2021]

Table 2.: Top 10 countries according to the Global Innovation Index 2021

GII rank	Economy	Score
1	Switzerland	65.5
2	Sweden	63.1
3	United States of America	61.3
4	United Kingdom	59.8
5	Republic of Korea	59.3
6	Netherlands	58.6
7	Finland	58.4
8	Singapore	57.8
9	Denmark	57.3
10	Germany	57.3

Source: [Dutta et al., 2021]

3. Innovation and Covid-19 Health Crisis in the Republic of Serbia

Innovation is an important factor in increasing the competitiveness of any country. According to the latest GII report from 2021, which includes 132 countries, Serbia took 54th place, which is a decrease of 1 place compared to 2020, but an improvement of three places compared to 2019 (Table 3). The profile of the Republic of Serbia according

to the GII indicates that Serbia's performance in the field of innovation is better than expected for countries with similar gross domestic product (GDP). In the group of 34 countries with higher middle incomes, our country is on the 8th place, while among the 39 European countries it is on the 34th place. When it comes to innovations, the report of the World Economic Forum is also noteworthy. It analyzes the competitiveness of countries on the basis of 12 criteria, among which is the application of information and communication technologies, but also the possibility of innovation. The report includes 141 countries, and Serbia ranks 72nd. It is encouraging that it was ranked 59th out of 141 in the field of innovation capacity. Serbia belongs to the group of moderate innovators, together with Croatia, Hungary and Slovenia. Innovation categories in which our country stands out the most are innovators, company investments and effects on sales. The overall positive result is influenced by ICT training and innovation activities of small and medium enterprises. The weakest areas of innovation are related to intellectual property, competitive research programs and finance and support. [Startech, 2021]

Table 3.: Global Innovation Index for the Republic of Serbia for 2021

GII rank	Economy	Score
45	Russian Federation	36.6
46	India	36.4
47	Greece	36.3
48	Romania	35.6
49	Ukraine	35.6
50	Montenegro	35.4
51	Philippines	35.3
52	Mauritius	35.2
53	Chile	35.1
54	Serbia	35.0
55	Mexico	34.5

Source: [Dutta et al., 2021]

In the conditions of the Covid-19 crisis, the Republic of Serbia is facing great challenges when it comes to innovation. It should be emphasized that in the Republic of Serbia, the scientific community is very valuable national resource that is underused. The number of scienti-

fic papers published in prestigious scientific journals has increased significantly in the past few years, as has the number of international projects obtained by our researchers, with a large number of papers and projects related to the health crisis and pandemic. However, the efforts of the scientific community are still not sufficiently recognized. The main problems of the business environment in Serbia are massive brain drain, insufficient investment in research and development by the state and private sector, slow adoption of new technologies, inadequate cooperation between science and economy, inefficient protection of intellectual property, lack of appropriate financial incentives for innovation. [Jovanović, 2018] This points to the fact that the Republic of Serbia still has a long way to go to improve its innovative capacity.

To achieve positive innovative results, it is necessary to take the following measures (Table 4): [Ristić et al., 2016: Dajić, 2017]

- creating a stimulating business environment that would be favorable for the development of innovation,
- ensuring cooperation between science and economy,
- creating an adequate institutional framework to support innovation,
- creating an adequate knowledge structure through investment in education,
- investing in the development of modern information and communication technology,
- improving the funding of research organizations as a fundamental source of new knowledge necessary to foster innovation,
- harmonization of education policy and employment policy (harmonization of the education system and market needs),
- preventing brain drain (reducing the departure of highly educated people from the country),
- increasing budget for research and innovation.

Table 4.: Recommendations for improving the innovative potential of the Republic of Serbia in the conditions of the Covid-19 health crisis

Restrictions	Recommendations
Insufficient cooperation between science and economy	Improving cooperation between educational institutions and the economy Creating networks of scientists and businessmen with the aim of encouraging innovative activities Financial support to educational institutions for capacity building for development and encouragement of innovations
Insufficient investment in research and development	Allocating more funds from the budget for research and development
Brain drain	Harmonization of education policy and employment policy Encouraging young people to self-employment and creative entrepreneurship Encouraging innovation, initiative and creativity among children and youth

Source: Authors

5. Conclusion

At the very beginning of the pandemic, there was the question what would be the the impact of the Covid-19 crisis on the innovation. Investments in innovations have shown great resilience in the conditions of the pandemic, especially in the field of modern information and communication technologies (ICT), ICT hardware and electrical equipment, and pharmaceutical products and biotechnology. It is important to mention that the number of published scientific articles on a global level has increased. North America and Europe continue to be ahead of other regions in terms of innovation. Switzerland, Sweden, the United States and the United Kingdom are ranked among the top 5 in the last three years, while the Republic of Korea joins the top 5 most innovative economies according to the Global Innovation Index for the first time in 2021. They are followed by the Netherlands, Fin-

land, Singapore, Denmark and Germany.

According to the latest report of the World Intellectual Property Organization (WIPO) from 2021, which includes 132 countries, Serbia took 54th place, which is a decrease of one place compared to 2020, but an improvement of three places compared to 2019. The profile of the Republic of Serbia according to the Global Innovation Index indicates that Serbia's performance in the field of innovation is better than expected for countries with similar gross domestic product. In the conditions of the Covid-19 health crisis, Republic of Serbia is facing great challenges when it comes to innovation. It should be emphasized that in Republic of Serbia, the scientific community is an extremely valuable national resource, especially in conditions of health crisis. To achieve positive innovative results, Republic of Serbia should take the following measures: modernization of the business environment to stimulate innovation, creation of institutional framework to support innovation, harmonization of education policy and employment policy to prevent brain drain, encouraging young people to self-employment and creative entrepreneurship, improving the financing of scientific research organizations, allocating more funds for research and development, improving cooperation between educational institutions and the economy.

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INOVATIVNOST KAO FAKTOR EKONOMSKOG RAZVOJA U USLOVIMA COVID-19 ZDRAVSTVENE KRIZE

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Rezime: Imajući u vidu veliki značaj koju inovativnost ima za ekonomski razvoj, svaka se država trudi da svoj poslovni ambijent prilagodi kontinuiranom razvoju inovacija. Na pocetku zdravstvene krize Covid-19 postavljeno je pitanje kakav će biti njen uticaj na inovacije. Investicije u inovacije su u uslovima pandemije pokazale veliku otpornost, posebno u oblasti savremenih informaciono-komunikacionih tehnologija i naučno-istraživačke delatnosti. Severna Amerika i Evropa i dalje prednjače ispred drugih regiona po inovacijama. Cilj rada je da ukaže na značaj inovativnosti privrede u uslovima zdravstvene krize Covid-19. U prvom delu rada se ukazuje na ulogu inovacija kao faktora razvoja privrede. Drugi deo rada je posvećen analizi Globalnog indeksa inovativnosti za 2021. godinu i uticaja zdravstvene krize Covid-19 na inovacije. Treći deo rada je posvećen analizi inovativnosti privrede Republike Srbije i preporukama za unapređenje inovativnosti privrede Republike Srbije u uslovima zdravstvene krize Covid-19. Nakon sveobuhvatne analize raspoložive literature, daju se relevantni zaključci.

Ključne reči: inovacija, ekonomija, zdravstvena kriza, Covid-19, globalni indeks inovativnosti