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ANALYZING THE IMPORTANCE OF DIGITALIZATION OF ECONOMY IN DEVELOPING COUNTRIES

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ABSTRACT

The pace of economic activity has altered dramatically as a result of digital technology. The role of digitalization in the economy has grown over time, especially since the advent of industrial revolution 4.0. This study intends to investigate the importance of economic digitalization for developing countries by comparing different economies (developed, developing, least developed). This project makes use of comparison assessment index system based on the idea and traits of the digital economy from three perspectives: digital economy infrastructure, openness of the digital economy, environment for innovation, and competitiveness needed for the advancement of digital technology. Findings demonstrate that, despite a clear geographical imbalance in the development of the digital economy in those nations, the digital economy has a very favorable impact on their economic growth. Furthermore, the findings reveal a long-term steady link between technological innovation and its drivers, including the digital economy, bank financing of R&D spending, GDP, and financial risk.

Keywords: economic digitalization, multi-regression model, economic growth, technological innovation

ANNOTATSIYA

Raqamli texnologiyalar natijasida iqtisodiy faoliyat sur'ati keskin o'zgardi. Iqtisodiyotda raqamlashtirishning roli vaqt o'tishi bilan, ayniqsa 4.0 sanoat inqilobi paydo bo'lganidan beri o'sdi. Ushbu tadqiqot turli iqtisodiyotlarni (rivojlangan, rivojlanayotgan, rivojlanmagan) taqqoslash orqali rivojlanayotgan mamlakatlar uchun iqtisodiy raqamlashtirishning ahamiyatini

o'rganishni maqsad qilgan. Ushbu loyiha raqamli iqtisodiyot g‘oyasi va xususiyatlariga asoslangan taqqoslash indeksi tizimidan uchta nuqtai nazardan foydalanadi: raqamli iqtisodiyot infratuzilmasi, raqamli iqtisodiyotning ochiqligi, innovatsiyalar uchun muhit va raqamli texnologiyalarni rivojlantirish uchun zarur bo‘lgan raqobatbardoshlik. Topilmalar shuni ko'rsatadiki, ushbu mamlakatlarda raqamli iqtisodiyot rivojlanishidagi aniq geografik nomutanosiblikka qaramasdan, raqamli iqtisodiyot ularning iqtisodiy o'sishiga juda yaxshi ta'sir ko'rsatadi. Bundan tashqari, topilmalar texnologik innovatsiyalar va uning drayverlari, jumladan, raqamli iqtisodiyot, ilmiy-tadqiqot xarajatlarini bank tomonidan moliyalashtirish, YaIM va moliyaviy xavf o‘rtasida uzoq muddatli barqaror bog‘liqlikni ochib beradi.

Kalit so'zlar: iqtisodiy raqamlashtirish, ko'p regressiya modeli, iqtisodiy o'sish, texnologik innovatsiyalar.

INTRODUCTION

Since digital technologies are permeating more and more facets of society and the business, defining what the digital economy is a challenge. The idea of the "digital economy" is based on the earlier notions of "information economy" and "network economy," and it is anchored in digital technology, information networks, and the activities that individuals engage in inside such networks. The Internet and other associated technologies are used to execute a number of economic and social models as part of the digital economy.

In the twenty-first century, new, revolutionary technologies that can create and promote long-term economic growth and social welfare play the primary role in the long-term expansion of the national economy. Digital technologies, typically represented by the Internet, big data, 5G, artificial intelligence, accelerate the deep integration with industries, bringing the world into the era of digital economy. Without the advancement and transformation of digital technology, innovative development and scientific progress are incredible. Innovation creation and introduction are impacted by digital technology in many ways. Digital technology is quickly becoming a part of every aspect of our life worldwide in the modern, global economy. These procedures necessitate the ongoing growth of company models, which gradually progress toward more digitalization.

New, innovative technologies that are able to create and promote long-term economic growth and social welfare play a key role in the long-term expansion of the national economy in the twenty-first century. In addition to assisting in the creation of new businesses and industries, innovation also serves to revitalize established ones, increasing economic growth.

Innovation creation and introduction are impacted by digital technology in many ways. Through the more precise incorporation of bigger amounts of data and a wider range of academics participating via remote collaboration, digital technologies have extended research techniques and instruments.

Let's take example of developed counties' economic digitalization: The commercial dynamics of the G7 countries have been altered by technologies (ICTs). These developments in digitalization have benefited the G7 economies in terms of higher productivity, societal transformation, and industrial growth. These top seven nations account for 58% of the world's net worth (OECD, 2019). Furthermore, the G7 nations' economies have been performing much better over time. Additionally, these top seven economies are investing billions of dollars in R&D, which has improved their performance in terms of innovation and the economy. Therefore, in terms of the G7 nations, it is important to examine how digitization and R&D have impacted technological innovation. As a result, the G7 nations represent a sizable portion of the global net wealth, they have boosted technical innovation, and they have also advanced digitalization. Due to their increased technical innovation and advancements in digitalization, the G7 nations now represent a sizable portion of the global net wealth. There is a wealth of literature on the factors that influence technological innovation. The following factors are regarded as significant predictors of technological innovation: income, imports, human capital, institutional quality, financial development, debt financing, corruption, knowledge spillovers, and, most significantly, R&D investment.

When it comes to digitalization of developing and least developed countries, a fundamental level of digital infrastructure is necessary to reap the full benefits of the digital economy, but this level is rather low in many emerging nations. Additionally, emerging nations have a certain degree of technical dependency. Developing nations have the opportunity to profit the most from digitization since they won't have to invest a lot of money in creating cutting-edge digital solutions.

To optimize the effects of digitalization on development, developing nations should be included in strategic planning. Those nations run the danger of slipping behind in terms of competitiveness.

METHODS

We construct a thorough assessment index system based on the idea and traits of the digital economy from three perspectives: digital economy infrastructure, openness of the digital economy, environment for innovation, and competitiveness needed for the advancement of digital technology. The weights and total scores of digital economy indicators from 2009 to 2019 are then determined using the factor analysis and principal component analysis.

Also, ICT Development Index, Global Innovation Index (GII), Networked Readiness Index, High-Technology Exports (% of manufactured exports) were also taken into account as they clearly state digitalization level to some extent.

Moreover, comparison method is also used to compare difference between developed and developing countries' economic growth and digital growth and how much it is important to keep improving technology sphere of the country so they do not stay too behind of countries with developed digital economies. While developed countries finance new technological development projects and it is considered risky, developing countries have all structures ready and they just need to apply structures without hesitating.

LITERATURE REWIEW

Firstly, in an article, concerning this topic authors (Popov, E. V. & Semyachkov, 2019) hold the view that the Internet and digital devices are a driver of economic growth [1]. As an example of their point of view, this article analyzes the developing counties' digital economy and society in the context of comparison with EU countries and draws conclusions regarding future development trends. I totally agree that digitalization has huge impact on the growth of economy. But in my opinion, e-commerce has also great influence on economy and should not be underestimated, for example, Amazon is one of the biggest five companies of US and contributes greatly to the economy of US by paying taxes and creating jobs.

Secondly, In the perspective of author (Dirican C, 2015) the digital economy is as an effective tool to increase economy [4]. In his article, he evaluated the role of digital economy on the

economic growth of countries along the "Belt and Road" and the impact of COVID-19 on their digital industries. In my opinion, using post and pre-covid eras were great way to scale the importance of digitalization, as it grew largely and economy was inclining in all countries, so data is more precise that it could have been in other phases of economy. Their results show that digital economy development in countries along the "Belt and Road", the digital economy has a significantly positive effect on their economic growth. In my opinion, the regional imbalance clearly shows the difference between digitalization in developed and developing countries, furthermore, I agree that it digitalization and economy has positive correlation even clearer at covid era. Other professors (Mella P, Semyachkov K, 2010) agree in their articles that the main impact mechanism was through promoting industrial structure upgrading, the total employment and restructuring of employment. I totally agree on this term, for example, Amazon has created more U.S. jobs in the last decade than any other company ([6], [7]). These are jobs that pay at least $15 per hour, more than double the federal minimum wage, and come with comprehensive, industry-leading benefits.

Additionally, author of very good article say that creating a modern competitive economy and achieving irreversible economic growth is hardly possible without the realization of an innovation-based approach [8]. Author (Constantinidies P., Henfridsson O., Parker G.G., 2018) argue that innovative development and science-based growth is incredible without digital technological development and transformation and that digital technologies affect development and introduction of innovation in several ways. Article gives real life example of how in contemporary global economy digital technologies gaining speed to be incorporated in every spare of our lives over the globe and that processes entail continuous evolution of business models, which eventually are becoming more and more digitalized. Article contains very valuable information about this topic and supports the opinion that one of the main factors in 21st century to develop the economy is to focus on digital economy and economic growth is totally dependent on digitalization of economy.

RESULTS OF RESEARCH

Firstly, GII was taken as one of the main indicators of digitalization for the purpose of

analyzing the difference between developing and developed countries, in this case, Russia vs Finland, Germany, Netherland and Switzerland. It is common fact that Russia is a giant developing country while Finland, Germany, Netherland and Switzerland are developed countries and developed digital economy may be one of the factors that these countries are considered developed.

For additional information, The Global Innovation Index is an annual ranking of countries by their capacity for, and success in, innovation. Switzerland was overtaken by the Netherlands, while Russia lost more than 2%. In retrospect, this pattern persisted. Imagine the pattern: for a long time, whether or not Russia improves its score, it maintains its place. However, a crisis suddenly arises, which causes the country to drop many positions. A crisis may present possibilities for growth, but if those opportunities aren't taken advantage of, the tendency of falling in rank continues. Russia trails behind other nations in the manufacture of items with a high R&D intensity, such as aerospace products, computers, medicines, scientific instruments, and electrical gear, according to the ranking of nations by high-tech exports [2]. The majority of Russian exports are basic resources. The metallurgical, chemical, and mining sectors combined with minerals accounted for 66.8% of exports in 2018, and they were low-tech intermediate items; high-tech exports made up only 10.7% of all Russian exports.

Table 1. Global Innovation Index

	2021	2019	2017	2015
Russian Federation	0.58%	0.68%	-2.04%	0.41%
Finland	0.76%	-2.35%	-1.10%	-1.10%
Germany	0.83%	0.78%	1.47%	1.93%
Netherland	1.001%	3.70%	-5.37%	1.67%
Switzerland	0.98%	2.13%	-2.96%	5.43%

Russia fell to the 45th spot in the ICT Development Index in 2018. Despite its commitment to the advancement of the information society (Petrenko et al., 2017; The Presidential Decree, 2017),

Russia lags behind more developed nations in the Networked Readiness Index (41st position) and the IDI, where the top spots were held by Finland, Singapore, Norway, the Netherlands, and Switzerland in 2016, while Russia came in second place.

European nations attained a level of 80% or above in the Share of Households with Internet. The average number of people with Internet connection in the EU in 2018 was 87 percent. In terms of Internet penetration among EU nations, the Netherlands held the top spot, while Luxembourg, Denmark, Sweden, Finland, and the UK also recorded rather high numbers. In the nations on the list, over 90% of homes have access to the internet, indicating a high level of broadband Internet penetration. 74.8 percent of connections were reported by the Russian Federation.

And now, let's compare also Central Asia countries which are also considered developing countries. In terms of national cyber security, Russia ranks highly (63.64%). The top two nations are France (83%), followed by Germany (83.12%). The CIS nations, particularly Kazakhstan and Uzbekistan, lagged behind Russia. The index was created in the following 5 steps:

1) Determining the most important cyber-threats at the national level;

2) Determining the capabilities and security measures at the national level;

3) Choosing significant and quantifiable factors;

4) Creation of cybersecurity metrics;

5) Combining cybersecurity warning signs.

We can see that Russia comes after developed countries but before other developing countries while Russia is way more innovative than these countries and nearly developed itself. It gives clear evidence that economy of country is perfectly dependent on digital and innovative aspects of economy in 21st century. As much digitalization, innovation, technology improves in country, the economy will get better together with them.

Now, to see clearer picture, we will not only use GII or cyber security while digitalization is bigger concept than these who metrics. We construct a thorough assessment index system based on the idea and traits of the digital economy from three perspectives: digital economy infrastructure, openness of the digital economy, environment for innovation, and competitiveness needed for the advancement of digital technology. The weights and total scores of digital economy indicators from 2009 to 2019 are then determined using the factor analysis and principal

component analysis. Table 2's development of the digital economy in developing nations from 2009 to 2019 reveals an upward trend. East Asia, Southeast Asia, Central and Eastern Europe, but not South Asia or Central Asia, are home to the majority of the top 10 nations on the list [3]. This implies that there is a clear geographical imbalance in the growth of the digital economy among emerging nations. Although China's digital economy's overall score came in sixth on the list, it rose quickly from 2009 to 2019. This suggests that China has given the digital economy greater attention recently, extending the adoption and use of information technology. As a result, the digital economy industry's global competitiveness has continuously increased.

Ranking	Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Singapore	75	77	74	74	76	76	80	84	90	90	100
2	Israel	61	59	61	61	60	61	68	69	71	71	74
3	Malaysia	59	60	60	62	62	66	68	67	67	67	71
4	Estonia	42	47	51	51	51	53	54	55	57	57	66
5	The Czech Republic	40	42	43	43	43	46	46	49	52	52	62
6	China	35	38	40	41	45	45	46	50	53	53	58
7	Vietnam	18	20	22	28	33	36	40	44	48	48	52
8	Hungary	44	46	44	40	39	38	36	42	45	45	50
9	Lithuania	34	34	35	37	37	38	40	41	43	43	49
10	Thailand	31	31	28	31	33	34	38	43	46	46	49
11	Slovenia	37	37	34	34	34	33	37	38	42	42	48
12	Latvia	27	27	30	34	37	40	43	41	40	40	45
13	Cyprus	46	47	42	36	35	36	34	34	39	39	41
14	Bulgaria	23	23	25	27	27	26	28	31	36	36	39
15	Greece	28	27	29	28	27	30	32	33	34	34	38
16	Saudi Arabia	28	33	37	35	34	32	35	34	34	34	38
17	Poland	29	29	28	29	29	32	33	34	36	36	38
18	Russian federation	23	25	22	25	28	31	33	33	33	33	37
19	Croatia	25	27	27	28	29	28	28	30	29	29	34
20	Romania	24	23	22	20	20	24	24	25	26	26	32
21	Kazakhstan	20	23	26	33	38	38	38	32	29	29	32
22	Oman	20	24	27	28	29	28	26	21	28	28	31
23	Azerbaijan	12	15	16	21	26	25	24	24	29	29	30
24	Armenia	1	9	10	14	15	16	18	21	21	21	25
25	Ukraine	15	14	16	20	19	20	22	20	21	21	25
26	Mongolia	6	6	9	10	10	12	7	12	10	10	22
27	India	14	13	15	14	14	11	13	17	18	18	21
28	The Republic of Egypt in Arabia	10	10	11	12	12	9	11	11	15	15	20
29	Moldova	3	7	10	11	13	16	16	15	18	18	20
30	Kyrgyzstan	2	0	3	4	5	8	13	15	16	16	14
31	Pakistan	1	3	4	4	4	2	3	3	8	8	13

Even these nations can be grouped into the following three groups based on how far their digital economies have developed:

1) In terms of total scores for the growth of the digital economy, Singapore, Israel, and

Malaysia were placed as the top three nations, with scores above 70, in 2019. Singapore was placed #1 among them, mostly as a result of its high ratings for the three key factors: the availability of cutting-edge technology, the penetration of fixed broadband, and the percentage of Internet users. This demonstrates Singapore's established information infrastructure, cutting-edge information and communication technology, and the country's high level of digital economy popularity and openness.

2) In 2019, countries with comprehensive ratings of 30 to 70 included Estonia, the Czech Republic, China, Vietnam, and others. This suggests that there is a need to further support the growth of the digital economy in these nations. These nations performed well in terms of fixed telephone and mobile phone penetration, while other metrics lagged. In order to encourage scientific and technical innovation and provide solid guarantees for the implementation of high-quality development of the digital economy, these nations still need to strengthen the infrastructure supporting the digital economy.

3) With overall ratings below 30, Armenia, Ukraine, Mongolia, India, Egypt, Moldova, Kyrgyzstan, and Pakistan had generally subpar digital economies in 2019. These nations are mostly found in West Asia, Central Asia, and South Asia. These nations severely lack the infrastructure, professional personnel, ICT capabilities, and environment for digital technology innovation needed for the growth of the digital economy. This suggests that these nations have a significant "digital gap." Therefore, to make up for the gaps in the infrastructure and technical innovation capacities, the nations that are trailing behind in the digital economy need to enhance their collaboration with others among them.

In general, even developing countries are divided into groups when it comes to their economics and countries such as china who is nearly developed and Singapore who is fully developed have high correlation with the rate of digital economy. It is clear indicator that economy’s main driving sectors are now innovation and digitalization. As it is obvious from table and grouping, countries with weaker economies have also weak digital economy as they are highly

correlated.

CONCLUSION

In conclusion, we can say that there is obvious high correlation between digitalization and growth of economy. Digitalization in economy plays a vital role in the economic growth of a country, and technological innovation is not achievable without digitalization and plays a significant role in affecting factor productivity.

This theory is proven by firstly comparing developed countries to Russia, and from that, it is obvious that developed countries are better when it comes to innovative development and they have relatively higher GII than Russia, which is nearly developed country itself. Afterwards, some of digitalization components economy in Russia as cybersecurity is compared to Central Asia countries as Uzbekistan and Kazakhstan which are developing countries. The result from this comparison is once again proof that digitalization directly affects economy of a state. Thirdly, most developing and some developed digital economies are compared and divided into groups. States in the first and second groups are nearly developed or fully developed while third group participants are newly developed and some of them have poor economics, and this is the third proof that economy and digitalization have strong in between.

Those nations run the danger of slipping behind in terms of competitiveness. Solution to the problem is that since they don't have to invest a lot of money in creating cutting-edge digital solutions, developing nations have an opportunity to profit the most from digitization. To optimize the effects of digitalization on development, developing nations should be included in strategic planning.

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