

Regulation of the Digital Economy in Modern Conditions of Competitiveness

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Abstract: - The article is devoted to the main directions of regulation of the digital economy in the Republic of Azerbaijan. In recent years, growth rates in the field of digital economy have been observed in all countries of the world. Analysis shows that in international rating reports the Republic of Azerbaijan has been annually increasing its economic position in terms of economic development indicators. All these processes are positively influenced by factors such as the implementation of an effective economic policy in the country, the development of a modern digital economy, and the stimulation of attracting foreign investment.

The development of the digital economy in globalizing world is considered one of the main priorities of developed countries. However, as in other regional countries, there are certain problems in the development of the digital economy, the introduction of ICT in all economic spheres, and the export of modern digital technologies in the Republic of Azerbaijan. That is why it is important to regulate the digital economy in Azerbaijan, taking into account international experience. The continuous reforms carried out in the Azerbaijan on the basis of international experience in the field of digital economy are considered effective. The level of development of the sphere of digitalization in the Republic of Azerbaijan, the output of products (services) in the ICT sector and the volume of investments in fixed assets is not high compared to previous years. That is why Azerbaijan's position in international reports on the digital economy is lower than of other countries in the region.

The article analyzed the measures taken in the field of digital economy in the Republic of Azerbaijan, as well as the existing problems in this area. The analysis shows that economic measures towards the development of the digital economy should be continued.

Key-words: transport, economy, digital, investment, competition, information, sustainable development

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1 Introduction

The process of digitization of the national economy in the modern globalizing world is a new direction. The process of preparing statistical reports, determining international rating indicators in this area has not yet been fully formed. These processes create difficulties for conducting a wide range of research in the field of digital economy [1]. The development of digital technologies around the world is one of the most pressing issues. So, in more developed countries, the 4th industrial revolution is underway. The industrial revolution includes the process of automation, robotization, use of artificial intelligence, the introduction of modern digital technologies in economic sectors [2]. The modern process of digitization is associated with the development of technological infrastructure. This

also leads to the introduction and rapid development of scientific innovations in economic fields. In recent years, developed countries have been implementing new measures in the direction of digitalization. Nowadays, the use of digital technologies is being discussed more. Especially the digitalization of economic spheres and the formation of a digital economy are the main priority [3].

In the conditions of modern globalization, the process of digitization between the countries of the world has a different level of development. All countries of the world are collectively divided into several groups according to the level of digitization. Leaders in the field of digitalization are countries such as South Korea, Denmark, Great Britain, Switzerland and China [4]. The group of major

developing countries in the field of digitization includes Germany, the USA, Japan, India, and etc [14]. For example, in the Republic of Azerbaijan, which is considered one of the post-soviet countries, serious measures are also being taken towards the development of the digital economy (Skare,2021. The Republic of Azerbaijan already faces such tasks as achieving new goals in the development of the digital economy. Thus, the digitalization of the national economy, the formation of the digital economy are among the main priorities for the introduction of modern innovations in this area. The Republic of Azerbaijan, located in the South Caucasus, has all the opportunities for digitalization of the national economy and sustainable development of the digital economy. The Republic of Azerbaijan has a favorable geographical location, natural resources, as well as dynamically growing human resources. In the latest World Bank report "Doing Business 2019", the Republic of Azerbaijan entered the top ten most successful countries in Europe and Central Asia. In all countries of the world, the Republic of Azerbaijan was ranked 25th among 190 countries by rating. Azerbaijan Republic occupies a leading position in international rankings is the successful continuation of the broad reforms carried out in the country in the economic and social spheres [12].

2 Literature Review

In modern economic conditions, both the digitization of the national economy and the development of the digital economy are impossible without stable and safe branches of technological infrastructure. At the same time, the creation of digital products and services is impossible without modern digital technologies [15]. The availability of modern technological infrastructure is the basis of the digitization process and the digital economy. In recent years, the Internet of Things (IoT), 5G, robotics, cybersecurity, and artificial intelligence applications all over the world also require the development of infrastructure. Providing internet services in accordance with international standards is impossible without constantly developing areas of technological infrastructure [5]. The development of communication services around the world is expanding. In recent years, the number of users of both mobile and broadband internet has been growing in developing countries. In developed

countries, mobile operators annually make large amounts of investments in technological infrastructure [6].

For example, the British consulting company "Analysis Mason", specializing in telecommunications, media and technology, present information that in 2014-2020 mobile operators around the world will spend 300 billion US dollars on the development of internet infrastructure [7].

According to the report of the International Association of Mobile Operators GSMA - "The Mobile Economy 2019", from 2018 to 2025, the level of the Internet of Things (IoT) worldwide will grow by 25 billion. This means that the number of devices connected to the internet is growing all over the world. During 2018-2025, the income of the world's population from the internet will increase 4 times and amount to 1.1 trillion US dollars. In addition, the development of digital and technological infrastructure will lead to an increase in the number of mobile internet users worldwide (Samimi,2015). The prepared report shows that the number of mobile internet users in 2018 amounted to 3.6 billion. In 2025 this figure will be increasing to 5 billion.

The improvement of international communication services in the modern globalizing world leads to the fact that internet services are in increasing demand in the world every year. It is necessary to improve the existing technological base, the formation of a new technological infrastructure [8].

The Republic of Azerbaijan, which has been dynamically developing in recent years among the post-soviet countries, is also constantly implementing economic and technical measures to turn into a regional digital center. In the Republic of Azerbaijan Digital Hub program is being successfully implemented. The main Internet provider of the Republic of Azerbaijan is AzerTelecom. The main goals of AzerTelecom is to create a technological infrastructure in accordance with international standards. AzerTelecom is creating a modern technological infrastructure both within the country and abroad. For example, in recent years, joint economic projects in this direction have been implemented with the Azerbaijan Railways Company. For this purpose, main fiber-optic cable lines have been laid along the protective strip of railway lines within the Republic of Azerbaijan. As a result, in the direction of " North-South " established a network connection

with the telecom operators of neighboring countries. As part of the Digital Hub program, it is planned to form a new digital historical "Silk Road" between Europe and Asia. In the near future, it is planned to lay a "Trans-Caspian highway" between Azerbaijan and the Central Asian states along the bottom of the Caspian Sea and the formation of an international highway infrastructure. All this will make it possible to create a regional data center in the Republic of Azerbaijan in the near future and turn the country into a center for international internet exchange. "Azerbaijan Digital Hub" program is a convenient platform for the development of the digital economy. This program will create new opportunities for the development of technological infrastructure in the Republic of Azerbaijan in the near future [12]. These processes will allow in the near future to increase the number of entrepreneurs working in the field of digital business in the Republic of Azerbaijan and export digital services to neighboring regional states. All this will eventually lead to the promotion of the Republic of Azerbaijan in international rankings and an increase in GDP several times. According to the latest reports of the WEF, the development of the digital economy has a huge impact on the country's GDP growth. For example, the share of South Korea's digital sector in GDP is 12%, the UK-7.1%, the USA-7.4%, Finland-8.3%, Sweden-8.6% [9].

According to the latest data from the World Economic Forum, in the next ten years, digital platforms will account for up to 80% of the new value that is formed in the national economy of developed countries [15].

3 Methodology

The method of studying the statistical relationship between one or several quantitative variables of a dependent quantitative variable is called regression analysis. The dependent variable in regression analysis is called the resultant, and variable factors are called predictors or explanatory variables. The analysis shows that the linear regression model is more widely used in the field of digital economy development. The regression model can also be used to analyze the impact of the digital economy on other economic spheres. The predicted correlation between 2 or more variables X and one variable y is more often called linear regression.

The multilinear regression model in the field of digital economy can be noted as follows (1):

$$Y = \alpha_0 + \alpha_1 * x_1 + \alpha_2 * x_2 + \dots + \alpha_k * x_k + \varepsilon \quad (1)$$

Here the variable y depends on the number of variables X . ε is considered a random error.

The description of the dependence of Y on a linear model with 2 variables is defined as follows (2):

$$Y = \alpha_0 + \alpha_1 * x_1 + \alpha_2 * x_2 + \varepsilon \quad (2)$$

Regression analysis is very closely related to correlation analysis. Correlation analysis determines the direction and density of interaction between quantitative variables.

In regression analysis, the form of dependence between quantitative variables is determined. In fact, both methods study the same connection. In practice, correlation analysis precedes regression analysis. Having proved the existence of the relationship by the method of correlation analysis, the form of this interaction can be expressed using regression analysis.

4 Result and Analysis

The recent economic reforms and important programs implemented by the public and private sectors. The "Strategic Roadmap" adopted in the Republic of Azerbaijan, state programs for the development of ICT are among the main activities carried out in this direction. The Republic of Azerbaijan, which has the status of the main energy and transport center of the region, will be able to develop its economy and become the digital center of the region among the post-soviet countries in the near future, using the available economic resources.

Developing countries are also constantly developing and implementing new economic programs, strategies, strategic roadmaps for the implementation of the digitalization process. In addition, citizens of developing countries are increasingly using digital technologies.

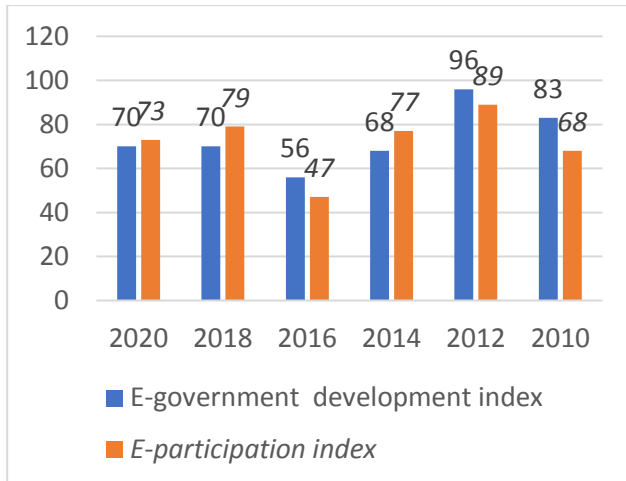


Fig. 1: The position of the Republic of Azerbaijan among the countries of the world on the e-Government Development Index and e-participation index in recent years

Source: <http://ec.europa.eu>

The analysis shows that in recent years, Azerbaijan's position among 193 countries on the e-Government Development Index and e-Participation Index has changed. In 2020, the Azerbaijan ranked 73rd in the Electronic Participation Index. According to the E-Government Development Index, in 2020 Azerbaijan was in 70th place. (Figure 1). The analysis shows that in 2020, compared to 2012, there was a decrease in both indicators.

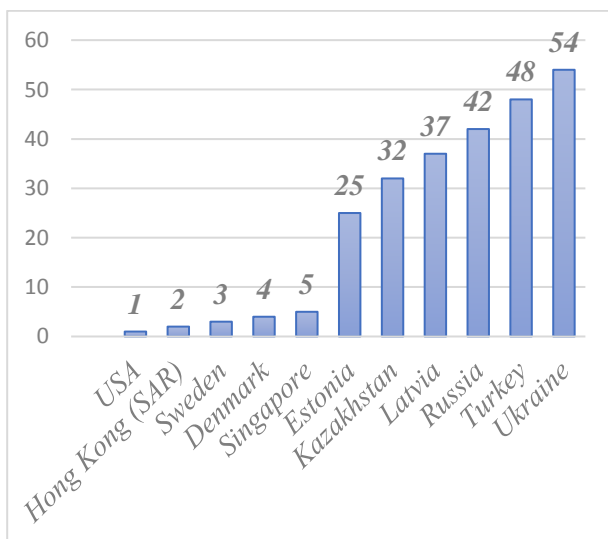


Fig. 2: Global Digital Competitiveness Ranking by Selected Countries (2021)

Source : <https://www.imd.org/>

In the world ranking of digital competitiveness, the United States was ranked 1st, Sweden - 3rd, Singapore - 5th, Turkey - 48th. Other post-soviet countries such as Estonia was on the 25th place, Kazakhstan - on the 37th, Russia - on the 42nd, Turkey -on the 48th, Ukraine - on the 54th. It should be noted that serious progress has been made in these countries in implementing sustainable measures for the development of the digital economy (Figure 2).

Table 1. Production in ICT sector of Azerbaijan (mln. manats (AZN)) and investments by ICT enterprises (mln. manats, 1 USD=1.70 AZN)

years analyzed	Production in ICT sector, million manats (AZN), (X)	Investments directed to fixed capital by ICT enterprises, mln. manats (AZN) (Y)
2017	1688,0	170,2
2018	1826,8	183,7
2019	2083,2	294,7
2020	2315,2	177,2

Source: www.stat.gov.az

Azerbaijan Republic has undergone serious changes in indicators for the production of products (services). In comparison with 2017-2019, in 2020, the volume of output of products (services) in the field of ICT increased to 2315.2 mln. manats. In 2020, investments in the ICT enterprises decreased compared to previous years (2019) achieved to 177.2 million manats (AZN) (Table 1). Analysis of statistical data shows that the production of ICT products increased in the Republic of Azerbaijan in 2017-2020. At the same time, in 2017-2019, the volume of investments in enterprises operating in the field of ICT increased. Only in 2020 this indicator decreased. The main reason for this is the negative impact of the COVID-19 pandemic on the national economy of Azerbaijan

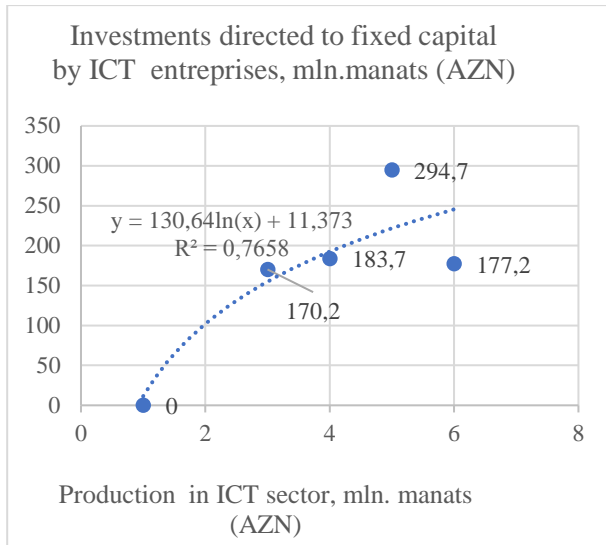


Fig. 3: Correlation between production in ICT sector and investments by ICT enterprises

In recent years, we can determine the trend line and correlation between the production of ICT enterprises in the Republic of Azerbaijan and investment in ICT enterprises in recent years (Figure 3). Graphically, this interaction is a regression model expressed by the equation $Y=130,64 \ln(x)+11,373$. Coefficient of determination $R^2 = 0.7658$. This indicates a close regression relationship between the two indicators. Correlation coefficient $R = 0.87$. This indicates a high correlation between the two measures.

5 Discussion

The increase in the number of mobile devices of citizens in all countries of the world, the global expansion of social networks, the storage of all data in cloud technologies, the increase in the number of regional data centers once again confirm the accelerating processes of digitization [9].

According to the annual final reports compiled by the European Union, the volume of the European digital transformation market in 2018 reached 256 billion USA Dollars. In the next 10 years, this indicator is projected to increase by 2 times. The countries of the European Union occupy the third place worldwide in the procurement of transformational technologies. The first places among all countries in the world in this area are occupied by the United States and the Chinese state [15].

According to the reports of the world famous companies “IDC” (International Data Corporation) and “Citrix”, which are considered the world's leading companies are constantly developing cloud technologies, quickly switching to innovative digital technologies [16]. At the same time, they are completely updating their network infrastructure. It should be noted that “Citrix” specializes in creating innovative computer networks, developing new technological programs around the world [10]. The annual reports of “IDC” and “Seagate”, which are considered the largest technology companies in the world, note that as a result of digitalization and the creation of digital content in today's globalizing world, the volume of data collected on basic, peripheral and end-user devices is growing rapidly. In 2018 the volume of the global data sphere amounted to 33 zettabytes. In addition, it is predicted that by 2025 the volume of the global data sphere will increase 5 times and amount to 175 zettabytes. Among all countries of the world, China is considered one of the fastest growing countries in the implementation of cloud solutions. China accounts for the fastest growth in the global information sphere in recent years [17]. The development of the digital economy in a globalizing world creates favorable opportunities for consumers, states and modern societies. Different countries are implementing important measures to create a digital economy, expand digitization, and introduce high technologies [18]. For example, the state of Singapore adopted its "Smart Nation" concept in 2014. Local business structures and experts took part in the implementation of this concept.

The concept of "Smart Nation", implemented by the government of Singapore, provides for the use of digital technologies in the daily lives of all citizens of the country. It also contributes to improving the quality of life of the country's citizens. Small, medium and large companies are also actively involved in the implementation of the Smart Nation concept in Singapore [11]. As for the global development of digital technologies, China has made great strides in this area. For example, in recent years, China has achieved the integration of traditional industries with digital industry in its “Internet Plus” program for the development of the digital economy [13].

For developed and developing countries around the world, the formation of a digital economy is one of the main priorities. The digitalization processes

already underway in most states and create favorable opportunities for the Republic of Azerbaijan. Thus, in the conditions of the 4th Industrial Revolution (Industry 4.0), the Republic of Azerbaijan correctly uses its geographical location, rich natural resources and human resources. To this end, the latest innovative trends in the field of ICT are being introduced in the country. The development of the digital economy in the Republic of Azerbaijan and the use of modern digital technologies ensure sustainable economic development.

6 Conclusions

In recent years, the Republic of Azerbaijan has been implementing important economic and political measures aimed at the formation of the digital market infrastructure and the sustainable development of the ICT sector. The main goal here is to ensure the transformation of the Republic of Azerbaijan into a regional digital center. The “Digital Hub” program of the Republic of Azerbaijan will ensure digitalization and development of the digital economy in the country. In the coming years, it is planned to lay a 300-400 km long fiber-optic cable trunk line along the bottom of the Caspian Sea between the Republic of Azerbaijan and Kazakhstan, the development of the Digital Silk Road corridor between Europe and Asia. In addition, the coordination of networks of regional states on the territory of the Republic of Azerbaijan will be carried out [12]. The implementation of the “Digital Hub” program will expand digital ties between Azerbaijan and the countries of Central Asia. As a result, Russia's economic influence on these countries in the digital sphere will be completely eliminated.

The implementation of the new “Digital Hub” program in the Republic of Azerbaijan will enhance its role in the “One Belt, One Road” initiative project, which is considered an international program of China. Republic of Azerbaijan will have a great influence on the transformation of this project into the main telecommunications corridor between the countries of Europe and Asia.

The expansion of the digitalization process in the Republic of Azerbaijan includes the creation of a new technological infrastructure in the field of ICT, the renewal of the existing technological

infrastructure and the introduction of new innovative technologies. The main basis for the creation of a digital economy in the country is the expansion of the scope of information and communication technologies. It should be noted that the basis of the ICT infrastructure is broadband access to the international Internet. Broadband access requires the organization of a 4-5G mobile network across the country using a full fiber optic cable and satellite communications.

In general, based on the analysis conducted, we consider to implement the following measures to ensure the development of the digital economy in the Republic of Azerbaijan :

- continuous implementation of economic measures towards the development of the digital economy in the country;
- expansion of opportunities for the use of modern digital technologies in all spheres of the national economy;
- at the state level, state support for modern ICT smart innovative projects for the development of the digital economy should be continued;
- the state should stimulate the attraction of domestic and foreign investments in the activities of companies that produce and export innovative ICT products to all sectors of the national economy;
- continuation of joint cooperation with developed countries (USA, South Korea, Japan, etc.) in the direction development of the digital economy;
- Azerbaijan Republic should adopt new state programs for the development of the digital economy;
- stimulating the attraction of local and foreign investment flows to increase the volume of production of products and services in the field of modern ICT and etc.

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- Aygün Aliyeva: methodology,
- Konul İbrahimova: discussion, conclusion, literature review

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