

IMPACT OF THE DIGITAL ECONOMY ON THE ECONOMIC DEVELOPMENT OF THE COUNTRY

**Elshad Yagub oglu Mammadov, Azerbaijan State University of Economics
Esmira Mirmammad gizi Ahmadova, Azerbaijan State University of
Economics**

ABSTRACT

Recently, the role of modern ICT technologies and innovations in the development of the national economy of developed countries has been increasing. Modern technologies make it possible to increase the efficiency of production and work processes in economic spheres. The term "digital economy" has entered the field of science in recent years. The digital economy is an economy based on the application of information and communication technologies in the economic sphere.

The role of digital technology can be seen both globally and locally. The digital economy is a rapidly growing part of the global economy as a collection of new economic sectors. In recent years, the development of modern technologies has led to the emergence of large markets for internet network services, mobile communications, the online gaming industry and others. The digital economy is mainly based on the development of a number of markets directly related to mobile and digital technologies. The digital economy will be more dependent on the traditional economy in the next 15-20 years. At the present stage of development of digital technologies and the current state of markets, the digital economy should be considered not as a goal, but as a means of increasing the efficiency of economic activity. The modern digital economy demonstrates the need to change management mechanisms in accordance with changing trends and puts forward new business models. The adoption of digital technologies in some industries is particularly fast.

Keywords: Innovation, Digitalization, Digital Economy Development, National Economy, Integration, Economic Potential

INTRODUCTION

Since digital technologies are used in almost all spheres of human life, it is difficult to determine and assess the size of the digital economy market.

It should be noted that existing methods for estimating GDP and economic activity may not be suitable for changing working conditions and consumption patterns. For example, in recent years, the international internet has continuously offered new electronic services. A wide range of goods and services are already being delivered to the buyer via new logistics routes. In addition, some services are sent free of charge to all customers via email and social media, directly or indirectly through advertising. Modern instant messaging allows users to communicate with each other for free, forcing internet and mobile providers to change their business models. Other types of online digital economy are also actively developing, and their share in GDP is growing. According to international statistics for 2018, the most developed countries in the field of ICT are Korea, Japan, the Netherlands, Switzerland, Sweden, Great Britain, Denmark, China, Norway and Iceland, etc (OECD,2021). The market for international services is growing and developing rapidly around the world. However, determining the size of this international market worldwide remains a controversial issue. In developed countries, the ICT market accounts for 3% to 6% of GDP. According to the OECD, in recent years this figure averaged 6.8% in Sweden, 6.5% in the UK and 5.2% in Germany. Ireland was the leader in excise tax status with 11%. The total global volume of the digital sector can be estimated at 6%

of world GDP and 4% of employment. These calculations are based on the share of turnover of digital companies, as well as on the dynamics of the number of employees.

All over the world, the digital sector tends to attract more workers. For example, in Canada, the annual growth in the number of people employed in this area increased from 1.4% to 2.8% between 2015 and 2020. Official reports on the digital economy in countries such as the United States, the United Kingdom and Germany indicate that new talent is needed to meet the growing demand in this area.

The United Kingdom is one of the most developed countries in the world and in Europe in terms of the digital economy. The British government prefers the development of many new promising technologies that it considers strategically important for the development of the country's economy. In particular, 5G communication and blockchain can be mentioned in this area. According to the UK government, in the digital economy on average, more than 1.7 million people, more than 214 thousand enterprises in 2016-2020. In the UK, the digital economy has averaged 8-10% of GDP in recent years. Germany, a member of the European Union, is also a leader in the development of the digital economy. In 2017, the value added in the German ICT sector reached 102 billion euros, and investments in this area reached 15.5 billion euros. In 2017, internet services in Germany generated an average of € 1,500 per capita. In recent years, the total turnover of the German digital economy in 2015-2020 has been more than 110 billion euros (WB,2021).

Among the 100 largest multinational companies in the world, the number of digital companies is growing. If in 2012 there were 13 such transnational companies in the world, then in 2018 their number increased to 24. The average annual growth in the number of employees in high-tech transnational companies increased by 5%, turnover - by 5%, assets - by 11%.

LITERATURE REVIEW

The largest companies in the United States by market value are digital companies. These include major companies such as Microsoft, Apple, Facebook, Amazon, and Alphabet. The total capitalization of these companies is more than 3 trillion USD. They account for more than 15% of US GDP.

It should be noted that the number of patents issued in the field of ICT in all countries of the world is decreasing every year. The main reason for this is the dynamic development of the digital economy. The product life is shorter in economic areas, and the patent pending period is already increasing. The main reason for this is the rapid pace of digitalization in most sectors of the national economy and the discrepancy between patents, as well as the rapid introduction of new digital technologies. It turns out that the development of modern ICT solves many short-term problems and leads to new problems in a few years (Adebayo,2020). Therefore, it is incorrect to talk about the current level of development and structure of the digital economy. The digitalization process in all countries of the world creates an incentive for the spread and accessibility of the Internet. The internet has been developing in all countries of the world since the 1990s. In the European Union, over 86% of the population currently has access to the Internet, and 77% use it daily. According to the World Bank, 60% of the world's population will have access to the internet by 2020. However, in less developed countries, internet access is low, accounting for only 15% of the population (WB,2021). The biggest obstacle to widespread use of the internet in today's world is the high subscription fees. The comprehensive development of ICT infrastructure in developing countries, payments for mobile broadband in 2015 amounted to 18% of GDP, while in developed countries it was only 4%. It should be noted that the digital economy allows for the digitization of supply chains in the non-digital sectors of the global economy. In 2020, 65% of TNC's largest sales came from foreign countries.

The growing importance of the digital economy and the issue of active growth are constantly discussed in all countries of the world (Abdullayev,2021). Economic data is an essential element of the digital economy. It is important to collect, analyze and continually

process the information that underpins the success of the digital economy(Carta,2020). These technologies are developing intensively, improving every year and attracting more and more young specialists (Fernandez-Jardon,2020).. Each technology can have a negative impact on a number of traditional sectors of the economy.

METHODOLOGY

Statistical modeling regression analysis is a set of statistical procedures for studying the relationship between dependent and random variables. It includes a number of methods for modeling and analyzing dependent variables and explanatory variables. Regression analysis helps you understand how the “typical” value of the dependent variable changes when one of the explanatory variables changes, while the other explanatory variables remain fixed.

Most often, in regression analysis, it estimates the conditional mathematical expectation of the dependent variable, taking into account the values taken by the independent variables. In all cases, the function of the mathematical expectation of the dependent variable from the independent variables, called the regression function, is estimated. Regression analysis is widely used for numerical forecasting, classification and forecasting by industry (Harrison,2020). In recent years, numerous methods of regression analysis have been developed and applied throughout the world.

The most popular of these are simple multiple linear regression, root mean square, and logistic regression. These models are parametric in the sense that the regression function is defined by a finite number of unknown parameters that are estimated from the data. Regression analysis is one of the most common methods for studying dependencies and processing experimental results in natural sciences, economics, technology and other fields (Hofstede,1980) A simple linear model is expressed using the following equation:

$$Y = a + bX \quad (1)$$

Y - dependent variable, X - is the independent variable (explanatory), a - free term (shift along the OY axis), b - is the slope (1). It indicates the behavior of the curve (decreases or increases, the angle between the axis), a and b are called linear regression coefficients. Finding them is the main task.

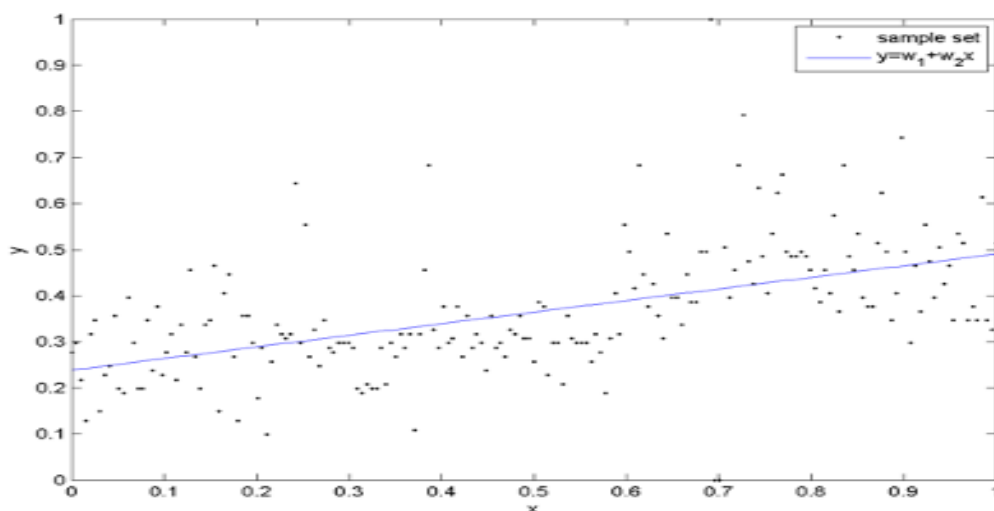


FIGURE 1
GENERAL GRAPH OF LINEAR REGRESSION

If there are several factors in our problem: x_1, x_2, x_3 on which depends on y , then we need to use multiple regression described by the equation (2):

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 \quad (2)$$

In general, there are a number of methods for determining the ratios a and b. But the simplest and most reliable is the least squares method (it can be scientifically proven that this is the best way). A key factor in applying any statistical model is a proper understanding of the domain and its business application.

Linear regression is a fairly simple but powerful tool that can make the analyst's job much easier when studying consumer behavior; factors affecting productivity and return on investment; will improve the understanding of business processes in general (Jaskyte,2004).

RESULT AND ANALYSIS

Recently, Azerbaijan has made progress in the e-government development index and the e-participation index. We see this in the position of the Republic of Azerbaijan among 193 countries in recent years. The position of the Republic of Azerbaijan on the e-government development index took 89th place in 2008 and 83rd place in 2010. 2018 was in 70th place for this indicator. The Republic of Azerbaijan was ranked 49th in the e-participation index in 2008 and 79th in 2018 (Figure 2).

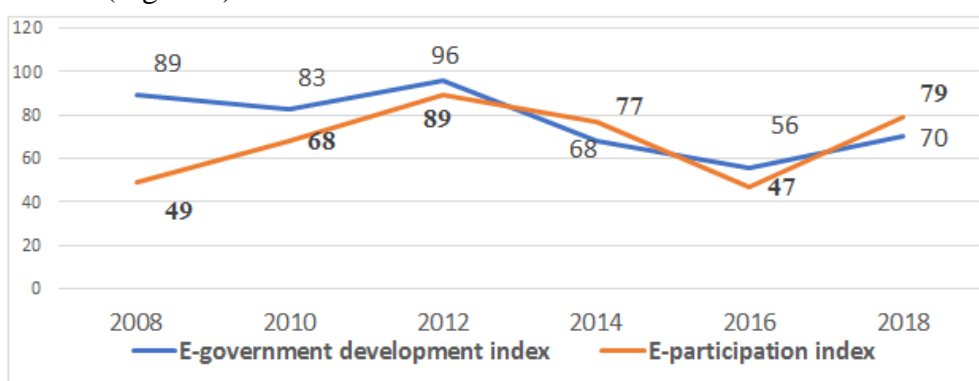


FIGURE 2

POSITION OF THE REPUBLIC OF AZERBAIJAN ON E-GOVERNMENT DEVELOPMENT INDEX AND E-PARTICIPATION INDEX IN RECENT YEARS

Source : The Digital Economy and Society Index (DESI) [Electronic resource] // 2018 <http://ec.europa.eu/digital-single-market/en/desi>.

If we analyze the statistics, we will see that in the global IMD digital technology competitiveness ranking, the United States took 1st place, Hong Kong 2nd, Sweden 3rd, Denmark 4th, Singapore 5th and Turkey 48th. In addition, Estonia ranked 25th, Kazakhstan 32nd, Latvia 37th, Russia 42nd, Turkey 48th and Ukraine 54th among post-soviet countries (Figure 3). In recent years, these countries have made significant progress in implementing sustainable measures to develop the digital economy.

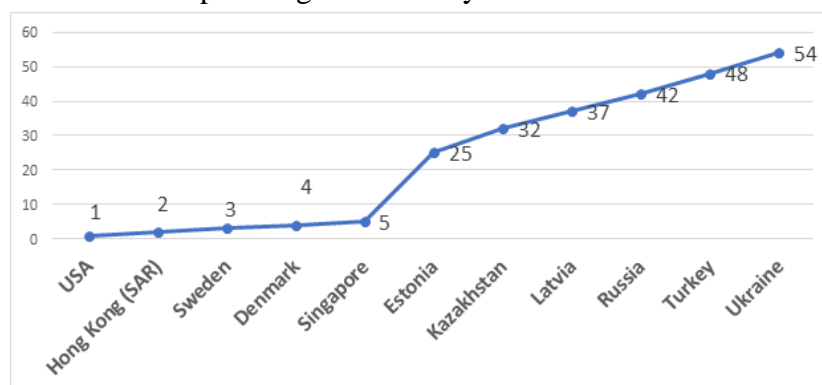


FIGURE 3

POSITIONS OF CERTAIN COUNTRIES IN THE WORLD RANGE OF DIGITAL COMPETITION (2021)

Source: World Digital Competitiveness Rankings - IMD Business School [Electronic resource] // <https://www.imd.org/centers/world-competitiveness-center/rankings/world-digital-competitiveness/>

In recent years, significant changes have been observed in the volume of ICT production in the Republic of Azerbaijan (Table 1). For example, the volume of production in the field of ICT in 2017 amounted to 1688.0 million manats (AZN). In 2018, this figure increased to 1826.8 billion manat. manat (AZN). In 2020, the volume of production in the ICT sector in the Republic of Azerbaijan reach 2315.2 million. manats (AZN).

Years	Output in ICT sector, mln. manats (AZN) (X)	Gross Domestic Product mln.manats (AZN) (Y)
2017	1688,0	70000,3
2018	1826,8	80092,0
2019	2083,2	81896,2
2020	2315,2	72432,2

Source: Compiled by the author based on State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az, 2021) data (1\$=1.70 AZN).

In recent years, significant changes have been observed in the GDP of the Republic of Azerbaijan (Table 1). Thus, if in 2017 the GDP of the Republic of Azerbaijan amounted to 70000,3 mln. manats , in 2018 this figure increased to 80092,0 million. manats (AZN). In 2020, the volume of GDP decreased compared to previous years and amounted to 72432,2 mln. manats (AZN). The COVID-19 pandemic also had a serious negative impact on these processes.

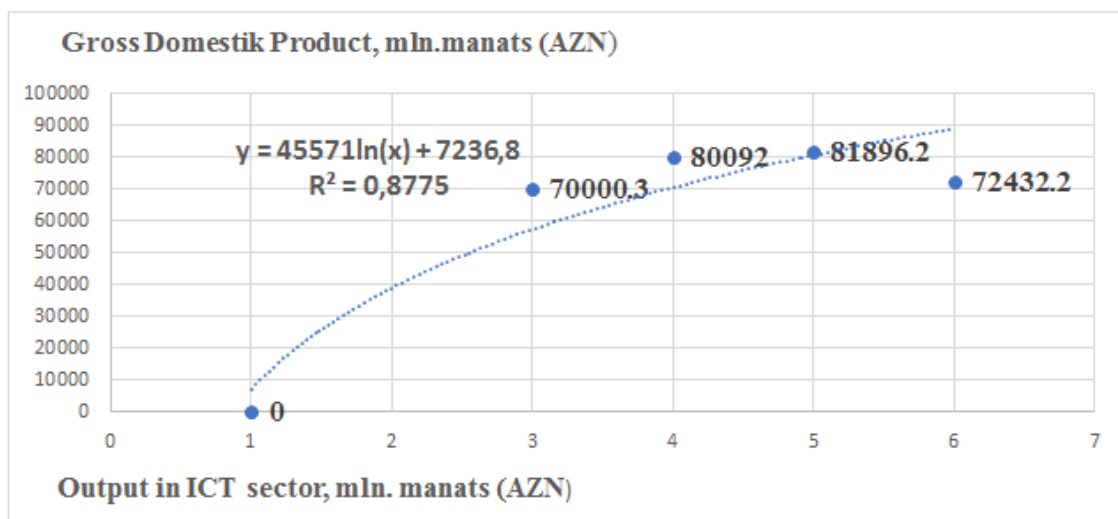


FIGURE 4

CORRELATION BETWEEN OUTPUT IN ICT SECTOR AND GROSS DOMESTIC PRODUCT IN THE REPUBLIC OF AZERBAIJAN IN RECENT YEARS

Source: Compiled by the author based on State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az, 2020) data

In recent years, we can determine the trend line, determination and correlation output in ICT sector and Gross domestic product (GDP) of the Republic of Azerbaijan in recent years (Figure 4). If we look at the graph, we can see that this relationship comprises a regression model expressed by the equation $y=45571\ln(x) + 7236,8$. The coefficient of determination $R^2 = 0,8775$ shows that the link between the two indicators is at a high level. The fact that the coefficient of determination $R^2 = 0,8775$ means that the corresponding regression equation

is explained by 87.75% of the variance result and 12.25% by the influence of other factors. A high coefficient of determination indicates that the regression equation better reflects the original data and that a smaller part of the resulting factor (12.25%) is explained by the factors included in the model. The correlation coefficient $R = 0.93$ indicates a high level of correlation between the two indicators.

DISCUSSIONS AND IMPLICATIONS

All over the world, the competitiveness of the state is determined by the efficiency and speed of reaction to the emerging modern digital technologies. New technologies expand opportunities for market participants, but also create a number of obstacles for them (Kafka,2020). The impact of the digitalization process on the competitive environment and the labor market is stronger (Kostis,2015) . Because the digital economy leads to the automation of work processes, which leads to an increase in the demand for highly skilled and low-skilled workers. At the same time, the number of employees with secondary specialization is decreasing (Petraakis,2020). The economic policies pursued by developed countries show that good governance is essential for the design and management of e-government programs. From this point of view, a number of countries are making only certain successes in this direction (Kafka,2018). It should be borne in mind that sometimes developing countries lag behind developed countries in the field of digitalization to manage economic processes (Ariza-Montes, 2014). It should be noted that only certain sectors of the economy can achieve great success. Despite the above, the agricultural sector, which provides the largest share of employment in the post-soviet countries, still lags behind in the field of digitalization (Majidi, 2010).

EU member states have made significant progress in expanding access to ICTs and digital networks. In addition, developed countries have achieved a high level of universal access through mobile communications (Mohamad, 2020). At the same time, developing countries have made significant progress in this area by expanding mobile services. Due to the COVID-19 pandemic, most countries have started using e-services for health and education. The analysis shows that in the least developed countries of the world and in some developing countries, the vast majority of citizens do not have access to various electronic services (Molina-Ramirez, 2021). Low incomes of citizens in these countries, lack of necessary skills and lack of digital infrastructure prevent the proper use of ICTs (North, 1999).

The analysis shows that more attention is paid to existing national digitalization strategies aimed at a broader transformation of the national economy and society. Most of the existing e-services for agriculture in EU countries are usually limited to e-government systems or ICT strategies (Ober,2020). In some countries, basic electronic services in the agricultural sector end up with general information. The use of digital technologies in all countries of the world creates a need for policy and regulatory measures in terms of the extensive processing of existing data (Park, 2021).

In general, local entrepreneurs working in sectors of the national economy use digital technologies to solve various economic problems (Petraakis, 2014). In the post-soviet countries, a significant number of agricultural enterprises can use digital technologies only on co-financing terms. Sometimes farmers need more incentive government support (Rothwell, 1986). Therefore, it is important to significantly improve the existing legislation and legal framework in the field of digitalization.

In the context of modern globalization, technologies based on artificial intelligence play an important role in improving the efficiency of management in many agricultural enterprises (Schwartz, 2004). The use of modern innovative technologies allows farmers to assess the current situation in the fields and control all stages of the production cycle. Technologies based on the use of modern innovative technologies are changing the activities of the agricultural sector. Modern innovative technologies can positively affect the activities of all sectors of the economy (Shane,1993).

CONCLUSION

The modern digital economy includes: digitalization of healthcare, education, housing and utilities, the creation of electronic government to regulate new elements of the digital economy, the development of new regulatory laws in this area, etc (Shane,1995). The biggest challenge in the regulation of innovation systems is the faster development of technologies and their application in economic fields. Despite all this, most developed countries are already taking economic measures to regulate the current situation with the use of digital technologies (Shapero,1982).

The main goals of regulation are: stimulating the creation of new types of communication, the internet and forms of communication, increasing competition within the sector, protecting the interests and safety of consumers, etc (Smith,1997).

Decisions made to regulate this area can have the opposite effect. For example, tightening control over the flow of information could slow down the global development of the internet (Triandis,2009). Support for digital communication formats in a certain economic area can hinder the development of a business model. In the modern world, there are three main problems that the digital economy regulation system must solve (Ulijn, 2001):

- First, the digital sector, the internet and new forms of communication are developing rapidly. New services and platforms are emerging in the digital economy. As a result, regulation bills can quickly lose their influence and relevance.
- Secondly, in all countries of the world, the process of merging the mainstream media and Internet sources continues. Mobile internet and television are becoming more and more interconnected. This is always accompanied by new changes in the functioning of individually regulated markets. As a result, antitrust authorities face new problems. In the European Union, control over telecommunications and television, as well as television and radio broadcasting, is already exercised by one regulator.
- Thirdly, the decentralization of the Internet and the digital economy, the lack of clear geographical boundaries in this area create the need to regulate the digital economy in different countries of the world (Westwood, 2003)

In today's globalized world, some aspects of digital technology and the Internet have already been discussed internationally. It should be noted that some norms of intellectual property rights, domains, principles of mobile communications are standardized and harmonized (Yun, 2020). However, there are more unregulated problems in the digital economy. In conclusion, it should be noted that the widespread use of ICT in the global economy has had such a great impact that the concept of the digital economy has emerged.

However, despite the widespread occurrence of the digital economy, the scale of the relatively traditional economy is still small, and it is too early to speak about its decisive role in the economy. In only 15-20 years, the digital economy will occupy most of the global market. In the near future, new technologies will be created that will change the entire world economy. Modern innovations and attempts to support economic growth in different countries have not yet made it possible to determine a successful concept. There are conflicting principles governing ICT operations in different countries. It is important to maximize the positive impact of the digital economy (Zhen,2021). At the same time, the risks associated with the spread of new technologies - unemployment, social inequality, etc., should also be eliminated.

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