“Challenges and opportunities of digital economy development: Case of Azerbaijan”

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ARTICLE INFO	Arzuman Huseynov, Daniel Balsalobre-Lorente, Lala Hamidova and Elnara Samedova (2025). Challenges and opportunities of digital economy development: Case of Azerbaijan. *Problems and Perspectives in Management*, *23*(2), 265-276. doi:10.21511/ppm.23(2).2025.18
DOI	http://dx.doi.org/10.21511/ppm.23(2).2025.18
RELEASED ON	Thursday, 10 April 2025
RECEIVED ON	Wednesday, 21 August 2024
ACCEPTED ON	Wednesday, 02 April 2025

JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
44	2	6

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

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CHALLENGES AND OPPORTUNITIES OF DIGITAL ECONOMY DEVELOPMENT: CASE OF AZERBAIJAN

Abstract

Telecommunication technologies have entered all spheres of society, creating wide chances for improvement. The splendid, safe, and effective digital revolution in best practices and the productive use of resources in this field are the driving force behind the improvement of innovation. The aim of the study is to identify the main problems of the arrangement and evolution of the digital economy in Azerbaijan, as well as to offer recommendations for the successful usage of digital technology opportunities. Using regression analysis, the impact of the digital economy on economic growth was determined. The analysis showed a direct relationship between the indicators (r = 0.857) and a high closeness of the relationship on the Cheddock scale. The outcomes showed that during the last eight years (2015–2023), there has not been a significant growth in the ICT Development Index in Azerbaijan. According to the ICT Development Index, Azerbaijan ranks 87th, the Development Index of e-government – 83rd, and the Network Readiness Index – 75th in the world. The results stressed the necessity of state support for the digital economy in Azerbaijan to solve problems in this area and the significance of applying the progressive foreign countries' experience in the digitalization of the economy. The study examines the factors influencing the development of the digital economy in Azerbaijan and offers proposals and recommendations for the effective use of digital technologies that have practical and scientific significance.

Keywords digital economy, digitalization, communications, ICT sector, ICT Development Index, innovation

JEL Classification O33, L86, O38

Received on: 21st of August, 2024
Accepted on: 2nd of April, 2025
Published on: 10th of April, 2025

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Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

The phenomenon of globalization leads to a rapid transformation of the world economy. This transformation reveals the idea of the digital economy, expressed in changing economic transactions and existing ways of doing business established on information and communication technologies (ICT). One of the main elements for countries to achieve the Sustainable Development Goals is the improvement of the digital economy. Currently, with the improvement of ICT, the growing trends toward digitization have led to many digital activities. Consumers get the opportunity to quickly compare, select, and buy the desired product from a variety of alternatives in a digital environment. This situation forces enterprises operating at home and abroad to compete. Therefore, the impact of digitalization on the economy is of great importance. In particular, the global COVID-19 epidemic, which has swept countries around the world since 2019, requires businesses to use digital technologies to reach their customers. The use of the digital economy is becoming more widespread worldwide. Greater efficiency and transparency have been achieved by countries directly by the development

of e-government and digital services. To succeed in the digital age, it has become meaningful to understand and maintain the digital-based economic structure known as the digital economy.

The digital transformation of the economy and society has become one of the priorities for the Republic of Azerbaijan in recent years. In the area of digitalization, important work has been done, new infrastructure in communication technologies and in the sphere of information has been built, and modern technologies have been introduced. However, the current situation in the economy's digitalization in Azerbaijan and Azerbaijan's position in international reports again show serious challenges that persist in the development of the digital economy.

1. LITERATURE REVIEW

The digital economy is a main driver of global economic upswing in the 21st century, changing traditional business models and creating new opportunities for economic development. In the condition of globalization and fast technological progress, digital change became the main factor for sustainable economic upswing, especially in dynamically developing countries such as Azerbaijan. Even though the concept of "digital economy" has been in use lately, much attention has been paid to this term in recent years. In that regard, given the key purpose of this study, scientific publications on the digital economy can be split into three main groups: (1) theoretical approaches to the digital economy; (2) the influence of digitalization on economic upswing; and (3) foreign experience of digital economy development strategies.

The idea of a "digital economy" firstly was introduced by a Canadian speaker, writer, and consultant on business strategies and organizational change Tapscott (2015). The digital economy is a global organization of economic activity, professional interaction, and business transactions supported by information and communication technologies. Tapscott (2015) notes that the Internet and the World Wide Web are creating a new economy by combining human agility. In the digital economy, people and companies build wealth using network intelligence, knowledge, and collaborative efforts in various industries such as agriculture, manufacturing, and services. On the digital border of that economy, the participants, rules, dynamics, and requirements necessary for successful functioning are transforming. The digital economy describes the latest economy, a new enterprise, and new technologies, as well as their interaction and mutual influence on each other (Tapscott, 2015, p. 16).

The phrase "digital economy" is explicitly assigned to the latest and still bigger unrealized change in all departments of the economy through computer digitization of information (Brynjolfsson & Kahin, 2000, p. 2). Although the digital economy is famous as a generator of new wealth and the latest business models, it suppresses past business models and threatens jobs and investments in established enterprises. The digital economy is an economy formed on communication technologies (Overby & Audestad, 2021, p. 3) and information. According to OECD (2014), three main elements of the idea of the "digital economy" can be known: (1) auxiliary infrastructure (equipment, software, telecommunications, webs, etc.); (2) electronic business (how business is managed, some action performed by an organization through computer intermediary networks); (3) electronic trade (transmission merchandise, for instance, while selling books on the Internet).

However, social networks such as Facebook, which is now considered a global giant and e-government, have evolved (OECD, 2014). In this regard, OECD's approach does not fully reveal the essence of the concept of the digital economy. Elder-Vass (2018) defines the digital economy as an economic system related to communication and personal interaction within the framework of the "economy of the world of life." The notion is reduced to producing and selling goods, in contrast to classical economic activities related to money and power in the hands of the market and the state system (p. 228).

The digital economy is a complex of economic and commercial occupation found in the usage of digital technologies and electronic communications (Xia et al., 2024). This sphere includes digital marketing, e-commerce, digital financial services, software development, digital content cre-

http://dx.doi.org/10.21511/ppm.23(2).2025.18

ation, computer games, and cloud services (Guo et al., 2023). The digital economy is actively developing and contributes to a shift in focus to online and digital business interactions. Due to the key role of digital technologies, this area has become an important engine of growth and development in several countries (Gulaliyev et al., 2023). It covers various sectors, offering users and companies quick access to services and products, as well as an improved user experience (Sarnacchiaro et al., 2024; Rana et al., 2022). Technological progress and the development of electronic communications are stimulating the digitalization of the global economy. The digital economy generally includes economic and commercial activities based on digital technologies and significantly affects various spheres of life (Rosário & Dias, 2023; Li et al., 2023). The digital economy has several unique characteristics that distinguish it from the classical economy. First, it offers high connectivity and interdependence through digital platforms and networks (Spivakovskyy et al., 2021). For example, thanks to digital technologies such as the Internet and social media, businesses and consumers can interact in the present, despite distances and time zones; 95% of the population of the world lives in areas with access to mobile communications (Rappitsch, 2017). Thus, the Internet has a wide reach, allowing people from different places to access online content (Cabeças, 2022). Besides, the digital economy focuses on efficient data use. Data processing technologies such as analytics, big data, and artificial intelligence play a key model in its improvement (Zakaria et al., 2021). These technologies allow the collection and analysis of a large amount of data, which gives companies valuable information about buyer behavior, market tendency, and other important aspects (Yang & Cai, 2022). Finally, the digital economy is characterized by fast innovation thanks to breakthrough technologies that allow companies to quickly create and bring the latest products, services, and business models to market (Novak et al., 2018). The Organization for Economic Cooperation and Development (OECD, 2020) report notes that "the digital economy includes all types of economic activities, including digital technologies, digital infrastructure, digital services, and data, which depend on digital resources or are significantly improved through their use" (p. 5).

So far, the essence and features of the digital economy have not been fully formulated. Therefore, digital trades and organizations are produced in the digital economy, and they also do not have marginal costs or are close to zero. However, the marginal costs of products produced today in material production cannot be zero. On the other side, the definitions of the "digital economy" do not allow one to fully define its boundaries, which, in turn, creates serious problems in its measurement. Digitalization processes get their most important development in the economic field of society, primarily having superiority for business entities (Abdullayev et al., 2024). The digitization of business processes impacts social and economic components, namely increasing profitability, including the number of jobs in related industries, accelerating the rise of small and medium-sized businesses, decreasing negative environmental impacts, accessibility of online education, etc. (McKinsey Digital, 2024).

The second major group of studies focuses on the impact of digitalization on economic rise. In current years, digitalization has become an important driver of economic growth, especially in the context of fast technological development. Several studies highlight various aspects of the influence of digitalization on economic processes, which allows one to form a comprehensive view of its importance for the modern economy. Investments in ICT have a productive effect on Gross Domestic Product (GDP) development, but the effect varies depending on the level of development of the country (Niebel, 2014). Myovella et al. (2020) empirically examined the impact of digital technologies on economic growth by analyzing 41 African and 33 OECD countries. It was found that regardless of the country's level of development, the digital economy has a positive effect on economic upswing. Zhang and Dong (2023) highlight the role of digital change in developing labor productivity and business efficiency. Accordingly, the introduction of digital technologies contributes to the automation of production processes, which, in turn, leads to an increase in output and lower costs. Strilets et al. (2024) also noted the positive impact of digitalization on the innovative activities of enterprises, which is becoming a key factor in their competitiveness in global markets. According to Dutta and Lanvin (2023), an increase in the level

of digitalization by 10% leads to GDP growth of 0.5-0.6%. Qiu et al. (2024) also noted that the digital economy donates to an increase in employment in high-tech industries that has a positive impact on the overall level of well-being of the population.

However, not all studies emphasize the exceptionally positive impact of digitalization. For example, Vassilakopoulou and Hustad (2023) draw attention to the risks associated with the digital divide between social groups and different regions. Digitalization can increase inequality if certain factors, such as geographical location or income level, limit access to digital technologies. The work also points to the need to develop government strategies to mitigate such risks.

The third major group of scientific research is related to the foreign experience of digital economy development strategies. In the latest year, digital economy development strategies have become an important element of public policy in different countries around the world. Various countries are taking measures to stimulate digital change and the integration of new technologies into economic processes, which provides competitive advantages in the global market. Many countries adhere to a government digital strategy to develop ICT infrastructure, including broadband Internet, as well as support innovation in sectors such as fintech and e-commerce (Abou-Moghli & Shatem, 2024). The implementation of these strategies has contributed to the significant improvement of the digital sector, which has become one of the engines of the country's overall economic development (Gong & Yang, 2024).

Brodny and Tutak (2022) assess the experience of the European Union in the field of digitalization, especially in the context of the Digital Europe strategy. The key aspects of this strategy are ensuring cybersecurity, developing the digital skills of the population, and creating a single digital market. Bansal (2024) focuses on the national Digital India program, which aims to provide digital services to the public and stimulate e-commerce. The study shows that despite significant advances, such as increased access to the Internet and mobile services, there are challenges associated with digital inequality and the need for further investment in infrastructure. Veiga et al. (2024) covered the experience of Latin America in implementing digital development strategies, in particular Brazil. Despite the active efforts of the government, such as the Brazil Digital program, the region faces serious challenges, including low levels of digital literacy and lack of investment in infrastructure.

Thus, the analysis of foreign experience shows that successful digital development strategies include an integrated approach that covers infrastructure development, innovation support, and the accessibility of digital technologies for the population. These aspects must be considered when improving and implementing Azerbaijan's digital strategy. Successful digitalization requires coordinated efforts between the private and public departments, adaptation of the regulatory framework, and investment in research and development. Given Azerbaijan's current level of development and economic characteristics, strategies aimed at integrating digital technologies into traditional departments of the economy are the most relevant.

The purpose of this study is to identify key challenges and opportunities for the development of the digital economy in Azerbaijan, as well as to develop recommendations for the successful digital transformation of the national economy. The study formulates the following hypotheses:

H_0: *The introduction of digital technologies in the economic sectors of Azerbaijan does not have a significant impact on accelerating economic growth.*

H_1: *The introduction of digital technologies in the economic sectors of Azerbaijan contributes to accelerating economic growth.*

2. METHOD

The study analyzes documents and statistical data. Official documents and reports were used, including materials from the State Statistics Committee of the Republic of Azerbaijan and data from the OECD, the World Bank, the United Nations, the International Telecommunication Union, and the World Economic Forum. Next, key indicators of digital development were compared. The following indicators were considered: the ICT Development

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Index, the E-Government Development Index, and the Network Readiness Index. A comparative analysis was conducted of the countries that occupy the leading places in the ratings, as well as countries such as Azerbaijan, Kazakhstan, and Ukraine.

The system analysis considered the digital economy as a complex system, including the correlation between its different components and factors, which made it possible to identify probable influences and effects in such areas as economics, healthcare, and education. A regression analysis was accomplished to test the hypothesis and establish economic growth's dependency on the ICT development indicator. In the analysis, the dependent variable (y) is GDP per capita, and the independent variable (x) is the ICT Development Index (IDI).

One of the key indicators is the ICT Development Index (IDI), which is used to assess the level of digital development of countries. This index was developed by the International Telecommunication Union (ITU). This composite indicator combines several parameters characterizing the availability, use, and skills of working with digital technologies. The methodology for calculating the ICT Development Index 2024 is based on three main components.

First, access characterizes the development of telecommunications infrastructure and the level of penetration of digital technologies. It includes the density of fixed and mobile communications, coverage of Internet services, and availability of broadband connection. Second, usage reflects the degree of population involvement in the digital environment, including the level of Internet penetration, mobile broadband access, and user activity on the network. Third, skills assess the level of preparation of the population to work with digital technologies. The level of education, the number of ICT specialists, and the proportion of the population with basic digital competencies are considered.

Each component is assigned a certain weight to calculate the final IDI value, after which the weighted average is calculated. The index has a normalized scale, which allows for a comparative analysis of countries and tracking the dynamics of digital development. The value of the indicator ranges from 1 to 100.

A regression analysis was conducted to assess the impact of digital development on economic growth. Coverage period is 2005–2023. The exchange rate as of January 2025 is 1 manat = 0.57 euro. The mathematical regression model is presented by the following equation:

$$y = \beta_0 + \beta_1 x + \varepsilon, \quad (1)$$

where y – GDP per capita (in manats), x – the ICT Development Index (IDI), β_0 – the free term of the equation reflecting the value of GDP at a zero IDI value, β_1 – the regression coefficient showing how much GDP changes when IDI changes by one unit, ε – the random error of the model.

To test the statistical significance of the model, the determination coefficient R^2 was calculated to show what share of the GDP variability is explained by the change in IDI; t-statistics and p-values were used to test the significance of the coefficients; residual analysis was conducted to identify autocorrelation and heteroscedasticity.

3. RESULTS

The creation and improvement of the digital economy have recently become important priorities of the strategic state programs developed by the government of Azerbaijan. Thus, the National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan (2003–2012), the State program for the development of information technologies for 2010–2012, the National Strategy for the Development of the Information Society in the Republic of Azerbaijan for 2014–2020, the Decree On the creation of a unified electronic information system for citizens appeals to local executive authorities, the Electronic agricultural information system, the State program for the implementation of the National Strategy for the Development of the Information Society in the Republic of Azerbaijan for 2016–2020, and other official government documents ensure digitalization is one of the main priorities in the national economy.

According to the resolution of the Head of the Republic, the Strategic Roadmap for the development of telecommunications and information technologies in the Republic of Azerbaijan was

approved (The Government of the Republic of Azerbaijan, 2016). One of the three lead strategic goals of the strategic roadmap was the digitization of government and the social environment. Digital transformation is also envisaged by the Azerbaijan 2030: National Priorities for socio-economic development document. The document identifies five priorities: (I) sustainable development and a competitive economy; (II) social justice and society found on inclusivity; (III) competitive human capital and innovation; (IV) strong development of the territories of Azerbaijan; (V) a clean environment and the improvement of an ecological economy (The Government of the Republic of Azerbaijan, 2021).

As a result, significant development has been achieved in the ICT sector in Azerbaijan. In 2023, the output of products (services) in the ICT sector increased almost 1.6 times compared to 2018 and amounted to 2988.8 million manats, which amounted to about 1.7% of the country's GDP (Table 1).

The state budget of the Republic of Azerbaijan provides for expenditures on science, which in 2022 amounted to only 0.13 percent of the country's GDP and 0.52 percent of state budget expenditures (Table 2); and this is very small compared to the countries that have formed the digital economy.

The ICT Development Index calculated by the State Statistical Committee in 2005 was 2.58, and in 2023, this indicator increased to 7.09 (State Statistical Committee of the Republic of Azerbaijan, 2024) (Figure 1).

As shown in Figure 1, the ICT Development Index (IDI) in Azerbaijan has not significantly increased over the last eight years (2015–2023). The IDI is a composite indicator originally developed to estimate the degree of improvement in the communication and information technology sector. Table 3 shows some of the countries that took high places in terms of IDI in the ranking in 2024.

Table 1. Key indicators for the ICT sector in Azerbaijan

Source: State Statistical Committee of the Republic of Azerbaijan (2023, 2024).

Indicators	2018	2019	2020	2021	2022	2023
Output of products (services) in the ICT sector, million manats	1826.8	2083.2	2158.2	2249.7	2514.8	2988.8
Share of ICT value added in GDP, %	1.4	1.6	2.2	1.8	1.4	1.7
Share of ICT products in total exports, %	0.021	0.012	0.143	0.023	0.060	0.053

Table 2. Expenditures on science from the state budget

Source: State Statistical Committee of the Republic of Azerbaijan (2022).

Expenditures	2000	2010	2015	2019	2020	2021	2022
Expenditures from the state budget on science, million manats	9.3	92.8	113.2	122.3	143.6	151.8	167.8
Relative to gross domestic product as a percentage	0.20	0.22	0.21	0.15	0.20	0.16	0.13
Regarding state budget expenditures, percentage	1.22	0.79	0.64	0.50	0.54	0.55	0.52

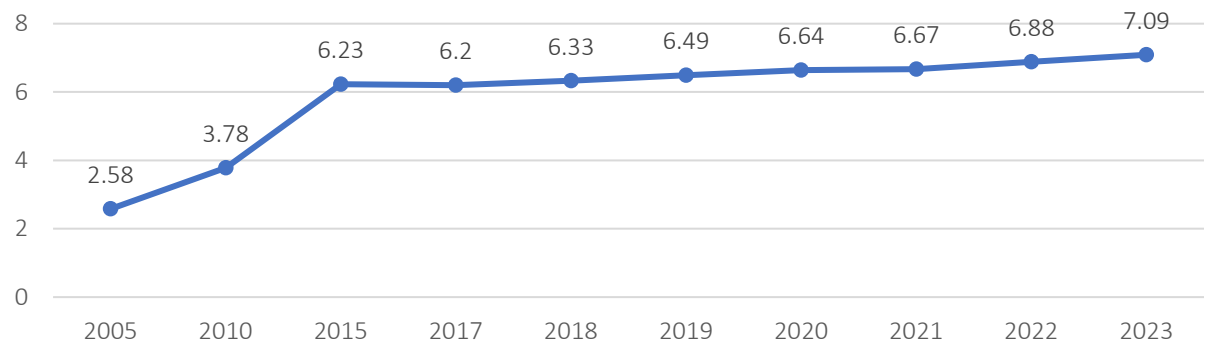

Figure 1. ICT Development Index in Azerbaijan

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Table 3. ICT Development Index (IDI) in 2024

Source: International Telecommunication Union (2024).

Country	IDI Score 2024	Country	IDI Score 2024
Australia	95.1	Japan	93.2
Austria	94.3	Kazakhstan	90.1
Azerbaijan	80.4	Kuwait	100.0
Brunei Darussalam	95.7	Latvia	94.3
Denmark	97.1	The United Arab Emirates	97.5
Estonia	97.9	Qatar	97.8
Finland	98.1	Turkiye	87.5
Hong Kong, China	97.4	Ukraine	81.0
Iceland	95.9	The United States of America	96.7

According to Table 3, Azerbaijan occupies the 87th position in the global ranking. Kuwait is in the first place with a 100% result.

Just as there is no common agreement among scientists on the concept of the digital economy, so there are no special methods for the real value of the volume of the digital economy. Therefore, it is only possible to give an approximate estimate using several methods, one of which is cross-functional methods (Bukh & Heeks, 2017). A method called "Internet economics" is used in McKinsey reports. It is based on the share of GDP generated by Internet-related activities (Rausas et al., 2011). Thus, currently, there are no special indicators adopted by all countries around the world to measure the digital economy. However, many countries and international organizations use special indexes to measure the digital economy. One such index is the UN-prepared E-Government Development Index (EGDI). According to the UN E-Government Survey 2022, Azerbaijan ranked 83rd in 2022 (UN, 2022). Table 4 shows the position of the highly rated countries and the position of Azerbaijan in the E-Government Index.

One of the reasons for Azerbaijan's lagging behind in this index is the weak participation of the country's citizens in decision-making and their execution at the macro level (electronic participation).

Another ICT indicator is the Network Readiness Index (NRI) by the World Economic Forum. This index consists of ten stages that assess areas from the valid framework and business environment to infrastructure, affordability, and usability. This includes both hard guidance and opinion polls. In 2023, Azerbaijan ranked 75th out of 131 countries with a score of 45.57 points. The country is lagging in the government's usage of the Internet and in achieving the economic influence of ICT. Table 5 shows the rating of some countries according to the NRI 2023 indicator.

From Table 5, it becomes clear that Azerbaijan is lagging far behind mainly in several areas. Azerbaijan is ranked 98th in the "Content" sub-index of the NRI "Technology" indicator (i.e. the type of digital technology produced in the country and the content and application issues that can be applied locally); 103rd in the "Regulation" sub-index of the "Governance" indicator due to the lack of satisfactory regulation, and 90th in the "Inclusion" sub-index of the "Economy" indicator (i.e. the lag in economic effects from participation in the network economy) (Dutta & Lanvin, 2023).

Table 4. Ranking of countries according to the E-Government Development Index (EGDI), 2022

Source: UN (2022).

Rank	Country	EGDI 2022	Rank	Country	EGDI 2022
1	Denmark	0.9717	14	Japan	0.9002
2	Finland	0.9533	22	Germany	0.8770
3	The Republic of Korea	0.9529	28	Kazakhstan	0.8628
4	New Zealand	0.9432	46	Ukraine	0.8029
5	Iceland/Sweden	0.9410	48	Turkiye	0.7983
10	The United States	0.9151	60	Georgia	0.7501
13	The United Arab Emirates	0.9010	83	Azerbaijan	0.6937

Table 5. Ranking of countries according to the Network Readiness Index, 2023

Source: Dutta and Lanvin (2023).

Rank	Country	NRI 2023	Rank	Country	NRI 2023
1	The United States of America	76.91	14	Australia	70.36
2	Singapore	76.81	20	China	67.31
3	Finland	76.19	30	The United Arab Emirates	62.43
4	The Netherlands	76.04	43	Ukraine	55.6
5	Sweden	75.68	47	Turkiye	53.22
9	Germany	74.00	58	Kazakhstan	50.97
13	Japan	71.06	75	Azerbaijan	45.57

A regression analysis was conducted to test the hypotheses. The dependent variable was GDP per capita in national currency (manats) for 2005–2023. The independent variable was the ICT Development Index for the same period. Having compiled a table of auxiliary values and determined the coefficients (Table 6), the following equation of paired linear regression was obtained:

$$GDP = -1898 + 1607.1 \cdot IDI, \quad (2)$$

where *GDP* – Gross Domestic Product per capita in manats, *IDI* – ICT Development Index.

A general drawing of the scatterplot and the plot of the regression equation is shown in Figure 2. The ratio coefficient (r) is 0.857. There is a direct relationship between the studied features; the closeness (strength) of the connection on the Cheddock scale is high. Several levels of freedom (f) are 17. The Student's t-test is 6.835. The crucial value of the Student's t-test for a given amount of levels of freedom is 2.11. $t_{observ} > t_{crit}$, the relevance of the features is significant statistically (p = 0.000004). The coefficient of explanation $R2$ is 0.733 (factorial feature x determines 73.3% of the variance of the dependent feature y). The general approximation

Table 6. Regression analysis

Regression statistics					
Multiple R			0.85626481		
R-Square			0.733189425		
Normalized R-Square			0.717494686		
Standard error			1586.350826		
Observations			19		
Analysis of Variance	**Df**	**SS**	**MS**	**F**	**Importance F**
Regression	1	117560264.2	117560264.2	46.71561552	2.90042E–06
Remainder	17	42780652.03	2516508.943		
Total	18	160340916.3			
	Factors	**Standard error**	**t-statistics**	**P-value**	
Y-intersection	–1898.020118	1271.803772	–1.492384407	0.153923771	
Variable X	1607.123817	235.1355525	6.834882261	2.90042E–06	

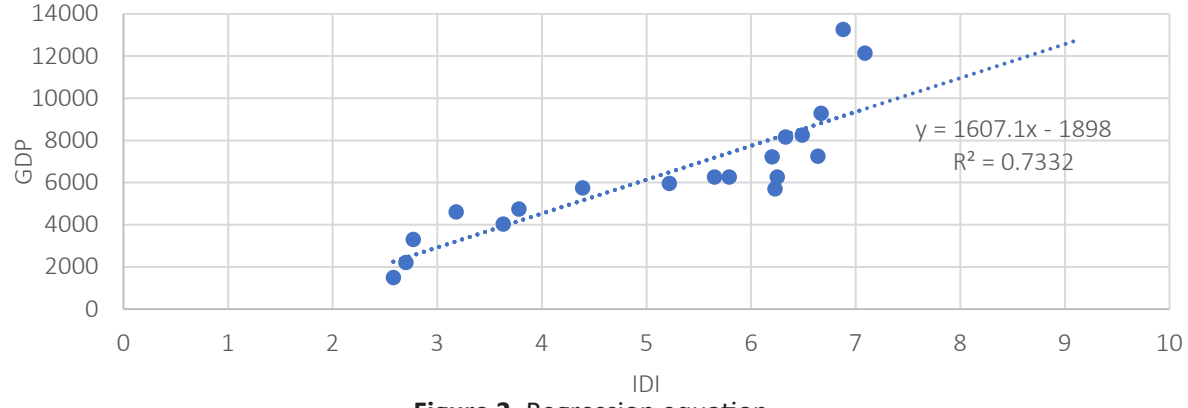

Figure 2. Regression equation

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error (characterizes the adequacy of the regression model) is 18.3%. The equation of paired linear regression demonstrates that with an increase in the ICT development index by 1 unit, GDP per capita will increase by 1607.1 manats.

The null hypothesis (H_0) is rejected since the *p*-value of the coefficient for IDI is less than 0.05 (at a significance level of 5%), which indicates a significant impact of digitalization on GDP. Thus, H_1 is accepted: The introduction of digital technologies in the economic sectors of Azerbaijan contributes to accelerating economic growth ($p < 0.05$).

4. DISCUSSION

The regression analysis showed that the coefficient of IDI (β1) is statistically significant ($p < 0.05$), which confirms H_1 on the positive impact of digital technologies on economic growth in Azerbaijan. A sufficiently high coefficient of determination ($R2 = 0.733$) indicates a significant explanation of GDP by the level of digital development.

The results demonstrating the positive impact of digital technologies on economic growth in Azerbaijan are consistent with earlier findings. Myovella et al. (2020) conducted a comparative analysis of the impact of digitalization on economic growth in developed and developing countries. The results show that the introduction of digital technologies contributes to the acceleration of economic growth, especially in developing economies. Piatkowski (2004) examined the impact of information and communication technologies on economic growth in countries with economies in transition. An increase in the level of digitalization has a significant positive impact on GDP per capita. However, there are also studies with different findings. Aly (2022) notes that in some countries, the introduction of digital technologies does not lead to the expected economic growth due to insufficient infrastructure and institutional barriers. This highlights the need for an integrated approach to the digital transformation of the economy.

Despite the positive relationship between IDI and GDP, questions remain about the mechanisms through which digital technologies affect economic growth. The analysis revealed a significant and positive impact of digital technologies. In recent years, Azerbaijan has seen an increase in digital initiatives, the development of e-government, and increased access to Internet services, which contribute to increased productivity and business efficiency. However, the study is based on aggregated data for the period 2005–2023, which may hide the short-term effects of digitalization. In addition, using IDI as the main indicator of digital development does not consider some specific aspects, such as the quality of Internet services, the level of digital literacy of the population, and the level of cybersecurity.

The results show that the digital economy in Azerbaijan is at the stage of formation, with certain achievements in areas such as the legislative framework, e-government, and digitalization of banking services. However, significant challenges remain, including a lack of digital infrastructure, limited access to the Internet in rural areas, and a shortage of skilled professionals. As already noted, numerous measures connected to the digitalization of the economy have been implemented in Azerbaijan recently, and despite this, there are still important problems in the digitalization of the country's economy. The presence of problems in the improvement of the digital economy is also evidenced by the low performance of Azerbaijan in world rankings in terms of indicators such as the ICT Development Index, E-Government Development Index, and the Network Readiness Index.

In the future, it would be useful to consider the impact of individual IDI components (availability, use, skills) on the economy and conduct a panel analysis taking into account the impact of other macroeconomic factors.

Thus, the study confirmed the hypothesis about the positive impact of digital technologies on Azerbaijan's economic growth. However, digital transformation requires a comprehensive approach, including investment in infrastructure, human capital development, and adaptation of institutions to the new conditions of the digital economy. Future research can deepen the understanding of the influence of digital technologies, which will help to develop more effective digital development strategies.

CONCLUSION

This study aims to explore the main challenges and opportunities associated with advancing the digital economy in Azerbaijan and to propose recommendations for achieving an effective digital transformation of the national economy. The hypothesis put forward in this study is that the introduction of digital technologies in various sectors of the economy of Azerbaijan contributes to accelerated economic growth. This hypothesis was confirmed through regression analysis. The analysis, which consisted of identifying the natural relationship between the country's economic development and the ICT development index, showed a strong linear relationship between the ICT development index and GDP per capita. The results of paired linear regression analysis show that an increase in the ICT development index by 1 unit leads to an increase in GDP per capita by 1607.1 manat.

The government is the main driving force in forming and developing a modern digital economy. In this regard, creating an improved legal framework in Azerbaijan will accelerate digital change and streamline the digital economy. Ensuring the complete digitization of public administration is vital. The government should increase its support for enterprises engaged in digital transformation and promote the use of digital solutions by the country's population. Finally, it is critical to form a digital economy infrastructure in the country and develop innovative activities.

Furthermore, it is necessary to improve the state innovation policy. The main directions of the state innovation policy of Azerbaijan should include improvement and development of regulatory and legal assent for invention activity, tools for its system of institutional transformations, stimulation, protection of intellectual property in the innovation area, and its involvement in economic turnover. Next, there is the development of the infrastructure for the innovation process: information support systems, examination systems, financial and economic systems, production and technological assistance, certification and transfer of developments, personnel training and retraining systems, etc. The government should also pay attention to small innovative entrepreneurship development by providing particularly favorable conditions and implementation of critical technologies that will allow the digitization of a particular sector of the economy.

Thus, the obtained results confirm the importance of digital transformation for sustainable economic growth in Azerbaijan. However, digital transformation requires a comprehensive approach that includes investments in infrastructure, human capital development, and the adaptation of institutions to the new conditions of the digital economy. Future research can deepen the understanding of the mechanisms of influence of digital technologies, which will help to create more effective digital development strategies.

AUTHOR CONTRIBUTIONS

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http://dx.doi.org/10.21511/ppm.23(2).2025.18

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