

Trajectory of economic development of the Republic of Uzbekistan in the process of digitization

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Abstract. The purpose of the this work is to study the process of digitalization of the economy of Uzbekistan and its impact on the economic development of the country. The digitalization process covers all new sectors of the economy and requires the country to make appropriate changes in economic policy. The Republic of Uzbekistan is also no exception. The country is on the path of reforms and transformations in various areas, and digitalization is one of the main tasks of the national economy. In this regard, it is necessary to conduct a deep analysis of the trajectory of the country's economic development in the process of digitalization, identify key problems and assess their impact on the economic growth and development of Uzbekistan. The article contains the opinions, conclusions and suggestions of the authors on the topic.

1 Introduction

The Republic of Uzbekistan is one of the fastest growing economies in the region. One of the main factors of this development is the introduction of digital technologies in the country's economy. In this regard, studying the issue of the trajectory of the economic development of the Republic of Uzbekistan in the process of digitalization is extremely important for understanding the current situation, analyzing the measures already taken by the government, and also for planning effective solutions in the future. Moreover, the topic is of international importance as part of the global digitalization process and can be a useful experience for other countries seeking to develop their economies through digital technologies.

The economy of the Republic of Uzbekistan is at the stage of active development, and digitization of the economy is one of the main priorities for the country. In a rapidly changing global market and advanced technology, it is important to understand how these opportunities can be used to your advantage and how successful these efforts will be.

Digitization is not only an economic priority, but also a key public administration tool that can solve many problems related to corruption, chaos and state control. Also, it can be an important resource in solving internal problems related to unemployment, low labor

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productivity and economic development of regions through the introduction of modern information technologies.

The Republic of Uzbekistan is planned to become a key player in the international and regional arena, and the use of digital technologies can increase the country's competitiveness and reputation as a new community ready for promising investment projects and daily economic cooperation.

Digitization will lead to an increase in the world economy, for example, according to the calculations of the prestigious consulting company McKinsey Global Institute, the use of the latest digital technologies until 2025 will bring the gross domestic product (GDP) to 3-6 trillion. Leads to an increase in the US dollar. The company's forecasts showed that this growth is caused by the development of 12 types of high - tech, including mobile Internet, advanced robotics, cloud technology, renewable energy, Internet of Things (IoT) - wireless data transmission, mobility and artificial intelligence, etc. [1].

Today, the issue of the development of the digital sector of the economy is also raised to the state level in Uzbekistan, large-scale measures are being implemented in this regard. In particular, electronic document management systems are being introduced, electronic payments are being developed, and the regulatory framework created in the field of e-commerce is being improved. At the same time, the digital economy operating on information and technological platforms is developing rapidly.

To achieve progress, it is necessary and necessary for us to master digital knowledge and modern information technology. This gives us the opportunity to follow the shortest path of ascent. Therefore, the active transition to the digital economy will be one of our top priorities for the next 5 years. Digital technologies not only increase the quality of products and services, reduce overhead costs [2].

The digital economy consists of various areas, such as the use of information technology in production, e-commerce, digital platforms, cloud services, big data, etc. It differs from the traditional economy with new opportunities for growth and development, such as increased efficiency and productivity, expanding markets, etc. Trends in the digital economy in Uzbekistan include an increase in the use of mobile devices and Internet technologies, the acceleration of digital transformation processes in various sectors of the economy.

An analysis of the experience of other countries allows us to identify the best practices and approaches to the digital transformation of the economy that can be applied in Uzbekistan. Consideration of the prospects for the development of the digital economy in the future includes an assessment of its potential for further growth and development, as well as the development of recommendations for the development of policies and programs for the digitalization of the economy.

Numerous studies provide evidence that digital technologies can reduce the cost of production and management of enterprises, improve service delivery processes and make businesses more efficient overall. Some studies also indicate that digitalization can spur economic growth and development by increasing investment and creating new jobs in the technology sector.

Digitalization is an important factor in economic development in the modern world. Research shows that the development of the digital economy, including the development of digital technologies, infrastructure and digital culture, can increase the competitiveness of the state and direct it towards sustainable development.

The digital economy includes a wide range of technological platforms and digital services that are used to improve the quality of services and business management. Research shows that digital platforms can optimize business processes, reduce production

and management costs, and improve the quality of products and services. Among the common technology platforms and services in the digital economy are cloud computing, Big Data, machine learning, the Internet of things, block chain, artificial intelligence, 3D printing, etc. In addition, there are many tools and platforms for developing and implementing digital solutions, such as enterprise business automation platforms, project and task management tools, e-commerce platforms, etc. In general, the use of technology platforms and digital services in the digital economy is becoming an increasingly common and necessary factor for achieving successful results and competitive advantages in business.

2 The main part

The researchers also concluded that it is necessary to develop a mechanism for continuous cooperation and active participation of all major economic stakeholders in the transition to the digital economy, as well as continuous and continuous coordination mechanisms at all levels of government [3].

Scientists who have studied the main features of digital economy development assessment as a means of managing digital transformation processes at the national, regional and branch levels have developed its methodology in this regard. It includes a system of indicators, measurement tools and evaluation criteria that allow to evaluate the current situation with conditions, processes and effects of digital transformation [4].

The use of innovative advanced technologies in the economic development of the region also has great potential in terms of optimizing the time and diversity of the necessary tourist products for travelers. The real-time exchange of information brings enormous benefits to potential clients by reducing required documentation and eliminating language barriers [5].

A group of scientists approached from the point of view of the influence of the digital economy on accelerating the economic development of the city and region, as well as on improving the quality of life, to study the process of the development of the digital economy at the regional level and to determine the indicators for assessing the impact of digitalization on the economic situation of the region and the well-being of the population [6].

In order to achieve digitalization and intellectualization-based information technology integration innovations, the researchers who expressed an opinion on changing the traditional manufacturing industry said that it is necessary to create an innovative system that attaches great importance to the integration of higher education institutions and research institutes with enterprises [7].

In the process of digitalization, in the economic development of the region, in the economic development of the region, together with the tourism infrastructure, according to the researchers who proposed the development of the tourism info-structure, the introduction of innovative sources of information in all areas related to the development of tourism and their rapid improvement will form a digital space, the effective use of which will not only be used by local travelers, but also by foreign It is also considered one of the important factors for tourists [8].

Scientists who have studied the level of influence of the generation of digital technologies on the transforming factor of economic growth emphasize that digitalization has become a decisive necessity in all sectors of the economy, which is the basis for long-term success [9].

As a result of the analysis of the literature related to this field, in our opinion, economic development in the process of digitization creates the influence of many interrelated factors. Digital technology and the telecommunication environment play an important role in this.

The urgency of studying digital transformation and its impact on economic growth in Uzbekistan is determined by the growing importance of information technologies in the world and the need to increase the competitiveness of Uzbekistan's economy in the international arena.

One of the main documents aimed at the development of the digital economy in Uzbekistan is the decision of the President of the Republic of Uzbekistan dated July 3, 2018 "On measures to develop the digital economy in the Republic of Uzbekistan." It defines the priority directions of the development of the digital economy, such as the creation of electronic mass communication and information systems, the development of electronic commerce and electronic government, as well as the digitization of the economy and state infrastructure [10].

According to Datareportal.com's April "Digital 2023" report, 64.6 percent of the world's population of 8.03 billion, 5.18 billion of whom are Internet users, 68.3 percent (5.48 billion) are mobile phone users, and 4.8 billion people, that is, 59.9 percent of the world's population is an active user of social media [11].

In turn, these numbers are increasing every year. At the same time, Internet users are people of different ages, incomes and social status. It is interesting to note that among the active users of Internet resources, older and younger people who communicate on social networks and use the Internet to search for information are increasing every year.

In line with the global trend, the total number of Internet users in Uzbekistan has exceeded 31 million, and the number of mobile Internet users has exceeded 29.5 million. The speed of connection to the international Internet channel increased by 2.6 times in the last two years and reached 3200 Gbit/s [12].

In recent years, there has been a significant increase in the introduction of digital technologies in various sectors of the economy in Uzbekistan. Various statistics can be used to assess the impact of digital transformation on economic growth in Uzbekistan.

The first indicator to consider is GDP. According to the reports of the Central Bank of Uzbekistan, in 2020 the gross domestic product of our country amounted to more than 57 billion US dollars. This is a significant increase compared to previous years, and the introduction of digital technologies in various sectors of the economy, such as e-commerce, banking, and telecommunications, had a positive effect on the acceleration of economic growth.

The second indicator is the level of investments in the IT sector. According to the report of the Statistics Committee, investments in the IT sector in 2020 amounted to more than 740 million US dollars. This is a significant increase compared to previous years and shows the growing interest in the field of digital technologies. Investments in the field of information technologies allow to increase productivity, improve product quality and improve working conditions, which has a positive effect on economic growth.

The third indicator is the unemployment rate. In 2020, the unemployment rate in Uzbekistan was 9.8 percent. The introduction of digital technologies in various sectors of the economy leads to the creation of new jobs and the improvement of the skills of workers, which helps to reduce unemployment.

Table 1. Indicators of digital economic development of the Republic of Uzbekistan

No.	Indicators	2016	2017	2018	2019	2020	2021	2022

1	Permanent population (at the beginning of the year, thousand units)	31575,3	32120,5	32656,7	33255,5	33905,2	34558,9	35271,3
2	The ratio of the number of the employed population to the number of the population of working age (percentage)	68,2	68,7	69,2	67,4	68,1	66,0	67,0
3	Growth rates of the gross domestic product (at the beginning of the year, in %)	107,2	105,9	104,4	105,5	106,0	102,0	107,4
4	Growth rates of GDP per capita (at the beginning of the year, in %)	105,4	104,1	102,7	103,7	104,0	100,1	105,3
5	Total income of the population (billion soums)	197962,4	236893,1	300842,7	365735,6	414968,7	519181,4	634797,0
6	Growth rate of total income per capita compared to last year (in percent)	114,9	117,7	124,8	119,3	111,3	122,7	119,8
7	The amount of gross added value created in the fields of information economy and e-commerce (at the beginning of the year, billion soums)	3 876,3	4 967,7	6 377,8	7 732,1	8 491,9	10 777,0	17 066,5
8	The share of gross added value created in the information economy and e-commerce sectors in GDP (at the beginning of the year, in % of GDP)	1,9	2,1	2,3	2,0	1,7	1,9	2,5
9	Number of enterprises and organizations	6 370	6 427	6 403	6 975	7 901	9 517	10 587

	operating in the field of "Information and communication" by type of economic activity (at the beginning of the year, in units)							
10	The number of subscribers connected to the Internet (at the beginning of the year, per 100 inhabitants)	26,6	30,2	34,5	40,4	48,8	58,4	65,8
11	Share of enterprises and organizations connected to the Internet (at the beginning of the year, growth rate, in percent)	21,6	25,9	27,2	27,5	26,2	21,1	17,5
12	Length of optical fiber communication lines (at the beginning of the year, thousand km)	20	22,1	24,5	26,6	36,6	68,6	118,0
13	Availability of personal computers (except servers) in enterprises and organizations (at the beginning of the year, units)	734 569	800 767	853 825	929 900	1 012 726	1 014 686	1 106 143
14	Number of computers connected to the Internet in enterprises and organizations (at the beginning of the year, unit)	223 907	271 357	310 459	358 003	413 417	441 913	538 933
15	The number of computers connected to the local network in enterprises and	287 362	325 466	364 378	401 494	416 870	376 538	421 560

	organizations (at the beginning of the year, unit)							
16	Share of enterprises and organizations with a local network (at the beginning of the year, in percent)	4,5	5,2	5,3	5,8	5,3	3,8	3,0
17	Share of enterprises and organizations with personal computers (at the beginning of the year, in percent)	44,2	50	50	55,2	57,7	57,0	46,3
18	The number of subscriber radio stations connected to the mobile communication system (at the beginning of the year, per 100 inhabitants)	66,0	66,8	69,5	66,6	71,0	75,9	83,1
19	The number of broadband Internet subscribers (at the beginning of the year, thousand units)	466,3	511,5	498,5	622,2	725,4	1 080,0	1 457,5
20	The number of subscribers connected to the Internet through mobile communication (at the beginning of the year, thousand units)	7 793,7	9 022,9	10 258,8	12 668,6	15 651,2	17 946,5	20 991,8
21	E-commerce turnover (at the beginning of the year, billion soums)	-	6,0	12,1	40,9	275,3	1 002,5	5 978,7

Digital infrastructure, which is the basis of the digital economy, is currently actively developing in Uzbekistan. In 2020, the program for the development of the digital economic space until 2030 was adopted in Uzbekistan. Within the framework of this program, it is planned to implement the following digital infrastructure projects:

1. Introduction of new technologies in the banking sector: creation of mobile applications, online banking, electronic payment systems.
2. Development of state information resources: creation of electronic databases and registration systems.
3. Development of e-commerce: creation of online stores and electronic trading platforms.
4. Development of the electronic government system: creation of electronic portals for the provision of public services.
5. Development of digital industry: development of technologies and production of digital products.
6. Development of digital education: creation of online courses and digital libraries.

The development of digital infrastructure in Uzbekistan allows to reduce bureaucratic procedures in public administration, increase opportunities for citizens to use public services, create new jobs and attract additional investments to the country's economy.

Digitization brings the following economic benefits for Uzbekistan:

- The adoption of digital technologies such as automation, robotics and machine learning can increase efficiency and save time, reduce labor costs, which can reduce costs for businesses.
- Digital technologies can make production more efficient and meet international standards, which allows to increase the export of products from Uzbekistan and get additional income.
- Digitization can improve the quality of education and healthcare, expand access to services, and increase the level of comfort for the population of Uzbekistan.

Table 2. SWOT analysis of digital economy of Uzbekistan

<p>Strengths:</p> <ol style="list-style-type: none"> 1. Increasing number of Internet users. 2. Availability of highly qualified IT specialists. 3. Development of banking and financial technologies. 4. State support for the development of the digital economy. 	<p>Opportunities:</p> <ol style="list-style-type: none"> 1. Development of electronic commerce and electronic services. 2. Improving the quality of education and digital literacy of the population. 3. To attract foreign investment and develop international cooperation in the field of digital economy. 4. Development of Internet banking and electronic payments.
<p>Weaknesses:</p> <ol style="list-style-type: none"> 1. Inadequate availability of broadband internet in a number of remote areas. 2. Low security culture on the Internet. 3. Low level of education and lack of necessary knowledge for successful use of digital technologies. 4. Lack of effective copyright protection mechanisms on the Internet. 	<p>Threats:</p> <ol style="list-style-type: none"> 1. Underdeveloped infrastructure for electronic business and electronic financial services. 2. Risk of cyber-attacks and data security breaches. 3. Low competitiveness of goods and services in the international market.

As exogenous factors affecting the growth rates of the gross domestic product (Y) selected as the resulting factor in the econometric model, the growth of the permanent population of working age (x_1), the increase in the share of enterprises and organizations connected to the Internet (x_2), the length of optical fiber communication lines (x_3) and the increase in the number of subscribers connected to the mobile communication system (x_4) were selected.

All the resulting and influencing factors have a stable growth rate during 2016-2022.

A multi-factor econometric model of changes in the volume of the gross regional product under the influence of factors affecting it was created using the identified data. According to it, the regression equation (1) representing this process was created.

$$Y = -815,87 + 7,59X_1 + 2,26X_2 + 0,13X_3 + 3,52X_4 \quad (1)$$

Y - Gross regional product (at the beginning of the year, growth rate, in %)

X₁ - Permanent population of working age (at the beginning of the year, growth rate, in %)

X₂ - Share of enterprises and organizations connected to the Internet (at the beginning of the year, growth rate, in percent)

X₃ - Length of optical fiber communication lines (at the beginning of the year, growth rate, in percent)

X₄ - Growth in the number of subscribers connected to the mobile communication system (at the beginning of the year, growth rate, in percent)

A change in the permanent population of working age by 1% leads to a change in the gross domestic product by 7.59%. A change in the share of enterprises and organizations connected to the Internet by 1% leads to a change in the gross domestic product by 2.26%. Also, the increase in the length of optical fiber communication lines and the number of subscribers connected to the mobile communication system leads to a change in the gross domestic product by 0.13% and 3.52%, respectively.

We determine the coefficient of determination.

$$R = \sqrt{1 - \frac{s_e^2}{\sum(y_i - \bar{y})^2}} = \sqrt{1 - \frac{449.301}{57260.87}} = 0.9961$$

Since this coefficient is close to 1, the found regression equation is considered highly reliable.

We determine pair correlation coefficients.

$$\begin{aligned} r_{yx_1} &= \frac{25635.749 - 1031 \cdot 247.714}{1.518 \cdot 90.444} = 0.702 \\ r_{yx_2} &= \frac{21643.186 - 85.071 \cdot 247.714}{14.102 \cdot 90.444} = 0.447 \\ r_{yx_3} &= \frac{110567.421 - 346.714 \cdot 247.714}{291.717 \cdot 90.444} = 0.935 \\ r_{yx_4} &= \frac{31815.573 - 122.043 \cdot 247.714}{17.959 \cdot 90.444} = 0.975 \end{aligned}$$

It can be seen from these coefficients that the influence of the selected indicators on the gross domestic product is very high.

The standard form of the regression equation is as follows:

$$t_y = 0,13x_1 + 0,35x_2 + 0,7x_3 + 0,4x_4$$

It seems that the most influencing factor on the change of the gross domestic product compared to the base period is the share of enterprises and organizations connected to the Internet.

We determine the average error of approximation. Its result is as follows:

$$A = \frac{\sum_{i=1}^n \left| \frac{\epsilon}{\bar{Y}} \right|}{n} \cdot 100\% = \frac{0.236}{7} \cdot 100\% = 3.38\%$$

The average error of the difference between the amount of gross domestic product determined by the econometric model proposed by us and the real one is small. From this we can see that the reliability of the regression equation is high.

3 Conclusion

Thus, a change in the number of permanent residents of working age by 1% will lead to a change in the gross regional product by 16.6%. The change in the share of enterprises and organizations connected to the internet by 1% will lead to a change in the gross regional product by 0.99%.

The digitization of the economy has great potential for the development of the digital economy of Uzbekistan by improving the quality of Public Administration, Modernization of infrastructure, increasing the level of digital literacy of the population and creating favorable conditions for economic growth.

The growth in the number of technological startups and small businesses can become the driving force of economic development of Uzbekistan in the context of digitalization. However, the digitization of the economy also presents important problems such as the underdevelopment of digital infrastructure, the low level of digital literacy and the protection of personal data of the population.

For the successful implementation of the digitization potential, it is necessary to develop complex strategies and measures such as attracting investments in the IT field for the development of the digital economy, improving the professional qualifications of IT specialists and developing mechanisms for protecting reliable data.

To continue creating favorable conditions for the development of the IT sector in the country, such as tax incentives and investment benefits, to create the necessary conditions for the further development of digital infrastructure and the widespread use of electronic and cloud technologies, it is necessary to carry out regular monitoring and evaluation of the effectiveness of programs for the development of the digital economy.

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