WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

DIGITAL TECHNOLOGIES FOR THE INDUSTRY OF UZBEKISTAN: ANALYSIS AND PROSPECTS

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Abstract:

The article analyzes the role of the state program "Digital Uzbekistan - 2030" in stimulating the digitalization of various sectors of the economy, including industry.

Keywords: Digitalization, industry, information and communication technologies, automation, smart factories, artificial intelligence, Digital Uzbekistan 2030, productivity, competition.

Digital technologies are becoming an integral part of the sustainable development of industry in Uzbekistan, playing a key role in increasing productivity, product quality and competitiveness in the global market. In the context of the transition to an innovative economy, digitalization of the industrial sector allows optimizing business processes, introducing modern production management methods, reducing operating costs and increasing technological safety. Uzbekistan's industry, which is a key driver of the country's economic growth, today faces the need for large-scale modernization and increased competitiveness in the global market. In the third quarter of the industrial revolution (Industry 4.0), digital technologies are becoming not just the result of increased efficiency, but the foundation for creating fundamentally new business models and positions in the international arena.

Today, the share of industrial production in the GDP structure of Uzbekistan is more than 27%, and this sector has high potential for digital transformation. According to the Ministry of Digital Technologies, by 2024, more than 300 large and medium-sized industrial enterprises in the country have begun to implement elements of Industry 4.0, including automated control systems, robotics, IoT solutions (Internet of Things) and intelligent analytics based on big data. One striking example is the introduction of digital twins at mechanical engineering enterprises in the Tashkent and Navoi regions, which reduced the product development cycle by 25-30% and reduced design costs by 40%.

In 2023, the volume of investments in industrial digitalization amounted to about 2.1 trillion soums, and an increase to 3.5 trillion soums is planned for 2025. The state program "Digital Uzbekistan - 2030" stipulates that by 2030 the level of automation of key industrial enterprises should reach at least 70%. Already today, within the framework of the cluster approach, digital industrial platforms are being created that unite enterprises, research institutes and IT companies.

However, the main challenges remain the insufficient level of digital competencies among production personnel, limited access to modern digital infrastructures in a number of regions, as well as the need to adapt legislation to new technological realities. To overcome these barriers, Uzbekistan actively cooperates with international organizations, including UNIDO and the World Bank, implementing joint projects to develop a digital industrial ecosystem.

Thus, digital technologies open up broad opportunities for a qualitative leap in development for the industry of Uzbekistan. Accelerated digitalization can become a catalyst for the transition to a knowledge economy and sustainable growth, subject to systemic government support, active participation of the private sector and expansion of the educational base in the field of digital industries. The introduction of digital solutions opens up broad opportunities for optimizing production processes, improving product quality, reducing costs and expanding sales markets. This article analyzes the current state of digital transformation of the industry of Uzbekistan, reviews key digital technologies, and measures the growth and challenges facing countries in the era of the digital economy.

The topic of industrial digitalization has become the subject of numerous studies both in the global and regional contexts. According to research by the World Economic Forum (2020), countries that actively implement digital technologies have significant advantages in terms of competitiveness and economic sustainability. The importance of digital solutions for industrial development is also emphasized in studies by international organizations such as the UN and the World Bank. They argue that digitalization helps not only optimize processes at enterprises, but also accelerates innovative transformations, contributes to the creation of new jobs and improves the quality of life of the population.

In Uzbekistan, the issues of introducing digital technologies into industry became relevant with the adoption of the National Digital Transformation Strategy, which was announced in 2020[1]. According to the Ministry of Innovative Development of the Republic of Uzbekistan, for this period it was planned to increase the share of high-tech industries in the total gross domestic product (GDP) of the country to 20% by 2030[6].

Digitalization of industry in Uzbekistan covers several key areas. One of the most significant is the introduction of a production automation system. Many enterprises have begun to switch to production process management systems (PPMS), which has significantly increased the efficiency and accuracy of operations. In particular, in the chemical and textile industries, the introduction of automated lines and robots allows for faster production and a reduction in the number of defects.

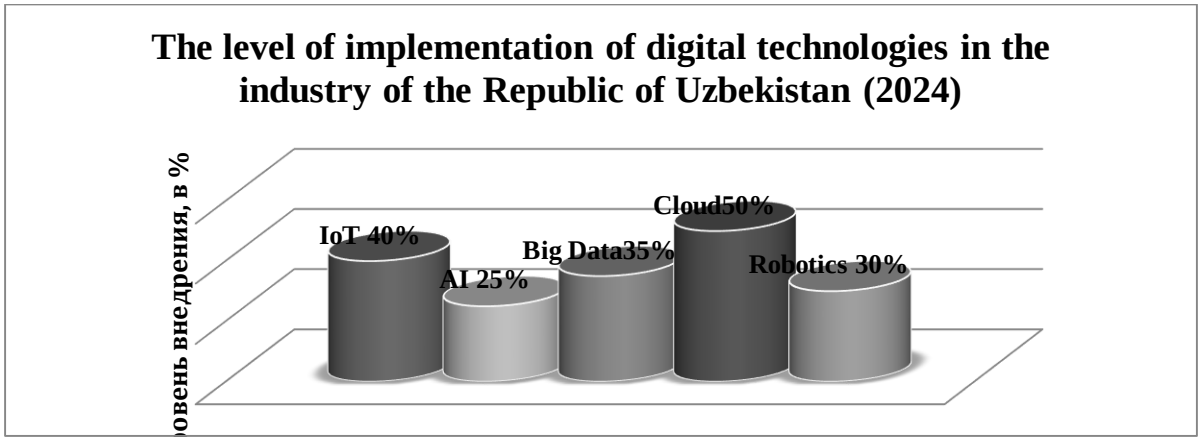

Figure 1. Level of implementation of digital technologies in the industry of the Republic of Uzbekistan (2024)[6]

Digitalization of industry in Uzbekistan is actively developing and has an impact on the world. In recent years, the information and communication technology (ICT) market in Uzbekistan has achieved growth. In 2021, the volume of this market was $ 1.5 billion, and it continued to grow gradually. It is projected to grow to $ 2.836 billion by 2027, with an annual growth of about 16% [2]. A special actively developing software sector, in which more than 12 thousand IT companies operate in the country, employing more than 100 thousand people. This indicates a significant interest in digital technologies in various industries, including industry. Exports of IT services and products from 2019 to 2021 increased more than 7 times, from $ 6.2 million to 46 million. The diagram in Figure 1 shows the level of development of digital technologies in the industry of Uzbekistan (Fig. 1)

Based on the data, we can draw a conclusion about the population growth trend both in the Republic and in the city of Tashkent. Considering the capital by districts, the highest population growth rates are observed in the Yashnobod, Yunusabad and Almazar districts with an increase over the past year of 9.6, 9.1 and 7.6 thousand people, respectively. In turn, the most insignificant increase in population is observed in such districts as Chilanzar, Mirabad and Uchtepa.

Table 1. Population growth of the Republic of Uzbekistan

Territory	2023	2024	2025
Republic of Uzbekistan	18370.9	18771,1	19139,4
Tashkent city	2956.4	3040.8	3112.8
Uchtepinsky district	293.5	299.4	301.7
Bektemir district	55.8	60.5	65.5
Yunusabad district	367	376.1	385.2
Mirzo Ulugbek district	323.1	331.2	337.1
Mirabad district	149.5	152.2	154.2
Shaikhantakhur district	360.6	365.4	369.6
Almazar district	395.1	404.4	412
Sergeli district	162.3	168.2	173.2
Yakkasaray district	126.9	133.5	139.7
Yashnobod district	289.5	300.1	309.7
Chilanzar district	272	275.1	276.7

For Tashkent, as a developing megalopolis, the adaptation of the above international methods can contribute to: the development of mechanisms to reduce the environmental depreciation of assets; the establishment of environmentally sound standards for the depreciation of city property; the accounting of damage from pollution when budgeting for repair and restoration work. The introduction of LCA and environmental audit in the modernization of transport and energy infrastructure seems particularly promising.

As of August 30, 2020, 140 enterprises in Uzbekistan have been certified according to international ISO standards. Of these, 112 enterprises are certified according to ISO 9001 (quality management system); 14 enterprises - according to ISO 50001 (energy management system); 6 enterprises - according to ISO 22000 (food safety management system); other enterprises are certified according to various management systems.

Certification was carried out by 19 accredited bodies, and the majority of certified enterprises are from the light, food and construction industries.

For example, the retail chain company Korzinka became the first in the country to receive five ISO certificates: ISO 9001, ISO 22000, ISO 45001, ISO 14001 and ISO 50001.

Issues of implementing quality management systems are also being actively discussed in Tashkent. According to data for 2025, the number of enterprises that have implemented the ISO system in Uzbekistan has reached 250, and it is expected that by the end of the year their number will increase to 1.8 thousand. These companies operate in various sectors of the economy, including oil and gas, metallurgy, chemical industry, railways, services, food industry and other sectors..

In the study, we will consider the Yunusabad district as one of the most popular for moving and closer to the city center, Chilanzar as the least attractive for moving, based on statistical data, as well as the Sergeli district, which was recently annexed to the city of Tashkent. Further, environmental factors will be considered for each district (certain microdistricts) and their impact on the price in the future. The country is introducing automation systems, smart factories and Internet of things, which significantly increase the efficiency of the State Program "Digital Uzbekistan - 2030", which actively supports these changes, focusing on the digitalization of various sectors of the economy, including industry. Digital technologies are expected to continue to grow in areas such as artificial intelligence, household appliances and big data, which will open up new opportunities for industry and improve its global level. In the trend of Uzbekistan, it is necessary to significantly develop smart factories and introduce new technologies to improve production efficiency in industries such as automotive and metallurgy, which will make these companies more competitive [3].

The figure shows the dynamics of the volume and growth rate of investment in fixed assets in Uzbekistan for the period January-March from 2021 to 2025.

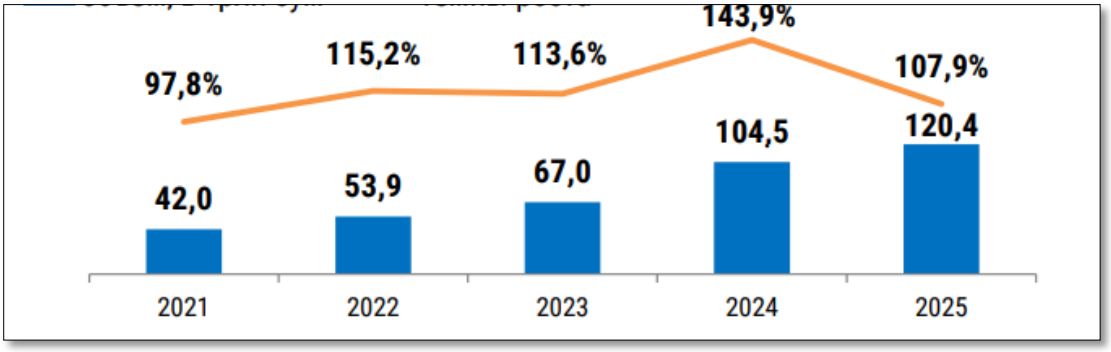

Figure 2.Dynamics of the volume and growth rate of investments in fixed assets (January-March 2025)

According to the diagram, the volume of investment in fixed assets shows steady growth: from 42.0 trillion soums in 2021 to 120.4 trillion soums in 2025. The most significant growth in volume is observed in 2024 - 104.5 trillion soums with a record growth rate of 143.9%. However, already in 2025, the growth rate slowed down to 107.9%, despite a further increase in the absolute volume of investment.

Thus, the graph shows both positive dynamics in terms of investment volume and volatility in their growth rates, which may indicate the influence of various economic factors and changes in the investment climate in the country. The most noticeable step in digitalization was the creation of industrial parks focused on the development of high-tech industries. Thus, the Tashkent Technopark was opened in Tashkent, specializing in the development and implementation of digital solutions for industry. In these technology parks, young companies and startups can develop innovative projects that can later be implemented at large manufacturing enterprises [4].

Digitalization of industry in Uzbekistan opens up great prospects for the development of the country's economy, increasing its competitiveness in the international arena and improving the quality of life of the population. The introduction of new technologies, such as automation, the Internet of Things and big data, is already yielding positive results, but for further development it is necessary to solve problems related to personnel, financing and infrastructure. It is important to note that success in this area largely depends on government support and the creation of conditions for the development of the private sector in the field of digital technologies. In general, digitalization is a strategically important step for Uzbekistan, which can significantly change the industrial landscape and increase production efficiency in the long term.

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