

The Role of Digital Technologies in the Development of the Digital Economy

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Abstract: This article shows that the development of artificial intelligence is one of the most pressing issues in the Republic of Uzbekistan. It aims to systematically establish national scientific research and development activities in the field of artificial intelligence. Artificial intelligence is shown to enhance the country's capacity to develop a digital economy and introduce innovations in every sector.

Keywords: artificial intelligence, robot, sensor, thermal imager, space systems, digital economy, innovation.



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INTRODUCTION

One of the most important topics in today's time is digital technologies, which are rapidly entering all spheres and people's lives. The development of the digital economy has become the most important task in our country.

The resolution of our President dated April 28, 2020 "On measures for the widespread introduction of the digital economy and e-government" sets the task of increasing the share of the digital economy in the country's gross domestic product by 2 times, the volume of services in this area by 3 times, and their export to 100 million US dollars by 2023¹.

According to statistical data, the share of the digital economy in the gross domestic product of countries is 10.9% in the USA, 10% in China, and 5.5% in India. Researchers from the Vouchercloud portal have published a list of the 25 "smartest" countries in the world. According to the results of the study, Japan took first place. The country also received the highest marks in the study's key indicators - the number of Nobel Prize laureates, the average IQ of the population, and the performance in schools².

Switzerland, China, the United States, and the Netherlands were next in line. China came in third place due to its high level of intelligence, while the United States came in fourth place due to the number of Nobel laureates. South Korea, Taiwan, and Singapore are among the top countries in terms of the number

¹ Resolution of the President of the Republic of Uzbekistan dated February 17, 2021 No. PP-4996 "On measures to create conditions for the accelerated introduction of artificial intelligence technologies".

² Resolution of the President of the Republic of Uzbekistan dated February 17, 2021 No. PP-4996 "On measures to create conditions for the accelerated introduction of artificial intelligence technologies".

of educated (intelligent) young people, but they did not make it to the top of the ranking solely because of the small number of Nobel laureates.

Main Section

According to the estimates of McKinsey experts, nearly 10% of the current global GDP comes from digital assets, and the rate of their production accounts for 30% of global economic growth. The development of digital assets resembles the acceleration effect of an engine booster. We know well that forming a digital economy requires the necessary infrastructure, substantial financial resources, and human capital. Therefore, an active transition to the digital economy will be one of our top priorities for the next five years. Digital technologies not only improve the quality of products and services but also significantly reduce unnecessary costs—especially corruption.

At this point, let us focus on the concept of the digital economy. It refers to a system of interconnected processes—production, distribution, exchange, consumption, and management (via human-to-human, machine-to-machine, cloud-based, and Big Data technologies)—that is aimed at maximizing benefits through the optimization of information exchange using digital technologies and the Internet.

It is especially worth noting that a new period of awakening—a Third Renaissance—is being laid as a foundation, which demonstrates the grandeur of our future. It is difficult to imagine the development of a society or country without science and enlightenment.

The digital economy encompasses a complex of innovative technologies, including (see Figure 1):

1. Big Data technologies
2. Artificial Intelligence (AI)
3. Cloud Technologies
4. Mobile Technologies (e-mobile)
5. Internet of Things (IoT)
6. Robotics and Sensorics
7. Digital platforms and ecosystems
8. Quantum Technologies
9. Smart Contracts
10. Industry 4.0 Technologies
11. Virtual and Augmented Reality (VR/AR)
12. Crowdsourcing and Crowdfunding Technologies
13. Blockchain Technologies
14. Cryptocurrencies and Initial Coin Offering (ICO) Technologies
15. 3D and 4D Technologies
16. Drone Technologies

Today, it is necessary to update 60% of the specialties taught in schools and higher education institutions.

To join the ranks of developed countries, we must first take the shortest path to advancement through deep mastery of modern information and communication technologies, the Internet, and digital tools. At the same time, practical efforts have already begun in our country to digitize all sectors—such as healthcare, cadastre, social protection, agriculture, and education—which will soon yield positive results.

The digital economy brings about certain transformations in society, particularly affecting labor conditions. In the context of digital transformation, increased automation, the expansion of artificial intelligence, and the use of large-scale data analytics systems and robots serve as substitutes for human labor. As a result, business processes become more efficient, and productivity significantly improves.



Figure 1. Sectors Where Artificial Intelligence Technologies Are Being Applied³

If we want digitalization to enter our daily lives more rapidly and bring various conveniences into our routines, a systematic approach to its implementation is essential. For nearly a decade, we have been striving to develop the e-government system.

The most important aspect of effectively introducing digitalization technologies into everyday life is offering public services to the population, which accelerates interactive communication between the government and the people. This demonstrates how expanding the system of electronic public services to the population and business entities—based on the principles of “intelligent government”—is indeed the right direction⁴.

First, digitalization is a “data warehouse”, containing vast amounts of information. Second, it is crucial to expand platforms for managing, storing, and processing large data streams (Big Data). Third, although implementation mechanisms and funding sources have already been identified in relevant programs, we believe that strengthening public oversight in the monitoring process is equally important.

The World Bank's research titled “Digital Dividends” emphasizes how relevant and important the digital economy is in the development of national economies. Specifically, a 10% increase in internet speed leads to growth in a country's GDP. In developed countries, this figure stands at 1.21%, and in developing countries, it reaches 1.38%.

In countries with advanced digital economies, both the total GDP volume and GDP per capita are higher. From this perspective, the attention our country's leadership pays to this issue at the state level pursues two main goals:

³ N. Nilsson, *Principles of Artificial Intelligence*, Moscow: Radio i Svyaz, 1985.

⁴ President of the Republic of Uzbekistan, “On measures to create conditions for the accelerated implementation of artificial intelligence technologies,” Presidential Decree No. PQ-4996, Feb. 17, 2021.

To improve the standard of living of the population

To increase the real incomes of the population.

On February 17, 2021, the President of the Republic of Uzbekistan adopted a Decree on Measures to Create Conditions for the Rapid Implementation of Artificial Intelligence Technologies. The primary objective of this Decree is to accelerate the introduction of AI technologies in accordance with the “Digital Uzbekistan – 2030” Strategy, to ensure the broad use of these technologies throughout the country, to enhance the accessibility and quality of digital data, and to create favorable conditions for training qualified personnel in this field.

In line with this Decree, a list of pilot projects for implementing AI technologies in 2021–2022 was approved. Specifically, AI technologies are to be applied in the following sectors:

Applications of Artificial Intelligence in Key Sectors

In Agriculture:

Monitoring the condition of soil and agricultural crops based on remote sensing data, as well as tracking the operation of agricultural machinery, including combines.

In the Banking Sector:

Enhancing the efficiency of monitoring commercial bank operations and simplifying compliance with regulatory requirements (SubTech and RegTech), analyzing the quality of banking services, performing remote biometric identification of users (Face ID), and assessing credit risks.

In the Finance Sector:

Analyzing budget expenditures, pensions, social and insurance payments, as well as evaluating the effectiveness of benefit payments.

In the Transport Sector:

Monitoring the movement of locomotives during operation, issuing alerts to drivers in hazardous situations, analyzing public transportation flows and determining their optimal routes, as well as monitoring vehicle movement and traffic congestion.

In the Healthcare Sector:

Diagnosing pneumonia based on computed tomography (CT) scans of the lungs and detecting breast cancer at early stages based on mammography analysis.

In the E-Government Sector:

In today's environment of rapid development in science and information and communication technologies (ICT), the widespread use of ICT and artificial intelligence (AI) capabilities in developed countries has become a key issue in various fields such as public and societal administration, economy, industry, social protection, education, healthcare, employment, agriculture, defense, security, tourism, and others.

In Uzbekistan as well, the priority goal has been set to become one of the leading innovative nations by 2030 through the development of information and communication technologies and the digital economy.

In order to expand the use of artificial intelligence technologies, and to improve the systems for collecting, storing, and processing digital data, a number of measures are being taken in the country—particularly in training qualified personnel and supporting scientific projects in this area.

Within the framework of supporting scientific and technical research and innovative developments in the field of artificial intelligence, 9 projects with a total value of 15.1 billion soums, planned for 2021–2024, are currently being implemented⁵.

⁵ V. Sh. Rubashkin, *Representation and Analysis of Meaning in Intelligent Information Systems*, Moscow: Nauka, 1989.

At present, AI is being applied in many areas of life, including the Internet, medicine, business, transportation, and others.

AI is actively used in business. One of the largest retail chains that extensively utilizes AI is Walmart.

With the help of neural networks, the company has automated its payment system, accelerated inventory management, and enabled delivery via drones. Since 2017, Bossa Nova robots have been operating in Walmart stores. These robots check every department of the supermarket three times a day to ensure the availability of items, accuracy of pricing labels, and more.

The process of data collection and analysis is carried out using specialized software developed with AI components. The data is then transferred to the logistics department for action⁶. AI also assists in recognizing pathologies in X-ray, MRI, and CT images. With the help of AI, doctors can diagnose lung inflammation. While AI-based systems can analyze such medical data in just a few seconds, it may take doctors 20 to 30 minutes to reach the same conclusions. (See Figure 2)



Figure 2. Artificial Intelligence in Uzbekistan's Medical and Preventive Institutions

AI is also widely used in the military-industrial sector. It is known that in 2018, the U.S. Army developed a system that can recognize human faces in the dark using thermal imaging. The main purpose of this system is to identify enemy commanders in combat zones. A system called ALPHA, based on AI, is undergoing active testing. It is designed to control unmanned fighter jets and participate in aerial military operations. The test results of ALPHA showed that the computer was able to simultaneously manage four fighter jets and defeat two human-operated enemy aircraft⁷.

In security systems, AI is primarily used for facial recognition and identification. In addition, these "intelligent" systems are applied for detecting dangerous objects and items, and also aid in ensuring cybersecurity. By analyzing information about potential threats, AI helps security services save time and improves their decision-making speed and capabilities.

Thanks to the use of AI, the education system will develop in two main directions:

Adaptivity:

⁶ V. Sh. Rubashkin, *Representation and Analysis of Meaning in Intelligent Information Systems*, Moscow: Nauka, 1989.

⁷ [1] S. S. Gulyamov, R. Kh. Ergashev, and S. N. Khamraeva, *Digital Economy: Textbook*, 2020.

The main goal here is to address the challenges of varying learning capacities among students. AI analyzes students' performance and informs teachers about individual learning levels, allowing for adaptive curriculum planning⁸.

Proctoring:

The aim is to monitor students during tests and exams. This system oversees whether students are communicating or using cheat sheets. If any rule is violated, the AI immediately alerts the proctor responsible for monitoring the test process.

In the judicial system, the People's Republic of China was one of the first countries to adopt AI. Currently, neural networks are used in an assistant role. They analyze massive datasets from government databases and assess individual profiles to issue recommendations about a person's guilt or innocence. Most of today's AI-powered computers in China have the predictive capability to forecast rule violations or crimes based on statistical data. This is expected to help reduce overall crime rates in the future.

When Will AI Be Introduced into School Curricula?

In 2021, the Russian Ministry of Education began testing AI learning modules in schools. By 2024, half of all schools are expected to offer AI courses as part of their regular curricula.

In South Korea, AI lessons were introduced starting from the second semester of 2021. Beginning next year, middle school students in grades 2 and 3 will be able to take courses such as Introduction to AI or AI Mathematics.

Chinese tech companies are also partnering with schools to offer robotics and AI courses to nurture more talent for the future.

In Uzbekistan, the wide implementation of new technologies, including artificial intelligence, in social protection programs and other sectors promotes the use of modern information technologies in both the public and private sectors. This supports the development of the digital economy and introduces innovation into every field.

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⁸ I. A. Bessmertny, Artificial Intelligence, St. Petersburg: ITMO University, 2010, 132 p.