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## Digitalization as a factor in the development of the modern economy

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### Abstract

The article presents a description and analysis of the process of digitalization of almost all sectors of the modern economy, the growth potential of the "digital economy". The boundaries and contradictions of the "digital economy" are defined.

## Introduction

Over the past 40 years of industrial and technological development, the modern economy at all levels (nano-, micro-, meso-, macro-, mega-, global economy) has become more and more technological, digital and even cloudy. It is described by Yu. M. Osipov as "technonomics" - the result of the development of electronic computing technology and technical achievements of the late XX - early XXI centuries, technology, the phenomenon of digitalization of the economy and human life as a threat[3]. New technologies, including ICT, create virtual and augmented reality. New stages of production automation, robotization are defined.

Particular attention is paid to these aspects by the Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No. PD-60 "On the development strategy of New Uzbekistan for 2022-2026" [1].

## Literature review

The digitalization of the economy is defined by T. N. Yudina and I. M. Tushkanov in the narrow and broad sense:

- in a narrow sense: the creation of information and digital platforms at different levels of the economy (global, mega, macro, meso, micro, nano) and operators that allow solving various economic tasks, including strategic ones: the development of medicine, science, education, transport, new industrialization, government regulation and economic planning;

- in a broad sense: a change in the nature of industrial or economic relations, a change in their subject-object orientation. When using algorithms, machine-to-machine (M2M) relationships arise in which a person can no longer

participate as a subject. The productive forces and factors of production of society will also change. This is how the Internet of things and even the Internet of "everything" appears [5, p. 197]. The Internet of Things (IoT, Internet of Things) is usually understood as the possibility of remote control and management of computer networks and related physical objects (objects) in a systemic and automated mode without human intervention in combination with built-in sensors and software for data collection. and exchange (J'son & Partners Consulting research, 2016).

According to V.P. Kupriyanovskiy, digital railway (DR) is based on the use of digital railway signaling, which was previously developed during the creation and operation of high-speed railways in the world, in particular in the UK. At present, digital rail signaling is already in operation on more than 80,000 km of high-speed rail (HSR). The system of standards for digital railway signaling was developed by the European Union of Railway Transport. As part of this alliance, extensive pilot testing has been carried out on traditional UK railways to transition from analogue to digital signaling. According to the authors of the idea of switching to digital railways in the UK, as a result of accelerating the digital modernization of the railway, "one of the main goals of digital railways is the sustainable growth of the country's economy" [11, p. 246-247]. The authors of the article write: "It brings transformational benefits and challenges that positively impact safety, size, cost, performance, customer experience, and the environment. In general, three goals (tasks) of this transformation are stated: more trains, better communication, more convenience for customers [11, p. 246-247]. However, the authors do not take into account noospheric processes, turning off digital devices as a result of solar eclipses, and so on.

The process of digitalization is accompanied by the transformation of business processes: from the robotization of mass production of consumer goods (goods and services) to new industries, the creation of goods with individual characteristics for each consumer, such as innovative digital technologies such as 3D printing and prototyping capital growth. According to experts and analysts in the field of the digital economy, in the next decade (around 2030), almost half of the goods and services in the consumer and investment markets will be completely or relatively "new smart" ("smart cities") ("smart house", "smart road"), "Smart car", "smart clothes", etc.) [6, p. 246-247].

## Research methodology

As a result of research, the development of new technologies in the field of digitalization, the management of digital transformation processes are related approaches, and scientific conclusions and recommendations for the formation of business processes in production have been developed. The study used methods such as abstract thinking, a systematic approach, and a comprehensive assessment.

## Analysis and results

In the process of digitalization, a number of measures are being taken in our country, in particular, the Decree of the President of the Republic of Uzbekistan "On measures for the widespread introduction of the digital economy and e-government" dated April 28, 2020 No. PP-4699 on measures to introduce the digital economy and e-government. In order to further increase the competitiveness of the country's economy through the widespread introduction of modern information technologies in the economy and public administration and the expansion of telecommunications networks, it is planned to double the share of the digital economy in GDP by 2023 (Decree of the President, 2020).

The practical aspect of the digitalization of economic life in the world, or the physical manifestation of the digital economy, is the creation of hubs, ranging from small jewelry, from human tissues to large infrastructure facilities, such as digital reboot (modernization), digital robotization. A vivid practical example of such a deployment of the digital economy is the creation of 3D printers for the construction of bridges (Amsterdam, the Netherlands), motorcycles in Sweden, residential buildings (China, UAE) and other objects using 3D printing technology.

The modern construction industry today is equipped with information and communication technologies that allow you to create digital models of buildings, change projects as quickly and flexibly as possible, manage the construction and operation of buildings and structures at any time (BIM technologies - information modeling technologies in construction): from the opinion and pen of an architect, from the calculation of the construction estimate - to the execution of financial documents, to commissioning with subsequent physical obsolescence,

and to the appropriate accounting [7, p. 393].

The digital approach allows you to imagine, create and use the full life cycle of almost any product (PLM - Product Lifecycle Management) before it is created and used. This applies not only to individual household items, but also to complex systems.

Digital technologies are already being actively introduced to manage the engineering infrastructure of a modern home: electricity, lighting, heating, gas, etc. - "Smart home" systems. In addition, systems of cyber-physical devices make it possible to effectively manage not only individual houses, but also the infrastructure of entire microdistricts, cities and megacities - the Smart City system. The construction of the "city of the future" Songdo has been going on in South Korea for almost seven years. This is one of the largest and brightest innovative digital projects in the world, the result of industrial and technological progress in recent years. The future city of Songdo is being built on an artificial island 60 km from Seoul, and it will be a smart city. It connects people and objects - agents of the digital economy - through the Internet of things and the Internet of "everything".

"Number" in services. Modern services such as UBER, Airbnb, Alibaba and Facebook can be cited as a vivid example of the successful creation of organizational and technological digital platforms.

The digitalization of our vital economic space, including with the help of companies such as UBER, is certainly a megatrend of our time. Despite the uncertainty of the UBER business model (for example, in terms of the company's financial viability), new business models are being created and obsolete ones are disappearing thanks to new big data exchange technologies [9]. The amount of money attracted to the digital economy by developed countries is growing from year to year. This is clearly shown by the analysis of the following table (Table 1).

Indeed, in the process of transforming a non-digital economy into a digital one, due to the growth of digital capital, the number and size of individual elements of material production (buildings, structures, banking equipment) are decreasing: large databases, communication channels, clients, algorithms, software, and much more.

Digital high-tech medicine, as one of the branches of the economy of a new technological direction, is one of the most important areas of human and human life, in which the quantitative results of scientific and technological progress are clearly visible. Innovative biological preparations created in recent decades make it possible to carry out specific targeted treatment of a particular organ without harming the entire body or other parts of it. However, this effect needs to be confirmed in the long term. Standardized methods of treatment are being transformed into a system of individual selection of innovative drugs, taking into account the genetic characteristics of each patient. Modern innovative medicine is developing digital genetic technologies that allow for the correction of genetic abnormalities before birth or the treatment of previously incurable diseases using multiple injections. The projects provide for the development of "telemedicine".

Table 1.

**1. Analysis of the attraction of funds to the digital economy by developed countries**  
(<http://ru.newsbt.com>)

| Countries involved in financial innovative technologies (Fintech) | Cost (in millions of dollars) | "Virtual reality" (virtual reality, VR) | Cost (in millions of dollars) | Autonomous Management to the system | Cost (in millions of dollars) |
|-------------------------------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------|-------------------------------------|-------------------------------|
| China                                                             | 7,158                         | China                                   | 7,158                         | USA                                 | 582                           |
| USA                                                               | 5,437                         | USA                                     | 5,437                         | China                               | 367                           |
| Great Britain                                                     | 1,793                         | Great Britain                           | 1,793                         | Japan                               | 268                           |
| Germany                                                           | 668                           | Germany                                 | 668                           | Australia                           | 264                           |
| Japan                                                             | 493                           | Japan                                   | 493                           | Great Britain                       | 142                           |
|                                                                   |                               |                                         |                               |                                     |                               |
| Innovative devices                                                | Cost (in millions of dollars) | Educational technology                  | Cost (in millions of dollars) | Robotics and drones                 | Cost (in millions of dollars) |
|                                                                   |                               |                                         |                               |                                     |                               |
| USA                                                               | 1,724                         | USA                                     | 1,282                         | USA                                 | 728                           |
| China                                                             | 992                           | China                                   | 681                           | China                               | 227                           |
| Germany                                                           | 170                           | Japan                                   | 217                           | Japan                               | 129                           |
| Canada                                                            | 130                           | Great Britain                           | 163                           | Singapur                            | 96                            |
| Great Britain                                                     | 95                            | India                                   | 145                           | Canada                              | 59                            |
|                                                                   |                               |                                         |                               |                                     |                               |
| 3D print                                                          | Cost (in millions of dollars) | Big data                                | Cost (in millions of dollars) | AI and automated learning           | Cost (in millions of dollars) |
|                                                                   |                               |                                         |                               |                                     |                               |
| USA                                                               | 602                           | USA                                     | 6,065                         | USA                                 | 3,782                         |
| China                                                             | 221                           | Great Britain                           | 1,673                         | Great Britain                       | 1,222                         |
| Germany                                                           | 182                           | China                                   | 942                           | China                               | 900                           |
| Japan                                                             | 181                           | Singapur                                | 651                           | Japan                               | 473                           |
| Russia                                                            | 181                           | Russia                                  | 554                           | Australia                           | 329                           |

Regenerative digital medicine is developing in cooperation with medicine, biology, genetic engineering and the digital economy. It involves the production and use of 3D bioprinting, which allows growing and replacing tissues and organs, which is negatively perceived by some scientists of Moscow State University, for example, Doctor of Biological Sciences M.G. health and treatment of a sick patient, taking into account big data. In particular, the use of portable medical diagnostic equipment should serve to collect and apply large amounts of data for effective disease prevention, early diagnosis and timely treatment of the disease([www.therunet.com/articles/5942](http://www.therunet.com/articles/5942)).

Due to the social significance of the medical industry and its high level of state regulation, its consistent development requires strong support from the state, as well as a highly qualified level of the scientific community [10]. In the 1990s, due to insufficient funding for social infrastructure, overcoming technological gaps in the healthcare sector required not only financial support from the state, but also the search for other sources of funding, for example, based on corporate social responsibility.

However, the bias of different education systems in training specialists for the modern conditions of the digital economy can be different. In Western countries and a

number of their former southeastern colonies, education prevails, preparing a person as a program for a modern high-tech digital system.

## Conclusions

The development of a new digital transport network of the republic is of great importance for economic growth and quantitative development. Today, its insufficient level of development is explained by the following reasons: large investments are made in the maintenance of existing infrastructure facilities, which reduces the amount of free funds for financing network transport innovations. The development of transport infrastructure is a priority direction of the republic's economic policy. This is confirmed by the projects for the construction of high-speed railway lines as part of the One Belt One Road megaproject based on digital technologies.

The evolution of information and communication technologies (ICT), the widespread use of which leads to institutional changes in all spheres of human and human life, as well as to the possibility of increasing the level of convenience for individuals. Today's traditional forms of life - from health care, education to financial services - are

digitizing, enabling better, more convenient and wider use of design. But a number of scientists are asking the question: what does digitalization itself lead to: to freedom or a digital concentration camp? [12, p. 61].

The key role in this process will be played by the development of high-speed data networks and an increase in the speed of smartphone access. According to current forecasts, by 2020 this figure will exceed 50%. This simplifies digitization and allows gadget users to increase mobility. In addition to smartphones, new types of wearable mobile devices are also becoming more widespread: from smart watches and bracelets to virtual reality devices. Thanks to intelligent decision-making systems, cars ("smart cars" with electronically controlled twenty years ago were the world of science fiction) are now becoming a reality. Infrastructural megaprojects will increase the speed of transport and increase the level of living comfort in megacities.

The growing demand for M2M technologies is observed in various sectors of the economy, especially in energy, utilities, industrial production, in particular, they are most widely used in the automotive industry. The obvious prospects for the development of M2M solutions for different sectors of the economy largely depend on the availability of a favorable regulatory framework, the level of development of partner ecosystems, and the nature of the business model [13, p. 237]. Under the digital ecosystem, participants in economic activity (both objects and subjects) are also understood as resources combined with a specific target area (for example, education, construction, etc.) or industry affiliation. In particular, the digital ecosystem of design and production in construction may include university educational laboratories and architectural workshops, digital equipment (for example, 3D printers and intelligent robots), as well as the resources of companies and corporations (performers and customers). All components of such ecosystems effectively interact through cloud technologies, being in the same cloud.

Indeed, rapidly advancing technological innovations are creating a smart, mobile, virtual, scalable, high-contrast world in which the pros and cons must be weighed. New business processes require the development of technological and new economic thinking in all post- and neo-industrial sectors of the economy. At the same time, new economic and technological thinking is becoming an intellectual part of a changing economy, and as a result of industrial and technological progress, digitalization is becoming a megatrend of a globalizing and innovative economy.

The only way to develop the digital economy is the digitalization of all stages of production. The development of high-tech industrial products is an important step towards the application of new technologies outlined in the Industry 4.0 concept. This includes digitizing not only models of complex products, but also manufacturing processes, systems, sources, and other elements included in the product life cycle.

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