
Digital Technologies in the Context of Economic Systems Development

Submitted 15/04/24, 1st revision 08/05/24, 2nd revision 29/05/24, accepted 18/06/24

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Abstract:

Purpose: *The study aims to analyze the impact of digital technologies on the development of economic systems, including cloud computing, big data, blockchain, and cryptocurrency*

Design/Methodology/Approach: *The article provides a systematic analysis of current trends in the use of digital technologies in the field of economics. Both theoretical and practical approaches are used to study the impact of these technologies on economic processes.*

Findings: *The study shows that the introduction of digital technologies significantly changes the structure and functioning of economic systems. This is reflected in increased productivity, changes in industrial relations, and new opportunities for business development.*

Practical Implications: *The results of the study can be used to develop strategies for the development of economic systems with regard to digital technologies. This can help to increase the competitiveness of countries and improve their economic development.*

Originality/Value: *The study makes an important contribution to understanding the impact of digital technologies on economic systems and points to opportunities for their use to improve economic development.*

Keywords: *Digital economy, cloud computing, big data, blockchain, cryptocurrency.*

JEL Classification: *C91, E2, F15.*

Paper type: *Research article.*

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1. Introduction

Modern trends in the development of socio-economic systems are largely determined by the processes of formation of the digital economy as a form of production relations dominated by digital technologies, and technological processes are functionally dependent on the use of these technologies.

Today, the digital economy can be represented as a new type of socio-economic system, within which all the subsystems that form it and their individual elements are transformed. At the same time, unlike previous stages of technological transformation, digitalization (or digitalization) is comprehensive, affecting all areas of economic activity and social life, and in particular, these processes occur in an extremely short time.

The economy is a complex and multilayered system that plays a key role in everyone's life. It covers the production and consumption of goods and services, as well as the formation of supply and demand for these goods and services. In today's world, the concept of the digital economy is a central topic of discussion among experts in various fields (Kadlubek *et al.*, 2022).

This is due to the fact that many countries have made significant progress due to scientific and technological advances, especially the introduction of digital technologies into economic processes. Thus, the digital economy is becoming a fundamental component of modern economic development, transforming all aspects of society.

Many domestic and international experts have studied the factors and constructs of the development of digital transformation of the economy in an interdisciplinary dimension. Thus, the general concept of digital transformation in economic systems was considered by Huk *et al.* (2024), Kozhyna (2022) and others. The impact of digitalization on industrial growth was considered by Bobro (2024), Lopushchak *et al.* (2021), Kaku (2019), Norena-Chavez and Thalassinos (2023) and others.

An important study of recent years is the article "Anthropomorphic information networks and converging technologies challenge to humanity (vs), step forward?" by Yahodzinsky (2023), which describes in detail social modernization through the interpretation of convergence as a strategic innovation. The author points out that the lack of public control over the convergence of networks leads to the opposite - the divergence of processes.

The author also notes that the emergence of anthropomorphic networks based on big data, machine learning, and artificial intelligence technologies raises the question of the future for every inhabitant of the planet. We agree with the scientist's judgment and would like to add that the question of the opportunities and benefits of simultaneous industrial, digital, and economic development remains

open (Velinov *et al.*, 2023; Grima *et al.*, 2023; Auzina *et al.*, 2023; Thalassinos *et al.*, 2024).

2. Research Methodology

The research methodology is based on the concept of analyzing various aspects of the digital economy. The study includes an analysis of digital economy technologies such as cloud computing, big data, the Internet of Things, cognitive technologies, blockchain, and cryptocurrencies.

It also examines the impact of key concepts that form the basis of the digital economy, such as Industry 4.0 and the Smart Economy. The study analyzes the factors that influence the development of the Smart Economy, such as the desire and motivation to innovate, the level of business development, the economic and financial situation of the country, economic indicators, labor market instability, and participation in international economic processes.

The impact of digital technologies on the economy is assessed by analyzing their impact on increasing the competitiveness of the economy, creating new jobs, economic development, reducing costs, and making information available.

3. Research Results and Discussion

The development of the digital economy plays a key role in enhancing the country's potential and is one of the most effective ways of modern global economic development. A proper understanding of the need for transition to the digital economy stimulates the successful implementation of future tasks. As industrial relations improve, output and consumer demand for new products increase.

As a result of rapid scientific and technological progress, digital innovative technologies are being widely implemented in production. Reducing the cost of infrastructure development, data processing, storage, and transmission is bringing humanity to the threshold of a new large-scale digital revolution, the main feature of which is the merger of online and offline environments.

It is worth noting that digital innovation is the engine of long-term economic development because it is the way in which improved knowledge is applied to economic processes. Growth ultimately depends on innovative companies. Empirical studies show that digital innovation in the form of productivity gains in products, processes, services, and systems is a key condition for both business competitiveness and broader economic growth.

Digital innovation is not free, it requires investment and resources. Investments in tangible and intangible innovation assets - such as research, design, learning and skills, intellectual property, organizational and managerial capabilities, etc., are

necessary to support productivity growth that drives both GDP growth and welfare. A central component of this is government investment in research and information infrastructure, education and training, and public procurement.

In modern conditions, achieving high levels of productivity is possible only if the social and personal needs of the population are fully met (Yahodzinskyi, 2023). To be effective, innovation policy should be based on the recognition of the real digital characteristics of innovation in the economy, which are as follows:

- Digital innovation takes many forms, involving different investment models. Some types of innovation are based on research and development, while others rely primarily on design or engineering skills, or on the ability to obtain information from external sources. Some forms of innovation create entirely new goods and services, while others improve existing ones.
- Digital innovations are widespread in all sectors of the economy. They are being implemented not only in high-tech sectors but also in low-tech industries, business, consumer services, public and third sectors. Digital innovations play a vital role in the service sector, which is central to the current dynamics of innovation in developed countries.
- Digital innovation in companies depends on the broader innovation environment, often being a collaborative process involving both private and public institutions. The context of digital innovation can be viewed as an "innovation system": an ecosystem of knowledge creators, research providers, investors, regulators, and financial institutions that together shape innovation and manage its risks and uncertainties.
- The innovation system is based on two forms of infrastructure. First, there is the "knowledge infrastructure" of universities and research institutes. Second, there is what we call the "innovation information infrastructure". Progressive organizations choose a company for its experience and ability to solve problems. These product consumers know that collaborative problem-solving is necessary for long-term cost minimization and performance improvement (Jia *et al.*, 2023).

Thus, the digital economy is the basis for all types of production carried out with the help of digital technologies and electronic systems. The transition to this system increases efficiency, speeds up work, saves time, improves various types of machinery and equipment in production, and provides consumers with affordable and convenient use of products and services.

The digital economy's goal includes the elimination of physical labor, the ability to obtain accurate information, and the ability to do more in less time, which is associated with e-business, which is conducted on the basis of digital technologies.

It is important to strengthen the material and technical base, train specialists, and improve the professional level of employees.

Successful implementation of any national projects and government programs requires a strong human resource base, including management personnel. Since the digital economy requires a highly skilled workforce, it is important to use the best practices of developed countries to create digital systems, which, in turn, necessitates a scientific study of the transformation processes of institutions in the digital domain.

For example, the infrastructure of the digital economy is based on intellectual technologies, including many new information and communication technologies:

- Cloud Computing is an information technology concept that provides convenient network access to the total amount of various computing resources at minimal cost and without contacting providers;
- Big Data is a technology that uses various approaches, tools, and methods of processing data from various sources.
- The Internet of Things (IoT) is a set of technologies that take into account Internet connectivity and equipment with sensors for remote monitoring and control of various tools and devices.
- Cognitive Technologies - these technologies include AI (artificial intelligence) and ML (machine learning);
- Blockchain - are distributed (decentralized) databases, each record in which includes a history of all transactions, and reliable protection against fraud.
- Cryptocurrency is a virtual currency based on the use of specialized cryptographic algorithms, and emission ("mining") of new infrastructure to ensure the functioning of cryptocurrency platforms (work on creating new blocks in the blockchain).

The use of digital technologies (e.g., robots) leads to improved industrial relations. This is reflected in the term Industry 4.0, which pays great attention to this aspect. The concept of Industry 4.0 is to use modern smart technologies and the Internet, to continue simple continuous production and the experience gained from it, to move to extended continuous implementation and to carry out fundamental reforms in this area.

One of the main directions of the digital economy today is the "Smart (Intelligent) Economy" (Long, 2020). The "smart (intellectual) economy" is one of the newest concepts in international terminology. The smart economy is characterized by the

following six key factors:

- desire and motivation to implement innovations;
- level of business development;
- the country's economic and financial situation;
- economic indicators;
- labor market instability;
- participation in international economic processes.

Thus, innovative digital technologies and intelligent systems increase the competitiveness of the economy and labor productivity, create new professional jobs, stimulate economic development, reduce costs, make information more accessible, and enable education and access to new markets. This, in turn, has a multiplier effect on the growth of the entire economy.

4. Conclusion

The study analyzes various aspects of the digital economy and its impact on modern society. It was found that the development of digital technologies is a key factor in increasing the competitiveness of the economy, creating new business opportunities, and contributing to the growth of labor productivity.

In addition, the study showed that the use of digital innovations can have a multiplier effect on economic development, which in turn can help improve the living standards of the population.

Based on the study's findings, it is recommended to improve policies to promote the development of the digital economy, including stimulating innovation, supporting digital startups, and increasing investment in research. It is also important to develop educational programs in digital technologies to provide the population with the necessary skills to function successfully in the digital environment.

Conflict of interest statement: The author states that there is no conflict of interest.

Declaration of interests : The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Additionally, there is no funding for this work. The article is published for free as part of the CSR of the published, ISMA.

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