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**Article**

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# RESEARCHING THE PROBLEMS OF DIGITAL ECONOMY DEVELOPMENT AS AN INDICATOR OF THE INFORMATION SOCIETY: POTENTIAL THREATS AND PROSPECTS

*The object of the paper is peculiarities of digital economy development in the framework of informatization of socio-economic, socio-cultural relations. It contributes to the in-depth development of the noosphere, the emergence of new industries and a qualitative transformation of production and distribution relations. The paper examines the impact of digitalization on transformational changes in the economy. As noted at the 14th G20 Summit, the main goals of digitalization are the development of innovations, focused on the development of society 5.0, ensuring the free flow of data and at the same time solving problems, related to information security and the protection of intellectual property rights, as well as bridging the digital gap and promoting the digitalization of micro, small and medium-sized enterprises and the development of smart cities.*

*The research methodology is based on theoretical and methodological analysis of the literature, statistical, comparative analysis, as well as synthesis, generalization and systems analysis.*

*The study has revealed differences between the national approach and world experience in the interpretation of digitalization. For instance, in Ukraine the phenomenon involves, first of all, «digitization» in the field of data collection and analysis. At the same time, the concept of digitalization in developed countries is considered as the modernization of the manufacturing sector based on the implementation of information and communication technologies in order to reduce the capital and material intensity of products to increase competitiveness. In addition, the level of development of central bank digital currencies (CBDC) as one of the indicators of the information society has been analyzed. As a result, it was found, that about 80 % of all central banks in the world have been working on projects to issue their own digital currency. The basic requirements for national CBDC have been systematized.*

*The practical significance, presented in the paper, lies in making recommendations for policy implementation of national economy digitalization. It is important, first of all, to «digitize» the real manufacturing sector, but not only create all sorts of «remote access services», clearly define the government position on cryptocurrencies and continue to implement the project of e-hryvnia (digital currency of National Bank of Ukraine) introduction.*

**Keywords:** *digitalization of the economy, information society, central bank digital currencies (CBDC), innovative development.*

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## 1. Introduction

The global environment of the information economy is determined by the post-industrial phase of civilizational development, characterized by the continuous improvement of information and communication technologies. In such conditions, digitalization (introduction of digital technologies) is defined as a constant process of functional transformation of the economic order, based on the introduction of innovations. In turn, innovative development is a factor of qualitative economic transformation. According to the Global Innovation Index 2020 Report [1], which compares innovation activities of 131 countries and economies of the world, leaders of innovative development are Switzerland, Sweden, USA, and Great Britain. For example, Ukraine is ranked 45-th in the Global Innovation Index 2020, and has been entered the TOP-2 countries of the lower-middle income group. It should be noted, that innovative development, as one of digitalization factors, is a matter of govern-

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ment interest. It determines the relevance of studying the digital economy problem.

Thus, *the object of the research* is digital economy peculiarities in terms of informatization of socio-economic, socio-cultural ties, which contributes to the in-depth development of the noosphere, the emergence of new industries and qualitative transformation of production and distribution relations. *The aim of the paper* is to study the features of digitalization, its key aspects as well as differences in the implementation of the concept of digital economy in developed countries and, for instance, in Ukraine.

## 2. Methods of research

To the theoretical and methodological basis belong modern economics views, works of leading scientists in the field of digitalization of the economy.

In the process of performing the investigation, modern research methods were used, namely:

– method of theoretical generalization, historical and logical methods, systematic approach (to study the theoretical foundations of digitalization in the global economy);
– methods of analysis and synthesis, method of functional and structural analysis (to assess the manifestations of central banks digital currencies (CBDC) introduction);
– statistical methods (for analysis and assessment of the dynamics of the innovative technologies introduction);
– methods of scientific abstraction, induction and deduction (to determine ways to transform the national economic system in the context of digitalization).

## 3. Research results and discussion

Digitization (introduction of digital technologies) in the conditions of information society existence is defined as a constant process of functional transformation of an economic system. In other words, it is the implementation of information and communication technologies (ICT) in different segments of the economy, both at the national and global levels. It is determined by the «fourth industrial revolution». The concept of Industry 4.0 involves fully automated production, which is controlled in real time, taking into account the effects of external conditions. The world's leading industrial countries (such as the United States, Germany, Italy, Japan, etc.) understand the concept of digital economy as a process of creating and using unified production and service systems [2]. *In Ukraine, digitalization is focused on the introduction of new services.* Such digitization is based on the data collection and analysis and does not cover the problem of radical change in the production system. It does not include the question of production, marketing and operation, which is enshrined in the concept of Industry 4.0.

It should be noted, that the size of global digital economy is estimated at 4.5 to 15.5 % of world GDP [3]. About 40 % of the added value, created in the global information and communication technology (ICT) sector, is formed by the United States and China.

Regarding Ukraine, the digitalization of the industry has shown a negative dynamics of development. The technological lag is critical for the Ukrainian economy, as the process of implementing Industry 3.0 has not yet been completed. Even the level of automation in Ukrainian industry is still below average. For example, in metallurgy it is about 50 %. Therefore, the problem of rapid transition from the level of Industry 3.0 to Industry 4.0 is very acute. The level of digitalization of Ukraine's economy differs significantly depending on the specific industry. In particular, the level of use of digital technologies (automation, robotics) in the mining industry is very low. This leads to a significant gap in terms of labor productivity in the industry [4].

It should be admitted, that the innovation vector of state development, namely public spending on innovation, is a modern indicator of the information society.

According to the State Statistics Service [5], in 2019 it was spent on:

– innovations of the enterprise approximately 526.7 million USD, including the purchase of machinery, equipment and software – 377.22 million USD;
– internal and external research and development – 108.10 million USD;
– for the acquisition of other external knowledge (acquisition of new technologies) – 1.38 million USD;
– other work, related to the creation and implementation of innovations (other costs) – 39.97 million USD.

The costs share in 2019 for the purchase of machinery, equipment and software, compared to 2018, has been increased from 68.1 to 71.6 %. At the same time, the expenditures share on research and development (R&D) decreased from 26.3 % in 2018 to 20.5 % in 2019, the acquisition of other external knowledge has been decreased from 0.4 in 2018 to 0.3 % in 2019. At the same time, the share of other expenses increased, including marketing and advertising from 5.2 to 7.6 % [5]. At that time, according to the Global Innovation 100 Report, the total expenditure of the world's 1,000 largest companies on research and development (R&D) in 2019 reached 702 billion USD. The R&D spending leaders are Amazon (16.1 billion USD) and Volkswagen (12.5 billion USD) [6]. The State Statistics Service points out that there is a direct tie between the size of an enterprise and the level of innovation. Currently, the volume of funding for innovation in Ukraine is less than 1 % of GDP (Fig. 1), while in the EU this figure is about 2.14 %. It has a negative impact on the digital transformation and modernization of the economy.

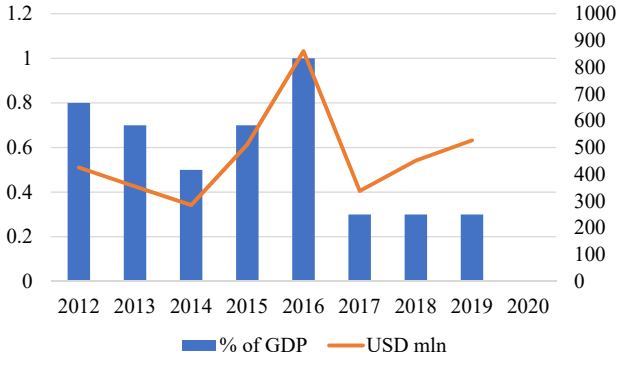


**Fig. 1.** The amount of funding for innovation in Ukraine [5]

Another modern indicator of information society development and digitalization of the economy is Central Bank Digital Currencies (CBDC) introduction, as transactions are much faster and the commission is virtually absent. It should be noted that, conceptually, digital money is defined as currency based on blockchain technology, but it is issued by the national central bank and is a legal tender in the country. CBDC differs from conventional

cryptocurrencies, as the latter are not issued by the government and do not have the status of legal tender in the country. CBDC effectively performs the functions of fiduciary money, i. e. is a means of circulation.

The main requirements for the creation of CBDC are set out in the Bank for International Settlements Report [7]. In particular, it is noted, that digital currencies of central banks cannot harm monetary and financial stability, as the main purpose of digital currency is to promote innovation and efficiency of settlements, coexisting with cash forms of settlement. There can be no single standard for CBDC creating due to different national priorities and conditions, but it must be at least:

– stable and safe to maintain working capacity;
– convenient and affordable (free or at a low price) for end users;
– maintain appropriate standards and be regulated by a clear legal framework;
– to promote competition in the market and the development of innovations.

Regarding the countries experience in CBDC introduction, we emphasize that in 2020 China conducted the largest tests of digital currency (initiated the distribution of the digital yuan for a total of about 1.5 million USD). Developments in this area are being conducted by Singapore (Ubin), Canada (Jasper), South Africa (Khokha), Sweden (E-krona), Uruguay (E-peso) and others. According to the Bank for International Settlements (BIS) Report [8], about 80 % of surveyed central banks have been working on projects to issue their own digital currency. The European Central Bank (ECB) is also launching a pilot project on the «digital euro» [9]. In test mode, the digital euro will rotate for two years. During this time, a number of tasks have to be solved: the main one is to ensure security and privacy. This should effectively combat money laundering and tax evasion. The digital euro will allow eurozone residents to place deposits directly in the ECB. This option is usually only available for commercial lenders, governments and other central banks. The ECB notes that the new type of currency will complement the traditional one, but it won't replace it.

In Ukraine, the introduction of e-hryvnia began in 2016. The e-hryvnia will not need expensive intermediaries in the form of banks, as operations will take place on NBU (the National Bank of Ukraine) servers. Issuance of e-hryvnia is much less risk in comparison with placing money in a commercial bank (no need to worry about the bankruptcy of a commercial bank). It is assumed, that the e-hryvnia can be used, for example, to pay subsidies for utilities and other social assistance. According to the developers of e-hryvnia project, it will simplify the control over cash flows that are allocated from the state budget [10].

Deepening digitalization in all areas leads to the optimization of the economic system, but the more the economy is «digitized», the more the problem of cybersecurity and data protection need to be solved.

## 4. Conclusions

The paper revealed differences between the national approach to the interpretation of digitalization concepts and global experience. Developed countries, first of all, focus on the digitalization of production, while in developing countries, as exemplified by Ukraine, digitalization is developing in the form of «remote access services». This trend is confirmed by the dynamics of low investment activity in the field of innovation (below 1 % of GDP) and the backwardness of the industrial sector.

It was also determined, that the current trend of the information society and the digitalization of social and economic relations is CBDC project implementation (about 80 % of surveyed central banks have been working on developing their own national digital currencies). The advantages of CBDC based on blockchain technology are instant transactions as well as low cost.

A comparative analysis showed that the main purposes of CBDC introduction are the instantaneousness of transactions and low transaction costs. Talking about Ukraine, the national digital currency is currently considered as an instrument of control over earmarked funds.

The findings can be interested to scientists who have been studying digital economy peculiarities as well as relevant government institutions, dealing with the problems of digital transformation of Ukraine's economy.

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