

## Digital Competition in Different Sectors of the Economy

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**Abstract.** The introduction of information and communication technologies (ICT) into different sectors of the economy has led to the emergence of the digital economy, defined by the “fourth industrial revolution”. Digital competition in different sectors of the Ukrainian economy is mainly seen in the creation of digital services, while global practice demonstrates the modernization of enterprises based on digitalization of production, the sales sphere and so on.

Digitization and its competition in different spheres of the national economy is studied here. Namely, it is determined that nowadays digitization of the real sector of Ukraine's economy in the form of innovative production is not observed at the moment, but digitalization is more represented in the financial sector. Taking into account the current structure of the financial market in Ukraine, it was found that digitalization processes have largely affected the banking sector, which is embodied in the presence of developed Internet banking. It is found that the stock market in Ukraine currently lags far behind the banking sector in terms of the introduction of digital technologies.

**Key words:** digital economy, digitization, real and financial sectors of the economy, digital competition

### Introduction

**Relevance of the article.** Nowadays, in the term of global capital and production flows, digital competition in different spheres of the national economy leads to real advantages of globalization – the flow of ideas, talents and contributions that drive innovation and productivity. Value chains are being changed, new centers are emerging, and economic activity is being transformed. This transition creates new grounds for countries to increase their role in the world economy. These opportunities will help to locate the infrastructure, institutions and business environment in which their companies and citizens have to participate fully.

**Level of problem investigation.** Reviewing recent studies and scientific research in the field of digitalization, there is an apparent lack of investigation into the peculiarities of digital competition in different spheres of the national economy.

**Scientific problem.** Researchers emphasize that digitizing data, markets, and economic branches gives additional control over information to subjects of economic relations. This additional control allows users to “shape their own experience”. In other words, digitization allows for an expanded degree of interaction between the user and information. Many scientists are exploring the radical uniqueness of digitization and information digitization. Many scientists believe that the digitization of information gives us significant and important properties. Scientists consider this to be a characteristic of digital information and a necessary consequence of digitization. Today, there are virtually no analogues in digital technology. The ultimate reason is that digitization shapes social groups and social interactions. Scholars often use the term “digitization” to discuss changes in social structure and practice.

**Object of the article** is studying digitalization and its competition in different spheres of the national economy.

**Aim of the article** is to investigate the peculiarities of digital competition in the economy of Ukraine.

**Objective of the article** is to define theoretical backgrounds of digitalization and the digital economy to analyze consequences of digital competition between different spheres for the national economy.

**Methods of the article.** The study uses modern research methods, namely:

- systematic approach (to study the possible theoretical foundations of digital competition in different spheres of the economy);
- method of theoretical generalization, historical and logical methods, systematic approach (to study the theoretical foundations of digitalization in the global economy);
- statistical and economic-mathematical methods (to analyze the current trend of development in real and financial sectors);

- methods of scientific analysis (to obtain data about common backgrounds of ways to transform the national economic system in the context of digitalization);
- method of theoretical generalization, historical and logical methods, systematic approach (to study the theoretical foundations of digitalization in the global economy).

## 1. Theoretical part

Digital transformation is a profound transformation of business, its organization, competencies and models that must take full advantage of the changes and opportunities of digital technology. Although digital transformation is largely used in business contexts, it also affects others – such as government agencies and organizations involved in addressing social issues, such as environmental pollution and population aging.

We should emphasize the positive impact of digitalization, as lots of scientists do (Slozko, & Pelo 2015; Chmarzo, 2017; Matt, Hess, & Benlian, 2015; Hartl, & Hess, 2019). It is established that digitalization (conversion of information from analog to digital form for further usage, storage and processing on electronic media), from an economic point of view, entails the penetration of digital technologies into different sectors of economy, to optimize and automate operational processes, and increase in productivity.

The term “digital economy” appeared in 1995 (simultaneously in Topscott, & Negroponete), and is defined as an economy based on digital computer technology and information and communication technologies (ICT), but, unlike informatization, digital transformation is not limited by the introduction of information technologies, and radically transforms areas and business processes.

The digital economy began to develop in the late 1950s, and digital innovations have been active around the world since the 1960s. The second phase of digitization began around the mid-1990s, with the global spread of the Internet and mobile communications. Today we can talk about the third stage of digitalization, associated with the spread of digital currencies and distributed registry technology in the world economy.

The concept of Industry 4.0 provides fully automated production, which is managed in real time, taking into account the influence of external conditions. The world's leading industrial countries (such as the United States, Germany, Italy, Japan, etc.) understand the digital economy as a process of creating and using unified production and service systems. In Ukraine, digitalization focuses on the introduction of new services based on the collection and analysis of various data and does not cover issues of radical change in the production system, approaches to design, production, marketing and operation of these physical objects, which is embedded in the concept Industry 4.0. The economic effect of digitalization of industry can have many directions. This includes both the digitization of technological processes and methods of organization of production, and the digitization of means of labor (equipment, appliances, machinery) with the best quality characteristics.

The human element is key at all levels, as well as at the stages of social transformation (cooperation, ecosystems, skills, culture, empowerment, etc.) as, of course, digital transformation. In non-digital interactions and operations, digital transformation plays a role in terms of empowering any agent. The strategy of digital transformations is aimed at creating opportunities to take full advantage of new technologies and their impact faster, better and more innovatively in the future. The path to digital transformation requires a step-by-step approach with a clear roadmap that engages a variety of stakeholders. This roadmap takes into account the ultimate goals as an ongoing process, sustainably embodied in digital innovations.

Moreover, Internet commerce has increased the usage of new technologies, as result increasing the demand for new electronic payment methods. Thus, a new trend is the use of the Internet as a new money market (Boshkov, 2018).

Nowadays, crypto currency takes a prominent position in digital completion as well as ready-made information money on a microprocessor or database. Undoubtedly, the purpose of such a tool is to increase the efficiency of the traditional method of payment. There are currently no clear standards in the Blockchain mechanism, so participants can easily communicate without a controller. Blockchain

technology is a universal online currency, which in turn raises many questions about the benefits and the risks/losses that may arise from its use. High technology ensures the development of payments and global competition. The ambiguity of judgments about the use of digital currency leaves ample room for analysis of its acceptance, trust and expectations, which are the main drivers of the spread of the network. Network distribution requires interdependence with demand, which means that the network must reach the minimum requirements before it reaches balance. The minimum network size is called the “critical mass”. Therefore, the future of digital currency is still an unresolved issue due to the existence of the concept of “critical mass”.

Although there is no standard definition of digital finance, there is a common understanding that digital finance covers all products, services, technologies and/or infrastructure that allow individuals and companies to access payments, savings and credit services online. According to the analysis of the transformations, it acquires new characteristics: firstly, the globalization of the world market implies its growth worldwide due to increased trade turnover, number of participants and instruments; secondly, the processes of deregulation, integration and convergence of international financial markets, the emergence of financial conglomerates, transnational banks and corporations contributed to the further deregulation of financial markets; thirdly, the process of digitalization has led to significant changes in payment systems: technical support, technological improvement and application (Tsyganov, & Apalkova, 2016). Thus, by “digital finance” we propose to mean financial products and services produced using information and communication (digital) technologies, as well as technologies and infrastructure that allow individuals and companies to access payments, savings and credit services remotely on the Internet) without direct communication with a financial service provider. The role of information and communication technologies is becoming increasingly important in today’s globalized world. With the reduction of costs for data collection, storage and processing and the significant increase in computing power, “digitalization” is becoming more and more a separate economic activity around the world. Although the pace of digital transformation varies from country to country, they represent both opportunities and risks for countries at all levels of development. This impact depends on the willingness of countries, businesses and people to reap the benefits of digitalization (Borzenko, & Hlazova, 2021).

## 2. Analytical part

Digital competition in different branches of the economy in Ukraine is basically expressed in background sectoral digitalization and its competitiveness. Digitalization focuses on the introduction of new services based on the collection and analysis of various data and does not cover issues of radical change in the manufacturing sector, approaches to design, marketing and operation of those physical objects, which is enshrined in the concept of Industry 4.0.

According to the Global Innovation Index Report, (2020), which compares the innovation activities of 131 countries, Ukraine ranked 45th in 2020, joining the economic group of lower-middle income countries (the leaders in innovation development are Switzerland, Sweden, the United States, and the United Kingdom). According to the report of the World Economic Forum (WEF) for 2019, Ukraine ranked 60th among 100 countries in terms of technology and innovation. In terms of production structure and driving forces, Ukraine ranked 70th and 59th, respectively. That is, Ukraine belongs to the group of countries that lag behind (OECD Report, 2021).

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, in 2019 approximately 1 billion USD was spent on innovations, internal, external research and development, and other spheres related to the creation and implementation of innovations (Table 1).

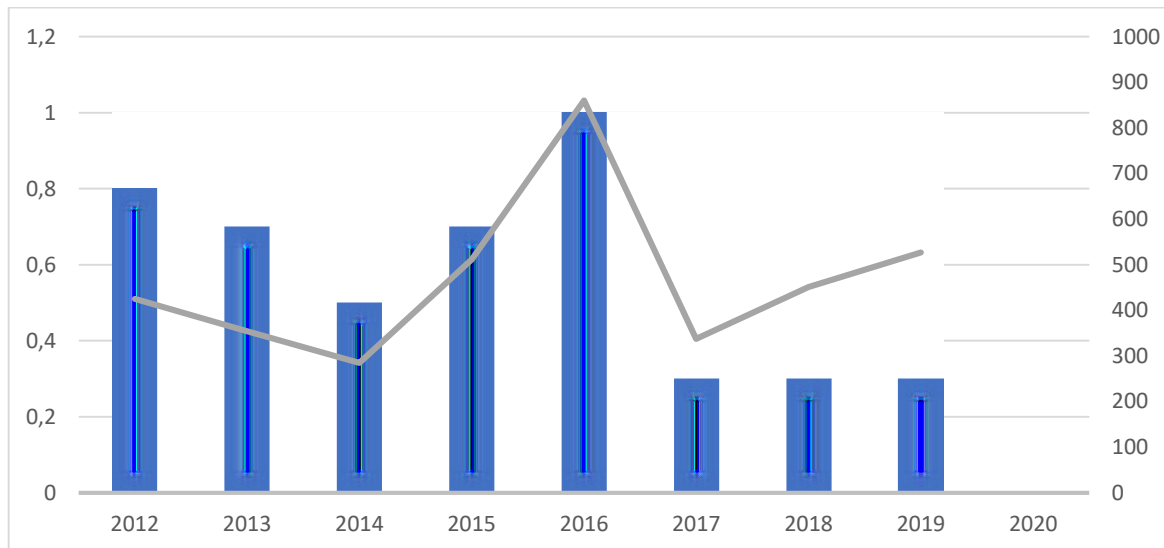
**Table 1**

<b>Structure of innovative activity and its funding</b>		
	<b>Type of innovative activity in Ukraine</b>	<b>Amount</b>
1.	Innovations of the enterprise	526 million USD
2.	The purchase of machinery, equipment and software	377 million USD

3.	Internal and external research and development	108.10 million USD
4.	Acquisition of new technologies	1.38 million USD
5.	Work related to the creation and implementation of innovations	39.97 million USD

Source: State Statistics Service (2019).

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%. This fact has a negative impact on the digital transformation and modernization of the economy.



Source: State Statistics Service (2020).

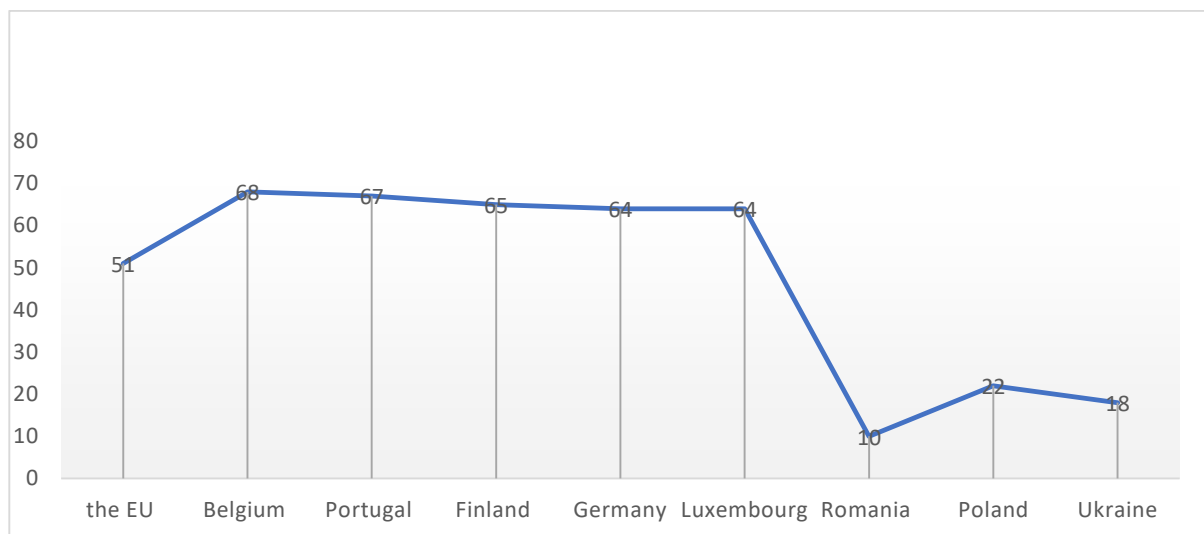
**Fig. 1. The amount of funding for innovation in Ukraine (million USD (right axis), % GDP (left axis))**

Thus, we believe that the funding for innovation in Ukraine should be on an appropriate level to develop and maintain digitalization of the real sector of the national economy. Since Ukraine is attending to integrate into the EU single market, it is necessary to accelerate digital transformation in the weakest areas, namely: legal regulation, the development of telecommunications infrastructure and the introduction of digital technologies into the real sector of the national economy. Depending on the level of digitalization that Ukraine will gradually implement within the framework of the EU digital single market, there might be a positive cumulative impact on Ukraine's GDP.

We propose that the components of the EU digital single market that need to be improved in Ukraine are: electronic identification, payment systems, electronic payments and settlements, protection of intellectual property rights on the Internet, cybersecurity and personal data protection.

Considering the digital competition in different sectors of the economy, it should be admitted that the process of digitalization in Ukrainian industry shows negative dynamics. The process of implementing Industry 3.0 has not yet been completed in the Ukrainian economy. Even the level of automation in Ukrainian industry is very low. For example, in metallurgy it is about 50%. The most important partners of innovative enterprises in cooperation are mainly suppliers of equipment, materials, components or software (26.1%), as well as consumers (13.7%). The share of enterprises that cooperated with scientific organizations (consultants, commercial laboratories, universities and other universities and research institutes) is only 8.4% in Ukraine (Nekrasov, 2019). According to the State Statistics Service, only 16.4% of enterprises were engaged in innovative activities in industry. In developed countries, the share of innovative enterprises is 4-5 times higher and on average in the EU is 51%, including in Belgium - 68%, Portugal - 67%, Finland - 65%, Germany - 64%, Luxembourg - 64%. The lowest in Romania - 10% and Poland - 22% (Fig. 2). In Ukraine, only 3.9% of enterprises spent money on research and development (internal and external). The share of innovative products in total sales has been at the level of 6-7% for many years. Science-intensive GDP in Ukraine has decreased significantly.

Therefore, we believe the problem of rapid transition from the level of Industry 3.0 to Industry 4.0 is very acute.



Source: State Statistics Service, 2020

**Fig. 2. The share of innovative enterprises in 2020, %.**

Nowadays, digitalization is mainly seen as the creation of services in Ukraine, while modernization of enterprises based on the introduction of innovative technologies into production, marketing and so on is being conducted in developed countries. Digitization of the real sector of Ukraine's economy in the form of innovative production is not observed. Digitalization is more represented in the financial sector, embodied in the form of developed Internet banking (Privat Bank, Ukrsibbank, Alfa-bank, Monobank).

A question of great importance in digital competition sphere is the introduction of e-hryvnia (crypto hryvnia). It has been implemented since 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 risky in comparison with placing money in 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.

We should admit that Ukraine's legislation is quite restrictive on digital trade. Here, most barriers are related to:

- cross-border electronic payments and cross-border electronic transactions (lack of mechanisms for the use of electronic digital signatures in foreign trade contracts, lack of mutual recognition of electronic identification and electronic trust services between Ukraine and major trading partners, etc.),
- technical requirements for the use of local software and cryptography.

We believe that overcoming these barriers is necessary for Ukraine's integration into the European and global digital space, which is increasingly affecting international trade and the global economy.

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 economic cybersecurity can be faced, and data protection needs to be solved.

## Conclusions

Thus, we define theoretical backgrounds of digitalization and digital economy to analyze the consequences of digital competition between different spheres for the national economy, getting the following results:

1. Digital competition in different spheres of the economy is embodied in Ukraine in the form of “remote access services”, while digitalization in developed countries is seen as the modernization of enterprises based on the introduction of innovative technologies in production, marketing and more.
2. Digital competition in the form of the introduction of innovative production is not generally observed in the real sector of Ukraine's economy, while digitalization is more represented in the financial sector. This trend is confirmed by the dynamics of low investment activity in the field of innovation (below 1% of GDP), low level of innovative enterprises in the economy of Ukraine (approximately 16 %).
3. It was also determined that the current trend of the information society and the digitalization of social and economic relations is seen in the implementation of the Central Bank Digital Currencies project, embodied in the development of the e-hryvnia. The advantages of CBDC based on blockchain technology are instant transactions as well as low cost. The national digital currency is currently considered an instrument of control over earmarked funds.

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

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