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DIGITAL CHALLENGES IN THE ECONOMY AND THEIR IMPACT ON REGIONAL DEVELOPMENT

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Introduction. Digital transformations that have occurred in socio-economic development of entire society have been proven, so that direct consumers of digital products and services are population gaining access to the Internet, certain applications, programs and databases that help to improve the quality of life, make it more comfortable in conditions of turbulent development and quarantine restrictions caused by the COVID-19 pandemic. Development of digital opportunities has emphasized importance of supporting this area from regulatory and legislative framework, in particular its improvement and regulation, which will be reflected in improving population's well-being and regional development.

Aim and tasks. The aim of the article is devoted to consideration of theoretical and practical foundations of ongoing changes in the economy of territorial economic systems under the influence of rapid spread of innovative technologies, in particular digital transformations and digital challenges, their impact on regional development.

Results. In the given article we have considered approaches and individual directions concerning certain changes in socio-economic direction of society's development under the influence of digital transformations. The factors and indicators influencing region's level of assessment of digital capabilities are indicated. A possible scenario for transformation of digital economy is given, taking into account forms of involvement in digitalization process contributing to the development of digital network and business, formation of new approaches to sustainable strategic development of the regional economy. The role of investment component in promoting and developing digital opportunities, which are reflected in population's social well-being, has been proven. It has been established that the digital development of society is formed under the influence of the relationship between government and business, the use of the latest information technologies.

Conclusions. The widespread dissemination and implementation of digital opportunities is the key to sustainable development of the region, which affects the improvement of business, interaction with the authorities and the growth of the population's well-being. Expanding access to the Internet, levelling user opportunities will accelerate implementation of digital economy and achievement of positive socio-economic changes. It is digitalization of the economy and society that is the main tool for development. A systematic approach to the usage of digital technologies will act as a stimulating factor in the development of society and economy at different levels: national, regional (territorial) and local. In addition, the systematic usage of digital technologies has an impact on raising the level and improving population's living conditions.

Keywords: digital transformation, digital economy, information services, development, region.

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ЦИФРОВІ ВИКЛИКИ В ЕКОНОМІЦІ ТА ЇХ ВПЛИВ НА РЕГІОНАЛЬНИЙ РОЗВИТОК

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Вступ. Цифрові трансформації що відбулись у соціально-економічному розвитку суспільства у цілому доведені, отже безпосередніми споживачами цифрових продуктів та послуг є населення, котре отримує доступ до Інтернету, певних додатків, програм та баз, які допомагають у покращенні якості життя, роблять його більш комфортним за умов перманентного розвитку та карантинних обмежень, спричинених пандемією COVID-19. Розбудова цифрових можливостей підкреслює важливість підтримки цього напрямку з боку нормативно-законодавчої бази, а саме її вдосконалення та регулювання, що знайде своє відображення у покращенні добробуту населення та покращенні регіонального розвитку.

Мета та завдання. Розкрити теоретичні та практичні засади змін що відбуваються в економіці територіально економічних систем під впливом швидкого розповсюдження інноваційних технологій, а саме цифрових трансформацій та цифрових викликів, їх вплив на регіональний розвиток.

Результати. Розглядаються підходи та окремі напрями, що стосуються певних змін які відбуваються в соціально-економічному напрямі розвитку суспільства під впливом цифрових трансформацій. Зазначаються фактори та показники, котрі впливають на рівень оцінки цифрових можливостей регіону. Наводиться прогнозний сценарій трансформації цифрової економіки, котрий враховує форми залучення у процес цифровізації, що сприяє розвитку цифрової мережі та бізнесу, формування нових підходів сталого стратегічного розвитку регіональної економіки. Доведено роль інвестиційної складової у питаннях сприяння та розвитку цифрових можливостей, та які відображаються на соціальному добробуті населення. Встановлено, що цифровий розвиток суспільства формується під впливом взаємовідносин влади і бізнесу, використанням новітніх інформаційних технологій.

Висновки. Широке розповсюдження та втілення цифрових можливостей є запорукою сталого розвитку регіону, що впливає на покращення ведення бізнесу, взаємодію із владою та зростання добробуту населення. Розширення доступу до Інтернет мережі, вирівнювання можливостей користувачів прискорить впровадженню цифрової економіки та досягнення позитивних соціально-економічних змін. Саме цифровізація економіки та суспільства є головним інструментом розвитку. Системний підхід до використання цифрових технологій виступатиме стимулюючим фактором розвитку суспільства та економіки на різних рівнях: національному, регіональному (територіальному) та місцевому. Крім того, системне використання цифрових технологій впливає на підвищення рівня та покращення умов життя населення.

Ключові слова: цифрова трансформація, цифрова економіка, сфера інформаційних послуг, розвиток, регіон.

Introduction. Rapid development of digital technologies does not raise doubts that we are on the verge of entering new logical stage in the development of society's technological sphere and entire legal and socio-political reality. Today, digital technologies are rapidly capturing socio-economic environment both at the global, national and regional levels. Digitalization occupies a leading position among the factors of economic growth of economy and acts as a modern development trend.

Any implementation of new changes and technologies, in particular, digitalization is a process that has a time dimension and a set of unknown challenges and dangers for society.

The qualitative transformations of intellectual abilities and the widespread introduction of products in the field of information technology contributed to the influence and modification of development of the regional economy.

There is a significant number of scientific works, both foreign and domestic scientists, among which can be distinguished the following: T. L. Mesenbourg [1], S. Grimes [2], H. S. Kehal and V. P. Singh [3], M. Graham, I. Hjorth and V. Lehdonvirta [4], T. Koch and J. Windsperger [5].

The existing scientific results of past studies are used as the basis for the theoretical and methodological base concerning the transformation of the regional economy, and certain influences of digital technologies in the context of the socio-economic development of territorial-economic systems have not yet been sufficiently used. The topical issue in the study is the rapidity of the spread of digital opportunities and their impact on the development of territorial economic systems.

Aim and tasks. To reveal theoretical and practical foundations of the ongoing changes in the territorial economic systems' economy under the influence of rapid spread of innovative technologies, in particular, digital transformations and digital challenges, their impact on development.

The theoretical basis of the study was the scientific work of domestic and foreign scientists in the direction of society's digital transformation, their impact on socio-economic development.

Results. The current state of territorial and economic systems or communities' development level is characterized by instantaneous structural and qualitative transformations under the influence of rapid spread of innovative, in particular, digital technologies. The path to digitalization of economy and social relations contributes to the process of deepening and interdependence between all actors in the market environment, beyond national borders, are the basis of GDP growth, productivity growth, implementation and dissemination of innovations related to life. At the same time, turbulent technological transformations that have a multiplier effect require creation of qualitatively new, adaptive mechanisms and models for managing economic processes, which are carried out at all levels. It is not practical to leave without attention and ignore the impact of priority trends in society's digitalization, which determine transformation and qualitative growth of economic and social processes, implementation of strategies for economic breakthrough of the state, regional and other countries' individual industries.

The economy is based on implementing and broad usage of technology, storage and processing of large amounts of information (Big Data, Cloud Calculation), the Internet of Things, information technology that provides cybersecurity, the use of robots and general automation, numerous processes and industries, as well as a wide range of areas of development of innovative technologies that change human's importance in a large economic system [6].

The created national e-commerce market in Ukraine is sensitive and responds in a timely manner to ever-growing demand, focused on re-equipment, increase, integration and reduction of prices for online services, duplicating global trends in the virtual market. This trend is highlighted by the growth of the e-commerce market, where experts note that its volume has rapidly increased by almost 18 times for the period 2013-2020. Therefore, the highest cost and growth relative to consumers of services interested in e-commerce was more than 207% compared to the previous year, which was observed in 2016 [7-9].

During 2017-2020, there is also a characteristic increase, but at a slower pace [10-12]. The current global situation with the COVID-19 pandemic has led to the rapid development of artificial intelligence

technologies that have helped brands improve their customer information platforms and data processing capabilities that combine online and offline data (Table 1).

Table 1. Dynamics of production volumes of products (services) of the main types of economic activity in the field of digital transformation of the economy in Ukraine.

Types of economic activity	2015	2016	2017	2018	2019	2020	Growth 2020/2015,%
Telecommunications (electric communication)	43833.3	45927.7	48639.7	52080.3	55775.3	64034.8	46.1
Share in GDP, %	3.0	2.9	2.4	2.2	1.9	1.8	-1.2
Computer programming, consulting and related activities	21432.3	32007.4	52304.1	79149.2	107748.4	143163.5	568.0
Share in GDP, %	1.5	2.0	2.6	3.3	3.6	4.0	2.6
Provision of Information Services	7381.3	8581.7	12662.4	16753.7	23528.6	3166.9	329.0
Share in GDP, %	0.5	0.5	0.6	0.7	0.8	0.9	0.4

Source: [8, 10].

The pandemic also accelerated implementation of the 5G project, which emphasizes convenience of online shopping process, and affected implementation of the project to build a "smart city" [13-14]. Entertainment industry is not left out and it has stepped up its online focus to retain customers.

Analyzing 2015-2020, it is worth noting rapid growth of sales of products and services of enterprises working in the field of information and communication, as well as increase in the share of entire industry in Ukrainian gross domestic product. Turbulent, in particular more than five times during the study period, is the growth of IT industry, directly related to the development and implementation of software, as well as consulting in the field of IT technologies. Thus, the share of this species in GDP for the analyzed period increased by 3.5%, which

characterizes rather significant innovative changes associated with underdevelopment of economy and society. Today, the IT industry employs more than 180,000 professionals, and their number is constantly growing.

According to experts, the main indicator of development of IT industry in Ukraine is the large number of highly qualified specialists, the lack of intervention of country's leadership in development of IT business, as well as good tax conditions that allow it to develop small business without paying income tax.

In recent years there has been an increase in the volume of information services provided, in particular in the field of web portal development, cloud computing, formation and management of online platforms, etc. During 2014–2019, the volume of production of services in this sector increased 3 times, respectively, the share in GDP increased by 0.4% [7; 12].

As for the volume of production of products and services in the direction of telecommunications, it is slower (+ 46%) for the analyzed period and is based on higher rates of development of industry in 2010-2016, and as a result led to the so-called stabilization of domestic demand [7; 12]. The growth of value added is positive and is much faster than in terms of the volume of services, which confirms significant promising contribution of digital technologies to the development of national economy.

Therefore, during the study period, the volume of gross value added of telecommunication enterprises increased rapidly by 155%, and direct information services and sectors - by 518% [12]. Significant for the field of information and communications, in addition to the rapidly growing market, is considered to be a fairly high value of profitability compared to certain economic activities in Ukraine. Table 2 presents dynamics of financial results of digital enterprises in Ukraine [6-8].

Table 2. Dynamics of financial results of information and telecommunication enterprises in Ukraine.

Areas of digitalizing	Telecommunications (electric communication)			Computer programming, consulting and related activities			Provision of Information Services		
	Financial result profit (loss) million UAH.	Enterprises that made a profit, % of the total number	Profitability of operating activities, %	Financial result profit (loss) million UAH.	Enterprises that made a profit, % of the total number	Profitability of operating activities, %	Financial result profit (loss) million UAH.	Enterprises that made a profit, % of the total number	Profitability of operating activities, %
Years									
2012	6340.8	57.8	4	397.2	57.2	3.9	263.4	58	2.2
2013	7581.0	61.2	5.9	646.3	65.9	3.9	342.2	62.1	4
2014	9368.3	63.8	5	754.1	65.8	4.3	368.6	60.2	0.7
2015	8678.6	64.1	3.9	1161.6	67.3	4.8	595.1	62.5	5.5
2016	7991.0	64.1	-4.1	2120.2	67.2	7.2	489.7	63.2	0.6
2017	7548.4	71.1	1	3128.8	72.5	1.8	670.0	69.6	0.2
2018	7249.2	72	7.4	3484.1	70.5	7.9	716.8	65.6	2.8
2019	12327.7	73.4	8.8	4224.6	70.5	7.7	1333.4	65	5.7
2020	12908.6	76.3	8.1	4899.9	71.8	7.7	1600.5	66.8	4
Growth, 2012/ 2020, %	103.6	18.5	4.1	1133.7	14.6	3.8	507.7	8.8	1.8

Source: [8; 10].

Thus, the IT industry is a highly profitable industry. It is worth noting that rapid growth of gross profit of enterprises, rather than sales of products indicates a high economic potential. Gross profit of IT enterprises, in particular computer

programming, consulting and related activities, for the period 2010-2018.

It has grown rapidly almost 11 times. As for the profit in the field of information services, during the analyzed period it increased 5 times, and in the field of telecommunications – about 2 times.

Given the share of profitable enterprises in the industry on average, it is about 72%, and this is the highest average in the industry. At the same time, there is a tendency to increase the cost of profitability from operating activities, which is 4% over the past 8 years.

This trend indicates the presence of significant domestic economic potential for building the potential of enterprises in Ukraine, which in favourable conditions can create a basis for global economic growth of national economy, taking into account the increase in exports of IT services, as well as the multiplier of innovating transformations in any other industry of our country.

In modern conditions, the IT industry is becoming one of the most promising vectors of investment income. The trend of investment growth associated with broadband is almost 10%, and this affects the increase in average annual GDP from 0.6 to 0.7% [8; 11].

The volume of capital investments in the development of industry and telecommunications increased by almost 246% from 2010 and amounted UAH 29884.9 thousand at the end of 2018. The largest hyper-growth of capital investments in the industry took place in 2016 and 2019. Nevertheless, the share of gross capital investment in the economy during the study period increased by only 0.4%, except 2016, when their share was over 8.4%. If we talk about the volume of capital investments in the field of information and telecommunications, there is a decrease of almost 12% compared to the previous period, there is a tendency to reduce the share of gross investment by 0.1% in 2020 [10].

We should also consider the volume and share of capital investments according to the type of economic activity in the dynamics within 2011-2019. In the structure of industry's main components, 11.8% of investments in 2019 were directed to telecommunications (radio communications), 0.8% – to the computer modelling industry and

1.2% – to the development of information services.

This distribution was influenced by the level of capital intensity in production of services in these industries. Despite the decline in total capital investment in 2020 compared to the previous period, the volume of foreign investment in country's information and telecommunications tends to increase. Thus, at the end of 2020, the number of capital investments amounted to 2939.6 million US dollars, which is 8.2% of total foreign investment in Ukraine. A significant part of foreign investment is concentrated in the IT sector, respectively, due to the concentration of most IT companies in Ukraine and the fulfilment of foreign requests directly from outsourcing and export of services.

Thus, the export of IT services from our country has a high potential for formation and growth, despite the conditions of weak government support. It should be noted that exaggeration of requests for exports of telecommunications products creates a state of insufficient consumption of IT products in Ukraine. Thus, in 2019, the total volume of ICT services provided amounted to almost 1.560 billion dollars [12]. This is 6 times less than the Polish economy consumed during the same period.

The priority at the current stage of digitalization of socio-economic systems in Ukraine is "the removal of legislative, institutional, fiscal, tax barriers that hinder the development of the digital economy and formation of motivation for digitalization of society" [6].

Determining dependence of processes of digital transformation of economy in developed countries on GDP and the main current challenges of IT in Ukraine, experts of the initiative "Digital Agenda of Ukraine" [10] made a forecast of options for digital transformation of the national economy and society.

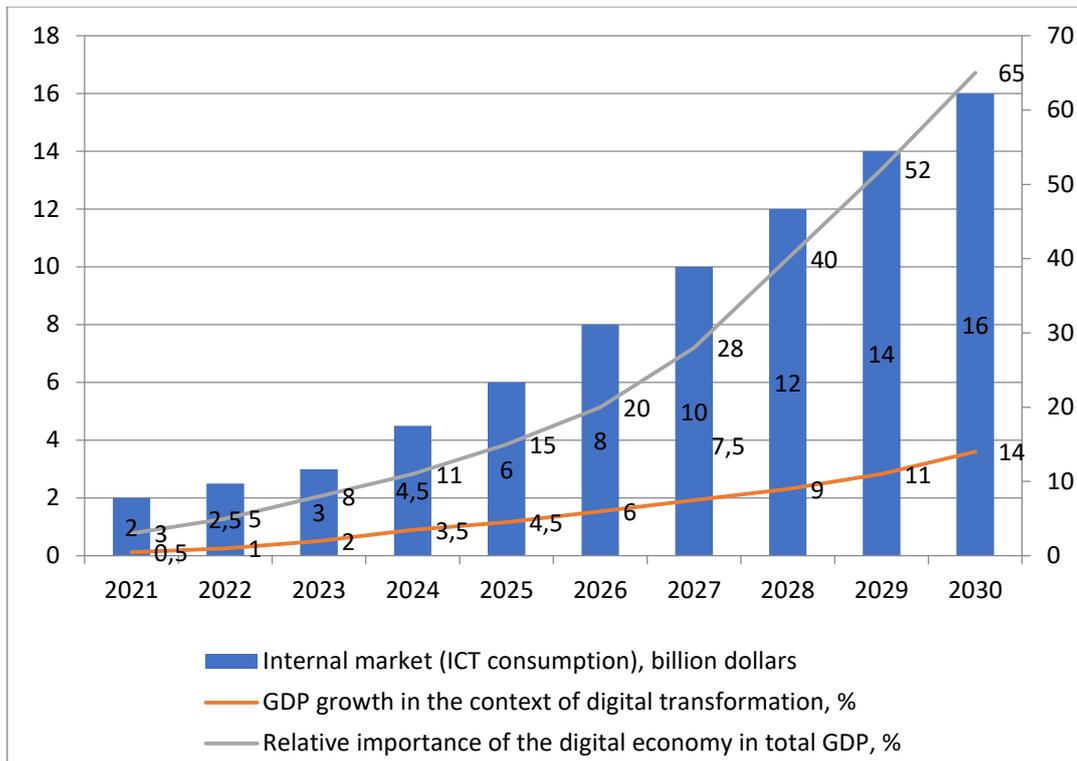


Table 3. Forecast indicators of digital transformation of economy and society in Ukraine.

Source: [6].

These forecasts are rather relative in nature and might be fulfilled by implementation into the targeted government policy focused on the field of digitalization and development of powerful effective measures for its implementation in all areas of management and economic activity. In particular, the forecast was made in 2017, and only at the end of 2019 some of its values became closer to the forecast values of 2021 [11]. Thus, the domestic market using information systems in 2019 received a mark of more than 1.6 billion US dollars [8-9]. The share of digital economy sectors in Ukraine's GDP in 2018 is over 4% [10-12].

To what extent does the effect of digitalization depend on the value added created in each industry, on the impact of digital technologies at the macro level and the increase in gross value added in all areas of economic activity at the macro level.

Considering new form of statistical data collection used by the State Statistics Service of Ukraine in the framework of bringing statistical indicators in line with Regulation (EC) № 251/2009 of 11.03.2009, it is possible to: assess the main trends in its formation and development and their significant impact on the state of national economy, in particular GDP

growth. Subsequently, in compliance with the new form of grouping, statistics are provided for a set of economic activities that directly affect the level of digital economy [11], in particular:

1) Information and communication technologies in production, combining types of economic activity directly related to the production of information and communication equipment (manufacturing computers and peripherals, communication equipment, and other types of electronics like production components for these products).

2) Information and communication technologies in services, which distinguish between types of economic activities carried out through the provision of telecommunications services, software sales and launch services, configuration and maintenance of information and communication infrastructure, etc.

3) The information sector concerns services related to the usage of computer equipment, which summarizes activities of enterprises working with digital systems, in particular: development, modification, testing and technical support of software, planning and design of integrated computers, networks

combining equipment, software and communication technologies; manages and supports client computer systems and / or data processing and other professional activities in the field of information technology.

Discussion. Dynamics of development of main directions of digital economy in Ukraine in 2011-2019 shows dynamics of GDP in actual prices [12]. Thus, during the study period there is a very negative trend, which has a negative character of 56%, in terms of reducing the number of people employed in high-tech industries producing technologies and equipment used in digital economy and social processes, as well as a small increase in related products in the production sector of information and communication technologies and is 86% higher compared to other areas. Thus, it shows that in the context of growing trends in digital economy, our country is becoming increasingly dependent on imports of certain equipment or technology [15-16].

Significant growth is observed in the information sector, the direction of services related to using computer technology, during 2010-2018. Thus, during this time the number of employees in this sector increased by 31%, and the number of services provided increased by 818%, which is more than 8 times [14].

The calculations showed that in the context of current trends, the volume of production of IT services for the period from 2019 to 2024 will increase by 25%. In 2021, a certain "slump" of the market is expected, but in 2022 there will be a rapid growth of 11.4% [7; 12]. If the current dynamics continue, and the impact of external factors remains unchanged, the growth of information services using digitization processes by 2024 will be 25%, and from 2023 it will significantly affect GDP growth. This is due to the intensification of informatization mechanisms in all areas of production, management, market and social activities, an important component of which is the formation of e-marketing and commerce [17-20].

Conclusion. Thus, the analysis showed that despite a fairly large scientific base and labour potential of Ukraine, it has a significant gap with the vast majority of developed countries in terms of industrial production, IT and equipment, which is completely dependent on imports in this area. The formation and long-term development of this sector has great prospects for activating the mechanisms of digitalization in all spheres of economy and society, creating promising jobs and increasing GDP.

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