

Challenges of Digital Development in East European Countries

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Abstract. *The article reveals the challenges of the digital development in the economy. It examines and determines pros and cons of the digital economy in countries in the post-Soviet area. The peculiarities of the digital information presentation, the background, implementation and consequences of digitalization are considered. The advanced experience in the digital development in a number of post-Soviet countries has been considered. The forms and methods of assessing the degree of digitalization coverage in individual countries considered for obtaining new opportunities of digital technologies usage in business, the creation of information technology platforms, new values, benefits, and virtual services' provision.*

It has proposed to intensify cooperation between IT companies of the post socialist countries. The important role of private business in stimulating the use of the results of the digital economy pointed out.

Keywords: *digital development, challenges, digital format, East European countries.*

Introduction. The rapid technological advances, new technologies have emerged to store, process and transfer “mega giant” volumes of information effect the transfer to digital economy. This was the basis for the transition of the real economy to a digital economy. Digital reporting creates a specific product (or service). The transition from the real economy to the digital economy was made possible by the introduction of modern telecommunications (high-speed Internet based on 4G and 5G, high-speed fiber-optic high-throughput lines), which is the technical basis of the digital economy. The main manifestations of the digital economy are the emergence of digital products, digital services, electronic money, electronic trading platforms, electronic banking, i.e. all the elements of commerce that ensure the transition from real to digital commerce.

The modern stage of world economic and social development is characterized by the use of technological capabilities of information databases, the accumulation of large volumes of transmitted information, and the recording and analysis of business processes. Digitalization is seen as a process based on digital information and communication technologies aimed at increasing the efficiency of public production, maintaining a steady rate of economic growth in order to improve the well-being and quality of life of the population. Digital reporting creates a specific product (or service) as well. Providing citizens with access to the use of this product (service) in various socio-economic activities increases the efficiency of the economy. The scientific and educational activities, in the field of health care and in the organization of medical assistance, and in the organization of effective business management and control, legal services, in the field of advertising, i.e. the creation of e-government (or public document circulation) improve the quality of life.

The study of the characteristics of digitization includes the disclosure of the essence of digitization, the features of the digital presentation of information, the prerequisites and the possible positive effects of digitization on post-Soviet countries. Reconciling the concepts of “digitization,” “digitalization,” “digital economy”, “digital transformation,” digital form of data presentation” aimed at creating a business models. The expansion of methods for estimating the digital coverage of individual countries provides new possibilities for the application of digital technologies in business and the creation of new values, determining the virtual source of profits generated by their activities.

Review of the Literature. Digitization in a narrow sense refers to the transformation of digital

information, which in most cases reduces costs, new opportunities etc. The large number of specific transformations of information into a digital form has such significant positive consequences that lead to the use of the term digitization in the broad sense (Sologubova, 2019). The digitization of information is seen as a method of improving different private aspects of life. Halin & Chernova studied the impact of the diffusion of socio-economic processes on social development. By digitization in a broad sense, the current worldwide trend of the economy and society development, stimulates its efficient development of the economy, improves the quality of life of the population (Khalin & Chernova, 2018). Mandviwalla & [Flanagan](#) (2021) argue that digital transformation effects small businesses' development through sell, and deliver using technology, and the factors that influence the transformation process.

Digitization in a broad sense can only be considered as a trend of effective world development if the digital transformation of information meets the following requirements. It encompasses production, business, science, the social sphere and the ordinary life of citizens; accompanied only by the efficient use of its results. Its outcomes are available to users of the reformed information, and its benefits are used not only by specialists but also by ordinary citizens; users of digital information have the skills to work with it.

Digitization makes it possible to create complete technological environments «habitats» (ecosystems, information platforms), within which the user can create for himself environments, including technological, instrumental, methodical, documentary, partner, as well as large databases of personnel, technical, material, financial, marketing data for solving entire classes of problems. V. Lipov points to the great potential of information platforms comparable in their mobility to financial corporations. The used databases have the following features. They are easily replenished, restructured, and used according to the updated continuously needs of different consumer groups, regardless of their location (Lipov, 2020).

Digital innovations reflect the nature, process and outcome of innovation, as well as the long-term and short-term social, economic, and cultural impacts of their offerings (Nambisan et al., 2019). They are realized through the application of the following types of strategies:

- development of a new technology strategy in the existing business context;
- selection, and implementation of new software or platform;
- evolutionary transition from analog to digital processes are the basic forms.

To maintain their competitive position in the global digital market, firms also need to develop and implement digital innovations that transformed into a number of advantages.

These include optimized business processes resulting from automated financing and risk management of transactions for large institutions, Saas (Software as a Service) and other integrated technology solutions; digital solutions that reduce costs, increase profitability and increase income. The use of digital innovations by companies interested in development offers additional competitive advantages. Possible disadvantages consist of the possibility of damaging the company's core activities as a result of the increase in cybercrime, delays in the use of the latest information technologies, insufficient funding for R&D in the country.

A structured representation of digital economy competences identify the needs of organizations and citizens for new competencies for economic activity, and apply to find approaches to effectively manage their formation and training (Dneprovskaya, 2019). The characteristics of the information provided in the digital form include:

The possibility of using a variety of physical principles for the presentation, recording and transmission of information, including the ability to encrypt a message, transmit it in such a form and then decrypt it again;

The possibility of transmitting information using different physical media;

Copying and disseminating information without losing its accuracy;

Multiplying the density of its recording and the speed of transmission, as well as «incompetence» and «non-exclusive» it at consumption;

Creating digital technologies more efficient than analogue ones (Halin & Chernova, 2018).

Novak et al. (2018) argue that the share of digitalization within the overall economy across Central East Europe also approaches that of larger European Union countries. It has been growing at higher rates. These forces are complemented by high-quality digital infrastructure and an emerging digital ecosystem with successful companies, large and small, that compete locally and globally. Adapting to, and capitalizing on, the next phase of digitalization will be as essential to Central and Eastern Europe as it is to the future prosperity and competitiveness of countries around the world. Authors consider that the next phase will be driven by big data, the Internet of Things (IoT), and artificial intelligence (AI). As these technologies continue to permeate different sectors in a horizontal fashion, they promise significant productivity gains that hold the largest potential for future growth in Central and Eastern Europe. McKinsey & Company estimate conservatively that existing IoT solutions alone could contribute to up to €160 billion in GDP gains across Central East Europe by 2025 (Novak et al., 2018).

Research methodology. The study of the forms of the digital economy uses analysis and synthesis method. A comparative analysis applies for examining the challenges of information technology.

The goal of this article is to compare the role, characteristics and results of the introduction of the digital economy in the post-Soviet countries. The special properties of digital information have led to the emergence of the completely new scientific direction «digital economics», which comprises mathematical methods and models based on the digital format of information presentation and its properties stemming from it. It is quite natural for the digital economy to be understood as an economy whose main trend of efficient development is digital (Sologubova, 2019). This definition highlights the main feature of the digital economy - the impact of progress on digital innovation. It should be noted that there exist many definitions of the concept of the «digital economy», underlining different aspects of the impact of digitization on the national economy, such as the use of innovative information and communication technologies (ICT).

Scientists emphasize various digital effects on the ICT; Internet, mobile and sensor networks, online work opportunities; electronic workflow, modern electronic communications, information recording, and storage; new business development models, new markets and new customers, etc. Examples for application of digitalization are technologies used in logistics, geotechnical engineering, modern banking technology, information security technology, etc. and others.

Digital transformation is seen as a process of transforming business strategies, models, operations, products, marketing and management approaches using digital technologies (Androsova & General, 2020). A comparison of the definitions of the digital economy shows that each notion distinguishes some specific features. A summary of the most important of these points to the following features:

It is a system of social and economic relations based on the use of digital technologies to change the business model of development and to increase the competitiveness of the economy;

Expressing the modern paradigm of accelerated economic development, in which increasing competitiveness and efficiency becomes a necessity;

Characterizing the current stage of the evolution of the socio-economic and productive model of society;

Covering public life, production, business, science, management, households and individuals;

Reflecting the specificity of the new technological generation - the use of big volumes of data generated in a wide variety of information systems and processed to extract useful information from them;

Aimed at creating new industries, business models, management models, new markets and new consumers for profit;

Digital transformation involves a shift from analog interaction and analog media to electronic interaction using modern electronic means. It applies the active use of innovative digital information and communication technologies, modern electronic communication channels, electronic workflows and electronic means of recording the processing, storage and transfer of information. The use of the latest mathematical methods and models of information processing based on the digital form of its presentation and the properties of digital information create the advantages for transfer information.

Generally available online through platforms such as the Internet, mobile and sensor networks (Gorelov, 2019).

European Union countries develop digitalization of services at intermedia level. They comprise electronic identity cards, digital identity to use public services, online payments to personal account, digital invoice, residential citizen central database, flow cash of public expenditure and etc. The European Commission proposes an ambitious reform of the digital space, a comprehensive set of new rules for all digital services, including social media, online market places, and other online platforms that operate in the European Union: the Digital Services Act and the Digital Markets Act in December 2020. This proposed reform aims to stimulate integration among platforms, create competences to manage integration and digital networking, protect consumers and their fundamental rights online, and lead to fairer and more open digital markets for everyone.

Results. The following definitions of the digital economy officially adopted at the governmental level in a number of post-Soviet countries and in Uzbekistan.

Digital economy defines economic activity in which digital data is a key factor of production. The processing of large volumes and the use of the results of the analysis which, in comparison with traditional forms of management, makes it possible to substantially increase the efficiency of different types of production, technologies, equipment, storage, sale, delivery of goods and services (Khalin, 2019);

The digital economy is an economic activity where digital data is the key factor in production. It promotes the creation of an information space that takes into account the needs of citizens and society to obtain high quality and reliable information and the development of the information infrastructure of the Republic of Uzbekistan. It promotes the use of information and telecommunications technologies; as well as the formation of a new technological base for the social and economic sphere (Gorelov, 2019).

Comparison of the concepts of «digitization» and «digital economy» shows that digitization is the basis of the digital economy, which determines the direction of the world development of the economy and society. It defines the main modern trend in the economy and society, based on the transition to a digital format presenting information, thus stimulating the availability and reliability of storage and transmission of big data. Digitization contributes to the consistent improvement of all business processes in the economy and related social spheres. The progress in digital form application includes increasing the speed of interchange, accessibility and security of information, as well as increasing the role of the automation as a basis for digitization.

The requirements of digitization as the current trend in the economy and society, and thus in improving their development efficiency, demonstrated to some extent by the existence of the prerequisites of digitization at the macro, mezo and micro levels. Therefore, it is the task of the state to create favorable conditions for digitization, and to provide opportunities for their fulfilment (Khalin & Chernova, 2018).

In Ukraine, the digital economy provides the use of information technologies, the creation of new products, values and properties, and is the basis for the acquisition of competitive advantages in most markets. Governments in the post-Soviet area are taking large-scale measures to develop the digital economy, introducing electronic document circulation systems, developing electronic payments and improving the legal and regulatory framework for e-commerce.

The digital economy uses information technology platforms and is developing at an accelerated pace, which necessitates the creation of new models of such platforms (Resolution of the President of the Republic of Uzbekistan, 2018).

In the near future, there is planned to develop the National Concept of the Digital Economy, envisaging the renewal of all spheres of the economy based on digital technologies, and on this basis to implement the program «Digital Uzbekistan -2030». The digital economy would allow gross domestic product to grow by at least 30 per cent and would drastically reduce corruption. This is confirmed by the analytical studies of authoritative international organizations (Resolution of the President of the Republic of Uzbekistan, 2018).

The use of information technology ensures the transformation of the production system, the creation of new business models, and the stimulation of increased productivity. The Government of Ukraine and the EU signed a new Program of Support for E-government and Digital Economy in Ukraine for €25 million. The Government of Ukraine and the European Union signed a new Program of Support for E-government and Digital Economy in Ukraine. The target (accelerated) scenario of the transition of the Ukrainian economy over a period of 5-10 years to a significant share of the digital economy (up to 65 per cent), could bring Ukraine's nominal GDP to 1 trillion in 2030. US Dollars (Ukraine 2030, 2019).

The creation of the online public services portal "Action" 45 has become the most popular government measures in the field of digital environment development in Ukraine. The goal of the Ministry of Digital Transformation is using the portal through providing 100 per cent of digitizing services provided by the state until 2024. Citizens can already get a significant number of public services on the portal online and carry out online registration of various types of certificates, licenses, permits, benefits, lawsuits, as well as obtain the other online services, etc. The eHealth electronic healthcare system started functioning due to the medical reform in Ukraine in 2018. This system helps patients receive and provides quality medical services to doctors. In addition, the effectiveness of the public funds allocated to health care, spending of medical inventories and services are controlled (Digital transformations in Ukraine, 2020)

The advantages of the digital economy are lower costs of providing services, the development of e-commerce and the promotion of foreign capital inflows. International experts estimate that if developing countries, such as Uzbekistan, reach the Internet penetration level of developed markets, their long-term productivity will increase by 25 per cent. Uzbekistan has all the conditions to take advantage of the dynamic digital economy. The Republic is the most populous country in the Central Asian region, with a significant young and well-educated labour force.

At present, Uzbekistan employs about 29,000 people in information and communication technologies (ICT), working in 1,400 enterprises, whose total contribution to GDP is 2.2 per cent. The gradual opening of the sector already allows citizens of the country to receive Internet services and businesses to benefit from the digital economy (Information Agency of the Republic of Uzbekistan. 2019).

In Ukraine, it would be appropriate to highlight innovation as a national priority. This should be achieved not only through government support to selected knowledge-based sectors and industries, but also through the creation of incentives for innovation and entry into new markets by economic actors that stimulate the creation and development of innovative clusters (Nosova, 2019).

In the rating of the best 25 Ukrainian companies, which are the leaders in the introduction of digital technologies, the publication "The Power of Money" has allocated large private as well as state companies, as well as the Ministry of Digital Transformation. The list included "Naftogaz", "Kyivstar", "Ukravto", "Darnitsa", "Kernel", "TIS", Koslin Group, EPAM, as well as banks "Ukrghazbank" and PUMB (The best companies of Ukraine are named, 2019).

The priority areas for the development of information and computer technologies and the establishment of a modern digital economy are:

- modernization of information and communication technologies, taking into account global and local advances in nanotechnology, genetic engineering, NBIC convergence (the ongoing unification of nanotechnology, biotechnology, information technologies and cognitive science), information and biotechnologies oriented towards the development of the artificial intelligence;
- invention of modern multi-component materials based on the achievements of photonics, robotics and optoelectronics;
- combating cybercrime, strengthening information security on the Internet;
- legal regulation of citizens' free access to information and economic and State security;
- development of freelance capabilities;
- regulation and support of the digital economy in all sectors of the economy.

At present time, the most post-Soviet countries are in the process of digital transformation. Priority areas for digital transformation include the following:

Modernization of the system of education and professional training of IT-personnel through improvement of educational infrastructure and creation of branches of leading foreign universities in the sphere of IT. Specialists account for about 1 per cent of the total employed population of the country. This figure is expected to rise to 2.5 3 per cent over the next five years, corresponding to the world average;

- Introduction of IT start-up support mechanisms, including the creation of technology parks, attraction of venture capital, organization of business accelerators and incubators. 300 IT companies in Uzbekistan now use Mirzo Ulugbek Innovation Center. The current target is to increase the share of the IT sector in GDP to 4 per cent and increase IT exports 10 times in the next few years;

- Ensuring the development of information and communication infrastructure. By the end of 2020, the capacity of the international Internet link has been increased by 10 times, more than 2,300 km of fiber-optic links have been completed and more than 2,000 fourth - generation base stations have been installed.

Improvement of public e-services includes the introduction of technologies of smart and safe cities (smart cities) in regions of Uzbekistan. There are processing the big data, application of Internet, intelligent video surveillance and monitoring systems in public places.

Conclusions and Recommendations. The article examines the role, features and results of the introduction of the digital economy in the post-Soviet countries. The analysis of the relationships of concepts «digitization,» «digitalization», «digital economy» and «digital transformation» on the basis of the study of specific characteristics of the data categories as a process, application and realization of its results has been carried out.

The value of accelerating the digital transformation of the economy through close international cooperation among countries through the use of information technology platforms was pointed out. The best practices of digital engineering and the development of information technology in a number of post-Soviet countries have been investigated.

An analysis has been summarized the forms and methods used to assess the “digitalization” of certain countries in the case of Ukraine and Uzbekistan in order to obtain new opportunities for the use of digital technologies, the creation of technology platforms, new values and benefits, providing virtual services. It has been proposed to increase state expenditure on R&D, expansion of IT services to all the sectors in the economy, creation of digital economy infrastructure. The important role of private business with strong entrepreneurial and innovative approach with state support for the development of digital economy infrastructure was pointed out.

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