

Digital technologies as regions innovative development factor

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Abstract - The article is devoted to researching of digital technologies implementation and development processes at state and regions economy. The research pays particular attention to using digital technologies at socio-economic systems of Russian Federation subjects. The research purpose consists in identifying the problems preventing from widespread implementation of digital innovations in the economic processes of territorial subjects, contributing to the reconstruction of the economy to a new technological structure, as well as developing recommendations for work improving aimed to implementing targeted digitalization of society and business.

The research methodology is based on using of economic and mathematical research methods and is based on using of statistical analysis techniques aided method for scoring the results of introducing digital technologies and their influence on the rating of each subject in the Central Federal District structure.

The result of the research is an analysis of the conditions for the implementation and development of digital technologies in the economic systems of the regions of the Central Federal District, they are assessed, the digitization indicators that most significantly influence the level of development of the regional socio-economic system are identified.

The research found significant influence of digital technologies using indicators on the innovative development of territories, ensuring their socio-economic development and competitiveness. The proposed methodology is universal in nature and can be recommended to regional administrations and business representatives to determine the state of digital technologies implementation in the economy and their impact on economic growth.

Keywords – *digital technologies, innovative development, regional systems, economic growth*

I. INTRODUCTION

The implementation of digital technologies in the Russian economy is becoming the most important question not only for government and business, but also for civil society as a whole. It should be noted that digital technologies significantly contributed to the innovative development of the state and the regions last years, that was shown by economic growth and gross regional product volume indicators. Electronic services of business structures, authorities and local governments contributed to the economic and technological development of the territories. Significant changes are performed in the social activities of economic subjects. The digital technologies, that is being implemented, makes it possible to reinforce production management processes, and there is a strong need for new generation personnel and their specific training, because the

socio-economic system of both enterprises and regions based on digital technologies is no longer subject to existing management methods.

At the same time, we should note that in the digital environment the economic component does not change significantly, but some aspects are added, such as a formalized presentation, its reflection on the information field. Digital economy assumes that economists and subject field experts have a set of competences that allow them to constructively interact with the technological unit of the digital economy [1].

Meanwhile, the use of digital technologies in the production and sale of goods and services, in the public services rendering, and also in the of education field enables the whole society to receive the so-called "digital dividends", which are understood both the growth of national wealth plus material profit and transparency of public administration processes [2].

II. RESEARCH METHODOLOGY

It is necessary to talk not only about the widespread implementation into the traditional production and everyday life the entire spectrum of digital information and communication technologies, when speaking about the digitalization of the economy. This process becomes a high efficient tool only when all sectors national economy system compatibility and connectivity of the created technologies are ensured, which is the basic element for transformation to a new stage of the scientific and technological structure [3].

Therefore, one of the main distinctions of the digital economy from the ordinary one is that the part of intellectual property in the creation of new value will grow at a higher rate [4]. It looks so that intangible assets, such as theoretical knowledge, scientific and technological developments and, above all, innovations become the determining factors for the production development.

Meanwhile, many experts note a certain lag in the implementation of digital technologies in the Russian economy, while at the same time emphasizing that Russia is in the group of countries that are active followers of digital leaders, along with China, Central European countries and Britain and, according to analysts, It may achieve the current level of developed countries by 2025 and rise it's part in the volume of the economy from 3.9% to 8-10% [5].

Therefore, it is not by chance that the main part of publications on the problems of implementing the digital economy belongs to foreign authors. A number of them

concern the assessment of the current situation in our state. So, in particular, it is noted that there are serious flaws in the business field of existing digital services in Russia and it creates difficulties for obtaining new digital products and for improving service for users of these companies [6].

It is also suggested that some Russian banks don't paying the necessary attention to the implementation of digital services in their daily activities may lose a significant number of customers who prefer them to more developed banks that use advanced identification technologies [7].

However, it also notes that all large Russian banks under the auspices of the Central Bank of the Russian Federation created their own association for the development and implementation of digital technologies related to customer identification and their use in the payment space based on software development [8].

It should also be noted that, according to foreign experts, the attention being paid to projects financing in the digital technologies field is insufficient, especially to passing through venture capital companies ones. Such projects are mostly financed by private business, and major financial flows go to large IT companies [9].

Meanwhile, it is also argued that the digital economy is expressed in the equal use of online innovation and digital technologies by all participants in the economic system, from individuals to large companies, and digital transformation will affect all sectors of the international economy by 2025 [10].

III. RESULTS OF THE RESEARCH

Based on this, despite on the difficulties of digital technologies implementing, the Russian economy tends to expand. The main motive of digital transformation is determined by the desire of "customers of the new digital generation" to timeliness, accessibility, quality and personalization [11]. So the base principle of digital paradigm is "everything as a service", focused on data and information resources sharing.

In such a context, it is not the description of the opportunities that a new stage of human development opens up for society, but the digital economy entity and features characterization and risks analysis it generates take the particular significance. In addition, it is necessary to anticipate the threats that arise from the widespread use of information and communication technologies [ICT], as well as the problems of ensuring information security in the new environment [12].

At the same time, the emerging typical changes that appear in the framework of business structures digital transformation, as well as the interrelationships of these changes with changes in the organizational culture of firms, are becoming important [13]. That is why it also becomes necessary to form certain cultural norms, including purposeful knowledge management and orientation towards complementary assets, designed to explore new forms of digital enterprise organization.

The most important task for the state is still the problem of the resumption of economic growth and the new social advantages following it for the population. However, the main source of socio-economic achievements growth in the current conditions when the newest scientific and technological achievements are using at production and at a home and the application of digital technologies are investments in fixed

capital and investments in the "knowledge economy" field [14]. This circumstance, obviously, implies an increase the financing costs for science, education, information and communication technologies, biotechnology and health care. As for investment in the manufacturing sector, these costs have been being necessary for a long time ago due to significant amortization of fixed assets and the creation of conditions for the development and production of components for digital products and the creation of new technologies.

Meanwhile, the answer to possible challenges and risks that impede the digital economy forming in Russia may be possible through the creation of economically and socially significant IT companies aimed at digitizing the state strategic industries to ensure their leadership in global markets [15]. It should means the attention on conquering global markets for products whose long service life is ensured by their high reliability should be focused. These can include products of the aerospace complex, heavy energy and transport engineering and shipbuilding, and the IT industry should focus on their digitizing.

At the same time, it becomes obvious that in order to accomplish this task, deep technological integration of Russian industrial enterprises and scientific institutions is necessary. This is one of the effective measures to improve their workability and adaptation to the system of production and economic relations based on the use of digital technologies [16]. This fact, apparently, needs to be presented as the use of digital innovations and modern methods of information processing in order to demonstrate the results of an effective combination of industrial and intellectual resources. Therefore, enterprises must build a value chain with the synergy of technological integration of related industries.

It should be noted here that forming of technological integration chains, which are some new for our enterprises, but widely used in the West, is problematic for Russia. For example, a number of scientists consider the technological integration of enterprises as a necessary condition for their innovative development, based on long-term and comprehensive exchange of knowledge, based on the unification of innovative technologies, their mutually beneficial exchange, the creation of joint research and development sites [17].

So among the conceptual approaches to the development of technological integration one can single out their development using modeling scenarios based on economic and mathematical balance models [18].

It should be added that the providing of citizens with reliable information about the activities of various ownership forms enterprises, as well as state structures related to economic management, is getting particular importance in conditions of digital economy implementing at the regions. Here we can raise the question of ensuring information security for both the population and the authorities [19]. This should be presented as transformation of popular services for citizens and businesses in a convenient electronic format.

It also becomes necessary to provide cloud-oriented support for various marketing models and their interrelations with the main classes of cloud servers [20]. It is also important to have weights and criteria for relative assessment of service versions, what makes it possible to carry out an integrated assessment for the each version.

IV. DISCUSSION OF RESULTS

Thus, we can conclude that the implementation of digital technologies in the economy of the state, regions and business is a condition not only necessary but also non-alternative, and the results of digitalization in the context of regional socio-economic systems are getting particular significance.

In our opinion, It becomes possible to assess the degree of the regional economy digitalization on the base of the list of indicators, which was formed on using official statistical collections reflecting the dynamics of the subjects

development. This approach is universal and makes it possible, if necessary, to analyze in the context of all regions of Russia.

In this study, the assessment of the digitalization degree will be carried out on the example of the Central Federal District (CFD) regions for 2017.

We have formed a list of indicators, which reflects the estimated parameter by categories:

- the use of digital resources by both legal entities and individuals;
- financing of the digital sphere.

These indicators are presented in table 1.

TABLE 1. INDICATORS OF ASSESSING THE REGIONAL ECONOMY DIGITIZATION DEGREE

Number	Indicator
1	Use of personal computers in organizations (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation)
2	Use of servers in organizations (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation)
3	Use of special software in organizations (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation) to control automated production and/or some technical equipment and technological processes
4	Use of special software in organizations (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation) for solving organizational, management and economic tasks
5	ICT costs (million rubles)
6	Organizations that used electronic data exchange between their own and external information systems, by exchange format (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation)
7	The volume of information transmitted to/from the subscribers of the reporting operator network when accessing the Internet, petabyte (PB)
8	Population using the Internet every day or almost every day (as a percentage of the total number of surveyed organizations of the relevant subject of the Russian Federation)

Measuring of economy digitization degree Measuring of region economy digitization degree measuring in the framework of this study is proposed by calculating the scores for the selected indicators using the following formulas:

- interval range of the i-th indicator (when divided into 10 intervals) (Bi):

$$B_i = \frac{(x_{max} - x_{min})}{10} \quad (1)$$

- the maximum and minimum value of the i-th indicator for;

- common normalized indicator of regional economy digitization degree (Ij):

$$I_j = \frac{\sum L_{ij}}{n} \quad (2)$$

L_{ij} - scoring of the i-th indicator of the j-th region with $i \in (1; 8)$, $j \in (1; 18)$;

n is the total number of researching areas (in our case, 18).

According to this logic, the analyzed regions were assigned points from 1 to 10. It was used following scale characterizing the differences in the degree of the regional economy digitization:

- high development degree - 9-10 points;
- increased development - 7-8 points;
- medium degree - 5-6 points;
- decreased development - 3-4 points;
- low degree - 1-2 points.

V. CONCLUSIONS

The results of the analysis are presented in table 2.

TABLE II. RESULTS OF ASSESSING THE REGIONAL ECONOMY DIGITIZATION DEGREE

Development degree	Score	Region
High development degree (9-10 points)	10	Moscow
Increased development (7-8 points)	-	-
Middle degree (5-6 points)	5	Belgorod region
	5	Voronezh region
	5	Moscow Region
	5	Yaroslavskaia oblast
Decreased development (3-4 points)	4	Bryansk region
	4	Vladimir region
	4	Ivanovo region
	4	Kaluga region
	4	Kostroma region
	3	Kursk region
	4	Lipetsk region
	3	Oryol Region
	4	Ryazan Oblast
	4	Smolensk region

	4	Tambov Region
	4	Tula region
Low degree (1-2 points)	1	Tver region

Analyzing table 2, it becomes possible to conclude that there is a sufficiently significant differentiation of the regions of the Central Federal District for the evaluated criterion. It is caused, first of all, by the dispersion of initial resources distribution, what can be quite clearly estimated by the example of information and communication technology costs.

This significant differentiation in the source data has led to the fact that in 2017 the group characterized as “increased development” is completely absent. At the same time, only one subject demonstrates a high degree of digitalization of the regional economy - Moscow, which has the maximum scores for all indicators.

The average degree of digitalization is observed in the following regions: Belgorod region; Voronezh region; Moscow region; Yaroslavskaya oblast. It should be emphasized that all of these regions have the same points.

The group of regions "reduced development" is the most numerous. It includes the Bryansk region; Vladimir region; Ivanovo region; Kaluga region; Kostroma region; Kursk region; Lipetsk region; Oryol Region; Ryazan Oblast; Smolensk region; Tambov Region; Tula region. Note that the majority of regions in this group have a maximum score of 4 for this group. Only two subjects Oryol and Kursk regions received a score of 3.

Regions with a low degree of digitalization of the economy are represented by one subject - the Tver region.

Summing up the study, it becomes possible to conclude that there is a significant differentiation of the regional economy digitization degree in the CFD. This fact is a consequence of the existing strong imbalances of the original indicators. Thus, to solve the problems in the digital sphere, it is necessary to solve the accumulated problems in the resource component of the regional economy.

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