



THE DEVELOPMENT OF THE DIGITAL ECONOMY IN THE BELGOROD REGION

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Abstract

Purpose: The regions of the country have different levels of Information technology development, so an important step in the implementation of the informational support policy is the assessment of the region's readiness for the transition to the digital economy. In accordance with the digitization program, an important factor is also the study of the first results of the strategy for correcting plans for further digital development.

Methodology: The main methods of research in the course of conducting the given research include: analysis, description, monitoring, comparison, economic analysis, and statistical-economic method.

Result: The concept of "digital economy" was considered, the characteristics of digitization within the Belgorod region were characterized, the main directions of digitization of the region and the region's readiness to transition to a digital economy were identified.

Applications: This research can be used for the universities, teachers, and students.

Novelty/Originality: In this research, the model of The Development of the Digital Economy in the Belgorod Region is presented in a comprehensive and complete manner.

Keywords: *Information Society, Digitization, Digital Economy, Internet, Project, Website, Electronic Form.*

INTRODUCTION

The digitization of modern society is progressing rapidly. Both in everyday life and in economic interaction, information becomes the main resource - inexhaustible, accurate and timely.

Specialists from the Global Institute McKinsey predict that by 2025 digitalization could increase Russia's gross domestic product by 4.1-8.9 trillion rubles, that is, by 19-34%. Digitalization tools allow you to fully meet customer needs and increase productivity. E-commerce is capable of easing crises with the help of accelerated sales of services and products, virtual payment systems accelerate goods exchange, Internet advertising surpasses in its effectiveness all previously known ways of notifying about a new type of product (service).

From 2017, in accordance with the Strategy for the Development of the Information Society for 2017–2030 approved by the President of the Russian Federation (Decree No. 203 of May 9, 2017), the country is implementing a phased transition to a digital economy. It provides for the creation in the country of communication networks, digital platforms for working with various data, as well as an educational and research base ([Studenikin, 2017](#)).

The term "digital economy" was introduced by the American computer scientist Nicholas Negroponte in 1995. The Russian Information Society Development Strategy for 2017-2030, approved in Russia, defines the digital economy as follows: "The digital economy is an economic activity in which the key factor in production is digital data, processing large volumes and using the results of analyzing them. Compared with traditional forms of management, they can significantly improve the efficiency of various types of production, technologies, equipment, storage, sales, and delivery of goods and services. This definition is currently official on the territory of the Russian Federation.

Within the framework of the given research, the prerequisites and implementation of the digitization program are considered in the example of the Belgorod Region.

The relevance of the topic is due to the fact that the digitization of the economy is currently one of the ways to increase the country's competitiveness in the global market. The development of the digital economy contributes to improving the quality of life of the population, and also aims to increase productivity and export development of the Russian Federation.

METHODS

The main methods of research in the course of conducting the given research include: analysis, description, monitoring, comparison, economic analysis, and statistical-economic method. We used data from the Federal State Statistics Service, the Territorial Body of the Federal State Statistics Service for the Belgorod Region, as well as the Ministry of Digital Development, Communications and Mass Communications of Russia.

RESULTS AND DISCUSSION

Russia is a huge country, the regions of which vary in their geographic location, natural resources, and social and economic development. Therefore, an important stage in the consideration of the digitization of a region is the analysis of the factors

of the spatial development of a region, in this case, the Belgorod Region:

- Belgorod region is unique in its mineral resource region of Russia. About 400 mineral deposits have been identified and explored to a varying degree: iron ore, bauxite, apatite, mineral groundwater (radon and medical-table), chalk, sand, clay, marl. Manifestations of gold, graphite and rare metals are known, and there are also geological prerequisites for identifying platinum, diamonds, hydrocarbons and other minerals. The main advantage of the region is its fertile soil.
- The region is part of the Central Black Earth's economic region (CBER) and the Central Federal District of the Russian Federation and occupies a convenient geographical position. In the south and west it borders with the Luhansk, Kharkiv and Sumy regions of Ukraine, in the north and north-west with the Kursk region, in the east with the Voronezh regions.
- Belgorod region is a large producing and processing region with a developed transport infrastructure - 90% of the roads in the region have a hard surface.
- On an aggregate basis with a stable economic situation, the Belgorod Region offers a decent standard of living, ranking 6th in the rating of Russian regions for quality of life.
- Belgorod region is a region with a high concentration of population, availability of qualified personnel, a developed system of educational, cultural and sports centers.
- In the Belgorod region, life expectancy is high by Russian standards, which is due to favorable natural conditions and social causes. It exceeds the Russian figure by almost 2 years and the average figure for the Central Federal District.

The development of digitization is impossible without the initial preparation of the region at the legislative, information and other levels. Let us analyze the readiness of the Belgorod region for digitalization on the basis of the following areas.

Regulatory and administrative digitization [Rozhdensvenskaya, L. N., & Rogova, O. V. \(2019, May\).](#)

This section assumes the existence of a legislative base of the region in the context of digitization, the formation of the governing bodies of this process, as well as digitization projects to be implemented in the region.

Considering the value of the composite sub-index "Digital Russia" by the parameter "Regulations and administrative indicators of digitization", it should be noted that in 2018, compared to 2017, the index value decreased by 5.1% (table. This indicates the insufficient formation of internal regulatory environment in the Belgorod region, providing a favorable administrative and legal regime for the emergence and development of the digital economy in the region.

Table 1: The value of the sub-index "Regulations and administrative indicators of digitization" in the Belgorod region in 2017-2018.

Region	Sub-index "Regulations and administrative indicators of digitization"	
	2017	2018
Belgorod region	66.09	62.67

The development of the digital economy in the Belgorod region is based on the state program "Development of the Information Society in the Belgorod Region for 2014-2020". The Department of Digital Development of the Belgorod Region was established as an executive body authorized to conduct state policy in the Belgorod region on the state policy in the field of informatization and information technologies in accordance with the Order of the Government of the Belgorod Region No. 519-pp dated October 8, 2018.

As part of digitalization, the following projects are being implemented and planned for implementation in the region:

1. "Cultural region" - setting up the system of electronic sale of tickets to events, the possibility of visiting concert halls online;
2. "Health management" - digitalization of medicine in the region;
3. "Smart City" - the organization of a comfortable urban environment for the population;
4. "Smart Home";
5. «AgroNTI» (national technology initiative) - analysis of the economic efficiency of using unmanned aircraft systems in agriculture. The analysis includes an inventory of agricultural land; monitoring the status of crops and the quality of work performed in the fields; alternative use of RPAS (unmanned aircraft systems) technologies when performing technological operations in the fields.
6. A complex of organizational and technical measures carried out by the management of information technologies and communications of the administration of the governor of the Belgorod region in cooperation with the executive authorities of the region and local governments (the provision of state and municipal services to the population, the portal of government services "Gosuslugi"), etc.

The level of the population's education:

One of the hallmarks of digitization is the transforming of the labor market, which should provide the digital economy with qualified personnel. Considering the sub-index “Specialized personnel and training programs”, we note the growth of the sub-index value by 16.9% (Table 2).

Table 2: The value of the sub-index "Specialized personnel and training programs" in the Belgorod region in 2017-2018

Region	Sub-index "Specialized personnel and training programs"	
	2017	2018
Belgorod region	60.11	70.28

This direction involves the study of the education level of the population in the region as the basis for the formation of competent personnel in the development of the digital economy (Table 3).

Table 3: The education level of the population in the Belgorod region

Index	2014	2015	2016	2017
The share of the population with higher education in the total number of the employed population	30.2	30.9	32.3	33.1
Students in primary, basic and secondary education level in the total population	9.4	9.6	9.8	10.1
Students enrolled in the training program for qualified workers, employees, of the total population	0.4	0.4	0.4	0.3
Students enrolled in the program of training mid-level specialists of the total population	1.4	1.4	1.5	1.6
Students enrolled in higher education institutions of the total population	3.8	3.4	3.3	3.2

Changes in the economy and the lifestyle of the population due to digitization are directly related to the level of education of the population, i.e. the ability to perceive innovations and quickly assimilate new trends in the digital economy.

People with higher education in developed nations and developing countries have a similar level of “digital competencies” development in their everyday life. According to table 1, the proportion of the population with higher education for the period 2014-2017 increased by 2.9%. A positive point is a decline in the proportion of students enrolled in the training program for skilled workers and employees by 0.1% of the total population and the growth of students in middle-level specialists by 0.2%. At the same time, the proportion of students enrolled in higher educational institutions decreased by 0.6%, which may adversely affect the development of digitalization in society.

Availability and formation of research competencies and technological reserves, including the level of research and developmental works.

It should be noted that assessing the value of the sub-index “Availability and formation of research competencies and technological reserves, including the level of research and development and design efforts”, we can conclude that in the period from 2017 to 2018 there is the growth of this indicator by 11.1% (Table 4).

Table 4: The value of the sub-index “Availability and formation of research competencies and technological reserves, including the level of research and development efforts” in the Belgorod region in 2017-2018.

Region	sub-index “Availability and formation of research competencies and technological reserves, including the level of research and development efforts”	
	2017	2018
Belgorod region	62.41	69.35

This section demonstrates the development of research activities in the region in the sphere of information and communication technologies, as well as the availability of relevant innovative competencies, confirmed by inventions, registered patents and other documents (Table 5).

Table 5: Innovation potential of the Belgorod region

Index	2014	2015	2016	2017
Gross value added of the information and communication technologies sector: in current prices, mln. rub.	1790.5	1921.1	1779.9	1921
in% to GRP	0.29	0.28	0.24	0.24
The share of innovative goods, works, services in the total volume of goods shipped, %	0.8	0.4	2.6	2.7

The share of innovative products, works, services in the structure of exports of industrial production, %	4.9	1.2	8.8	15
Number of patents for inventions per 1 million population, units	74.9	107.7	74.1	100
The share of fundamentally new technologies in the total number of developed advanced technologies, %	-	6.1	19.6	2.7

The gross value added of the information and communication technologies sector for the period under review increased by 7.3% in 2017, while the share of the sector in the region's gross regional product decreased by 0.05%. The active development of informational support in the region is seen in the increase in the production of innovative products by 1.9% in the total volume of goods shipped, as well as a significant increase in the share of innovative products in the export structure, the number of patents granted for inventions increased by 33.6% compared to 2014. Negative is the decline in the level of new technologies in the total amount of development - in 2017 compared to 2016 - 7.3 times. Consequently, one of the directions for the development of digitalization of a region should be an investment support strategy for developments in the field of information technology. [Demchenko, M. V., Ruchkin, R. O., & Simaeva, E. P. \(2019\)](#)

Information infrastructure.

Considering the dynamics of this composite sub-index (based on the composite index "Digital Russia"), we can say that in the period from 2017-2018 there is an increase in the value of sub-index by 5.4% (Table 6). [Rozhdenstvenskaya, L. N., & Rogova, O. V. \(2019, May\)](#).

Table 6: The value of the Information Infrastructure sub-index in the Belgorod region in 2017-2018

Region	Information Infrastructure sub-index	
	2017	2018
Belgorod region	68.29	72.00

Information infrastructure implies the availability and dynamics of the means of information transmission of households and enterprises within the region (tab. 7, 8).

Table 7: The status of the information structure of households in the region

Index	2014	2015	2016	2017
Share of households with personal computers in the total number of households, %	69	67.2	69.2	74.4
Share of households with Internet access in the total volume of households, %	65.6	64	67	71.9
including broadband, %	59.6	55.4	66.2	74.2
The share of the population that used the Internet almost every day, in the total population, %	64	60.8	67.7	71.3
The proportion of the population using the Internet to order goods in the total population, %	14.6	48.8	56.7	64.3
The share of the population that used the Internet to receive state and municipal services in electronic form in the total population that received state and municipal services, %	21.1	40.5	51.1	69.2
Subscribers of fixed broadband Internet access per 100 people, units	13	17.6	18.6	19.2
Subscribers of mobile broadband access to the Internet per 100 people, units	48.2	48.4	50	69.5

The indicators' dynamics of the state of the household's information structure in the region can be called positive. The supply of households with personal computers is increasing from 69% to 74.4% in 2017, as well as access to the Internet - by 6.3%. The availability of broadband Internet in the region has significantly increased - in 2017, 74.2% of households were provided with the opportunity to use the network. [Demchenko, M. V., Ruchkin, R. O., & Simaeva, E. P. \(2019\)](#)

The population actively uses the Internet to order goods (64.3% of the population), to receive state and municipal services (69.2%). The achievement of indicators is facilitated by a complex organizational and technical measures implemented by the management of information technologies and communications of the administration of the Governor of the Belgorod Region in cooperation with the executive authorities of the region and local governments.

Table 8: Information structure of the Belgorod region organizations

Index	2014	2015	2016	2017
Share of organizations using broadband Internet, in their total number, %	80.4	83.5	86.4	87.6
Share of organizations using cloud services, in their total number, %	84.6	85.5	92.9	94.4
The share of organizations in the business sector that use the Internet to interact with customers, in their total number, %	39.8	43.3	44.9	49.7

with suppliers				
with customers	17.1	18.8	19.9	22.8
The proportion of museum objects listed in the electronic catalog and having digital images in the total volume of the museum fund, %	37.6	48.8	56.7	64.3

A positive trend is also seen in the information support of the Belgorod Region organizations. The majority of enterprises use the broadband Internet (87.6% in 2017), as well as cloud services (94.4%). The share of organizations using digital technologies for interaction with suppliers has increased significantly (49.7% in 2017 compared to 39.8% in 2014), as well as customers (by 5.7%). Digitization has also affected the organization of culture - a positive point is an increase in the share of museum exhibits listed in the electronic catalog from 37.6% to 64.3% ([Vladyka, et al. 2018](#)).

Thus, the development of digitization involves the development of the region in the legislative, educational, scientific, social and economic spheres.

The development of the digital economy involves many positive moments [Demchenko, M. V., Ruchkin, R. O., & Simaeva, E. P. \(2019\)](#) :

1. Improving the quality of the population's life i.e. improving the quality of services provided, working closely with state and municipal services, time-saving, etc.
2. Increasing the accessibility of management, both for the authorities and for the population i.e. the ability to control, analyze and make decisions at a distance. [Rozhdenstvenskaya, L. N., & Rogova, O. V. \(2019, May\)](#).
3. Reducing corruption as a result of reduced interpersonal contact and paper-based procedures.
4. The growth of labor productivity by reducing the human factor. [Krasnenko, Y. V. \(2019, May\)](#).
5. The growth of opportunities due to the ability to store terabytes of information.
6. Reduction of the emotional component in decision making, etc.

Considering the advantages of digitalization, it is impossible not to say that this process has drawbacks that cannot be ignored. [Tolstykh, T. O., Kretova, N. N., Trushevskaya, A. A., Dedova, E. S., & Lutsenko, M. S. \(2017, July\)](#):

DISCUSSION

The implementation of the "Digital Economy" strategy, besides the positive aspects, suggests the possibility of a number of risks:

- Unemployment growth. Automation of production contributes to the reduction of workplaces since one computer in terms of its productivity in performing work is equal to the efficiency of several depending on the nature of production.
- Down drift of workforce capacity. [Rozhdenstvenskaya, L. N., & Rogova, O. V. \(2019, May\)](#).
- The decline of systemic thinking. Systems thinking is being replaced by computerized, thus thinking develops into superficial and speed, instead of complex-purposeful and cause-effect. [Rozhdenstvenskaya, L. N., & Rogova, O. V. \(2019, May\)](#).
- The risk of appropriation of intellectual property. Within the framework of this problem, the World Intellectual Property Organization (WIPO) proposes the introduction of blockchain technology, which, due to the transparency of control, will prevent this risk.
- Reducing the level of staff creativity, the ability to create new. Open access to information is often considered to be a simpler and more profitable way to search for ideas than to create your own idea through brainstorming. [Tolstykh, T. O., Kretova, N. N., Trushevskaya, A. A., Dedova, E. S., & Lutsenko, M. S. \(2017, July\)](#):
- Problems of national security and information security vulnerabilities. [Demchenko, M. V., Ruchkin, R. O., & Simaeva, E. P. \(2019\)](#)

Information security "today is becoming the most important factor in the development of the digital economy, expanding the electronic interaction of market participants, the introduction of blockchain elements, the large-scale use of new technologies brings to the fore the issues of improving the competitiveness of the domestic financial system, ensuring its security as an object of critical information infrastructure" ([Vladyka, et al. 2018](#)).

Information security is of strategic importance for the country. At the same time, the situation is clearly aggravated by the growing level of threats in the information space, while the methods, methods, and means of such crimes are becoming increasingly sophisticated, which requires adequate measures to improve the cyber-resistance of financial market entities.

The main methods of ensuring information security in the Belgorod region are [Tolstykh, T. O., Kretova, N. N., Trushevskaya, A. A., Dedova, E. S., & Lutsenko, M. S. \(2017, July\)](#):

- Methodological assistance, as well as the control of technical protection of information on the objects of informational support of regional authorities at all levels.
- Work on connecting information systems and official sites of the executive authorities of the Belgorod Region to the protected Russian state segment of the Internet (RSNet).
- Issuance of electronic signatures by the certifying center of the Belgorod Information Fund.
- Development of cryptography in the region.
- Professional retraining in BSTU named after Shukhov on the program "Information Security".
- Carrying out Internet Security weeks for students, teachers, and parents.
- Development of guidelines for the implementation of measures aimed at ensuring the safety and development of children on the Internet, etc.

Thus, within the Belgorod Region, an active policy is being pursued to ensure the information security of the region's digital information, which contributes to the preservation of personal and confidential data during the development of the digital economy.

CONCLUSION

The digitization of a region is a complex and multidirectional task, requiring time, funding, and coordinated action. The main results of the digitization of the Belgorod region at this stage include:

1. Expansion of access to ICT for the population [Demchenko, M. V., Ruchkin, R. O., & Simaeva, E. P. \(2019\)](#)
2. The growth of the research base of the region in the field of digital technologies.
3. Creation of IT-classes and Yandex. Lyceum in the framework of solving the problem of lack of personnel in the field of digital innovation.
4. Implementing the "Cultural Region" project to increase the level of attendance at cultural events in the region, both through online ticket sales and through online broadcasts.
5. Implementation of the project "Health Management", the transition to medicine 4P.
6. Development of the system of provision of state and municipal services in electronic form.
7. Participation in the pilot project "Smart City" ([Andreeva, et al. 2018](#)).
8. Development of digitalization in the transport sector - installation of photo and video recording systems, adaptive automation systems for traffic lights, weight control points, etc.
9. Digitalization of the housing and utilities sector through the implementation of the Unified Regional Information System "State Information System of the Housing and Communal Services-Region".
10. Development of the project "Smart Home". [Rozhdenstvenskaya, L. N., & Rogova, O. V. \(2019, May\)](#).
11. Introduction of ICT in production activities.

Belgorod region has all the necessary prerequisites for the further implementing of digital potential and acceleration of the pace of digitization of the economy. New technologies will have a significant impact on the development of business and government, the growth of the quality of life, the emergence of new forms of people's socialization and their communication. The region has the necessary intellectual and scientific base; there are original organizational and technological solutions for creating an efficient infrastructure of the digital economy.

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