

**SCTCMG 2021****International Scientific Conference «Social and Cultural Transformations in the Context of Modern Globalism»****INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE FORMATION OF DIGITAL REGIONAL INFRASTRUCTURE**

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**Abstract**

In this article, the authors analyze the level of application of information and communication technologies for the formation of digital regional infrastructure. The authors identified the main problems in the formation of the digital regional infrastructure, and also analyzed the measures of state support. According to the authors, the formation of digital regional infrastructure will have a positive effect on the socio-economic development of the region and will improve the quality of life of the population. At the same time, it should be noted that when using information and communication technologies in the development of digital infrastructure, it is necessary to resolve the issue of ensuring information security and protecting personal data. This issue is most relevant in an environment where the threat of personal data leakage is growing, which allows unscrupulous persons to use it for fraudulent purposes. In this study, the authors paid special attention to the use of personal computers by organizations and providing access to broadband Internet. Based on the analysis, the authors of the article identified the main reasons that impede the development of digital infrastructure. These reasons include a lack of qualified personnel, a low level of development of information infrastructure, and an insufficient amount of funds. To eliminate the problems that have arisen, the state is taking various measures; one of the most important is the National Program “Digital Economy of Russia” until 2024. Within the framework of this program, it is planned to train about 800 thousand specialists with digital skills.



## 1. Introduction

Today, the main city where the digital infrastructure is most actively formed in Moscow, which entered the ranking of twenty cities of digital transformation, ranking next to Los Angeles, Johannesburg, and Santiago. Besides, in 2020, Moscow became a member of the Smart City project for the responsible implementation of digital technologies (Yudina, 2019). Among the priority areas in the digitalization process, such areas as the protection of personal data and the security of information systems are indicated. Also, Moscow is planning to introduce a five-year draft legal regime for the development of artificial intelligence. Also, pilot 5G zones have been installed in the city, which, according to experts, will make the Internet faster. It is predicted that in the future, 5G networks will find application in all spheres of human activity, including agriculture, transport infrastructure, educational and medical services, and others. Another region where digital infrastructure is actively developing is the Republic of Tatarstan (Gumerova & Shaimieva, 2018). The region approved the Concept of Digital Transformation for 2021–2024, where among the main digital transformation projects such projects as Digital City, Digital Transport, and Digital Road are noted. Besides, the region is actively developing digital infrastructure, where 87.8 % of residents have access to the Internet, 77.4 % of residents use the Internet every day. It is noted that 44 % of the region's residents interact with authorities electronically, and 32 % of the population make purchases online. The main goals of the digital transformation of the region include the creation of favorable conditions for the population, an increase in the share of digital business and the creation of information infrastructure, as well as the use of digital technologies in various sectors of the economy.

## 2. Problem Statement

Today digital technologies have become an integral part of modern life and have penetrated all spheres of human life: online banking, online education, electronic payments, online stores, online cinemas, etc., the result of which is the formation of the digital economy (Novikova & Atrogonova, 2020).

In 2017, the Russian Government approved the National Program “Digital Economy of Russia”, the goals of which are to create an ecosystem of the digital economy for effective interaction of the scientific and business communities, authorities, and educational institutions, to create conditions of an institutional and infrastructural nature for the development of high-tech business, as well as increasing the competitiveness of the domestic economy (Vaseyskaya & Glukhov, 2018). The main directions for the development of the digital economy are personnel, information structure, information security, digital technologies, regulation, and digital public administration. At the regional level, the implementation of the Digital Economy of Russia program faces several problems, the main of which are the uneven development of the regions and the underdevelopment of the institutions of the digital economy. This explains the relevance of the formation of a digital regional infrastructure based on government programs.

To do this, we will analyze the development of digital regional infrastructure using the example of the North Caucasian Federal District.

### 3. Research Questions

When analyzing the digital regional infrastructure, it is necessary to take into account the availability of information and communication technologies in organizations and access to the Internet.

In 2017, there were 92.1 % of organizations using personal computers. In 2018, this indicator increased by 1.9 %.

But already in 2019, there was a decrease in organizations using computers by 0.5 % compared to 2018 and an increase by 1.4 % compared to 2017.

In 2019, the government, military security, and social security bodies became the leader in providing organizations with personal computers – 97.1 %.

The second place is taken by the authorities in the field of health and social services – 96.8 %, the third place – activities in the field of information and communication – 96.5 %.

In 2019, the share of organizations using computers amounted to 93.5 %: in the Central Federal District – 95.1 %, in the Northwestern Federal District – 94.4 %, in the Southern Federal District – 93.7 %, In the Caucasian Federal District – 79.6 %, in the Volga Federal District – 94.9 %, in the Ural Federal District – 94.3 %, in the Siberian Federal District – 91.9 %, in the Far Eastern Federal District – 93.9 %.

Regarding the regions of the North Caucasian Federal District, we note that they are characterized by uneven use of computers (Borisova et al., 2020).

In the Republic of Dagestan, the share of organizations using computers is 62.8 %, in the Republic of Ingushetia – 100 %, in the Kabardino-Balkarian Republic – 95.3 %, in the Karachay-Cherkess Republic – 92.6 %, in the Republic of North Ossetia-Alania – 75.1 %, in the Chechen Republic – 71.3 %, in the Stavropol Territory – 96.5 %.

Regions have shown positive dynamics in the use of computers since 2017, except for the Republic of Dagestan, the Republic of North Ossetia-Alania, and the Chechen Republic.

In 2019, 91.2 % of organizations used the Internet against 88.9 % in 2017.

In 2019, the share of organizations using the Internet amounted to 91.2 %: in the Central Federal District – 93.1 %, in the Northwestern Federal District – 92.1 %, in the Southern Federal District – 91.8 %, In the Caucasian Federal District – 77.7 %, in the Volga Federal District – 92.8 %, in the Ural Federal District – 91.7 %, in the Siberian Federal District – 89.4 %, in the Far Eastern Federal District – 91.1 %.

As can be seen from the statistical data, the regions are distinguished by the uneven use of the Internet between federal districts and even between subjects of one federal district. This can be clearly demonstrated by the example of the North Caucasian Federal District.

In the Republic of Dagestan, the share of organizations using the Internet in 2019 amounted to 61.1 %, in the Republic of Ingushetia – 100 %, in the Kabardino-Balkarian Republic – 87.2 %, in the Karachay-Cherkess Republic – 90.5 %, in the Republic of North Ossetia – Alania – 72 %, in the Chechen Republic – 71.3 %, in the Stavropol Territory – 94.8 %.

It should be noted that in some regions this indicator has remained unchanged since 2017 (Republic of Ingushetia) or has changed slightly (Karachay-Cherkess Republic), or decreased (the Republic of Dagestan, Republic of North Ossetia-Alania, Chechen Republic, and Stavropol Territory).

Unlike other regions, the Kabardino-Balkarian Republic shows an increase in this indicator from 84.4 % in 2017 to 87.2 % in 2019.

The same situation is observed with the access of organizations to broadband Internet, whose share in the North Caucasian Federal District amounted to 74.5 % in 2019, while the top three included the Republic of Ingushetia (95.6 %), Stavropol Territory (89.8 %), The Kabardino-Balkarian Republic (87.0 %).

The number of organizations with websites in 2019 was 51.9 %.

The leading positions in this indicator in 2019 are shown by the authorities in the field of education – 84.8 %, in the field of health – 80.9 %, in the field of finance – 69.1 %.

In the North Caucasus Federal District, the share of organizations with websites in 2019 was 47.4 %.

The leader among the regions of the North Caucasian Federal District is the Republic of Ingushetia – 75.5 %, the second place is taken by the Chechen Republic (56.2 %) and the Stavropol Territory (56.1 %), the third place is taken by the Kabardino-Balkarian Republic with 52.5 %.

Since 2017, there has been a positive trend in this indicator in almost all regions, except for the Republic of North Ossetia-Alania, whose indicator compared to 2017 decreased by 6.6 %.

Besides, one should not ignore the fact of using special software in organizations, which in 2019 amounted to 66.6 % in the North Caucasian Federal District. At the same time, the leaders among the federal districts in this indicator were the Central Federal District (88.2 %), the Northwestern Federal District (87.7 %), and the Southern Federal District (85.1 %).

Regarding the regions of the North Caucasian Federal District, it is worth noting that in 2019 the Republic of Ingushetia, the Stavropol Territory, and the Karachay-Cherkess Republic became the leaders with 91.7 %, 89.3 %, and 85.3 %, respectively.

At the federal level, most of the software is used for financial settlements in electronic form, whose share was 57.1 % in 2019.

Among the regions of the North Caucasus Federal District, the largest share is also accounted for by electronic financial settlements – 42.4 % (Idigova et al., 2019).

The leaders are the Karachay-Cherkess Republic, the Republic of Ingushetia, and the Stavropol Territory with 60.2, 59.9, and 58.9 %, respectively. Also, at the federal level, software tools are actively used to solve organizational, economic, and managerial tasks and to manage automated production, technical means, and technological processes with 54.8 and 16.5 %, respectively. At the federal and regional level, software tools for design and scientific research are least used. Thus, in Russia as a whole in 2019, this indicator was 13 and 4.6 %, respectively, and in the North Caucasus to the federal district – 7.8 and 2.7 %, respectively. In terms of the use of software for scientific research, the leaders were the Stavropol Territory, the Kabardino-Balkarian Republic, the Karachay-Cherkess Republic, and the Republic of North Ossetia-Alania with 4.4, 3, 3, 3.2, and 3.1 %, respectively. The most actively used software for design is the Stavropol Territory (11.6 %), the Chechen Republic (11.4 %). Among the lagging regions in the use of software for design, we note the Republic Dagestan (2.7 %) and the Republic of Ingushetia (5.3 %).

#### **4. Purpose of the Study**

The study aims to analyze the use of information and communication technologies for the formation of a digital regional infrastructure using the example of the North Caucasian Federal District. To achieve this goal, it is necessary to solve several tasks:

- analyze the use of computers and the Internet by organizations at the federal and regional levels;
- evaluate the use of the software by organizations for financial settlements, production management, and solving economic problems;
- consider the level of accessibility of organizations at the regional level to broadband Internet access.

#### **5. Research Methods**

In the course of the research, the article used methods of statistical and comparative analysis, as well as methods of expert assessments, which made it possible to identify the main problems of the development of the digital economy at the regional level.

#### **6. Findings**

Based on the foregoing, we note that the regions are distinguished by the uneven use of information and communication technologies in various spheres of the economy.

Firstly, the level of computer use at the regional level is low. In the Republic of Dagestan the number of organizations using computers is 62.8 %, then in the Stavropol Territory it is 96.5 %. The reasons for the low use of computers may be the lack of funds of the organization to equip the employees of the organization with personal computers.

Secondly, there is a difference between organizations in the use of the Internet at the regional level. The Republic of Ingushetia has become the leader in the use of the Internet by organizations, which has shown positive dynamics since 2017, and whose indicator has not dropped below 100 %. Among the lagging regions, there is also the Republic of Dagestan, the Republic of North Ossetia – Alania, the Chechen Republic, and the Stavropol Territory. These indicators of the listed regions have significantly decreased compared to 2017. The reason for the low use of the Internet by organizations is the low level of development of information infrastructure. A similar situation is developing with the access of organizations to broadband Internet. Here the leaders are the Republic of Ingushetia (95.6 %), the Stavropol Territory (89.8 %), and the Kabardino-Balkarian Republic (87.0 %). Besides, there is a positive trend in the presence of websites. The only exception is the Republic of North Ossetia-Alania.

Thirdly, it is worth noting the use of software tools in scientific research, design, for solving economic problems, automation of production and control of technological processes, and for financial calculations in electronic form. It is for financial settlements in electronic form that information and communication technologies are most in demand both at the federal level and at the regional level. At the

same time, extremely low indicators are observed in other areas, which indicate a shortage of qualified personnel and funds.

## 7. Conclusion

Based on the results of the study, the authors identified the main reasons that impede the formation of digital regional infrastructure. To solve the problems that have arisen, the state is taking measures to effectively create a digital regional infrastructure. So, by 2024, at the state level, it is planned to increase internal costs for the development of the digital economy in gross domestic product to 5.10 %; secondly; to ensure a 100 % rate of connection of social infrastructure facilities to the Internet; to prepare 40 % of the population with digital skills.

It is obvious that the further formation of the digital regional infrastructure is impossible without the availability of information infrastructure and ensuring its security, as well as without the training of qualified specialists.

## Acknowledgments

The article was prepared within the framework of the scientific project 20-010-00141 A “Formation of the institutional framework of the regional infrastructure in the digital economy” supported by the Russian Foundation for Basic Research.

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