

Digital Economy as a Factor of Sustainable Development of the RNO-Alania

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Abstract: The development of the regional economy requires a wide spread of information technologies. The article deals with the main approaches to the concept of digitalization of the economy, the features of digitalization in different industries are considered. A comparison of the degree of digitalization of the economy of the RNO-Alania is presented. The advantages are reflected, as well as an analysis is carried out, as a result of which the significance of the digitalization process and its role in the economy are revealed, since digital technologies, being introduced into economic and technological processes, necessarily participate in the formation of the added value of the final product (service), regardless of its purpose (type of activity and sector of the economy). The study provides recommendations for removing existing obstacles and restrictions for the creation and development of high-tech businesses in the Russian Federation, because information and communication products produced in the ICT sector, in each type of activity, develop, implement and use their own ICT solutions, «digital personnel» and «digital capital», which are not directly taken into account and are not measured. In this regard, there is a need to improve approaches to assessing and measuring the volume of the digital economy at different territorial levels, including in regional economies.


1 INTRODUCTION


The world economy is being transformed by the rapid spread of new digital technologies, which has a strong rationale for Russia's sustainable development until 2030. Digital technology and data are driving innovation, increasing efficiency, and improving many products and services. They promote trade and investment and facilitate the transfer of technology. They help increase productivity, which leads to greater economic opportunities. It is essential to realize this potential and ensure that it is widely disseminated. Higher levels of digitalization of both the economy and society create new tools to address global challenges in socio-economic development; contribute to more inclusive development of countries. As of 2018, 9.5% of organizations in the telecommunications and information technology sector are engaged in innovative activities. The organizations' own funds are spent to cover more than half (50.6%) of the expenses on technological

innovations. In industrial production, costs covered by company funds are estimated at 65.9%; in telecommunications and information technology, at 95.5%. Telecommunications and IT organizations are strengthening their position in innovation markets - in 2018, production based on new and improved technologies exceeded the previous year's level by 12.4% and amounted to 138.6 billion rubles (\$1.8 billion) (Litvinceva and Karelin, 2020)

Particular attention needs to be paid to the ways in which regions can take advantage of the digital, data-driven economy as producers, innovators and exporters.

The course towards the digital economy, announced at the highest level, is designed to bring Russia among the leading economies of the mid-21st century. The Strategy for Information Society Development in the Russian Federation for 2017-2030 approved in Russia gives the following definition of the digital economy: "The digital economy is an economic activity in which the key

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factor of production is data in digital form, the processing of large volumes and the use of the results of analysis, compared with traditional forms of economic activity, allow to significantly improve the efficiency of various types of production, technology, equipment, storage, sale, delivery of goods and services". (Smirnov, 2021).

Digital innovation is a fundamental driver of digital transformation, leading to radical changes in the way people interact, create, produce and consume. Digital innovation not only generates new products and services but also creates opportunities for new business models and markets and promotes efficiency in the public sector and beyond (Fedosova, 2020). Digital technology and data are also driving innovation across a wide range of sectors, including education, health, finance, insurance, transport, energy, agriculture, fisheries, manufacturing, and the information and communications technology (ICT) sector itself.

2 RESEARCH METHODOLOGY

Economies, governments, and societies around the world are going digital. Although nearly half a century in the making, the pace of change has accelerated as digital technologies rapidly evolve and combine in new and innovative ways, pushing digital transformation in new and often unpredictable directions (Kramin and Klimanova, 2019).

At the same time, the continued deployment of communications infrastructure, the proliferation of digital technologies such as smartphones that enable ubiquitous computing, and the generation of vast amounts of data of all kinds are making data an important, strategic asset.

Digital technologies and large-scale data flows fundamentally change the way people live and work, interact with each other, participate in the economy and interact with the government.

Many are now comparing digital transformation to earlier industrial transformations caused by general-purpose technologies, such as steam or electricity. Whether it's the Second Machine Age, the Third Wave, Industry 4.0 or Society 5.0, significant shifts are taking place. Digital transformation affects all countries around the world, and the importance of digital technology is highlighted in the United Nations Sustainable Development Goals, where access to information and communication technologies and universal and affordable access to the Internet is one of the key objectives in transforming our world (Babkin, 2018).

According to surveys, 60-70 million people today are willing to work without travelling to offices and production facilities. According to the Social Investment Fund, there are several categories of people who can be referred to non-movable labor resources - women with small children, disabled people, pensioners, people who came out of prison, people who moved, for example, from Moscow and the Moscow region beyond the Moscow Ring Road not far enough and now are not ready to spend in traffic jams longer than their working day.

According to the Digital Society Index, Russia ranked among the top 10 countries leading the digital economy in 2018, and also ranked seventh in terms of the degree of population engagement in the digital economy. More than 8 million people, or 12% of the total number of working Russians, are connected to intensive use of ICT. Most of them work in the industries of "Information and communication activities", "Financial and insurance activities" and "Professional, scientific and technical activities" (Indikatory, 2020).

In 2019, fixed broadband traffic was 45.8 exabytes, while mobile traffic was three times less. A third of Russian subscribers (33.7%) had access to high-speed Internet in 2019 - 100 Mbit/s to 1 Gbit/s, almost half of subscribers (45.2%) had speeds of 10-100 Mbit/s, and a fifth of all subscribers had Internet speeds less than 10 Mbit/s.

The Russians are not inferior to the residents of the USA (83% and 82% respectively), Poland (80%), Italy (78%), but they are far behind the leaders - Ireland and Scandinavian countries (97-99%). Russians most often use the Internet to communicate (the indicator is close to the average European), and much less frequently to search for jobs and content (Borovskaya and Masych, 2020).

Internet users named email spam as the main threat to information security, with 22.3% of users encountering it in 2019. During the same period, three times fewer users (7.5%; for comparison, 17.1% in 2015) experienced virus attacks. There are eight times fewer anti-spam filter users than those who have installed antivirus tools. A clear understanding of the mobile economy is a key component for sustainable socio-economic development. The availability of digital channels helps Russian companies to be successful and competitive in the international market.

Despite the potentially huge benefits, small and medium-sized enterprises (SMEs) are lagging in digital transformation. As diverse as they are, new technologies offer a wide range of applications to improve productivity and overcome the business size

constraints they face. However, SMEs need to be better prepared, and the stakes are very high. Small and medium-sized enterprises are the largest contributors to the industry in many countries and regions; they create jobs (sometimes the majority of jobs) and cement an inclusive and sustainable society. The SME digital divide has increased inequalities between people, places, and firms. There are fears that the benefits of digital transformation may fall to early adopters, further widening these inequalities. Ensuring the digitalization of SMEs has become a top policy priority in OECD countries and beyond. The report examines recent trends in SME digital adoption, including in the context of the COVID-19 crisis. It focuses on issues related to digital security, online platforms, blockchain ecosystems, and artificial intelligence. The report identifies opportunities, risks of not going digital, and barriers to adoption. It looks at specific policy measures being taken worldwide to accelerate the transformation of SMEs and raises several considerations for advancing the SME digital policy agenda. While almost 80% of SME firms have a website on average, only 30% buy cloud computing. Wider diffusion is critical, given that many advanced digital tools have been shown to increase productivity, especially when combined with additional investment in managerial and technical skills (Buht and Hicks, 2018).

To help SMEs overcome barriers to the use of advanced digital tools an enabling environment for ICT adoption needs to be created. They need to address the specific challenges faced by SMEs through more targeted policies. For example:

Support schemes to facilitate the adoption of tools that are particularly beneficial and may be new to SMEs, such as cloud computing, which requires limited initial investment and offers flexible scalability of activities.

Measures to assist SMEs to overcome obstacles to the effective use and protection of intellectual property and other intangible assets.

Measures to avoid obstacles to expanding the value of SMEs. For example, SMEs may prefer to remain small to avoid the additional regulatory burden that may arise at a certain threshold size (Borovskaya and Masych, 2020).

These SME support measures can be taken into account in a digital transformation strategy for society.

Following the Strategy of Socio-Economic Development of the North Caucasus Federal District until 2025 (hereinafter - the Strategy), the main directions, ways, and means of achieving strategic goals of sustainable development and ensuring

national security of the Russian Federation in the territories of the Kabardino-Balkar Republic, Karachay-Cherkess Republic, Dagestan Republic, Ingushetia Republic, North Ossetia - Alania Republic, Chechen Republic and Stavropol Region that are part of the North Caucasus Federal District have been identified. The North Caucasus Federal District lags significantly behind other federal districts on many key socio-economic indicators, such as per capita gross regional product, labor productivity, and average wages.

The strategy's main objective is to ensure conditions for the accelerated development of the real economy in the constituent entities of the Russian Federation that are part of the North Caucasian Federal District, create new jobs, and improve living standards. At the same time, the Strategy plans the transition of these constituent entities of the Russian Federation from a policy of stabilization to a policy of accelerated growth, under which the key areas of state support will be an investment in the development of the economy to gradually ensure self-sufficient existence of the constituent entities of the Russian Federation that are part of the North Caucasian Federal District, as well as promoting their integration into the national and global economy.

Digitalization of the economy is also an issue of social entrepreneurship development and support of social entrepreneurship (Mirolyubova et al., 2020).

Each republic of the North Caucasus Federal District is at a different stage of digital development. Close monitoring and analysis of relevant trends and effective impact assessment is required. Measurement, monitoring, and evaluation are critical to the design and management of digital policies and enable policymakers and analysts to 1) assess the contribution of digital transformation to social and economic goals; 2) understand the barriers to digital transformation, which is critical for developing effective policies in the region; 3) evaluate the effectiveness of various strategic approaches, which allows for informed decisions about priorities, policies, measures and instrumentation, and the allocation of funds; 4) constantly improve the design and administration of programs (see Table 1).

Table 1: Digitalization index and digital intensity in organizations in the business sector of the SCFD: 2018.

	Business digitalization index	Share of organizations using digital technologies in the total number of organizations, per cent				
		Broadband Internet	Cloud services	RFID technology	ERP systems	E-Sales
North Caucasus Federal District	9.3	70.8	68.1	88.6	22.3	63.6
Republic of Dagestan	3.2	59.4	63.2	91.0	12.2	52.8
Republic of Ingushetia	1.5	53.9	66.8	84.9	25.3	77.2
Kabardino-Balkar Republic	10.2	75.4	82.9	90.7	32.5	79.3
Karachay-Cherkess Republic	10.5	67.5	72.6	84.6	22.8	75.3
North Ossetia-Alania	16.7	81.3	74.5	89.2	14.1	53.3
Chechen Republic	4.9	66.7	72.7	91.1	28.2	60.0
Stavropol Territory	17.4	87.2	68.1	87.9	27.8	75.3

Intangible assets (e.g. patents, organizational capital and software) drive digital innovation.

In the Republic of North Ossetia-Alania, legal support in this sphere is mostly focused on the development of information society (edict of the Head of North Ossetia-Alania "On Measures to Develop an Information Society in RNO-Alania" No. 10, January 19, 2010); open government (edict of the Head of North Ossetia-Alania "On Ensuring Access to Information on the Activity of Bodies of Executive Power and Local Self-Government in RNO-Alania Available on the Internet", August 27, 2010, No. 115); open government mechanisms (resolutions of the Government of RNO-Alania "On Ensuring Access to the Information on the Activity of Bodies of Executive Power and Local Self-Government in RNO-Alania", No. 115, July 28, 2010); the mechanisms of an open government in the activities of the republican and local self-governing bodies of RNO-Alania (the Resolutions of the Government of RNO-Alania "On Providing Access to the Information on the Activities of Bodies of the Executive Branch of RNO-Alania" No. 309, November 12, 2010) (Smirnov, 2021).

It is important to note that in RNO-Alania, a draft law "On State Support for the Development of the Digital Economy" has been developed and submitted to the Parliament of the Republic. The draft law is aimed at: - creating a legal environment that would create favourable conditions for the development of the digital economy; - increasing the competitiveness and investment attractiveness of the Republic of North Ossetia-Alania; - implementing economic activities related to the use of digital technologies; - creating a single state digital platform that would overcome the disparate departmental systems and be based on a single data set; - converting state services

into a digital format and digitalizing interagency cooperation with the automatic growth of electronic state and municipal services (Innovation, 2020). The primary purpose of the draft law is to stimulate the activities of digital economy entities. "State support measures include subsidies, assistance in obtaining loans, provision of tax incentives, organization of human resources training, etc. The draft law proposes to introduce the concepts of "digital economy actors" and "digital innovation" to identify the recipients of support measures" (Buht and Hiks, 2018).

North Ossetia is one of the leaders in the North Federal District in terms of broadband penetration (95%) and mobile signal coverage (93%). Simple use of the Internet by individuals is widespread throughout the country. However, less than 80% of people still use the Internet every day, and more complex online activities are less common. Typically, the level of usage decreases along with the degree of sophistication of the online activity. For example, 78% of Vladikavkaz residents use the Internet for e-mail, but only 7% take online courses (Albutova, 2013).

RNO-Alania can be considered a leader in implementing digital technologies in various areas of the republic, and this pace will only increase in the near future. For example, if we take the same sphere of transport, there is an indicator - informing the resident of the region about the movement of public transport. This indicator is already available in many administrative centers, where residents can use the Yandex.transport app to see how a route is moving and at what time it arrives at a particular stop. But this opportunity is not available to people living in rural areas in settlements 100-200 km away from this center. At the same time, there are opportunities to provide this service not by 2030, as was planned, but

as early as 2021. In RNO-Alania, it is possible, but with its own regional navigation information system. Therefore, 2021 should be focused on the development of target models.

With the help of Sber ecosystem companies, together with the government of RNO-Alania, digital services in healthcare and urban planning were tested in November 2020. These are projects using artificial intelligence, neural networks and speech recognition.

RNO-Alania participates in five federal digital economy projects, with an information infrastructure project completed in 2021. The main task is to connect to high-speed Internet the main socially significant objects, which is more than 200 (70% will be connected by the end of 2021, including the objects located in the mountainous part of the republic). Completion of this project is underway in 2022. In addition, four more projects are underway, such as training for the digital economy, for which more than 2,000 people have been trained.

SberBank works with 8 thousand entrepreneurs, and it issued about 8.7 billion loans for business development in the republic in 2020.

Within the framework of concessional lending, 160 companies received state support worth 207 million rubles, and 350 deals worth 832 million rubles were restructured. It should be noted that people in business of RNO-Alania have now started to actively convert their organizations to digital format, with more than 74 percent of them working with Sberbank Business Online. At present, the drivers of digital growth in the region's economy are the service sector, the residential real estate market, and the agro-industrial complex.

It is noted that in 2020 each client visited a Sberbank office 3 times, and the total number of appeals was about 1.6 million people. Compared to 2019, the loan portfolio volume for working with North Ossetia-Alania residents increased by 34 percent to 26.2 billion rubles, including mortgage lending - by 62 percent, to 4.2 billion. Loan disbursements amounted to about 13 billion.

The average consumer loan exceeded 210 thousand rubles, and 73 percent of them were obtained through Sberbank Online. The average mortgage loan exceeded 1.8 million, and 2,336 families in the republic improved their housing conditions in 2020 (Kramin and Klimanova, 2019).

Sber supports all of the North Ossetian government's initiatives to digitalise the region. Over the last 3 years, 11 investment projects worth RUB 5 billion have been financed in RNO-Alania. The largest deal of 2020 was the project of the fruit storage

for 50 thousand tons in Arkhonskaya village for 3,2 billion.

Health care is another collective challenge in which digital technology has great potential. For example, health care providers can improve care and potentially reduce costs by digitizing medical records, using new surgical equipment, expanding telemedicine and teleconsultation, and adopting mobile health technology. Digital technologies are also of particular importance for long-term care for the elderly in RNO-Alania, as one of the leaders in digital transformation in the North Caucasus Federal District, it implements solutions for the healthcare system. For example, the Republic has a voice-activated robotic assistant, Zalina, based on artificial intelligence technologies. It answers the questions of the region's residents about the symptoms and course of the disease, advises how to keep yourself and your loved ones safe, calls at home, or makes an appointment to see a doctor. However, data-driven health services also raise new challenges related to personal data protection and privacy, security, control and ownership, transparency and accountability, quality and security, many of which can be addressed through effective health data management.

Following the Concept of Development of the Digital Economy of the Republic of North Ossetia-Alania, approved by Decree No. 474-r of the Government of the Republic of North Ossetia-Alania of December 27, 2017 "On Approving the Concept of Development of the Digital Economy of the Republic of North Ossetia-Alania", the challenges of developing the digital economy are the following:

- the digital divide at the regional and municipal levels;

- weak level of digitalization and application of information and telecommunication technologies in local governments (Fedosova, 2020).

Many traditional firms are increasingly moving online and combining both digital and physical components. While traditional firms are going digital, some firms that started on the Internet are now heading in a different direction. This goes beyond traditional firms just having a website. On the one hand, traditional retailers are using websites, mobile apps, self-checkout, electronic kiosks and smart shelf technology; on the other hand, online retailers are beginning to create digital physical stores, removing friction from traditional shopping processes and offering the ability to "click and collect"

In turn, consumer behaviour is also changing. For example, consumers can research a product online before buying it in regular stores by reading reviews and comparing prices online. Similarly, other firms

mix online and offline elements to sell goods of variable quality (e.g., fruits and vegetables) or goods that require some fit that is otherwise difficult to judge online (e.g., custom-made clothing). Innovation in the digital age relies on a wide range of public and private sector resources, including basic research, research and development (R&D), skills, and intangible assets, including data and organizational capital.

However, the social implications of digital transformation are ambiguous. For example, digital technologies provide opportunities for increasing access to information, interpersonal communications, and a multitude of services (free and interconnected Internet), advancing science and improving health (e.g., telemedicine), and enriching education (e.g., massive open online courses). On the other hand, they can create work-life imbalance problems, contribute to the segregation of people into relatively isolated like-minded groups, reduce privacy and lead to screen addiction, depression, and cyberbullying, including among children.

3 CONCLUSIONS

Digital transformation has great potential to bring about positive change across the economy. For example, digital technologies facilitate access to markets and business start-ups and increase access to goods and services - including education, health, and financial services - for low-income groups (especially those living in remote areas). Digital technology helps SMEs become "responsive" to citizens and consumers. Digital technologies make it easier for people to participate in economic and social activities.

Realizing opportunities and solving problems is not automatic and may require several steps to make digital transformation work for the growth and well-being of the entire community. There are now many opportunities for SMEs, republics' leadership, and all stakeholders to shape a digital future that maximizes the enormous digital transformation opportunities to improve people's lives.

It should be noted that RNO-Alania, despite its leading positions in digitalization and the intensity of digital technology use in the organizations of the business sector of the North Caucasus Federal District, is far from being a leader in the digital economy. The digital economy has enormous potential to promote economic development by activating established markets for goods, services, and labor. Effective use of new digital technologies

will determine the competitiveness of republics and individual companies that form the infrastructure and legal environment for digitalization.

The development of this sphere requires coordinated work of the state and private sector companies in such areas as elimination of legal barriers to the introduction of advanced technologies, creation of infrastructure for the digital economy, improvement of the education system.

Nevertheless, such benefits come with new challenges, as digital transformation changes the nature and structure of organizations, markets, and communities and raises concerns about jobs and skills, privacy and security, and notions of equity and inclusion.

REFERENCES

- Albutova, A.I. (2013). Social'noe predprinimatel'stvo v Rossii: klyuchevye igroki i potencial formirovaniya, *Ekonomicheskaya sociologiya*, 14(3): 109-132.
- Babkin, A.V. (2018). *Cifrovaya ekonomika i Industriya 4.0 novye vyzovy*, Izd-vo Politekhn. un-ta, 573.
- Borovskaya, M.A. and Masych, M.A. (2020). *Indikatory innovacionnoj deyatel'nosti: statisticheskij sbornik*, Nac. issled. un-t «Vysshaya shkola ekonomiki», M.: NIU VSHE.
- Buht, R. and Hiks, R. (2018). Opredelenie, koncepciya i izmerenie cifrovoj ekonomiki, *Vestnik mezhdunarodnyh organizacij*, 13(2): 143-172.
- Fedosova, T.V. (2020). Rezervy rosta proizvoditel'nosti truda v usloviyah cifrovoj transformacii, *TerraEconomicus*, 18(4): 47-66
- Indikatory cifrovoj ekonomiki (2020): statisticheskij sbornik / G. I. Abdrahmanova, K. O. Vishnevskij, L. M. Gohberg i dr.; Nac. issled. un-t I60 «Vysshaya shkola ekonomiki», M.: NIU VSHE.
- Innovation activity indicators (2020), <https://ict.moscow/en/research/innovation-activity-indicators-2020/>
- Kramin, T.V. and Klimanova, A.R. (2019). Razvitie cifrovoj infrastruktury v regionah Rossii, *TerraEconomicus*, 17(2): 60-76.
- Litvinceva, G.P. and Karelin, I.N. (2020). Effekty cifrovoj transformacii ekonomiki i kachestva zhizni naseleniya v Rossii, *TerraEconomicus*, 18(3): 53-71.
- Miroljubova, T. V., Karlina, T. V., Nikolaev, and R. S. (2020). Cifrovaya ekonomika: problemy identifikacii i izmerenij v regional'noj ekonomike, *Ekonomika regiona*, 16(2): 377-390.