

Digital economy in the Russian Federation: problems and development prospects

Vinokurov, Ilya V.

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ЦИФРОВАЯ ЭКОНОМИКА В РОССИЙСКОЙ ФЕДЕРАЦИИ. ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ

ИЛЬЯ ВАЛЕРЬЕВИЧ ВИНУКОВ, директор программы, факультет государственного и муниципального управления Института государственной службы и управления
Российская академия народного хозяйства и государственной службы при Президенте Российской Федерации
(Российская Федерация, 119571, Москва, проспект Вернадского, 82). E-mail: i-vinokurov@mail.ru

Аннотация: К главным достоинствам цифровой экономики относятся: широкое использование Интернета и рост цифровых навыков; повышение инновационной и инвестиционной активности; расширение рынков наукоемких услуг и технологий; диверсификация рынков труда и услуг; инклюзивное развитие в регионах и т.д. Цифровая экономика благоприятно влияет на продуктивность труда и на способность компаний конкурировать между собой, снижаются издержки производства, увеличивается количество высокоэффективных рабочих мест, что способствует повышению благосостояния общества и обеспечению национальной безопасности. Цель настоящего исследования заключается в определении основных проблем процесса цифровизации в России, с которыми российское общество может встретиться или уже столкнулось в ходе внедрения в жизнь и производство новых технологий и знаний, полученных в качестве итога четвертой научно-технической революции.

Активирование развития бизнеса в области компьютерных информационных технологий и телекоммуникаций, а также создание необходимой экономической среды способствует: увеличению предложений информационных, технических и технологических продуктов, которые связаны с использованием компьютеров и компьютерных сетей, усилению государственного научно-технического потенциала; увеличению спроса субъектов государственной экономики на продукты, которые созданы и используются для создания информационно-компьютерных технологий; увеличению инвестиций информационно-компьютерной сферы, областей внедрения таких технологий в разных экономических отраслях. Главными результатами, которые ожидаются от цифровизации экономики, являются: увеличение уровня и качества жизни граждан; введение новых рабочих мест; уравнивание диспропорций между регионами; увеличение производительности труда и рентабельности корпораций; обеспечение надежного экономического роста.

Ключевые слова: цифровизация, цифровая экономика, цифровые технологии, перспективы развития

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DIGITAL ECONOMY IN THE RUSSIAN FEDERATION. PROBLEMS AND PROSPECTS FOR DEVELOPMENT

ILYA VALERIEVICH VINOKUROV, Program Director, Department of Civil and Municipal Service at the Institute of Public Administration and Civil Service
Russian Presidential Academy of National Economy and Public Administration (82, Vernadsky prospect, Moscow, 119571, Russian Federation). E-mail: i-vinokurov@mail.ru

Abstract: The main advantages of the digital economy include the widespread use of the Internet and growth of digital skills, increased innovation and investment activity, expansion of markets for knowledge-intensive services and technologies, diversification of labor and service markets, inclusive development in regions, etc. The digital economy benefits productivity and competition between companies, reduces production costs, increases the number of high-performance jobs, enhances public welfare, and ensures national security. The purpose of the study is to identify the main problems of the digitalization process in Russia, which the Russian society may meet or have already faced during the introduction and use of new technologies and knowledge obtained as a result of the fourth scientific and technological revolution.

Active business development in the field of computer information technology and telecommunications, as well as the creation of the necessary economic environment, contributes to an increase in the supply of information, technical and technological products that are associated with the use of computers and computer networks, strengthening the state scientific and technological potential, increase in demand for domestic information products, which are created and used for the production of information and computer technology, increase investment in information and computer sphere, as well as areas of implementation of such technologies in various economic sectors. Digitalization of economy will raise the quality of life for citizens, introduce new jobs, reduce regional disparities, increase labor productivity and corporate profitability, as well as ensure economic growth.

Keywords: digitalization, digital economy, digital technologies, development prospects

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Introduction

The purpose of the study is to identify the main problems of the digitalization process in Russia, which the Russian society may face or have already faced during the introduction and use of new technologies and knowledge obtained as a result of the fourth scientific and technological revolution. All identified problems will be taken into account and examined when further reforming and financing already existing government programs. In addition, to support the development of digital economy, new programs can be created to reduce the possible risks associated with both the growth of unemployment and the decline in the number of ICT specialists.

The article examines the works of the leading Russian scientists, analyzes statistical data on the process of digitalization in the country and related phenomena, and discusses the National Project "Digital Economy". The research methodology is based on general methods of knowledge: comparative analysis and rating, economic and mathematical modeling, observation, and fact-gathering.

Results and discussion

The term "digital economy" first appeared in 1995 in "The digital economy: promise and peril in the age of networked intelligence" by D. Tapscott.

In current world practice, experts mainly use three methods to calculate the relevant indices to assess the level of development of a country's digital economy: Networked Readiness Index (NRI), e-commerce readiness (E-Readiness Index (ERI)), Information Society Index (ISI) [Kvilinsky et al., 2019. P. 149].

Digital economy includes information and communication technologies as a method for increasing the efficiency of production, distribution, and use of the results of economic activity [Babanov, 2017. P. 255].

One of the main problems in the development of Russia's digital economy is the low level of digital literacy of the population. According to NAFI research, in 2020, the share of digital literacy of citizens was only 27 % [Abdrakhmanova, 2020. P. 203].

The problem of insufficient technology level is also essential. The sphere of domestic computer and telecommunications equipment requires development. It is recommended to use digital technology in as many spheres of life as possible. This will encourage all market participants to work together in a single information network, reduce transaction costs, and transform the distribution of labor. The main factor in the implementation of this idea is broadband Internet coverage of the entire territory of the Russian Federation.

One of the leading problems of the digital economy in Russia is data security. The existing security system is insufficient to prevent economic crime, so the development of the digital economy must be combined with the improvement of the security system [Sturgeon, 2021. P. 35].

During the transition to a digital economy, there is a chance that different regions will be differently prepared

for digitalization. In this case, it is necessary to introduce a corresponding federal law when the regions would have the right to issue specific acts to simplify and facilitate the implementation of the digital economy.

An additional factor slowing the development of the digital economy in Russia is the lack of IT specialists. Only 15 % of all IT graduates (out of 25,000) have sufficient knowledge for employment [Kader, 2020. P. 74].

In the global market, Russia's share of industrial robots is only 0.15 %. In 2019, 958 manufacturing robots were sold in the Russian Federation (98 more than in 2018), and only 4.8 % of them were produced in Russia. In Russia, the use of domestically produced robots is much lower compared to other countries. In this regard, there is a problem of modernization and robotization of current production facilities for their highest efficiency and competitiveness [Abdrakhmanova, 2020. P. 73].

Here are some reasons that hinder the development of robotics in Russia:

- insufficient number of narrowly focused professionals;
- insufficient qualification of the general mass of workers and engineers for learning robotics;
- insufficient number of domestic production technologies and the availability of imported analogues;
- absence of the necessary domestically produced electronic basis, the assembly of technological devices is made from foreign components and according to their own technologies;
- lack of design software, low level of infrastructure;
- poor funding, low level of development of the robotics market;
- the Russian Federation does not have its own international companies that participate in the development of start-ups and their introduction to the global market;
- inappropriate distribution of the budget of enterprises, which prevents the development of an industrial cluster according to current global traditions;
- absence of a regulatory framework;
- insufficient state support for robotics;
- lack of state support for innovative start-up companies, etc. [Abdrakhmanova, 2020. P. 111].

It can be concluded that it is necessary to increase the digital literacy of the population, improve domestically produced telecommunications and computer equipment, provide broadband Internet coverage throughout the country, develop a new security system for the digital economy, adopt an appropriate federal law concerning the regions, which simplifies and accelerates the implementation of the digital economy throughout the country [Abdrakhmanova, 2020. P. 202].

According to experts from McKinsey, Russia is not a leader in the growth of the digital economy in many regards, such as the degree of digitalization, the share of this area in the country's GDP, the slow level of technological development. The share of the digital economy in Russia's GDP is 3.9 %, which is 2–3 times lower than that of the leading countries. At the same time, the Russian

Figure 1. Results of assessing Russia's readiness for the digital economy [compiled by the author]



Federation has all the necessary initial stages for further development and implementation of digital technology, including the growth rate of the corresponding spheres [Grigorescu, 2021. P. 12].

According to RAEC (Russian Association for Electronic Communications), from 2016 to 2019, the country's Internet economy grew by an average of 15–20 % per year. The four main elements of the industry are advertising and marketing, e-commerce, infrastructure and communications, and digital content. In 2019, the total contribution of these elements to the country's GDP represented 4.7 trillion rubles; in 2020 (with the addition of the mobile economy), it reached 6.4 trillion rubles. Despite the coronavirus-related crisis in many sectors of the economy, the total increase in the contribution of these elements to the economy was 15–16 % [Abdrakhmanova, 2020. P. 24].

Improvements in intelligent control and data processing technologies mark a new stage in the production and use of robotic systems due to advances in the fields of energy, mechanical engineering, microprocessor technology, and telecommunications [Manko, 2015. P. 156]. The automation of production processes using industrial robots is practiced by such Russian companies as "FANUC", "Intellectual Robot Systems" LLC, "Belfingroup", "VECTOR GROUP" LLC, "FAM-Robotics", etc. [Malyshkin, 2018. P. 79]. According to Russian companies, the most promising industrial areas for robotics application are the military industry (46.6 %), mining and automotive industry (13.3 %), electronic and wood processing industry (6.6 %) [Abdrakhmanova, 2020. P. 104].

According to domestic companies, the most promising areas of robotics use in manufacturing are cloud technologies, artificial intelligence technologies (machine vision and learning, adaptive control algorithms, etc.), manipulators, wireless technologies, 3D Area sensor, various types of robots (exoskeletons, drones, nanorobots, patrolling drones), and production areas (laser welding/cutting, 3D printing technology, technical vision system, etc.) [Abdrakhmanova, 2020. P. 10].

For the economy, the use of such systems is initially associated with the ability to monitor the implementation of state-important projects in various areas, including industrial production, construction, military, and rescue operations. In addition to economic planning of processes of diverse nature, robotic systems united by one information network can solve many regional and state-managed tasks [Kvilinsky, 2019. P. 147].

An important component of the digital economy is the concept of "e-government", which involves three fundamental elements:

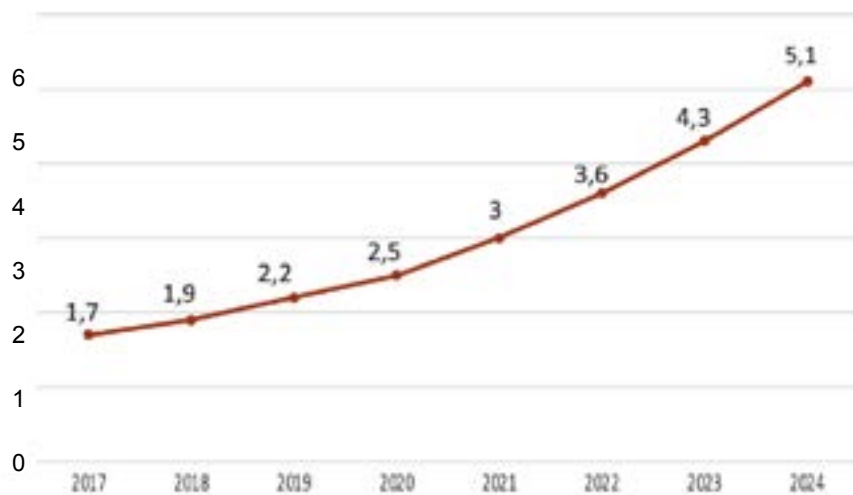
- easy 24/7 access to information in the sphere of state and municipal services by using the Internet, regardless of the location of the citizen;
- automation and informatization of bureaucratic processes through modern technologies;
- ensuring the "openness" in the work of state and municipal governments and the full participation of citizens in democratic actions.

Russia has an intellectual and scientific base, which is supported by a secondary and higher system of technical education. Russian specialists are traditionally strong in applied fields that are especially in demand in the digital age: software development, ensuring a high level of cybersecurity, and the use of artificial intelligence.

According to the researchers, now there are favorable conditions for reducing dependence on imports, and Russian specialists are increasing exports of domestic products in the field of digital technology to the international market. These factors include the weakening of the ruble, the implementation of import substitution under the supervision of government policy, as well as tax incentives for domestic developers. To succeed and take one of the leading positions as a software exporter, the Russian Federation needs to ensure an average annual growth rate that will be ahead of its competitors. To cope with this situation, we need to start exporting our licensed products and services with increased value in promising segments. Also, the presence of developing countries in the market, where the growth of the digital economy is moving faster than in traditional Russian markets, should be increased.

The process of digitalization of Russia's economy can be considered a relatively new phenomenon, which, together with the global accelerated development of technology, can radically change both the country's economy

Figure 2. Costs for developing digital economy
[Abdrakhmanova, 2020. P. 69]



and all spheres of human life. Particular attention should be paid to the consideration of the National Project “Digital Economy”, the budget of which is 1.6 trillion rubles, with more than 1 trillion rubles allocated from the federal budget. This shows an increased interest of the Government of the Russian Federation in the implementation of the project [Abdrakhmanova, 2020. P. 10].

To define the main problems of digitalization, it is necessary to study the issue related to the state of the country’s digital economy. Let us consider the results of the assessment of Russia’s readiness for the digital economy based on the World Bank report [World Bank..., 2018].

Figure 1 shows the principal indicators that characterize the readiness of the country to fully transition to digital economy with a switch from the traditional way of doing not only the economy of organizations but also the state. The data show a relatively average level of the country’s readiness for the transition to the digital economy. The indicators “Trust and Security”, “Digital Infrastructure”, and “Digital Citizens and Platforms” are rated 4. The rest of the indicators have rating of 3 out of 5, showing the need for further development of these sectors.

Figure 2 shows the dynamics of spending on the development of the digital economy as a percentage of the GDP of the Russian Federation [Abdrakhmanova, 2020. P. 69].

We can see a trend towards a steady increase in domestic spending on the digital economy development over the analyzed period. This indicates a state policy aimed at sustainable development without any unexpected leaps, which is the most beneficial way to achieve the goal. If we think from the point of view of systems’ development, a smooth transition to an increase in the volume of costs, provided that the level of GDP also increases, will allow us to mobilize financial and human resources for a given period and then move on to accelerated development. Although the Russian Federation is currently at the stage of initial development of the digital economy, in comparison with Western countries and the United States, where the

level of development of the digital economy currently exceeds Russia’s, the Government has chosen the most optimal and effective method of addressing the problems of competitiveness and maintaining its position on the global market in terms of the prospects of the country’s economy. It should also be taken into account that compared to other countries, Russia began the process of digitalization much later.

For the last 5 years, Russia has been in a difficult position due to the aggravation of the geopolitical situation in the world arena. This, in turn, affects both the state of the main spheres of life of the country’s citizens and the development of infor-

mation technologies and the digitalization of the economy [Abdrakhmanova, 2019. P. 10]. We need to understand that to maintain its place on the world stage, Russia needs to transition to digital economy. After all, the discoveries and merits, as well as the rich natural resources that Russia has made in the last 30 years, are no longer enough.

Now there is a tendency for Russia to lag behind western countries in terms of information technology development, which will ultimately lead to a decrease in Russia’s prestige in the world arena and the low competitiveness of Russian companies.

It is difficult to name the main problems that Russian society is currently facing on the way to the digitalization of the economy and the development of information technologies since they are already a system of problems that shapeshift and adapt to changes on the scale of the whole country.

First of all, it is a problem associated with high differentiation between the federal center and the regions. Technology and events typical of big and prosperous cities are still unusual in less affluent regions and small towns. This problem leads to a decrease in the objectivity of the assessment of the state and level of development of the digital economy in the country since the strong correlation of data leads to inaccuracies in the resulting calculations and, consequently, reduces the accuracy of econometric models built based on data from the whole country. The problem of the inaccuracy of conditional models of the digital economy development leads to the need for the detailed consideration of the situation in each constituent entity and the creation of individual models. That is, the state needs to use approach when it has to select and create programs for the development of the digital economy of constituent entities that differ from each other; to some extent, it imposes additional obligations on state-federal bodies, since the personnel level in the field of information technology and digitalization in the bodies of constituent entities is much lower.

Figure 3. The share of ICT specialists by country [Abdrakhmanova, 2020. P. 35]

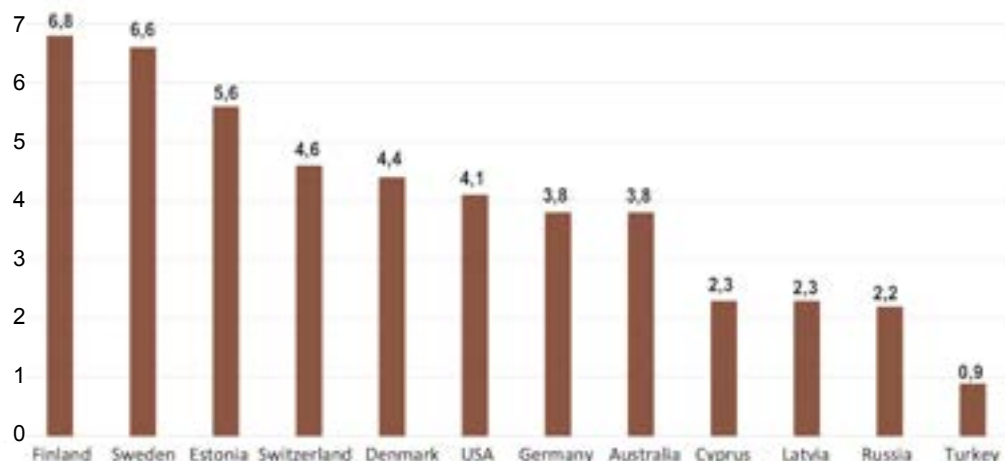


Figure 4. Interaction of the population with public authorities and local self-government [Abdrakhmanova, 2020. P. 35]

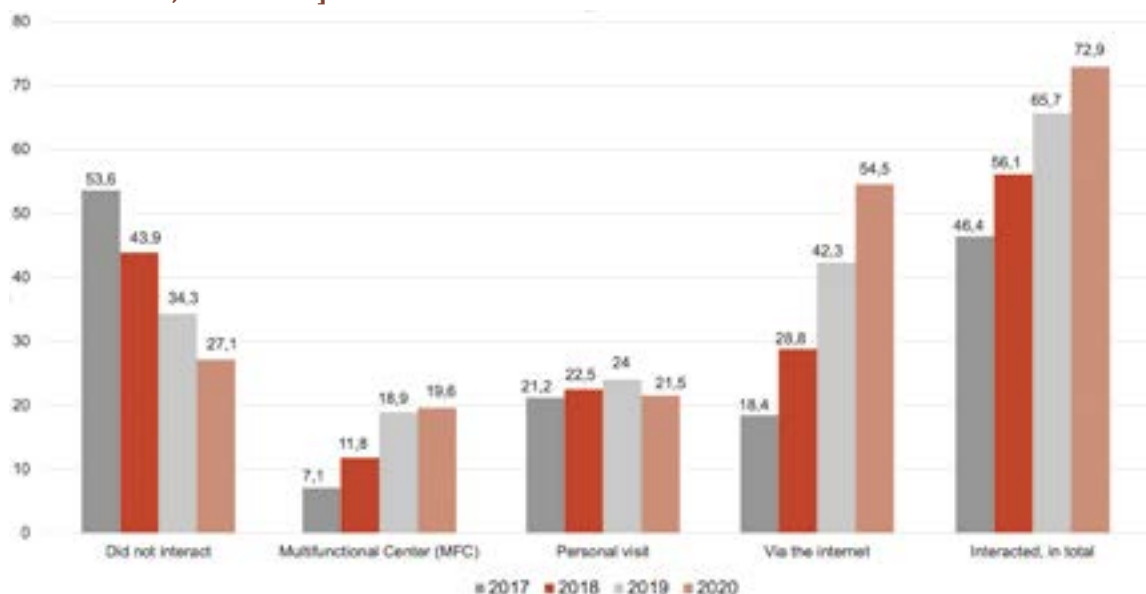
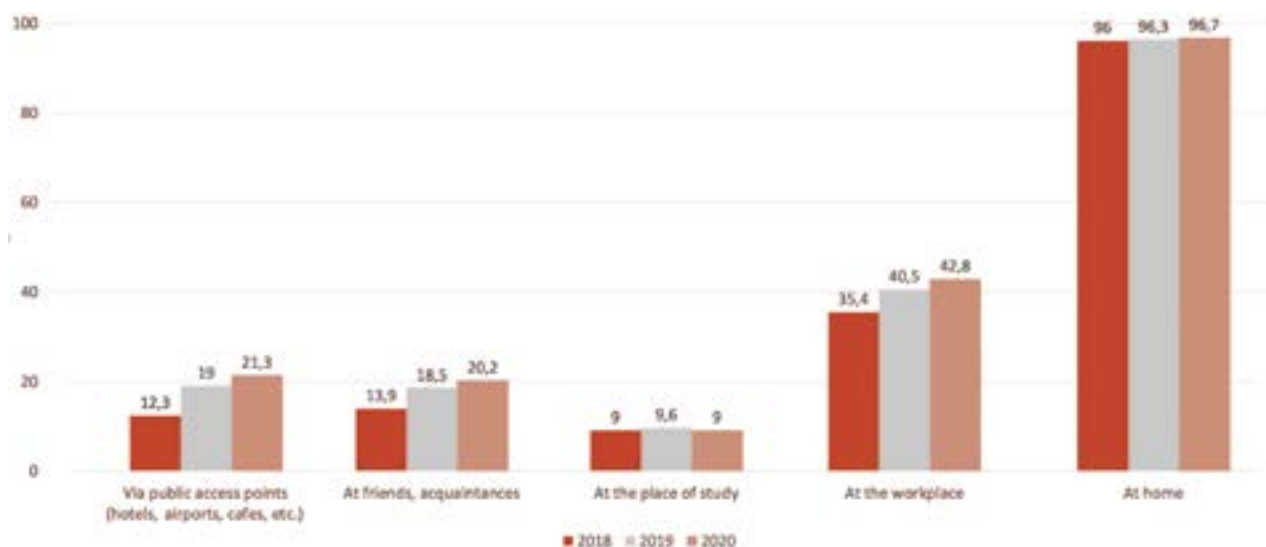


Figure 5. The use of the Internet by the population (based on the materials of sample surveys of the population on the use of ICT; as a percentage of the total population) [Abdrakhmanova, 2020. P. 10]



In recent years, the Russian economy has been characterized by increased investment in financial markets, while the real sector is bypassed by domestic investors, who prefer to invest in foreign companies or Russian government securities. Such a policy leads to a lack of funding of fixed assets and does not allow creating the necessary technical base for the modernization of production or a qualitatively new digital production. Companies cannot afford expensive equipment for the transition to a new form of production, and also, such a national trait as a denial at the first stages of everything new is involved here. Executives prefer to stick to traditional ways of managing organizations.

The problem of unemployment has always been acute in the Russian Federation. According to the Unified Portal of the Budget System of the Russian Federation, Russia ranks 106th out of 185 for the total level of unemployment in the country [Unified Portal of the Budget System of the Russian Federation, 2020]. The figure for 2020 is 5.1 % of the total workforce, which could be considered a relatively positive indicator, but there is a “nuance”. It should be taken into account that the process of digitalization involves the transition from the traditional way of doing business to a digital one with the use of information technology. If we look at the employee structure in an organization, due to digitalization, many people will lose their jobs because their duties can be safely performed by powerful computers with built-in artificial intelligence. In March 2020, at one of the meetings of the State Duma, the issue of dismissal of more than 15 million people due to the digitalization of economy in the coming years was discussed. These figures are considerably high on a national scale. The loss of jobs for 15 million people would lead to a sharp rise in unemployment and the inability of citizens to find work again. It would also cause severe damage to the country’s retirement system, which is based on the current level of employment.

There is also the issue of increasing the number of personnel occupied in the field of information and communication technology. **Figure 3** shows the share of information and communication technology workers in certain countries [Abdrakhmanova, 2020. P. 35].

In this list of countries transitioning to digital economy, the Russian Federation is at the very end. As mentioned earlier, Russia’s lagging behind other countries largely depends on the fact that the country has embarked on digitalization relatively recently. The National Project “Digital Economy” says that by 2024, more than 120 thousand people will receive higher education in information technology areas, and the number of trained specialists will increase from 30 thousand in 2019 to 270 thousand in 2024. These activities will increase the number of people employed in ICT, but we cannot determine how this will affect the total figure of the working population in the country. If we do not take into account the growth of unemployment, these measures are very effective since new areas of education related to ICTs will be created. Also, the factor ensuring the future growth of

the number of students studying in such areas will be that in the process of implementing the National Project “Digital Economy” and the development of the digital economy itself, the prestige and salaries of these professions will increase significantly.

The issue of data protection and safe transition to digital economy is a significant problem that needs to be addressed right now. The digitalization of the economy implies a transition to the Internet of Things. The Internet of Things is an interconnected system of equipment, computers, etc., connected to a single center. This technology allows for remote manipulation of the technical base and reduces the need of “manual work”. However, such production ecosystems require cloud servers capable of storing and processing all incoming information to run smoothly and efficiently. Here another problem arises since, according to current legislation, all information related to Russian individuals and legal entities must be stored within the territory of the country. We should also note the lack of legislation regulating the use of the Internet of Things. Gaps in the current legislation make it possible to illegally use these technologies, which will help cyber criminals involved in the declassification and theft of confidential information in this area.

In 2020, the whole world faced a global problem that changed the life as we know it. The COVID-19 pandemic forced almost all countries to adopt quarantine measures to restrain the spread of the disease (Yang, 2021. P. 201). With the restriction of social contacts, Russia’s digital economy and information technology have revealed weaknesses that may have been ignored before due to specific reasons related to non-urgency in addressing them.

During the regime of self-isolation, many citizens and organizations needed to apply to government agencies to obtain certain services or benefits online. Since the regions lagged behind the federal center in terms of the development of Internet networks and related equipment, problems arose related to receiving services or benefits without physically visiting government offices. It turned out that in creating conditional instructions and rules, the federal authorities did not take into account the peculiarities of the development of remote systems in the regions lagging behind. Now, citizens can receive public services remotely through the “Public services portal of the Russian Federation”, which requires identification in specialized institutions, and this is extremely difficult in the regime of self-isolation.

Figure 4 presents statistics on the interaction between the population and public authorities and local self-governments. The data shows that in 2018, only 54.5 % of the population interacted with public authorities and local self-government through official websites and portals. For a digital society, these numbers are notably low since it indicates either the underdevelopment of electronic resources for service delivery or the problems that exist with identifying and being able to use these resources. The second option is most common in the Russian Federation because if you want to access electronic

services, you must first sign in to specialized institutions.

The availability of broadband internet connection throughout the country is one of the most significant factors in the state's transition to digital economy. As a consequence of the coronavirus pandemic, working with electronic government resources via the Internet is extremely important. Currently, all developed countries use 4G Internet, which provides high speed to interact and manage massive data. In recent years, a new generation of networks has been developed that allows you to perform data processing operations almost instantly. The new generation network is called 5G. In the next 4 years, this technology will be finalized and later applied throughout the country.

Figure 5 [Abdrakhmanova, 2020. P. 102] shows indicators characterizing the proportion of the population with the ability to use the Internet for specific household or production tasks.

In 3 months of 2018, 80.9 % of respondents used the Internet. At the same time, there is a decrease in the dynamics of respondents who have never used the Internet. Compared to previous years, the rate of growth of this indicator in 2017 and 2018 is 15.1 % and 22.09 %, which indicates the increasing spread of the Internet. Nevertheless, in 2018, the figure was 12.7 %, higher than in the rest of the developed countries, and indicates the need to take measures to expand the areas covered by the Internet.

The coronavirus pandemic halted the work of many businesses in the country and slowed the growth of the Russian economy, while the national budget allocated enormous funds to support businesses and the popula-

tion. This will affect the implementation of not only the "Digital Economy" project but also the other national projects. At present, no changes or delays in the implementation of projects have been announced by the state authorities; however, this will inevitably happen if the situation does not improve.

Conclusion

Based on the results of the study, we can conclude that the Russian economy is now in a state of transition. The government is focused on the transition to digital economy using state programs to develop technology, cybersecurity, and human capital. We know that enormous funds from the federal budget and the budgets of the constituent entities are being allocated to achieve this goal. But we also see that society is not ready for this transition: the development and provision of the expensive technical base; lack of interest from foreign investors, who were the main sources of funding for the real sector of the Russian economy; differentiation between the constituent entities and the federal center; high risks of rising unemployment due to the inability to retrain workers and automation of production. These factors also include the coronavirus pandemic, which revealed new challenges in the transition to digitalization.

The transition to the digital economy will not be possible without solving the existing problems. This means that along with the implementation of the National Project "Digital Economy", we need to pay attention to existing shortcomings and eliminate them to maximize the effect of the measures taken.

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