

Development of the Information Society in the Russian Federation: Problems and Prospects



**Vladimir S.
USKOV**

Vologda Research Center, Russian Academy of Sciences
Vologda, Russian Federation

e-mail: v-uskov@mail.ru

ORCID: 0000-0001-5158-8551; ResearcherID: T-6713-2017

Abstract. The development of information technology and the informatization of society are putting forward new tasks that focus on obtaining major advantages in the use of information and communication technology, expanding the capabilities of users and effective use of the Internet and digital services. A characteristic feature of the modern stage of society's development is the digitalization of the economic and social spheres. Digital transformation has become an important factor in global economic growth: potential economic effects of the digital economy can significantly increase GDP, people's purchasing power, change the labor market and quality of life, and improve the business environment. The emergence of the concept of "digital economy" marked a new stage in the management of goods and services production based on the use of modern information technology. The development of the information society in Russia and the reduction of its lag behind the leading countries requires addressing the issues related to the development of intellectual, human, technological advantages; the formation of an adaptive regulatory framework for the introduction of digital technologies in all spheres of life. The purpose of the work is to comprehend the concept and the essence of the information society in its relationship with the phenomenon of the digital economy and to study trends, problems and prospects for development of the information society in the Russian Federation in the context of digitalization of the economy. We review theoretical concepts of the development of the information society, consider theoretical foundations of the essence of the information society in the context of digitalization of the economy, analyze the state of and trends in the development of the information society in the Russian Federation,

For citation: Uskov V.S. (2022). Development of the information society in the Russian Federation: Problems and prospects. *Economic and Social Changes: Facts, Trends, Forecast*, 15(2), C. 120–137. DOI: 10.15838/esc.2022.2.80.8

and reveal problems and directions of its development. Scientific novelty and originality are as follows: we develop theoretical and methodological approaches to studying the essence of the information society in the conditions of digitalization of the economy and the corresponding conceptual apparatus; we define scientific and methodological foundations for a comprehensive assessment of the situation and trends in the development of the information society in the Russian Federation; we propose a range of practical measures and a list of indicators characterizing the development of the information society.

Key words: information society, digital economy, problems, state, trends, development directions.

Acknowledgment

The article was prepared within the framework of state task no. FMGZ-2022-0002 “Methods and mechanisms of socio-economic development of Russian regions in the context of digitalization and the fourth industrial revolution”.

Introduction

The impact of information and communication technologies (ICT) on the socio-economic space is global, and the speed of their spread is high. They are widely used in various spheres of social and industrial activity. The scale of the informatization process determines the need to measure the impact of information processes and ICT on the national economy development.

The technological revolution of the late 20th century led to the transition from a “material” society to an “informational” one, where information is a priority production factor. This socio-economic transformation is reflected in the change in the production mode, GDP structure, emergence of new professions, development of information and communication infrastructure, globalization and digitalization of the economy, integration of services and technologies, as well as networks for the information transmission and processing.

All population groups and activity spheres are affected by informatization which is due to the information concentration in places of its accumulation and dissemination, as well as the possibility of its direct impact on society. Therefore, it is necessary to work out a number of measures for developing information and communication infrastructure that meets the needs of the economy and the information society.

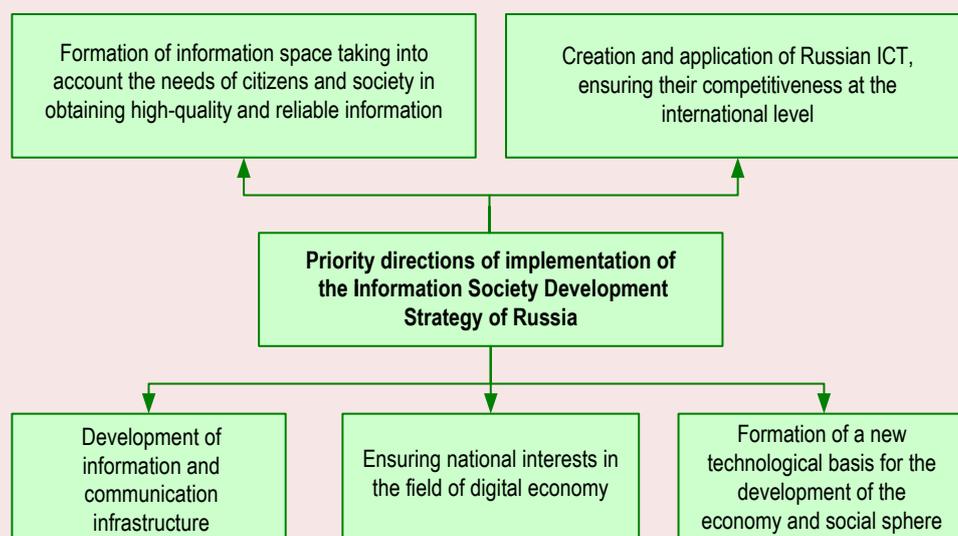
The ICT industry, as part of the material, industrial and social infrastructure, not only plays a direct role in solving all the tasks of forming the information society, but also has a specific stimulating effect in all economic and social spheres (Kuzovkova, 2017).

The Information Society Development Strategy in the Russian Federation for 2017–2030, approved by the Russian President, assigns information and communication technologies a major role in the development of Russia’s external and internal policy, the information society formation, the digital economy creation and ensuring state interests and priorities within the economic digitalization (*Fig. 1*).

In recent decades, ICTs have been of key importance in the process of developing the information society at the national and international levels and ensuring sustainable development standards. The importance of the industry is determined by the positive impact of the ICT use in the production of goods and services, as well as changes in the quality of production capacities and factors of production. Only when creating the information society it is possible to use the information resources and technologies effectively.

The purpose of the work is to comprehend the concept, the essence of the term of the information society in its relationship with the digital economy

Figure 1. Objectives of the Information Society Development Strategy in the Russian Federation for 2017–2030



Source: own compilation.

phenomenon, and to study trends, problems and prospects for the development of the information society in the Russian Federation in the economic digitalization. The following tasks are aimed at achieving it:

- 1) to summarize the theoretical concepts of the development of the information society;
- 2) to study the theoretical foundations of the information society essence in the economic digitalization;
- 3) to analyze the state and trends in the development of the information society in the Russian Federation;
- 4) to identify the problems and directions of the development of the information society in the Russian Federation in the context of the digital economy development.

Materials and methods of research

The research is based on the application of an interdisciplinary approach implying the use of a unified methodological framework in order to summarize the results in scientific, technological, industrial, socio-economic, institutional, administrative and managerial, political and legal and

other areas to conduct a comprehensive analysis of the formation and development of the information society in the Russian Federation in the digital economy development.

We have carried out the analysis of the state and trends in the development of the information society in the Russian Federation with the help of an array of statistical information covering, first, indicators of innovative economic development, second, data characterizing Russia's socio-economic potential, and third, indicators of the information and communication technologies market.

The information base of the research is the work of Russian and foreign economists in the field of scientific, technological and innovative development, public administration; scientists dealing with the digital economy development, the problems of formation and implementation of the information society in their relationship with the socio-economic development issue.

The research is based on the principles of complexity, consistency, dialectics which allow gaining knowledge about the essence of the

information society and the ways of its formation. Its scientific novelty and originality consist in the development of theoretical and methodological approaches to the study of the essence of the information society in the economic digitalization and the corresponding conceptual apparatus; in the development of scientific and methodological foundations for a comprehensive assessment of the state, trends in the development of the information society in Russia; in the formation of a set of practical measures and a list of indicators characterizing Russian's information society development in the conditions of digitalization.

Research theoretical aspects

The information society concept began forming as a result of the development of the post-industrial doctrine which assigned information and knowledge a major role in the development of production and society.

In the late 1950s, D. Risman introduced the concept of "post-industrial society". The emergence of the post-industrial society theory is a complex result of the application of various assessment methods to the dynamics of social development. Already in the early 1960s, the post-industrialism concept became widespread, along with the understanding that social and political factors were gradually giving way to factors of technological development.

There are several approaches to the post-industrialism theory in the scientific literature. The first is based on the definition of D. Bell, who understands post-industrial society as a society whose economy has moved from mass production of goods to the production of services, organization of scientific research, the education development and life improvement (Bell, 2001). In this regard, the post-industrial society determines the appearance of advisers, consultants who act as experts in the political arena.

The second approach assumes a connection with the definition of a new state of civilization

through the informatization development. In the 1960s, the concept of "information society" was introduced; this theory was widely spread in the works of R. Katz, I. Masuda, T. Stonier, M. Porat. Adherents of this approach note that the rapid development of the informatization processes leads to the information society as a result of a new qualitative development of post-industrial society. According to I. Masuda, the development of computer technology allows quickly moving from one technical solution to another which is better. The very speed of the spread of the information revolution is characterized by constant growth, and also exceeds the speed of technology development (Masuda, 1983a; Masuda, 1983b).

A significant contribution to the study of post-industrialism issues was made by the American political scientist Z. Brzezinski. He noted that under the influence of technology and electronics, the development of computers and communications in culture, psychology, society and economy, a post-industrial (technological) society is being formed.

In the early 1960s, the concept of "electronic society" (Marshall McLuhan) was proposed which led to the study of the development of modern culture characterized by the presence of electronic communication methods.

Among the studies of Russian scientists on the problem under consideration, we can note the works of V.L. Inozemtsev, A.I. Rakitov, and R.F. Abdeev.

According to V.L. Inozemtsev, the basis for the transition to post-industrial societies is not so much new technologies or knowledge, as the change of the person himself, the acquisition of a qualitatively new motivation. At the same time, the spread of post-industrial trends is extremely slow due to the unique property of the post-industrial type of society itself. For instance, having reached a certain development level, this society forms a relatively economically and socially neutral sector which is increasingly striving to interact with the rest of the elements of the social whole. V.L. Inozemtsev's works on the

development of post-industrial society as a social phenomenon are currently recognized by Western sociology (Inozemtsev, 2000).

A.I. Rakitov's studies of the development of the technological and information revolution note the main changes and innovations in culture, society and civilizations in general. In his opinion, the information society development includes several stages, the transition to which is carried out through technological (information) revolutions (Rakitov, 1998).

In the 1980s, R.F. Abdeev associated the main stages of the society's development with achievements in the field of informatics, information management, computerization, ecology (the concept of information civilization). In his opinion, the civilization development is influenced by the information revolution which leads to an increase in production efficiency, a reduction in employment in the economy. The creation of modern technologies is changing economic sectors and creating a favorable environment including for economic growth in developing countries.

The generalization of scientific papers on post-industrial development and research on social change, the society's development, allows identifying the main characteristics of post-industrial society. Among them are knowledge-intensive industries, the predominance of the service sector, the development of ICT infrastructure (integrated, distribution networks), information and knowledge that are determinants of social processes (Masuda, 1983a; Masuda, 1983b; Toffler, 1999; Webster, 2004).

According to the results of the analysis of theoretical and methodological approaches, the generally accepted definition of the concept of "post-industrial society" has not been developed in the scientific literature. Currently, when studying issues related to the information society development, the terms "new economy", "information economy", "Internet economy",

"knowledge economy" and "digital economy" are encountered. The interpretations of these terms offered by scientists are diverse and very vague depending on the scientific direction in which the concept is being studied.

In our opinion, the information society is a society where the production, processing, storage and transmission of information increase the efficiency of socio-economic processes.

In turn, the informatization of social processes is understood as the improvement of social and economic conditions of society with the help of modern information and communication technologies. In the absence of a sufficient technological basis that allows the dissemination of organized knowledge without spatial restrictions with the least expenditure of time and labor, the growth and development of the information society will be insignificant.

Society, filled with information consumption and equipped with modern information technologies, developed infrastructure, can perform tasks at a completely different level, conduct economic activities for sustainable economic growth and development.

According to Yokoshiro Kogan, the information space is a set of databases with advanced technologies, methods of storage and use, information transmission systems operating on the basis of uniform principles and providing information interaction between institutions and citizens to meet their information requests. The above components and the economic component of the development of the information society form a phenomenon called the "digital economy" (Amagaev, 2017).

In scientific research, the digital economy is primarily an economy in which the main share of gross domestic product is formed through the production, processing, storage and dissemination of information with the participation of more than half of those employed in the economy in this activity. Within the framework of a practical

approach, the digital economy is a concept that considers the use of information resources for economic development. The scientific and methodological approach to the definition of this concept assumes to consider the digital economy from the standpoint of analyzing the laws of creation, storage and dissemination of technical information.

A.M. Tufetulov believes that the digital economy is a complex of inter-economic interactions that have a number of key elements that differ from other possible types of economies. Thus, at present we can say that the digital economy is going through the period of its formation (Tufetulov, 2007).

The main trend of effective development of the digital economy is the digitalization. It is the process that forms the basis of the digital economy and causes the restructuring of traditional formats for the presentation of information to digital, in order to ensure the growth of the efficiency of business processes and improve living standards by increasing the speed of interchange, accessibility and security of information, increasing the role of automation.

Digitalization determines the creation of digital platforms in the economic space that allow solving strategic issues in the field of education and science, medicine, transport, public administration, industry, etc., it means that the nature of public relations is being transformed.

In order to study the information society phenomenon, it is necessary to consider the criteria for the formation of analytical approaches to its definition. The generalization of the economic literature on this topic revealed that there are four criteria for the analysis of the information society: related to employment, spatial, economic and technological (*Tab. 1*).

Thus, many approaches to the identification of elements of the information society are based on the acceptance of the fact that the emergence of new social and economic interactions in society is associated with significant quantitative changes in the production, processing, storage and dissemination of information.

Having considered various methods of interpretation of social and economic relations, created on the basis of information and digital technologies, we can conclude that at present detailed provisions on this issue have not been developed. Many studies pay attention to quantitative indicators of society's informatization, and we assume that soon, with sufficient growth, the digital economy will begin prevailing.

Research review in this field allows concluding that the transformations in modern society, caused by the global penetration of modern information technologies into many spheres of activity, appear

Table 1. Analytical approaches to the identification of the main elements of the concept of "information society"

Criteria	Characteristic	Researchers
Related to employment	Changes in socio-economic processes are a consequence of the employment of the majority in the field of production and dissemination of information. Data becomes the main resource, a significant increase in the workload in the field of their processing can be considered as a transition to an information society.	Bell D., Drucker P., Machhlup F. (Bell, 2001; Drucker, 1993; Machhlup, 1962)
Spatial	The global economic space is formed on the basis of the development of data transmission networks in different places. In turn, networks become the main feature of social development.	Barron I., Curnow R. (Barron, Curnow, 1979)
Economic	Takes into account the increasing value of the production, processing, storage and dissemination of information.	Lane N., Martin J. (Lane, 1999; Martin, 1978)
Technological	The presence of a large number of innovations in the field of ICT, which have become widespread in society	Fuchs C., Mulgan P., Urry J. (Fuchs, 2008; Irawan, 2014; Urry, 1999)
Source: own compilation.		

as an objective process due to the creation of increasingly advanced and efficient means of production and the formation of appropriate relationships. The processes of transformation of social development are so fundamental that, in addition to positive aspects, they bring with them serious problems, threats and risks to everyone who did not perceive and appreciate the new factors and conditions (Uskova et al., 2013). At the same time, the problems of the formation and becoming of the information society are multifaceted and affect all aspects of manifestation: technological, economic, social, institutional, etc.

The main research results

Currently, ICTs are being developed and disseminated in all sectors of the economy and spheres of public life acting as factors of economic development and improving living conditions. New ICTs make it possible to raise the educational level of society, develop its scientific potential, as well as increase the efficiency of using national and global resources. In order to form an information society, it is also important for the Russian Federation to develop and use modern information technologies.

In the Russian economic literature, business practice and everyday life there are different terms that characterize information products and services. In the Internet, periodicals and everyday speech, the concept of “information technology” (IT) is more often used, and in scientific and statistical literature, as well as in legislative acts – “information and communication technologies” (ICT). Within the framework of our research, both terms are used as synonyms, while from the perspective of the industry division of information goods and services, it is more correct to use the term ICT which makes it possible to identify differences between information and communication services, while the international and global term IT is more convenient when analyzing current trends.

According to the research of the EIU (Economist Intelligence Unit)¹, at present it can be stated that the development of the ICT sector in the countries will be different, since the leading states that were the first to introduce new technologies will have more opportunities for the sustainable development of the ICT sector in the future. It will be increasingly difficult for other countries to overcome the growing gap (Egorova, Torzhevsky, 2018).

In this regard, an analysis of the current state of development of the ICT sector and the digital economy in Russia is relevant (*Tab. 2*). Despite the fact that the development of such ratings of countries by relevant international organizations cannot be fully considered accurate and reliable, it can nevertheless be considered as an external assessment in determining the place and role of countries in the world economy.

Thus, the ratings allow concluding that there is a significant difference between the country’s available capabilities and their use in the economy. At the same time, Russia has the potential and readiness to actively develop information technologies.

The ICT market has started to develop actively only in recent decades. In 2018, its total global volume amounted to almost 4.0 trillion US dollars, and by 2023 it will increase by 1.5 times. Its share in the GDP of developed countries is about 6%, according to the forecast it will increase to 8% (Egorova, Torzhevsky, 2018). It is this growth that indicates the transition of countries to a new stage – active digitalization and the development of the information society (Makaroy, 2003).

The dynamics of the global ICT market in the period 2007–2018 correlated quite well with the

¹ Realizing the benefits of ICT and economic growth in Europe: EIU review. 2018. Available at: <http://emag.lis.ru/arc/infosoc/emag.nsf/BRA/c8b8769161ef8635c325716b0052794a>

Table 2. Russia's position in international rankings on the digital economy development

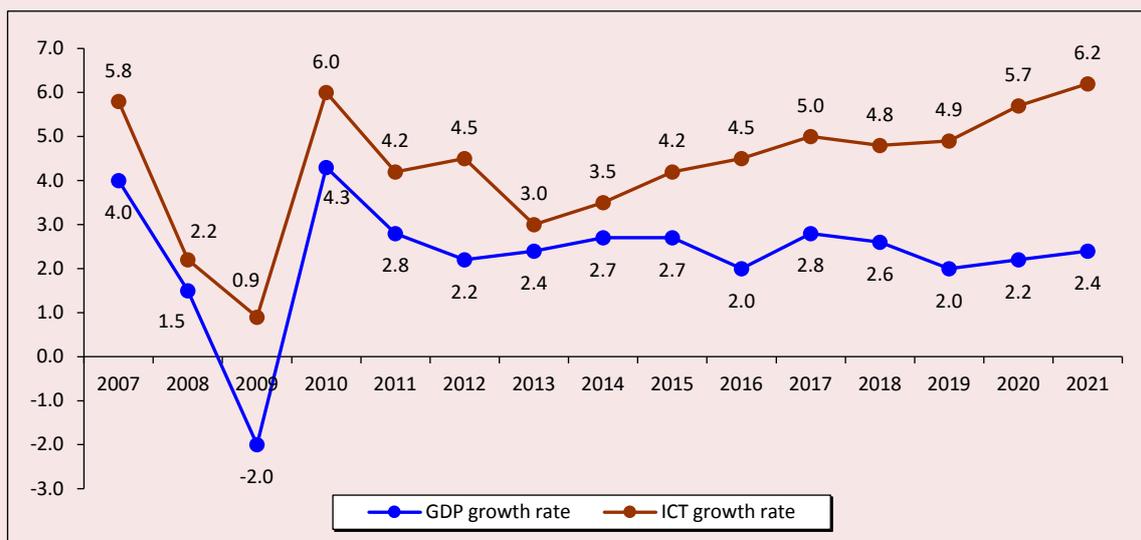
Index, year	Leading countries of the rating	Russia's place in the rating	Total countries in the rating	Russia's "neighboring" countries
Inclusive Internet Index, 2020	Sweden, New Zealand	26	100	Kuwait, Portugal, Taiwan
Global Networking Index, 2019	USA, Switzerland	41	79	Bahrain, Oman
Global Competitiveness Index, 2019	Singapore, USA	43	141	Slovakia, Cyprus
World Ranking of Digital Competitiveness, 2019	USA, Singapore	38	63	Czech Republic, Saudi Arabia
Network Society Readiness Index, 2019	Sweden, Singapore	48	121	Romania, Bulgaria
B2C E-Commerce Index, 2019	The Netherlands, Switzerland	40	152	Bulgaria, Greece
Global Innovation Index, 2019	Switzerland, Sweden	46	129	Montenegro, Ukraine
E-Government Development Index, 2018	Denmark, Австралия	32	193	Israel, Poland
Global Cybersecurity Index, 2018	United Kingdom, USA	26	175	Italy, China
EBRD Knowledge Economy Index, 2018	Estonia, Slovenia	17	38	Georgia, Kazakhstan
ICT Development Index, 2017	Island, Republic of Korea	45	175	Portugal, Slovakia
Digital Development Index, 2017	Norway, Sweden	39	60	Greece, Jordan
International Index of Digital Economy and Society, 2016	Denmark, Republic of Korea	37	45	Cyprus, Greece

According to: Abdrakhmanova G.I., Vishnevskii K.O., Gokhberg L.M. (2020). *Digital Economy Indicators: Statistical Collection*. Moscow: NIU VShE.

growth of global GDP (Fig. 2). However, since 2015, the market of information and communication technologies has almost twice outpaced GDP growth.

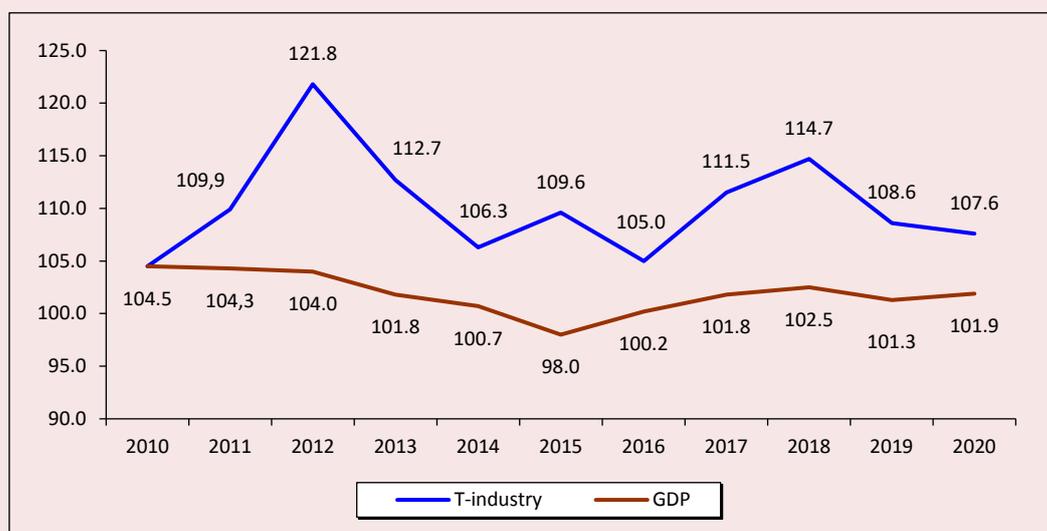
In the Russian Federation, the ICT market growth is associated with global trends and local features: the introduction of IT into production and management (primarily at the state level); the active

Figure 2. Dynamics of the global ICT market and GDP, %



Source: ICT global market. Tadviser. Available at: [https://www.tadviser.ru/index.php/Статья:ИКТ_\(мировой_рынок\)](https://www.tadviser.ru/index.php/Статья:ИКТ_(мировой_рынок))

Figure 3. Physical volume indices of the gross value added of the ICT industry, % compared to the previous year; in constant prices



Source: Dynamics and prospects of IT-industry development. Available at: <https://issek.hse.ru/news/371816718.html>

development of the Internet services; the growth of the number of “smart devices” among users. In the near future, active ICT introduction is expected in all sectors of production and services.

In the Russian Federation, about 350 thousand people work in the IT-industry – this is 0.5% of those employed in Russia. Over the previous decade, the industry has been experiencing positive development dynamics: according to the calculations of the Institute of Statistical Studies and Economics of Knowledge of HSE, in general, over the period 2010–2019, its gross value added has more than doubled to 945 billion rubles. The highest growth in the last six years was observed in 2018 – almost 15%. In 2019, it decreased to 8.6% (Fig. 3).

The share of the ICT industry in Russia in GDP for the period 2010–2018 also showed a steady positive trend (growth from 0.58 to 0.90%). If the gross value added of the IT-industry in Russia in 2014 was 374 billion rubles, then in 2019 it has already reached 822 billion rubles. And if the ICT share in the country’s GDP was 0.9% by the end of last year, then by 2024 it should reach

1.5%. However, this is almost three times lower than in the leading countries (EU countries, UK, Japan)².

According to the Ministry of Digital Development, Communications and Mass Communications of the Russian Federation, the ICT-industry growth in Russia is proceeding rapidly³. According to the information of the unified register of Russian software, there are almost 4,000 software products in the country.

The Russian Federation plays a leading role in the creation of social networks, search engines, antivirus programs and systems. There are also software products for the industrial sector, such as image recognition tools, design systems (Adem, Compass), systems for managing production, human resources, enterprise assets (1C, Galaxy), blockchain (Waves) (Korovin, 2019).

² Abdrakhmanova G.I., Vishnevskii K.O., Gokhberg L.M. (2020). *Digital Economy Indicators: Statistical Collection*. Moscow: NIU VShE. 360 p.

³ Strategy for the development of the information technology industry in Russia. Available at: <https://www.tadviser.ru/index.php/>

According to Russoft data, the supply of software products from Russia abroad amounts to more than 8.0 billion US dollars⁴. In addition, the Russian experience is reflected in the search for solutions in the most competitive parts of the global software market (big data, artificial intelligence, etc.). Several active and experimental projects are being implemented in Russia in the field of obtaining information from registries, electronic public services, electronic trading platforms, etc.

In order to improve citizens' living conditions, increase the country's competitiveness, develop all social spheres, modernize management systems through the ICT use, the state program of the Russian Federation "Information Society (2011–2020)" was adopted. Its first text was approved by RF Government Order no. 1815-r, dated October 20, 2010. The program is based on the plan of innovative development of social and economic processes of the Russian Federation in accordance with the Concept of long-term socio-economic development of the Russian Federation for the period through to 2020 (approved by the Government Order of the Russian Federation no. 1662-r, dated November 17, 2008 taking into account the program-target development principles of Russia's budget system).

In the period from 2014 to 2019, the state program of the Russian Federation "Information Society" was adjusted in connection with the adoption of a number of normative legal acts: "On national goals and strategic objectives of the development of the Russian Federation for the period through to 2024" (Presidential Decree 204, dated May 7, 2018); "On the Information Society Development Strategy in the Russian Federation for 2017–2030" (Presidential Decree 203, dated May 9, 2017); "On the approval of the Information Security Doctrine of the Russian Federation"

(Presidential Decree 646, dated December 5, 2016); "The main directions of activity of the Government of the Russian Federation for the period through to 2024" (approved by the Chairman of the Government of the Russian Federation on September 29, 2018), etc.

According to these documents, the main priorities for the information society development in the Russian Federation are to improve living standards and well-being of the country's population, the availability of public services, the development of digital literacy, as well as increasing Russia's economic potential through the use of modern ICT.

In the latest edition of the state program "Information Society" (approved by RF Government Resolution 386-20, dated March 31, 2020), the tasks of the ICT development are aimed at ensuring state interests and priorities within the framework of the development of the information society, and economic digitalization.

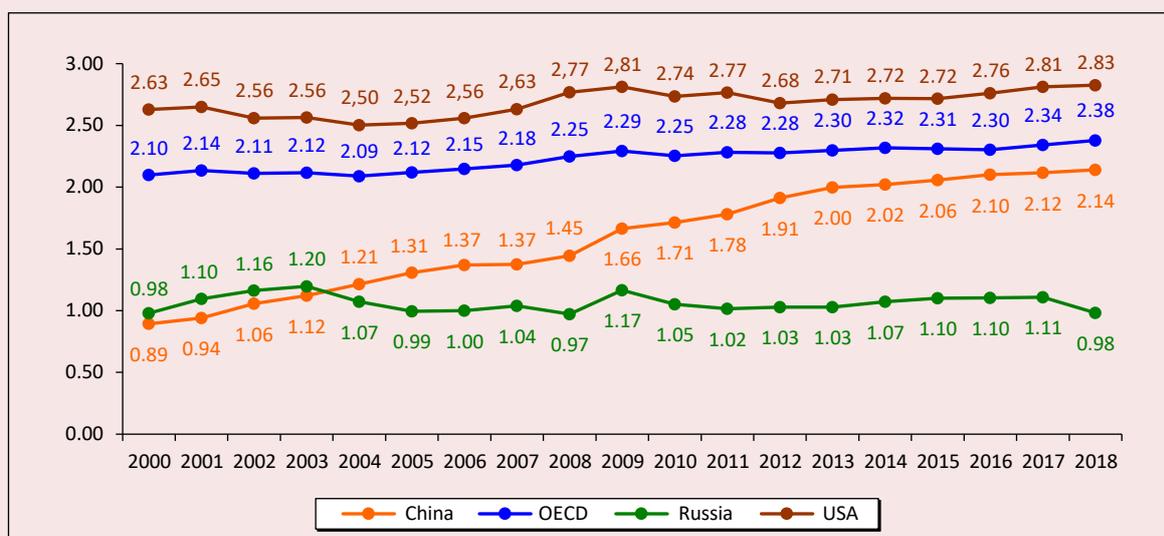
At the same time, digitalization processes require significant financial investments. It is necessary to purchase and maintain technical means, special software products, training and retraining of personnel.

According to the data, in the OECD countries, R&D expenditures for the period from 2000 to 2018 increased by 0.28% and amounted to 2.38% as a percentage of GDP (*Fig. 4*). In the Russian Federation, this indicator stagnated during the period under review. In 2018, R&D expenditures amounted to 0.98% of GDP (2000 level) which is 2.5–3 times less than in the OECD countries and China.

Real R&D expenditures in the Russian Federation increased by 9% from 2007 to 2018, mainly due to the dynamics of R&D results in the higher education and science sector. During the period under review, R&D expenditures in the public sector increased by 29%, while in the enterprise sector, on the contrary, decreased by almost 6%.

⁴ Export of the Russian software industry. Available at: https://russoft.org/wp-content/uploads/2018/10/RUSSOFT_Survey_14.1_rus.pdf

Figure 4. Share of R&D costs, % of GDP



Source: own compilation based on OECD data. Available at: <https://stats.oecd.org/>

An important problem is the statistical assessment of R&D and “end-to-end” technologies in the economy due to the lack of a commonly used description of their parameters, constant statistical accounting, and difficulties with attribution to the spheres of scientific and technological development. In addition, statistics mainly take into account only R&D carried out in state scientific institutes and universities, and a huge layer of work carried out by companies at their own expense is not reflected in official statistics. Statistical data on the volume of R&D and the number of patents on end-to-end

digital technologies are summarized in the *Atlas of End-to-End Technologies of the Digital Economy of Russia* (Tab. 3).

Based on the presented data, we emphasize that the most significant block of completed R&D is related to big data technologies (6800 units), having in value terms almost 120 billion rubles. This is followed by new production technologies (6,372 units) with the largest number of patents – 890 units. We should also note that over 58 billion rubles were spent on the development of artificial intelligence.

Table 3. R&D and patents on end-to-end digital technologies for 2011–2018

Name of technology	R&D number, units	R&D volume, million rubles	Number of patents, units
Big data	6800	119200	530
Artificial intelligence	4340	58770	585
Blockchain	675	11340	359
Quantum technologies	1270	7550	92
New production technologies	6372	63875	890
Industrial Internet	270	2444	141
Robotics	925	13520	302
Wireless communication	211	1470	226
Virtual and augmented reality	450	500	115

Source: *Atlas of End-to-End Technologies of the Digital Economy of Russia*. Moscow: Rosatom, 2019. Available at: <http://digitalrosatom.ru/proektnyj-ofis-cifrovayaekonomika-rf-gk-rosatom-podgotovil-pilotnuyversiyu-doklada-atlas-skvoznnyx-tekhnologij-cifrovojekonomiki-rossii/>

Thus, the available state and departmental statistics allow speaking about a high level of IT-penetration into public life in Russia. For instance, almost 80% of the country's population uses cellular and mobile Internet services.

Number of Russian subscribers of fixed and mobile broadband Internet access (broadband) in 2017 amounted to 30.9 and 117.4 million units (Fig. 5).

In addition, the volume of fixed traffic has also increased by 23%, mobile – by 84%. In 2017, the volume of information transmitted via broadband Internet access in the Russian Federation amounted to more than 40 thousand petabyte.

In recent years, the transition to the information society has been increasingly declared in the Russian Federation against the background of great success of private companies in introducing digital technologies, general digitalization of the market, the emergence of large infrastructure projects for digitalization, the development of high-speed mobile communications (Uskov, 2020a; Uskov, 2020b).

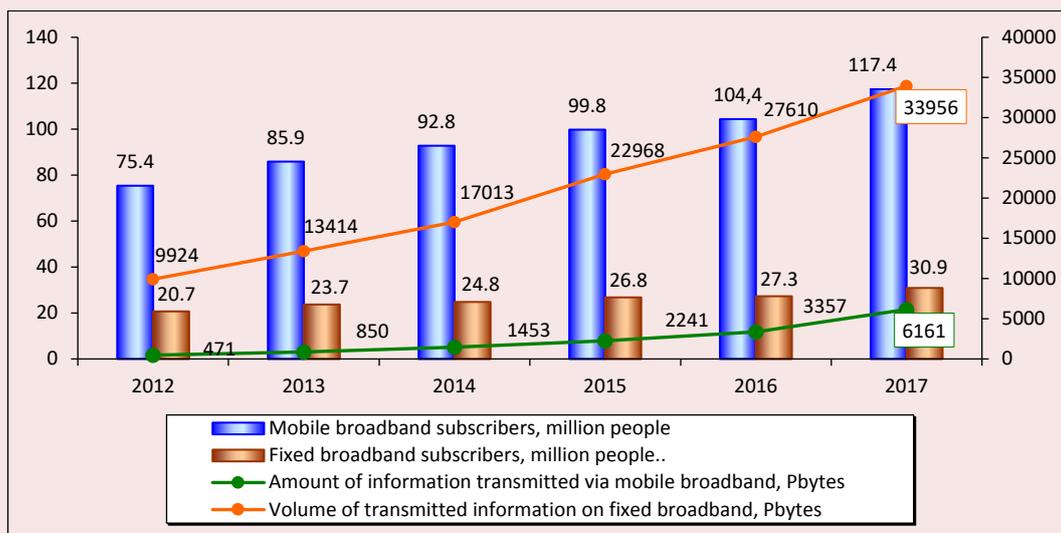
According to data from monitoring the development of the information society, from 2014 to 2020 in the Russian Federation, the share of students enrolled in bachelor's, specialty, and master's degree programs decreased from 3.6 to 2.8% of the total population (Tab. 4).

Also during this period, the number of researchers who carried out research and development decreased to 49.6 per 10,000 employed in the economy. At the same time, there is an increase in industrial organizations that have implemented technological innovations, from 8.8 to 10.8%.

At the same time, during the period, the volume of investments in fixed assets for ICT equipment has increased by 33% (up to 729 billion rubles) which entails an increase in the availability of the Internet to both the population and organizations.

For Russia, rapid dynamics became possible thanks to the development of the ICT sector and e-government infrastructure including the modernization of the government website, as well as the active representation of the interests of the Russian Federation in the framework of

Figure 5. Use of mobile and fixed-line communication devices and technologies



Source: Abdрахmanova G.I., Kovaleva G.G. *The ICT Sector in Russia*. Available at: <https://issek.hse.ru/news/227732702html>

Table 4. Key indicators of the development of the information society in the Russian Federation

Indicator	2014	2015	2016	2017	2018	2019	2020	2020 to 2014, %
Share of the employed population aged 25–64 with higher education in the total number of employed population of the corresponding age group, %	33.0	33.8	34.3	35.1	35.1	35.2	36.5	3.5
Proportion of students enrolled in educational programs of higher education – bachelor’s degree, specialty, master’s degree programs, in the total population, %	3.6	3.3	3.0	2.9	2.8	2.8	2.8	-0.8
Share of domestic research and development costs, % of GDP	1.07	1.10	1.10	1.11	1.0	1.04	1.1	0.0
Number of researchers, carried out research and development, per 10,000 employed in the economy, people	55.1	52.5	51.4	50.1	49.8	49.8	49.6	90.0
Share of industrial production and service sector organizations that implemented technological innovations in the total number of surveyed organizations, %	8.8	8.3	7.3	7.5	8.6	9.6	10.8	2.0
Share of fundamentally new technologies in the total number of advanced production technologies developed, %	11.6	12.5	12.5	13.6	13.6	11.6	13.4	1.8
Number of points of collective use (access) with access to the Internet, per 10,000 people, units	2.0	1.7	0.3	0.1	0.2	0.3	0.6	30.0
Number of subscribers of fixed broadband Internet access per 100 people, units.	17.0	18.3	18.6	21.0	21.7	22.2	23.0	135.3
Number of subscribers of mobile broadband Internet access per 100 people, units.	64.5	68.1	71.1	79.9	86.2	96.4	99.6	154.4
Volume of investments in fixed assets for equipment for information and communication technologies, in actual prices, billion rubles.	292.15	304.99	284.67	389.7	484.3	617.8	728.9	249.5
Source: Rosstat data.								

interaction with international organizations. The most significant breakthrough was the creation of a Single portal of public services — a key link of the “electronic government” of the country.

Considering the information security indicators of Russian enterprises, we can note that over the period 2014–2020, the share of organizations that used means to protect information transmitted over global networks decreased, in 2020 their share was slightly more than 75%. About 69% of organizations used electronic digital signature tools, 39% used

encryption tools (*Tab. 5*). Also, during this period, the proportion of the population that does not use the Internet for security reasons decreased by 1.8%.

However, the gap in digitalization indicators between the Russian Federation and the leading countries is still significant. Since 2014, the Digital Economy and Society Index (DESI) has been calculated in the countries of the European Union, currently it is calculated for other countries of the world. In 2017, the Russian Federation had a DESI index equal to 0.47 (in EU countries it is 0.54).

Table 5. Information security of enterprises and population

Indicator	2014	2015	2016	2017	2018	2019	2020	2020 to 2014, %
Share of the organizations that used means of protecting information transmitted over global networks in the total number of surveyed organizations, %	87.7	86.6	87.3	87.2	89.3	89.5	75.3	-12.4
of them used:								
- encryption tools, %	39.3	41.0	42.9	44.3	45.8	44.3	38.6	-0.7
- means of electronic digital signature, %	76.5	75.3	77.7	77.2	78.9	79.1	68.7	-7.8
Share of the population that does not use the Internet for security reasons in the total population, %	2.2	0.4	0.5	0.6	0.4	0.5	0.4	-1.8
Source: Rosstat data.								

The leaders in this indicator were Denmark (0.66), Finland (0.65) and Sweden (0.64).

The data of the Eurasian Economic Commission allow asserting that the significant potential of the digitalization in the Russian Federation (primarily the availability of digital platforms) is concentrated in the fields of information and communication technologies, Internet commerce, services and finance. There are certain difficulties with the development of digital platforms in the scientific field, medicine and the industrial sector.

Conclusion

The development of Russia's information society in the context of the economic digitalization is an important goal for the country in the near future. Back in 2018, the national program "Digital Economy of the Russian Federation" was adopted (approved by RF Government Order 1632-r, dated July 28, 2018), but it did not have the status (federal, state, interdepartmental), specific standards and sources of funding.

The scientific literature and public discussions have repeatedly noted in that this program only superficially touched on the main aspects of the economic and social digitalization (Ivanov, Malinetsky, 2017; Yakutin, 2017). This was largely influenced by the speed of its development, adoption and the hype that arose around the

problem of the digital economy. As a result, without a specific focus, goals, objectives and priorities of the digitalization, the program has not shown its effectiveness and has not been developed.

The development of the national project (program) "Digital Economy of the Russian Federation", approved by Presidential Decree 204, dated May 7, 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period through to 2024", was called upon to correct these shortcomings. The part of the decree concerning the digital economy declares the digitalization of the economic and social spheres of the state: industry, agriculture, construction, healthcare, education, etc. In fact, an opportunity has been opened to address the issue of ensuring communication and interaction between two important state issues – digitalization of the economy and society and import substitution in the ICT industry and other areas.

At the same time, the national program "Digital Economy of the Russian Federation" is not connected with other relevant documents of scientific, technological and innovative development: "Strategy of scientific and technological development of the Russian Federation", "Information society development strategy in the Russian Federation for 2017–2030" because a large number

of intellectual resources are needed for interaction in fundamental and applied research (Lenchuk, Vlaskin, 2018).

Thus, an important task is to determine technological priorities for solving issues related to the formation and development of the information society. The following digitalization areas come to the fore here: the development of the information and communication technologies, microelectronics, artificial intelligence and robotics. In addition, it is necessary to ensure the high status of the program exceeding the significance of similar projects in the areas of the digital economy development. The national program must be approved within the framework of the Presidential Decree or within the framework of the action of the Council for the Development of National Projects under the President of the Russian Federation.

If we approach this issue systematically, it is advisable to consider large-scale programs in the field of the digitalization as an integral part of the national program which solves certain tasks and against this background has priority over other projects financing. At the same time, the analysis of the passport of the national program “Digital Economy of the Russian Federation” suggests that it will be included in the programs “Information Society”, “Economic development and innovative economy”, etc. In this case, it is difficult to ensure the independence of its financing, since its implementation must be ensured through programs and projects that are part of it (Shevtsov, 2021). It is clear that such a decision will not contribute to the priority execution of the national program, but will lead to its financing as funds become available (on a residual basis).

Thus, first of all, it is necessary to create an independent project “Information system and resources of the digital economy”, the main tasks of which will be the development of the digital environment, digitalization of various spheres of the national economy, society’s informatization, solving

issues of its functioning on the basis of information systems that ensure the creation and processing of large amounts of data.

In addition, a special status should be given to the national program “Digital Economy of the Russian Federation” which allows it to be implemented excluding the general requirements of RF Government Order 1288 “On the organization of project activities in the Government of the Russian Federation”. It means that, in fact, it is required to ensure its transition from the existing structure of “Tasks – Results” to “Project – Goal – Task – Milestone – Event” which will contribute to better control over the program implementation.

Finally, it is necessary to ensure transparency of information on the implementation of the national program. Currently, there is very little information about this in the public domain, and therefore it takes a lot of time to search and analyze sources about the progress of the program. Information on the progress of the program is also not provided on the state portals (ANO “Digital Economy” and Digital Economy 2024).

The joint implementation of the above proposals will help to improve the formation and development of the information society and will contribute to the activation of innovative activities both in the field of public administration and in the field of the national economy.

When developing a strategy for the development of the information society in the country, it is important to determine priorities and focus of consideration from the point of view of industries and territories. The approach should be based on an understanding of their importance for maintaining national competitiveness, on the one hand, and the relative ease of implementing information technologies in this area, on the other. The focus of consideration determines what exactly should be worked with when implementing the strategy, what to influence, what to change. These are objects of attention and at the same time objects of change.

For example, the focus of consideration may be an organization as a whole or its component part (division), several related organizations (holding), an entire industry, a particular territorial entity (city, region).

When developing a strategy, it is necessary to focus on the objects of attention from certain positions or through a certain prism, for example, financial, personnel or, finally, digital. The combination of “the object of attention + the prism of consideration” generates the direction of the strategy development. If the whole region becomes the object of attention, and the prism of consideration is the “information society”, we get a “regional strategy for the development of the information society”. The focus of the strategy for the state organization can be set by top-level regulatory documents starting with the national

projects and ending with the region’s development strategy, and can be determined by industry specifics or regional specifics.

The main directions of the development and the focus of state support for the development of the information society are presented in *Table 6*.

ICTs make a significant contribution to the development of sectors of the national economy. They become part of the modern management system in most sectors of the economy, public administration, national defense, national security, etc.

There are several main areas in which information activities are related to computers and IT-technologies: production of new goods and services, scientific research, the development of information systems, education, publishing and workplace automation. Currently, a system of

Table 6. Directions of the development of the information society in Russia

no.	Problem	Decision directions
1.	Formation and development of the technical base of the information society	Ensuring the full functioning and high level of development of the following main components: information and communication infrastructure; ICT; scientific and industrial potential of information technologies; communication markets, information technologies, etc. Budget financing of thematic information systems of great social importance (healthcare, education, employment, etc.), as well as tax and customs service systems, information support of state bodies, law enforcement agencies, etc. Separate support for priority information technologies, transparent functioning of the sphere of state orders, public procurement; open and competitive selection of technologies for the implementation of the national informatization projects. Support from the budget of national scientific schools for the creation of domestic ICT, stimulating the development, production and implementation of ICT in various budget projects and informatization programs. Promotion of domestic software to the world market.
2.	Development of national security, leveling threats from the use of new information technologies	Development of a unified information security system in the context of an industry consortium of departmental systems that solve individual tasks of protecting information within their authority and in the interests of their sector. Monitoring of scientific, technological, social, economic and other changes abroad. International cooperation in the development and adoption of legal provisions, agreements to ensure information security in the process of information exchange; participation of the country in the development of international standards in the field of information security. Development of legal norms, measures of responsibility for hacking, unauthorized access to state and corporate information networks, violation of citizens’ rights in the process of information exchange.
3.	Socio-economic and socio-cultural problems of transition to the information society	Ensuring the interests of population, organizations and the state in the information sphere. Unconditional legal equality of all participants in the process of information interaction, regardless of their political, social and economic status. Reducing the formalization of public relations, creating transparent tools for the democratic control of society over power (on property relations in society, on the income of the elite, etc.). Providing access to global information resources, global information networks.
According to: Shevtsov Yu. (2021). Russian realities complicate the digitalization of the economy. <i>Society and Economy</i> , 3, 111.		

providing public services in electronic form is being created in the country.

In the Russian Federation, in connection with the task of ensuring universal access to information and communication technologies, there is a need to strengthen the use of technologies created on the basis of advanced knowledge (nano- and biotechnology, artificial intelligence, alternative energy, etc.).

Modern Russian society is interested in obtaining information that will help improve the intellectual and cultural development of the country's citizens.

The main priorities in the development of state interests within the framework of the formation of the information society in the Russian Federation are: taking into account the needs of citizens and society in obtaining high-quality and reliable information in the context of the formation of the information space; the formation and development of ICT infrastructure, the creation and use of ICT, their promotion at the international level; the development of the national economy and

society within the new technological fundamentals; ensuring national interests in the field of digital economy.

Thus, in order to develop the information society and reduce the gap between Russia and the leading countries, it is necessary to form and develop human and technological advantages, as well as create a regulatory framework for the development of information technologies in various social spheres. A comprehensive strategy of informatization of the economy and society providing for their comprehensive transformation, will lead to the development of competitiveness and the achievement of positive results in the world market.

The results of the study can be used to develop recommendations for the activation of state policy in terms of determining promising directions for the development of the information society; in the working out of programs, bills and other institutional foundations for the development of the national economic complex of the country based on the transition to the digital economy.

References

- Amagaev R.A. (2017). The role of the Central Bank in the formation of the digital economy. *Filosofiya khozyaistva. Al'manakh Tsentra obshchestvennykh nauk i ekonomicheskogo fakul'teta MGU imeni M.V. Lomonosova. Spetsial'nyi vypusk=Philosophy of Economy. Almanac of the Center for Social Sciences and the Faculty of Economics of Lomonosov Moscow State University. Special Issue*, 342–348 (in Russian).
- Barron I., Curnow R. (1979). *The Future with Microelectronics: Forecasting the Effects of Information Technology*. London: F. Pinter.
- Bell D. (2001). *The Coming of Post-industrial Society. A Venture in Social Forecasting*. New York: Basic Books.
- Drucker P. (1993). *Post-Capitalist Society*. New York: HarperCollins.
- Egorova N.E., Torzhevskii K.A. (2018). General trends in the development of the information and communication technology. *Ekonomicheskaya nauka sovremennoi Rossii=Economics of Contemporary Russia*, 4, 144–154 (in Russian).
- Fuchs C. (2008). The implications of new information and communication technologies for sustainability. *Environment, Development and Sustainability*, 10, 291–309.
- Inozemtsev V.L. (2000). *Sovremennoe postindustrial'noe obshchestvo: priroda, protivorechiya, perspektivy* [Modern Post-Industrial Society: Nature, Contradictions, Prospects]. Moscow: Logos.
- Irawan T. (2014). ICT and economic development: Comparing ASEAN member states. *International Economics and Economic Policy*, 11(1), 97–114.
- Ivanov V.V., Malinetskii G.G. (2017). Digital economy: From theory to practice. *Innovatsii=Innovations*, 12(30), 3–12 (in Russian).

- Korovin G. (2019). Development of digitalization processes in Russia. *Ekonomist=The Economist*, 6, 38–50 (in Russian).
- Kuzovkova T.A. (2017). Methodology of infocommunication development external socio-economic efficiency measurement. *Sistemy upravleniya, svyazi i bezopasnosti=Systems of Control, Communication and Security*, 4, 112–165 (in Russian).
- Lane N. (1999). Advancing the digital economy into the 21st century. *Information Systems Frontiers*, 1, 317–320.
- Lenchuk E.B., Vlaskin G.A. (2018). Formation of the digital economy: Problems, risks, prospects. *Vestnik Instituta ekonomiki Rossiiskoi akademii nauk=Bulletin of the EI RAS*, 5, 9–21 (in Russian).
- Machhlup F. (1962). *The Production and Distribution of Knowledge in the United States*. Princeton, NJ: Princeton University Press.
- Makarov V.L. (2003). Knowledge economy: Lessons for Russia. *Ekonomicheskaya nauka sovremennoi Rossii=Economics of Contemporary Russia*, 1(11), 5–30 (in Russian).
- Martin J. (1978). *The Wired Society*. Englewood Clis, NJ: Prentice Hall.
- Masuda Y. (1983b). *The Information Society as Postindustrial Society*. Washington: World Future Soc.
- Masuda Y. (1983a). *Computopia. The Information Technology Revolution*. Oxford: Blackwell.
- Rakitov A.I. (1998). *Informatsiya, nauka, tekhnologiya v global'nykh istoricheskikh izmeneniyakh* [Information, Science, Technology in Global Historical Changes]. Moscow.
- Toffler A. (1999). Adaptive Corporation. In: *Novaya postindustrial'naya volna na zapade: antologiya* [The New Post-Industrial Wave in the West: An Anthology]. Moscow: Academia.
- Tufetulov A.M. (2007). Information economy and information society. *Aktual'nye problemy ekonomiki i prava=Russian Journal of Economics and Law*, 39–46 (in Russian).
- Urry J. (1999). *Sociology beyond Societies: Mobilities for the Twenty First Century*. Routledge.
- Uskov V.S. (2020b). Problems of the state industrial policy formation within economic digitalization. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 13, 6, 134–151. DOI: 10.15838/esc.2020.6.72.8 (in Russian).
- Uskov V.S. (2020a). On the issue of the Russian economy digitalization. *Problemy razvitiya territorii=Problems of Territory's Development*, 6(110), 157–175 (in Russian).
- Uskova T.V., Lukin E.V., Vorontsova T.G. et al. (2013). *Problemy ekonomicheskogo rosta territorii* [Problems of Economic Growth of the Territory]. Vologda: ISERT RAN.
- Webster F. (2004). *Teorii informatsionnogo obshchestva* [Theories of the Information Society]. Moscow.
- Yakutin Yu.V. (2017). The Russian economy: A strategy for digital transformation (constructive criticism of the government program “Digital economy of the Russian Federation”). *Menedzhment i biznes-administrirovaniye=Management and Business Administration*, 4, 27–52 (in Russian).

Information about the Author

Vladimir S. Uskov – Candidate of Sciences (Economics), Senior Researcher, Vologda Research Center, Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: v-uskov@mail.ru)

Received July 2, 2021.