СТАТЬЯ НОМЕРА
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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ ЦИФРОВОЙ ЭКОНОМИКИ КАК КАТАЛИЗАТОР ЭКОНОМИЧЕСКОГО РОСТА РЕГИОНАЛЬНЫХ РЫНКОВ РОССИЙСКОЙ ФЕДЕРАЦИИ

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Аннотация
Данная статья содержит в себе концептуальные основы, раскрывающие понятие цифровой экономики как совокупности экономических отношений, которые опосредуются информационно-компьютерными технологиями, используемые всеми участниками социально-экономической системы. Кроме того, в статье представлена информация, связанная с внедрением современных технологий цифровой экономики как катализатора экономического роста региональных рынков товаров и услуг, ориентированной на решение проблем в условиях конкуренции; дана оценка влияния современных технологий цифровой экономики на повышение эффективности бизнес-процессов предприятий реального сектора экономики.

Ключевые слова: цифровая экономика; экономические отношения; сфера производства, распределения, обмена, потребления; информационное общество; индикаторы цифровой экономики; технологические тренды цифровой технологии, цифровые технологии; информационно-компьютерные технологии; технологические инновации; транзакционные издержки; цифровая инфраструктура, внешние и внутренние барьеры развития цифровой экономики; экономический рост; регион; региональные рынки.

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MODERN TECHNOLOGIES OF DIGITAL ECONOMY AS A CATALYST FOR ECONOMIC GROWTH OF REGIONAL MARKETS OF THE RUSSIAN FEDERATION

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Abstract
This article contains a conceptual framework that discloses the concept of the digital economy as a set of economic relations, which are mediated by information and computer technologies used by all participants in the socio-economic system. In addition, the article presents information related to the introduction of modern technologies of the digital economy as a catalyst of economic growth in the regional markets for goods and services, focused on solving problems in the competitive environment, the assessment of the impact of modern technologies in the digital economy on improvement of efficiency of business processes of enterprises of the real sector of economy.

Key words: digital economy; economic relations; sphere of production; distribution; exchange and consumption; information society; digital economy indicators; technological trends in digital technology; digital technologies; information and computer technologies; technological innovation; transaction costs; digital infrastructure; external and internal barriers to the development of the digital economy; economic growth; region; regional markets

Introduction

The concept of "digital economy" is becoming the most common in today's dynamically developing world, it is used by politicians, experts, scientists, journalists and businessmen. The issue of the digital economy implementation was discussed at the World Economic Forum in Davos in 2016. In addition, the formation of the digital economy is one of the priorities for most economic leaders, such as the United States, the United Kingdom of Great Britain, Germany, Japan and others [The Institute of Statistical Research and Knowledge Economy]. A growing number of international organizations, governments, unions, transnational corporations, consulting and analytical agencies of the world level pay attention to the development of the digital economy and the introduction of modern technologies of the digital economy as a catalyst for the economic growth of the market of goods and services [Official site of the Cherkizovo company, 2019]. Several dozen conferences, forums, meetings and seminars devoted to the digital economy and its modern technologies are held e very month. Despite the fact that the role and influence of digital technologies on the economic growth of the market of goods and services is quite obvious, but the place of the digital economy in the system of modern economic relations isn't properly reflected.

Discussion

Modern technologies of the digital economy require scientific understanding and emphasize the undoubted relevance and practical significance of the research topic, reflecting the issues of modern technologies of the digital economy, which contribute to the economic growth of regional markets of goods and services of the Russian Federation. This implies the purpose of this study, which is to study, review and identify modern technologies of the digital economy as a catalyst for economic growth of the regional market of goods and services of the Russian Federation.

In 1995, D. Tapscott, a Canadian specialist in the field of business and consulting, proposed the term "digital economy", which precisely characterizes global trends. In many of his works, the scientist touches on the description of how the way of life of society is changing under the influence of modern technologies of the digital economy [Institute of statistical research and knowledge economy, 2019]. In the scientific literature in the field of Economics, there are a huge number of interpretations of the definition of the digital economy. And I would like to note that most of them focus on the details and do not give a voluminous idea of this concept. The most common definition of "digital economy" is: "the digital economy implements and enables trade in goods and ser-

vices through electronic Commerce through Internet sources". The digital economy has three main components: infrastructure, which includes devices, software, telecommunications; electronic business (digital processes in organizations); e-Commerce or in other words sale of goods online [World Bank website, 2019]. The World Bank proposes the following definition of the digital economy: "The digital economy is a system of economic, social and cultural relations based on the use of digital information and communication technologies" [Decree of the President of the Russian Federation]. According to Vasilyeva T.V., the digital economy is a set of economic relations covering all links of commodity production, distribution, commodity movement and realization of material and non-material benefits occurring through electronic data exchange with the help of telecommunication network [VasilyevaT.V., 2013]. Stefanova N.A. describes "the digital economy" as a modern type of management, which is characterized by the predominant role of data and methods of management as a determining resource in the field of production, distribution, exchange and consumption [Stefanova N.A., Mursalimov D.A., 2018]. The above definitions of "the digital economy" neither reveal the essence of the changes taking place, nor give a description of the economic influences, which include changes in: user behavior; relations between producers and consumers; competition; labor productivity; value added structure and other aspects. In our opinion, a clear definition is given by G.I. Abdrakhmanov in the report to the international scientific conference on the problems of economic and social development [Indicators of Digital Economy: 2018]: "Digital economy is an activity whose key factors are digital data, and its processing and use in sufficiently large volumes can significantly increase the efficiency, quality and production during storage, sale, delivery and consumption of goods and services".

There are four main criteria used in the analysis of the digital economy, which, one way or another, are considered by a large number of researches. These include: criterion directly related to the sphere of employment, spatial (geographical) criterion, technological and economic criteria. The first criterion related to the sphere of employment is revealed in the works of famous American scientists Daniel Bell, Peter Ferdinand Drucker, and Charles Leadbeater, a British journalist. In their works, they consider the structure of employment and models of observed measurements. According to them, the reason for the transformation of socio-economic relations is that most of the employed work in the digital economy. Scientists consider the share of decline in employment in the production sector and the growth of employment in the service sector as a replacement of physical labor with information labor [The Siberian Oil Journal № 164]. Describing the spatial (geographical) criterion, it should be noted that special attention is paid to data transmission networks connecting different places, and subsequently influencing the formation of the global economic space. Today, this question raises a debate about what is really a network, how to distinguish between different levels of network, what are the amounts of data and the speed of its transmission to the digital economy.

The basis of the technological criterion was the majority of technological innovation in the field of information and communication technologies, which subsequently became available to a wide range of users. Innovative technologies are the most striking sign of changing the economic system, and they are called a catalyst for economic development. Quite a large number of researches in their own works note the importance of the impact of technological innovations. The spread of modern technologies of the digital economy serves as an incentive to discuss the information of new socio-economic relations of the digital economy.

The economic criterion implies taking into account the growth of economic value in the field of activities for the creation, transmission, processing, and storage of data. Most specialized companies and research organizations provide services for the collection, analysis of data for the purposes of the customer and, accord-

ingly, such data acquire a certain value. Picture 1. illustrates the place of the digital economy in the global economy. The core" of the digital economy is information and computer technologies (ICT), which contribute to the economic growth of the regional and world market of goods and services. Its work is provided by companies in the digital sector, which produce software and hardware, as well as provide consulting and telecommunications services. The digital economy and its technologies provide the basis for the development of new business models, digital platforms and services, the transformation of traditional industries that allow for new economic activities [Information portal of the Professors of Scientific Journal].

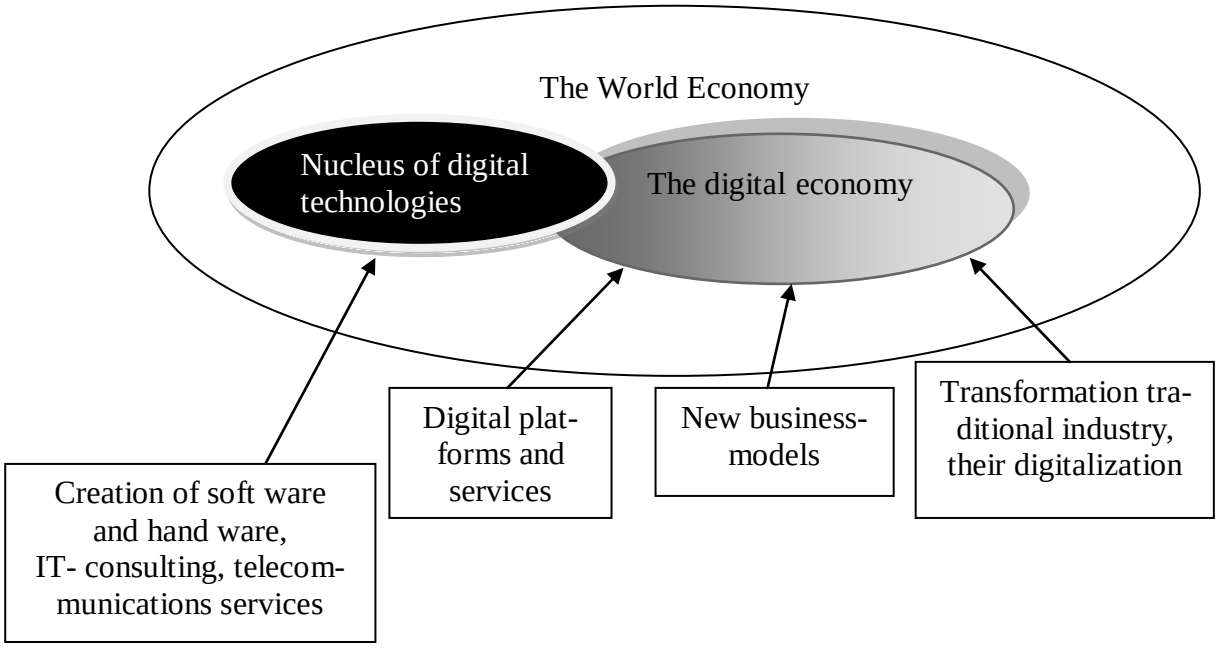

Fig. 1 Digital economy as part of the world economy
[Source: The Ministry of Digital Development]

Modern digital technologies are technologies used to collect, store, process, search, transmit, and present data in an electronic form, which are based on software and hardware and systems that are in demand in all sectors of the economy, creating new markets and changing business processes.

The Rosstat annually publishes a collection of statistical data "The indicators of the digital economy". Not so long ago, this collection was supplemented by the section "Technological trends in the digital economy, containing nine subsections: big data, quantum technologies, robotics components, neuroethologies and artificial intelligence, new production technologies, industrial Internet, distributed registry system, new production technologies, wireless communication technologies, virtual and augmented reality technology. These technologies are reflected in the collection "The indicators of the digital economy 2019", which appeared on the Internet in June [The Federal Service of State Statistics, 2019]. Below is a brief description of each technology of the digital economy.

1. Big data allows you to increase the speed of data transfer and storage capacity, reduce the cost of data storage, run educational programs in the field of big data and provides growth in the number of specialists in data processing and analysis.

2. Quantum technologies lead to increased electronics performance, the search for new encryption methods in the face of increasing cyberattacks, the creation of research centers and the launch of educational programs in the field of quantum technologies.

3. Robotics components and sensors contribute to the requirements for production flexibility, increasing the demand for industrial robotics on the part of companies to modernize production.

4. Neuroethologies and artificial intelligence – the need to increase the speed of the business process while reducing costs, the growth of investments in the development of neurotechnologies and artificial intelligence on the part of companies, the ability to more accurately determine the emotional response of consumers to products and services.

5. New production technologies allow to increase the availability of devices for 3D printing, the performance of computer systems, the need to reduce the time of product launch to the market: high costs for special production equipment in the manufacture of small batches of products.

6. Industrial Internet-launch of the process of standardization of relevant technologies: the need to improve the safety of unmanned vehicles; increasing the number of connected devices.

7. The distributed registry system creates the need to provide an environment of trust between the participants of digital transactions, the need for new tools for storing and processing big data, the growth of non-cash payments, the development of marketplaces using a blockchain technology.

8. The need to increase the volume of data and its rapid transmission as well as the growth of e-Commerce develops unmanned means of transport and gives rise to the capacity of networks due to the growth of traffic which allows wireless technology.

9. It contributes to the growth of demand for the display system, devices and software solutions VR/AR, increases the demand of companies for solution to improve the quality of the educational virtual and augmented reality technology [“Modern management technologies”, 2019].

The development of the digital economy and the use of its modern technologies have increased the income of the world economy, which is clearly confirmed in Picture 2.

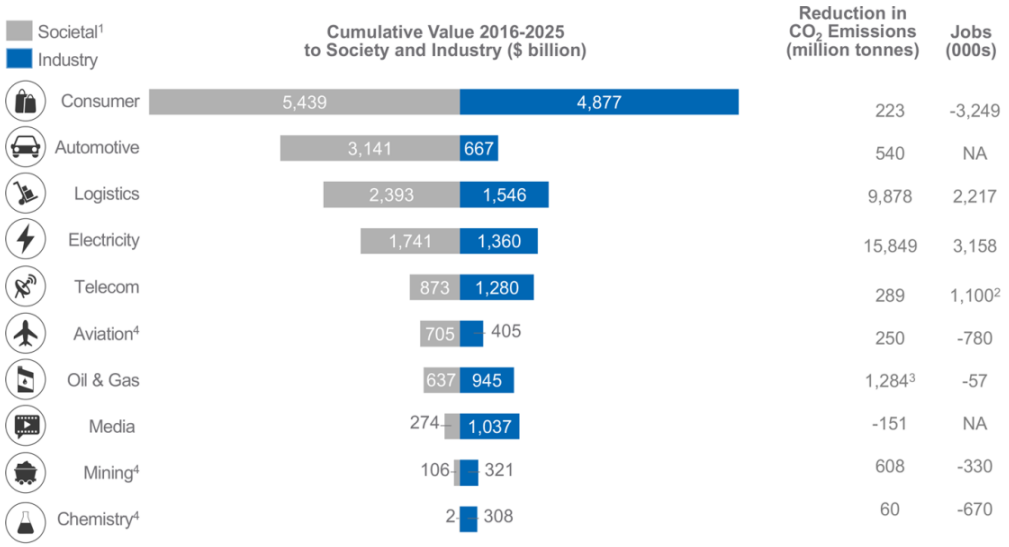

Fig. 2 WEF: the world economy’s income from the digital economy and the use of its modern technologies 2025 – 30 + trillion
[USD source: World Economic Forum, 2019]

Given the proliferation of modern technologies, the digital economy is changing now the world market and the regional market of goods and services of the Russian Federation: the main resource is the information trading site on the Internet is not limited, many companies are able to compete with lager market players.

The use of modern technologies of the digital economy creates an opportunity for all countries to participate widely in global processes. Companies in the digital sector are coming to the forefront and becoming growth points, while providing the economy with digital resources and contributing to the economic

growth of the market for goods and services. While at the beginning of the XX century the main locomotives of the world economy were large oil, metallurgical, engineering and mining enterprises, now the largest companies are representatives of the digital economy sector (Table).

Table

Ranking of the largest companies in the world, 2018

Companies	Main activity	Capitalization, $
Apple	Production of electronics and information technology	577,4bil..
Google	The Internet services, applications, video hosting YouTube	547,9bil..
Microsoft	Production of software	443bil..
Amazon	Internet Trading	360bil..
WellsFargo	Banks	299bil..
Samsung	PK, Mobile devices, household equipment, electronics	254bil..
ChinaMobile,	Telecommunications	250bil..
Walmart	Retailing	216,9 bil.

[Source: Indicators of Digital Economy: 2018].

As can be seen from the Table, the world's leading companies have achieved a high level of use of modern technologies of the digital economy, which allowed them to overtake their competitors and become leaders in business. Russia is also introducing modern technologies of the digital economy, allowing to effectively conduct business and sell its products. An example is GK "Cherkizovo", engaged in the production of meat products and meat semi-finished products, built in 2018 a fully robotic meat processing plant in Kashira. The commissioning of the plant allowed to produce up to 30 thousand tons of finished products per year. The X5 Retail Group, one of the leading Russian multi-format grocery retail companies, has introduced a platform for uberization of cargo transportation. In addition, machine learning and big data analysis were put into operation by Magnitogorsk Iron and Steel Works and Severstal for more efficient production [Official site of the Cherkizovo company, 2019]. Quite an extensive practice of the introduction of modern technologies of the digital economy is observed in the activities of The Gazprom Neft. Over the past two years, the company has implemented a successful project in the field of introduction of modern technologies of the digital economy, such as artificial intelligence, predictive analytics, industrial Internet of things, and the blockchain technology. Together with Moscow Institute of Physics and Technology (MIPT), specialists of The Gazprom Neft scientific and technical center implemented a self-learning program for forecasting rock properties in new fields [The Siberian Oil Journal № 164]. In order to promote their products and services to the market, each company is looking for an individual way to develop its business model through the use of modern technologies of the digital economy. As the world experience and Russian practice show, in addition to the undeniable benefits associated with the development of the digital economy and the introduction of its modern technologies, one should discuss the problems associated with the development of the digital economy.

The first problem is related to the growth of the share of domestic spending in the country's GDP on the development of the digital economy, which, according to analysts, should increase significantly and triple in size until 2024. However, it should be emphasized that at the moment, it is not known what will how effective these costs will be. The availability of information and the creation of more efficient technologies for its processing and use should, in principle, reduce transaction costs and increase the flexibility and efficiency of the economy. In other words, the use of older technologies and working with them causes an increase in transaction costs due to the increased costs of protecting information and assessing its reliability. Therefore, it is necessary to use

modern technologies of the digital economy, contributing to increase the economic growth of regional markets of goods and services of the Russian Federation.

The second problem is that, like any technological innovation, modern technologies of the digital economy entail the search for specialists of new professions with new competencies, but, at the same time, make unnecessary numerous groups engaged in traditional activities, which causes resistance and protests.

The third problem is the fact that many companies do not comply with basic requirements of the Law of the European Regulation on Personal Data (GDPR), resulting in discontent of the client, lack of transparency and control of data leakage. Suppliers will be forced to use anonymized or aggregated data, which will change the type of targeted advertising, and business will have to conduct forensic examination of their supply chains and ecosystems. Regulators will also take action against firms using fraudulent schemes to collect and use sensitive data.

The fourth problem arises from the information provided in the Decree of the President of the Russian Federation of May 9, 2017 "On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024" [The Decree of the President of the Russian Federation of May 9, 2017]. The Decree stipulates that the development of the digital economy will decrease (Fig. 4) internal costs for the development of the digital economy by no less than three times. This implies a huge increase in research and development costs directly related to digital technologies almost 9 times, and on technological innovation-almost 6 times by 2030 at current prices (Fig. 3). The increase in funding for science should be accompanied by a threefold increase in the number of researchers engaged in the field of digital technologies.

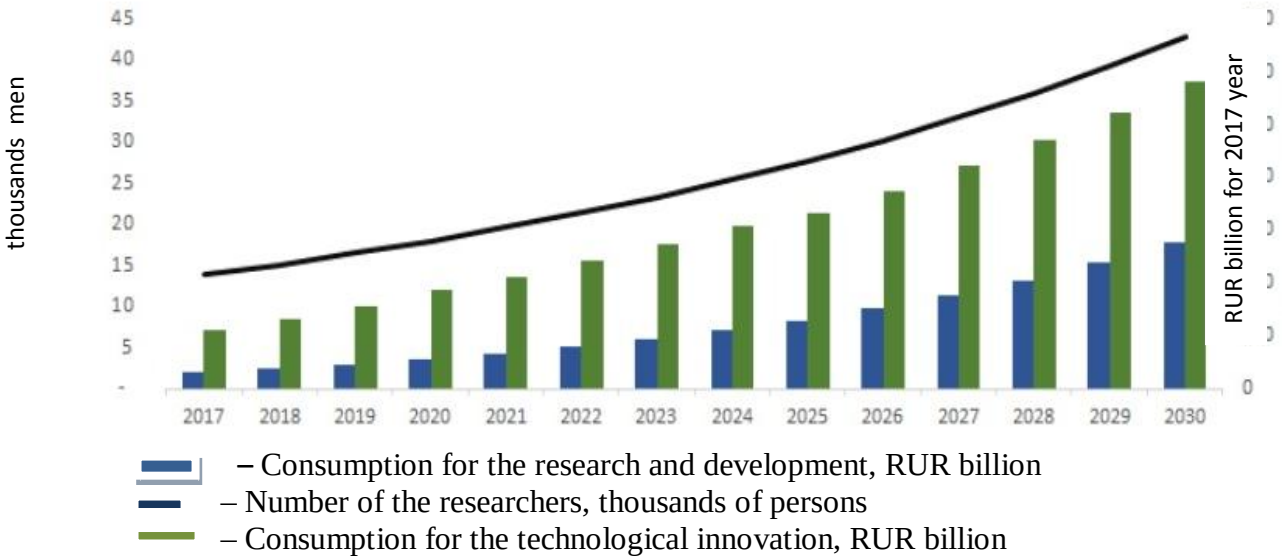

Fig. 3. Forecast estimates of the resource support for the development of the digital economy
[Source: The Institute of Statistical Research and Knowledge Economy]

More than a third of 940.4% of total domestic spending on the digital economy is spent by business sector organizations; slightly less – 36, 4% is spent by households (see fig.4). In these sectors of the economy, the benefits of the introduction and use of digital economy technologies are most evident, and the corresponding results can be obtained in the shortest possible time.

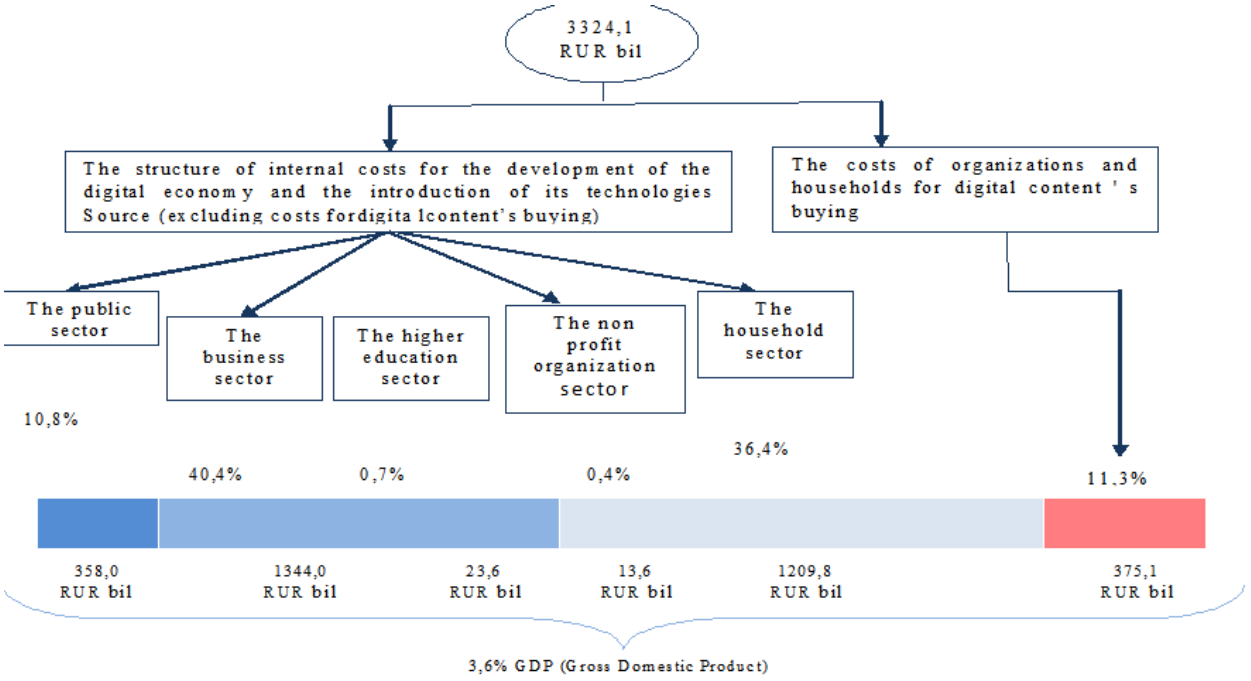

Fig. 4. The structure of internal costs for the development of the digital economy and the introduction of its technologies
[Source: The Institute of Statistical Research and Knowledge Economy]

Public sector organizations account for only a tenth (10.8%) of all costs associated with the introduction of modern digital economy technologies. Despite a fairly wide range of distance education programs, the costs of organizations of the higher education sector responsible for the introduction and use of modern technologies of the digital economy are relatively small – 0,7% of the total internal costs for the introduction of modern technologies of the digital economy [The Institute of Statistical Research and Knowledge Economy].

In addition, the development of the digital economy and the introduction of modern technologies of the digital economy face a group of internal barriers to the development of the digital economy: insufficient budgets, high cost of implementation and operation of systems. External barriers to the development of the digital economy and the introduction of modern digital economy technologies are also exacerbated by the instability of the economic situation, the insufficient level of digital infrastructure development in Russia, as well as the low readiness of suppliers and consumers to use modern digital economy technologies.

Conclusion

Thus, the digital economy and modern technologies of the digital economy are becoming a leading segment, a catalyst for economic growth of the regional market of goods and services of the Russian Federation. The expansion of the use of modern digital economy technologies allows ensuring national security and independence of any state, strengthening the competition of domestic companies and supporting the economic growth of the market of goods and services in regional and world markets. According to analysts, the share of the digital economy in GDP will increase significantly to 4,7 % of GDP by 2020 [The Decree of the President of the Russian Federation of May 9, 2017]. The intensive introduction of modern digital economy technologies into the activities of Russian companies will significantly bridge the gap between the Russian Federation and the leading countries and, moreover, it will give an impact to long-term sustainable development of the regional economy of Russia.

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