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**DIGITALIZATION OF THE ECONOMY AND ITS IMPACT ON  
ECONOMIC DEVELOPMENT**

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**Abstract**

The purpose of this work is to analyze the consideration of the process of the emergence of digitalization of the economic environment. The authors consider the problem of using information technologies at various stages of the development of the digital economy. The digital economy is considered in this work under the prism of information development in all spheres of life. The relevance of the problem we outlined earlier is confirmed by the high demand from the labor market and services in the field of application and adaptation of digital solutions to many problems that arise with the development of modern society. At the same time, the authors consider modern society in several aspects, including in contrast to historical development and world globalization. Within the framework of this article, the materials of analytical agencies and companies were analyzed, as well as relevant data and indicators characterizing the high demand for the use of information technologies in the economic sector, which often leads the state to the threshold of a new time of informatization. The problem of adapting new technologies, competent implementation and further application is also one of the logical ones in the work. As a result, the authors identified the possibilities of overcoming the barriers to the introduction of information technologies in the economic environment, and also highlighted key models for the development of the digital economy through the use of robotics and virtual reality technologies.

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## 1. Introduction

The geography and pace of development of the digital economy are impressive in their scale. Since the second half of the 20th century, the world has plunged into the era of information relations. Today, innovations are spreading throughout the world, replacing each other with waves emanating from the scientific epicenters of the USA, Europe and the USSR (Table 1). Moreover, each of these waves is more intense than the previous one and covers new regions, exerting an ever more tangible effect on the economy. At the beginning of the development of the information sphere, the transition from large electronic computers (computers) to personal computers lasted decades, now revolutionary changes take place in a matter of years and even months. And this is undoubtedly the success of individual scientists in various spheres of life, as well as the timely response of state institutions and the government apparatus, competent adaptation of technologies and the process of their effective dissemination.

**Table 1.** Accelerating waves of innovation

Year	Innovation
1960	Modern programming languages; database management system
1970	Basic office software; PC; document processing; storage of files; games.
1980	Corporate software; business process automation.
1990	Internet technologies; internet commerce; email and chats.
2000	GPS Wi-Fi; 2G / 3G Laptops; mobile phones.
2010	Social networks; smartphones and apps; digital advertising and marketing
2020	Large amounts of data; predictive analytics; internet of things; industry 4.0.
2025-present	Predictive algorithms; machine learning; a virtual reality; unmanned aerial vehicles; language recognition; robotics.

Source: authors.

Let's consider several stages in the development of information relations (Bahremand et al., 2019). The first wave of digital innovation came down to automating existing technologies and business processes. The second wave came in the mid-1990s, when the spread of the Internet, mobile communications, social networks, and the emergence of smartphones led to a rapid growth in the use of technology by end consumers. The third wave was characterized by the massive introduction and spread of IT technologies in every single region of the world (Aptekman et al., 2017). Now, without the Internet space and other technologies that greatly simplify our life, it is difficult to imagine any state. The effect of digitalization is noticeable to everyone, it is important to consider the economic and social benefits that contribute to the development of the economic sector, both national and global. The table briefly describes some of the benefits due to which any country, using information resources, can approach the information sphere and adapt various technologies, thereby activating the development process of many spheres of life, including one of the main ones – economic (Table 2).

**Table 2.** The effect of digitalization

Benefits	
Economic	Social
Significant contribution to economic growth	Increasing Inclusion and Reducing Poverty
Growth in the number of jobs in related industries 3-5 times	Improving the availability and quality of medical care
Increase in labor productivity	Reducing the cost and increasing the availability of mass education
Accelerating the growth rate of small and medium-sized businesses	Reducing the negative impact on the environment
	Reducing crime, increasing the availability of financial services, road safety

Source: authors.

## 2. Problem Statement

The objectives of this study are due to several stages. At the first stage, the authors collected facts in order to describe and explain various economic phenomena and processes associated with the use of digital technologies. At the second stage, the process of bringing the selected facts into a system and the formulation of principles, models and theories on this basis were carried out. At the third stage, based on the identified models of the development of the digital technology sector in the economic sphere, the process of developing economic policy took place, on the adequacy of which depended the fate of all citizens of the state. In the process of solving the third problem of economic research, it was necessary to pay attention to the stages of development of economic policy, which included the following. Firstly, the development of an economic strategy that presupposes the setting of appropriate development goals for the state's economic sector. Secondly, the choice of the best tactics for achieving the set goals (Vilkina & Klimovets, 2020). Thirdly, the analysis of the experience of the past and its comparison with the present. In conclusion, let us note that the issue of information technologies contributing to the development of the country's economic potential was also subject to consideration (Aptekman et al., 2017).

## 3. Research Questions

In the study, the authors raised questions about the main economic sectors, as well as about innovative technologies, which are gaining more and more popularity and relevance of use every day. The questions concerned, inter alia, the segment of economic development, namely: the sector of suppliers and buyers of real goods and services; software and technology developers; infrastructure in the form of a legal framework, training system, transmission and storage channels of all types of data. In turn, the following innovations became the main technologies. Big data is a set of special methods and tools that are used to store and process huge amounts of data to solve specific problems. Artificial intelligence is the ability of a digital computer or a computer-controlled robot to perform tasks determined by a person in order to quickly consider them and, as a result, solve them. Blockchain is a platform (database) used for information systems, including, on the basis of which cryptocurrency was created. Quantum technologies are a certain chain of mechanisms used to protect information systems, as well as for the timely transfer of certain data. Robotics is an applied science engaged in the development of automated technical systems and is the most important technical basis for the development of production, including economic.

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

The main purpose of this study is the process of considering the interaction of digital technologies and the economy. In the work, the authors put forward a hypothesis that the process of competent implementation and application of information technologies is a prerequisite for the development of an effective economic system with a developed sector of interaction in some problematic issues with other states. Also in this thesis one can see the idea of borrowing the experience of foreign countries in order to create a more logical and flexible system for the use of economic resources. It is also impossible not to notice the fact that today's age is rapidly changing and is marked as constantly improving. This is what prompts us to think that the use of digital technologies is an urgent and inevitable process that will bring our country to a priority new level. The next goal that will appear before our state will be the creation of a competent system of legal regulation of the digital economy based on a flexible approach to each area, as well as the introduction of civil turnover based on digital technologies (Passport of the national project «National program «Digital Economy of the Russian Federation»», 2019). This will have a characteristic effect on the process of creating a global competitive infrastructure for the transmission, processing and storage of data, mainly based on domestic developments.

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

The methods used by the authors of this study are various methods of transferring information. Some of the main authors used the method of scientific abstraction and the dialectical method. The possibility of using the method of scientific abstraction is due to the fact that all models and theories are abstractions, they reflect reality in an abstract and simplified form, which speaks of economics as a constantly developing science. Within the framework of scientific abstraction for research, the authors use analysis and synthesis. Both methods are dialectical. The analysis in this work is a method of cognition, which consists in dismembering the whole into parts. In economic theory, there are two levels of analysis that the authors use, describing some of the points of using digital technologies.

For example, microeconomic analysis tells us that when the problem of applying a certain information technology is investigated, we should consider the behavior of a separate economic entity. Macroeconomic analysis that when we study the national economy, it should be considered as an integral system. Synthesis in research is designated by a separate method of cognition, which consists in combining separate parts into a single whole. We can observe this on an example characterizing individual information technologies, which in general represent a digital reality. The study also used a deduction method based on inferences from the general to the particular. It was used in the transition from the second problem to the first, that is, from theory to facts. The logical method assumed the selection of the main thread of research without external influences of insignificant details in the introduction of this work. Here it is important to single out the method of dynamics, which involved taking into account the time factor. The final method of this study is the materialistic approach, which is based on the fact that the most important object of research in economic theory is the economic relations that arise between people in the process of production and circulation of goods and services.

## 6. Findings

The use of digital technologies can significantly increase the effectiveness of the implementation of economic policy undertaken by the Russian state, namely: in consumer markets, technologies allow to reduce the cost of searching and placing orders, contribute to the optimal selection of products that meet consumer requirements, provide increased transparency, which is important for effective and a well-developed economic system of any state. Users can compare prices, features, services, and product reviews with a couple of clicks. An example of such a technology is the Automated Own Price application. In addition, digitalization entails the ousting of classic intermediary companies from the market by the owners of digital platforms. In the travel industry, players are Aviasales.ru, Yandex.Bilet, Ozon.travel, Booking.com and Ostrovok.ru, which allow users to search and compare different offers, have entered the fragmented market of travel agents that previously performed intermediary functions. Between 2000 and 2018, online hotel booking revenues grew 10-fold, while the number of travel agents in the United States fell 48%. Strong market positions are shifting from physical intermediaries and asset owners to consumers and digital platforms, which are platforms through which service providers and consumers find each other and transact directly without intermediaries. Already, services such as Airbnb, Booking.com, and Uber are helping to improve the utilization of assets (housing, taxis, cars, etc.) for suppliers who connect to these platforms. At the same time, the possibilities of exploiting assets for owners who are not represented on such digital platforms are significantly reduced, which also speaks of the vector of digitalization of economic development.

The digital economy is transforming the labor market. The impact of digitalization on employment dynamics cannot be easily separated from the corresponding impact of other trends, such as a general economic downturn or a shift in production abroad. But some of the effects are obvious. The McKinsey Global Institute's report on the US labor market indicates that the recovery from recessions has been accompanied by fewer job creation (Aptekman et al., 2017). In economic crises, large companies seek to improve productivity not by increasing production or introducing innovations, but by reducing the number of employees. Industrial automation has become a permanent process, and during periods of economic slowdown or recession, jobs are at risk.

The introduction of digital technologies leads to a reduction in the number of workers with average qualifications. Robots are replacing workers on conveyor belts, and information systems are beginning to perform operations that were formerly responsible for accountants, secretaries and other office professionals. Digitization has accelerated the widening gap between low-paid and high-paid employees. Digital companies show the largest growth in wages, but in terms of the number of jobs, their share in the overall structure of the economy is small. On the other hand, digitalization also has a positive impact on the labor market due to the emergence of new professions that did not exist before. In addition, the development of Internet platforms is increasing the mobility of workers. In the future, by collecting information about the need for certain specialists, people will be able to better plan their studies and careers (4Industry, 2020).

Digital technologies create social elevators, erase geographic boundaries, allow residents of remote settlements to receive quality education, improve their skills and find work, not being limited by opportunities that exist on the ground. In 2009, they indicated that the basis for further economic growth in

the country will be an increase in the productivity of labor and capital. However, over the period since this study, Russia has failed to achieve a tangible increase in productivity, primarily due to the crises of 2008–2010 and 2014–2015; today, covid-19 is a barrier. Nevertheless, the e-commerce segment is actively developing in Russia, a prominent representative of which is the site of private classifieds Avito, included in the world list of "unicorns" (about 200 private technology companies with a capitalization of over \$ 1 billion). Transas has achieved impressive success in the global market for marine navigation systems, vessel traffic control systems and marine simulators, where it has held a leading position for many years. In the field of software development, Russian companies have also achieved significant success - such players as Kaspersky Lab and ABBYY occupy leading positions in the world markets in their niches.

## 7. Conclusion

Thus, digital technologies are becoming an effective tool for the economic development of Russia. The digital economy is a large-scale development project for any developing country, which plays an important role in the international arena and affects the cooperation of countries in the export of goods. With the competent use of information technology, many enterprises have the opportunity to increase profits by increasing personnel productivity, optimizing production and other business processes, attracting new consumers and clients (Ivanova, 2018). This, in turn, will further affect the success of the development of the economic sphere of the state, optimization of its potential in attracting foreign investment. The development of the sector of digital relations between companies is an undoubted incentive for promoting cooperation between countries in establishing economic ties. The creation of a comprehensive system for financing projects for the development and implementation of digital technologies and platform solutions, including venture financing and other development institutions, is leading to the transformation of priority sectors of the economy and social sphere, including healthcare, education, industry, agriculture, construction, urban economy, transport and energy infrastructure, financial services, through the introduction of digital technologies and platform solutions. Of course, technologies such as Neuronet, neuromorphic microchips, neural networks, big data, machine self-learning, DNA, quantum or optical computers, electronic identification, and even smart dust, line up in the technological basis of the future. All these are elements of our future everyday world, which are rapidly becoming commonplace and necessary.

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