

DEVELOPMENT OF THE DIGITAL ECONOMY IN MODERN AGRICULTURE OF RUSSIA: OPPORTUNITIES, DRIVERS AND TRENDS

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Abstract

The economies of the world's leading countries are characterized by a high level of development of digital technologies, the introduction and use of these technologies. Many countries make the construction of a new model for the development of the national economy, based on the development of the digital economy, the priority of their development. The construction of the digital economy in Russia is a strategic task that ensures national security, competitiveness and development effectiveness at various levels and in different sectors of the economy. The authors' interpretation of the concept of "digital economy" is given in the article, taking into account the prevailing level of development of digital technologies, their role and significance in modern society. The authors come to the conclusion that nowadays the Digital Economy is an economy using digital technologies. The study analyzes the current level of development of the digital economy in Russia, reveals that the country has significant scientific and resource potential for the development of the digital economy, including that of modern Russian agriculture. The current tendencies and perspective directions of development of the digital economy in Russian agriculture are considered.

Key words: digital economy, agriculture, development economics, information and communication technologies, economic systems, e-agriculture

INTRODUCTION

The agriculture of modern Russia is the guarantor of the country's economic system stability and security of its regions. Level of development of the agricultural sector of the country's economy depends on food security, social stability of society.

Russian agriculture, like other industries, is subject to changes in the world economy. One of the main trends in the development of the world economy is the active development of a digital economy. The national economies of countries also adapt to the changes taking place in the world economy, which are sometimes coordinated according to the previous level of development. Level of development of digital technologies is gradually affected by agriculture, which is manifested in the possibility of introducing new high technologies, expanding the

capabilities of artificial intelligence in the production of agricultural products and other processes.

Information and communication technologies, computerization, the Internet, mobile communications and other attributes are an integral part of the development of a modern progressive society that can actively implement innovations. Economic systems that have developed in the highly developed countries of the world cannot be imagined without the use of digital technologies that provide subjects of economic systems with information, the ability to promote products, advertisements, etc.

Another driver for the development of the digital economy in the world is the activity of transnational companies in the process of globalization of the world economy, which erases the narrow framework of individual sectors and fields of national economies.

These companies are forced to look for the most effective ways of developing organizations, the mechanism of interaction within companies, reducing external and internal costs, which is largely possible due to the use of modern information and communication technologies.

In turn, medium and small companies also actively use digital technologies in their activities. As a rule, introduction of these technologies does not require large material and financial costs, and the effect obtained from the introduction of these technologies significantly exceeds the costs incurred.

In the context of the research, the purpose of the article was to study and economically substantiate the further development of the strategically important branch of Russia's economy taking into account globalization and transformation of the world economic system, formation of a single digital space, and identification of opportunities and prospects for the development of the digital economy in agriculture.

MATERIALS AND METHODS

Theoretical and methodological bases of the research include the works of scientists of Russian and world economic science, such as S.Yu. Glazyeva [8], N.S. Revenko [18], Negro Ponte N. [15], V.V. Ivanova [9], R.V. Meshcheryakova [13], Kelly K. [10], Serbu R. [22], Chung K. [1], Matei A. [11], Gatut B. [7], Pavlicek A. [17], Muniz C. [14]. The legal basis of the study was the current regulatory and legislation of the Russian Federation, namely, the decrees of the President of the Russian Federation [25, 3], federal laws of the Russian Federation [5, 6], decisions and orders of the government of the Russian Federation [2, 16], the current state program [24] and others.

The study is based on the fundamental principles of classical economic theory, the theory of economic growth and development, the category of institutional economics, micro- and macroeconomics.

The main method of investigation used is the dialectical method, which assumes that all events are considered in development and not

a discontinuous connection between the causes of these events and their consequences. The study of the development of the digital economy in agriculture of the national economy was carried out within the framework of the system approach, which allowed revealing the main development tendencies, establishing drivers and constraints of development, advantages and disadvantages. And the use of the reproduction approach was the basis for identifying opportunities for the development of the digital economy in the agrarian sector of Russia's economy.

At present, the main indicators of the development of the digital economy are the provision of economic growth of the national economy as a whole and its sole sectors (including agriculture); the formation of a qualitatively new economic system that fosters productivity growth; ensuring effective management of branch business structures and use of available resources; increase of competitiveness and economic security of companies, industries and national economies in the context of the formation of a global digital ecosystem.

Official statistical data, as well as the results of the authors' own research on this topic were the data base of the study. Abstraction as a general method of theoretical thinking along with dialectics as a universal method of cognition was used as the ground for conducting research. The study used general methodological principles, a systematic approach and a set of methods of scientific cognition. In addition, the methods of this study were monographic, computational-constructive, economic-statistical, abstract-logical, methods of analysis and synthesis.

RESULTS AND DISCUSSIONS

Active development of the digital economy in the world began twenty years ago, in the 1990s. This is largely due to the development of the World Wide Web (WWW), Digital Internet, computerization, robotization, the activities of information and communication companies. Over time, digital technologies gradually spread to all spheres of human life,

including its economic activities and, as a result, affected many sectors and fields of national economies, actively spread in the global economy.

Among the large number of definitions of the "digital economy" available in economic science, the most common is the following: The digital economy is an economic activity in which the key factor in production is data in digital form, processing large volumes and using analysis results in comparison with traditional forms of management can significantly improve the efficiency of various types of production, technology, equipment, storage, sale, delivery of goods and services [3].

Current level of digital technologies development and their influence on the ongoing processes allow us to give the definition of the term: "Digital economy" is an economy implemented using digital technologies. Inherent elements of this economy are the use of artificial intelligence, robotization of work processes, reduction of living labor costs in the production process, ability to model and program economic systems through the use of special computer programs, etc.

According to the level of development of information and communication technologies, Russia occupies the 43rd place in the world (2016), while the leaders in the development of digital technologies are the Republic of Korea, Iceland, Denmark, Switzerland and the United Kingdom [12]. However, intellectual capabilities and available resources of the modern Russian economy, as well as the goals of strategic development of the national economy, put the development of the digital economy in the category of the most important.

One of the main tasks of the modern Russian economy development is the development of "intelligent" agriculture and the active use of information and communication technologies in agriculture based on the construction of the e-agriculture system. For example, information and communication technologies in agriculture have already been successfully applied in the leading countries of the Asia-Pacific region when creating an e-agriculture

system in the agricultural segment of national economies [4], as well as in the leading countries of the European Union [22,11] and America [18].

Current level of technical support for Russian agriculture, as well as the level of production technologies used, includes the use of new innovative developments aimed at reducing the labor costs for workers. New high-performance equipment supplied to Russian agricultural producers is provided with modern management tools, computer monitoring and satellite navigation tools are used, fuel consumption control, load optimization and the most efficient use of equipment. The annual volume of financing of technical and technological modernization of Russian agriculture by 2020 should reach 8,254.4 billion rubles, of which about 50% of the federal budget funds (Figure 1).

Modern information and communication technologies allow the operative monitoring of production processes in agriculture, which allows adapting these technologies to the needs of modern agriculture based on the construction and development of the e-agriculture system in the agrarian sector of the Russian economy. One of the most promising areas of the use of modern digital technologies is the use of GIS technologies for monitoring the use of agricultural land. The use of satellite navigation systems in agriculture allows us to control the vast territory of Russia, to prevent or minimize losses from the onset of adverse weather events.

Another driver, which determines the active development of the digital economy, is the problem of improving the management efficiency of large companies (including agricultural ones).

The problem of ineffective management of large companies for a long time was the inadequate coordination of the activities of structural units, the adoption of untimely management decisions, which led to a decrease in the effectiveness of organizations. Introduction of mobile information and communication technologies, creation of local networks in the activities within the companies practically minimized the loss of

time when making managerial decisions, organizations significantly increased the efficiency of

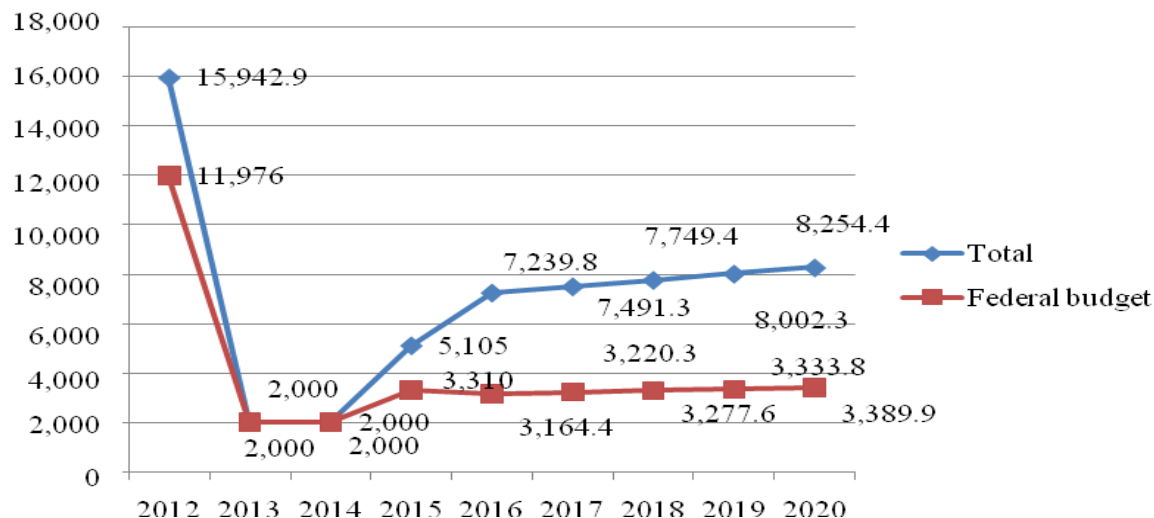


Fig. 1. The total amount of financing for technical and technological modernization, innovative development of the agrarian sector of the Russian economy, billion rubles.

Source: Calculated by the authors on the basis of data [24].

Total costs of companies for information and communication technologies in the Russian economy tend to increase. Thus, in 2005, the

costs of Russian companies amounted to 215 billion rubles, then in 2015 it reached 1,184 billion rubles (Figure 2).

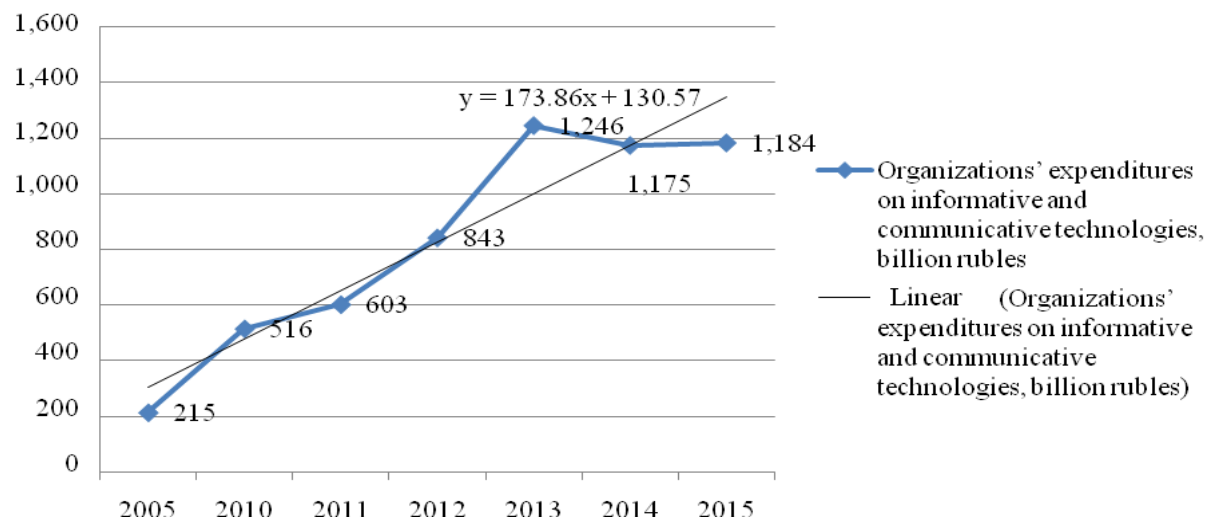


Fig. 2. Organizations' expenditures on informative and communicative technologies in the Russian economy, billion rubles.

Source: Calculated by the authors on the basis of data [20].

The use of digital technologies in the interaction of agricultural organizations and organizations of the financial sector of the economy is a promising area of digital technologies application. The use of electronic payments, special software, digital banking allows you to reduce transaction costs, improve the quality of service and

reduce the timing of operations. The possibilities of artificial intelligence, at this point in time, allow us to predict the development of the economy at the micro- and macro-level with a high degree of accuracy. The use of computer modeling, planning and forecasting of economic processes with the use of special software

allows us to visualize various development scenarios, to reduce the risks of the onset of negative events.

General availability of the Internet and software allows the Internet to be used as an interactive platform for trade in agricultural products, promotion of products. Search engines of large Internet companies, such as Google, Yandex and others are an indispensable tool for finding the necessary products, goods and services. Many agricultural producers create their own websites, where contact information and other information are placed.

The agro-food market is a promising area of application of digital technologies, both in international trade and trade within the country and regions. The activity of this market is based on the use of highly intelligent technologies, Internet facilities, possibilities of robotization and automation of production processes. Creation and development of this sphere allows the state and companies to control the processes of the product life cycle directly from production to consumption of the products produced.

Modern information and communication technologies are aimed at minimizing the resources spent, which is manifested in the possibility of saving production resources, including labor, and more accurate control over the flow of material and technical resources. So, for example, applied "accurate" farming systems use resource-saving technologies that are aimed at minimizing human labor, using robotic high-performance equipment, and using GPS navigation. The use of micro-irrigation, reclamation of water using high-tech installations in land reclamation also contributes to resource saving, lower water consumption and, as a consequence, environmental impact and cost savings, which in turn is manifested in lower cost and competitiveness of products.

At the same time, to ensure the process of building a digital economy, an active development of the system of modern Russian education (including the agricultural profile) is necessary. This system should meet the needs of the digital economy in specialists who are knowledgeable and able to apply

information and communication technologies in practice, and have appropriate competencies. An important role in this should be given to the system of higher education, as the basis for training specialists of a new generation for various branches of the digital economy of the future.

The basis of the emerging VI technological order in the world economy are digital technologies, the formation of the digital economy, the development of human potential, the formation of a new technological basis for development.

The studies of many scientists emphasize the importance of the development of modern ecosystems of the digital economy. Russian economists consider an actively developing digital economy the basis for the further development of the national economy. In the writings of scientists of the world economic science special attention is also paid to the development of the digital economy in various sectors and spheres of activity.

Many Russian scientists [8,19,21] understand only the sector of information and communication technologies under the name of "digital economy". This, in our opinion, is an inadequate approach to the concept that does not reflect the current level of development of digital technologies, their role and significance for the real sector of the economy.

Professor Meshcheryakov R.V. believes that in the disclosure of the term digital economy, two approaches should be considered. The first approach is based on the fact that the digital economy is the economy based on digital technologies and at the same time it is more correct to characterize exclusively the field of electronic goods and services. The second approach is based on the fact that the digital economy is the economic production using digital technologies [13].

In our opinion, the most accurate definition of the term "digital economy" reflecting the current level of development of digital technologies is the term we uncovered earlier. The digital economy is an economy implemented using digital technologies. (author's interpretation of the concept).

Leurent H. and Rösler P. [23] substantiated

the drivers that affect the development of production in the real sector of the future economy: technologies and innovations; regulation and legislation; global economy, trade and investment; production resources; human capital; consumer behavior. The combination of these drivers for the development of the economic systems of the future will, in their opinion, be the basis of economic growth and development, including the digital economy in the world.

Chung K. [1] links the development of the digital economy in the world with the possibility of international trade in food products between countries, their cooperation and the ability to coordinate the activities of large multinational companies.

Large multinational companies such as AT & T, Cisco, Citi and others [26] are trying to identify new opportunities for the development of companies in today's economy, while determining the importance of developing a global digital economy.

In his study Serbu R. [22] analyzed the possibilities of the development of the digital economy of the European Union and the construction of the system "e-agriculture".

According to Muniz C. [14], further growth of the European economy is associated with the development of digital technologies, as the basis for building a new economy.

Integral elements of the application of information and communication technologies that contribute to the development of the digital economy in Russia's agriculture, in our view, will be the following: provision of information to producers and consumers; possibility of sharing knowledge via the Internet; possibility of interactive exchange of operational information; promotion of products in various markets; possibilities of using digital banking services; provision of information on weather phenomena and the use of land resources; software for the use of artificial intelligence, robotic equipment and other processes.

CONCLUSIONS

Our study of the development of the digital economy in agriculture in Russia and in the

leading countries of the world made it possible to draw the following conclusions:

The digital economy will help reduce the negative consequences of the economic crises of the world economy, and also contribute to the economic development of individual industries (including agriculture) and national economies in general.

The digital economy will be the basis for the development of the Russian economy of the future, and will also stimulate the effective development of individual industries, including agriculture.

The construction of a new Russian economy is possible only on the basis of modernization of education, the training of highly qualified specialists, taking into account the requirements of the digital economy.

The application of information and communication technologies in agriculture creates equal opportunities for promoting products between large and small companies, which increases the efficiency of their activities and provides equal opportunities for ensuring competition in the industry.

The use of digital technologies in agriculture is possible not only as a necessary infrastructure of the production process, but also as the sphere of application of artificial intelligence directly in the production process, the creation and development of the e-agriculture system.

The further development of the digital economy in agriculture will be closely interrelated with the level of accumulated knowledge, the development of science, the technical and technological equipment of production processes, the ability to control processes at all stages of the product life cycle.

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