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DIGITAL ECONOMY OF AGRIBUSINESS: PROBLEMS AND DEVELOPMENT PROSPECTS

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Abstract

The digital economy, which encompasses all spheres of human activity, has a direct impact on improving the welfare of the population, improving living conditions and quality, and generally on socio-economic development. Digitalization represents a new way of world economic and social development replacing computerization and informatization. The prior factors for economic development, as a modern way of social economic development are: risks, problems, prospects and forecasts of digitalization of the Russian economy, positive and negative consequences of digitalization of the country's economy, methods of economic efficiency from digitalization of the domestic economy, as well as analysis of the current state of the goals and objectives of digitalization of the Russian economy. The relevance of the digital economy development in the agro-industrial complex depends on the volume of export-import operations and ensuring the demand for domestic agricultural products. There is an increase in the efficiency of the enterprise and production volumes while lowering costs when considering the digital economy from the of microeconomic point of view. Maintaining a balance between the practical application of digital technologies and the promotion of employment is a priority factor for successful economic growth from a macroeconomic point of view. The digital economy is crucial in the innovative development of agriculture when technological platforms are created: "Technology of the food and processing industry of the agro-industrial complex – healthy food products", "Eurasian Supercomputer Technology Platform", "Photonics", "Eurasian LED Technology Platform", "T technologies of economic development", "EURASIOBIO", "Technologies of metallurgy and new metals".

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1. Introduction

According to the level of the digital economy development, there are four groups of countries: leaders that slow down growth, promising and challenging. Russia is in the group of promising economic development, which suggests that it demonstrates a fairly steady growth rate and has the potential to raise up to the group of leaders.

The term digital economy was founded by American computer scientist Nicholas Negroponte in 1995 (Aletdinova, 2017).

The digital economy in the agricultural sector is aimed at developing agriculture, training qualified personnel, improving the quality of education and improving the living conditions of the rural population, as well as ensuring environmental safety. There are four pillars in the digital economy of the agro-industrial complex: assessment of the value of digital technologies, functional integration, organizational capabilities, individual characteristics (Quinton et al., 2016).

With the help of information technology agriculture is becoming one of the most attractive innovative ideas (Menne, 2017).

According to Panshin (2016), digital economy is formed when new technologies and platforms allow enterprise and individual management to reduce transaction costs of interaction on an ever-increasing scale and make closer contact with business entities and government agencies. There are four trends defining the digital economy in the technological aspect: mobile technologies, business analytics, cloud computing and social media; globally, social networks such as Facebook, YouTube, Twitter, LinkedIn, Instagram, etc. (Panshin, 2016). Digital transformation tools include the cloud, sensors, robots, and digital communications (Van Es & Woodard, 2017).

2. Problem Statement

Russia is leading the introduction and practical application of digital technologies. So, in terms of the number of Internet users, Russia ranks the first among European leaders and the sixth in the world.

According to a report from the McKinsey Global Institute, by 2025 there expects an increase in gross domestic product of 4.1–8.9 trillion rub.

The priority area with the potential for successful use of digital technologies after construction, insurance and trade is agriculture. There are various innovative technologies being developed for the development of the agro-industrial complex, such as a robot for weeding weeds and harvesting. The main problem in the development of the digital economy in the agro-industrial complex is the increase in the number of cybercrimes, which result in the leakage of confidential data. AIC enterprises are forced to spend time and money on eliminating the consequences of cybercrime, relegating to the background the directions of development of the investment policy of the AIC and innovation.

According to the forecast of the World Economic Forum, by 2022, the total planetary damage from cybercrime will increase to 8 trillion USD.

The second problem of the digital economy development in the agro-industrial complex is the development and implementation of artificial intelligence.

On the one hand, an increase in the world's population requires food security. Therefore, it is necessary to cultivate vast areas of land and provide plants with protection against various types of pests.

To protect plants from pests there is an artificial intelligence used – heavy-duty neural networks that allow you to analyze the condition of plants and quickly eliminate weeds, identify the need for herbicides, and assess the quality of agricultural products.

On the other hand, the digital economy development in the agro-industrial complex contributes to a reduction of employees. It will cause unemployment and lower wages for low-skilled personnel (Akhromeeva, Malinetsky, & Posashkov, 2017).

Though, despite the problems, the digital transformation in the agro-industrial complex has a number of advantages: providing enterprises with up-to-date information in order to quickly respond to changing environmental conditions. In 2019, the departmental project “Digital Agriculture” was launched by the Ministry of Agriculture of Russia.

It sets the following tasks:

1. Implementation of the Digital Agriculture platform to support agricultural producers.
2. Implementation of the Agro Solutions module to increase the efficiency of agricultural producers, increase of labor productivity at agricultural enterprises and reduction of administrative costs.
3. Creating a system for training qualified specialists in agricultural enterprises, with at least 50 % of the total number of specialists in the enterprise.

The barrier to the implementation of this project seems to be the problem of automation of the project leading to a decrease of its effectiveness.

Along with this, the digital economy in the agricultural sector faces the problem many wholesale and retail intermediaries. As a result, some small businesses are forced to sell products through wholesale intermediaries to their own detriment since the products are sold at a price that is lower than its cost.

3. Research Questions

Based on the problem statement, despite the shortcomings listed, the use of digital technologies by agricultural enterprises is one of the priority advantages of increasing competitiveness. The Government of the Russian Federation approved the National Program “Digital Economy of Russia for 2018–2024”, with federal projects such as “Normative regulation of the digital environment”, “Personnel for the digital economy”, “Information Infrastructure”, “Information Security”, “Digital Technologies”, “Digital Public Administration”. The development of digitalization programs for the Russian economy contributes to the formation of high-tech industries using digital technologies. The digital economy in the agro-industrial complex has a number of characteristics: the interaction of artificial intelligence with living organisms (heavy-duty neural networks), the distribution and control of agricultural products across various agricultural areas, and the consideration of the characteristics of production processes.

The development of digitalization of the agro-industrial complex has several stages (Table 01).

Table 01. Digitalization of the agricultural sector in Russia (Plotnikov, 2019)

Stages	Activity name	Features
1967–1980	Automatisation	Automated process of control systems
1980–1990	Electronization	Computers and electronic sensors
1990–2000	Informatization	Information Systems and Software
2000 till date	Digitalization	Automation of technological tasks

The share of high-tech and knowledge-intensive industries in the gross regional product in 2016 was 20.7 %, which is 0.5 % more than in 2015 (Table 02).

Table 02. The share of high-tech and knowledge-intensive industries in GDP

Regions	2014, B %	2015, B %	2016, B %
Russian Federation	19.6	20.2	20.7
Central Federal District	21.1	22.2	23.7
Northwestern Federal District	24.4	24.1	23.3
Southern Federal District	16.4	16.8	17.3
North Caucasian Federal District	18.5	19.1	18.8
Volga federal district	23,3	24,4	24,3
Ural Federal District	12,8	13,2	13,5
Siberian Federal District	18,9	18,3	17,9
Far-Eastern Federal District	14,5	14,5	14,2

Table 2 shows that the first place in the share of high-tech and knowledge-intensive industries in the GDP among the regions of the Russian Federation is given to the Volga Federal District with an indicator of 24.3 %; the Central Federal District – 23.7 %, the North-Western Federal District – 23.3 %. According to the Ministry of Agriculture of the Russian Federation, more than 23 % of the costs of agricultural enterprises can be optimized using digital technologies, and in 2016, the cost of grain for those receiving state support amounted to 450.2 billion rubles.

The priority area for the digital economy development is agricultural engineering. In 2016, there were 223.6 thousand tractors in agricultural organizations, and 216.8 thousand in 2017; in 2018 – 211.9 thousand units, combine harvesters in 2018 – 56.9 thousand units, which is 1.7 thousand units, more than in 2017 and 2.4 thousand units, less than in 2016 (Table 03).

The digital economy in the agricultural sector is aimed at solving the following problems: increasing the volume of agricultural production; ensuring environmental safety; reduced impact of the human factor. One can see these problems on the example of the grain yield and leguminous crops of the Russian Federation (Table 04).

Table 03. The share of high-tech and knowledge-intensive industries in GDP

Specifics	2016, thousands	2017, thousands	2018, thousands
Tractor	223.4	216.8	211.9
Plougher	61.6	59.7	58.5
Cultivator	90.3	87.6	84.8
Seeding-machine	87.8	82.8	79.0
Combine harvester	59.3	57.6	56.9
Mowing machine	31.0	30.5	30.1
Milking unit	24.1	22.9	22.4
Beet harvester	2.2	2.2	2.1
Water sprinkler	6.0	6.2	6.1
Granular fertilizer distributor	15.7	15.5	15.7

Table 04. The grain yield and leguminous crops in the Russian Federation (in agricultural organizations; centners from one hectare of harvested area)

Specifics	2016	2017	2018
Grain and pea crops	27.6	31.0	27.2
Wheat	28.4	33.2	29.1
Rye	20.3	21.5	20.7
Barley	23.2	27.9	23.3
Oat	17.8	20.3	17.9
Millet	15.5	12.1	11.8
Buckwheat	10.8	10.3	9.7
Rice	53.8	54.3	59.2
Leguminous plants	18.1	21.0	13.8

4. Purpose of the Study

The development of the digital economy in the agricultural sector is aimed at improving the competitiveness of domestic agricultural producers and achieving their goals.

The development goals of the digital economy in the agro-industrial complex follow from the existing problems:

1. The development of information and communication infrastructure contributes to the growth of economic growth and the export of information technologies. It is aimed at creating a single information space and a universal logistics provider, as well as increasing the accessibility of services to the population and improving the quality of life.

2. Ensuring information security to counter cybercrime, which threatens not only the safety of agricultural producers, but also constitutes a threat to national security. According to Kommersant, the Russian economy in 2015 suffered from the activities of cybercriminals in the amount of 203.3 billion rubles (Rozhkov, 2016).

3. The impact of the digital economy on unemployment. On the one hand, with the development of the digital economy in the agro-industrial complex, the need for an expanded staff of employees disappears, which leads to a reduction in the number of employees in the enterprise and an increase in unemployment. On the other hand, the reduction of personnel at the enterprise places high demands on the digital technologies used, since they are precisely the key tools that determine the steady and stable development of the enterprise in carrying out entrepreneurial activities. According to the McKinsey Global Institute (McKinsey, 2017), by 2036 from 2 to 50 % of work expressed in man-hours can be automated, and by 2066 this share can reach from 46 to 99 %.

4. The digital transformation of the economy and the social sphere are the priority areas of the state for the next 5 years. Certain steps have been taken in this direction, for example, the State Duma passed a bill on “digital rights” in the third and final reading. According to the Federal Law of March 18, 2019 No. 34-Φ3, digital rights are defined as “obligation and other rights, the contents and conditions for the implementation of which are determined in accordance with the rules of the information system that meets the criteria established by law. Implementation, disposal, including transfer, pledge, encumbrance of digital law in other ways or limiting the disposal of digital law is possible only in the information system without a third party.

The global Digital IQ study for 2018 identified the goals of digital transformation in Russia and the world, among which they highlight increased efficiency, the development of new markets, brand improvement and changing the business model.

5. Research Methods

Digitalization penetrates into all spheres of public life and should be considered as an engine of world economic and social development, focused not only on improving the quality of private life of citizens of our country, but also on the national security and improving the economic situation by increasing the degree of investment attraction. In the global economy, digitalization is a new global trend, the result of which is to increase the efficiency of the economy and satisfaction with human living conditions. Digitalization is a trend in the development of the digital economy, aimed at its effective development. We believe that the methodological basis for the study of the digital agriculture, its problems and prospects, is a systematic approach, which is a necessary element in the analysis of the economic situation in the process of applying digital technologies.

6. Findings

The development of the digital economy in the agricultural sector allows agricultural producers to improve the quality of agricultural products and increase their volumes, which is especially important in the face of increasing competition. The result of the digital economy in the agricultural sector is not only increasing the competitiveness of agricultural producers, but also expanding markets for agricultural products. Thanks to digitalization, by 2025 it is expected that the share of the digital economy in GDP will grow triply, and the country's GDP will increase by 4.1–8.9 trillion. rub., i.e. digitalization will provide from 19 to 34 GDP growth.

According to the research “Runet Economy / Ecosystem of the Digital Economy of Russia for 2018”, the contribution of the Internet economy to the Russian economy amounted to 3.9 trillion. rub. For example, the infrastructure segment grew by 13.3 % compared to 2017 and amounted to 106.2 billion rubles, the e-commerce segment – by 13.2 % compared to 2017 (1 953.4 billion rubles in 2018), the marketing and advertising segment – by 17.3 % compared to 2017 (262.9 billion rubles in 2018), the media and entertainment segment – by 7.1 % compared to 2017 (75 billion rubles. in 2018).

On the one hand, with the development of the digital economy, there is no need for an expanded staff, which leads to a reduction of employees in the enterprise and an increase in unemployment. On the other hand, the reduction of personnel at the enterprise places high demands on the digital technologies used, since they are precisely the key tools determining the steady and stable development of the enterprise in conducting entrepreneurial activities.

The main result of achieving the goals of the digital economy in the agro-industrial complex is to increase competitiveness and economic growth, the development of new markets and industries, the development of the telecommunication environment, and increased labor productivity.

The study considers the digital economy as an economic activity that focuses on the use of digital data and allows to increase the productivity and quality characteristics of economic activity in the

production and sale of various goods and services, through the use of digital technologies, as well as the introduction of innovative technologies in various fields, such as like manufacturing, trade, logistics and business, education, healthcare, etc.

7. Conclusion

The use of digital technologies in the agro-industrial complex will make it possible to quickly respond to changing conditions and make business decisions in real time, which will optimize business processes and minimize costs (Raisinghani, 2003).

Based on the foregoing, we can state that the digital economy in the agricultural sector is the latest stage in the practical application and implementation of digital technologies in the field of agriculture, focused on the collection, processing, transmission and storage of documented information in digital form, in order to improve the quality of social life, increasing the efficiency of production processes, minimizing costs of business processes, planning and coordination financial activities of agricultural organizations and productively on the provision of public services.

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