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MAIN DIRECTIONS OF RUSSIAN AGRICULTURE DIGITALIZATION: FEDERAL AND REGIONAL ASPECTS

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Abstract

Digitalization of agriculture is one of the areas of the Russian economy digitalization. However, despite the fact that this industry occupies an important place in the economic sector, this process is not as effective as one would expect. Based on the analysis of scientific literature, statistical and empirical data obtained as a result of interviewing representatives of agribusiness in a number of regions of the Russian Federation, the article forms and analyzes the main causes of the problem of agriculture digitalization at the present stage. The necessity to take into account the features of the federal structure of the Russian state is noted, which should be reflected in the organization of the activities for agriculture digitalization. It is necessary to form a single, national (federal) digital platform, as well as the introduction of information technologies at the regional level, taking into account the specific features of the region. Attention is drawn to the relationship with parallel existing systems, and in particular, with the education system, given that it is the educational activities of educational institutions that should solve the personnel issue in the training of highly qualified specialists who would have knowledge in the field of IT and their features in the agricultural industry, and could also apply them in practice. In this regard, the activities of specialized institutions of higher education that prepare graduates in various areas of training and specialties related to the field of agriculture can be considered a positive experience.

Keywords: Agriculture, digitalization, education, Federation, information technology, region

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1. Introduction

Agriculture digitalization, with all its complexity, labour intensity, cost and other aspects, is an inevitable process, although it is not intensive enough. Thus, in Russia, about 4.7 million people are employed in agriculture, but there is only one IT specialist per 1000 employees (Shcherbina, 2019); information technologies cover 5-10% of acreage ("Smart" agriculture: state and prospects, 2017). While the use of information technologies in agriculture can increase its profitability several times by optimizing costs and allocating funds. This is evidenced by both world practice and the experience of successful Russian agricultural producers, confirming the importance and necessity of modernizing agriculture through its digitalization (Manzhosova, 2019). Therefore, it seems to us that the defining subject of such construction, at least in the field of agriculture, is the state (Kudashov et al., 2017).

2. Problem Statement

The process of agriculture digitalization is extremely slow, despite the fact that the agricultural sector is an important part of the economy of any state, and especially for the Russian one (Laikam et al., 2019). The share of expenditures on ICT (Information and Communication Technologies) in this area of the economy was 0.34% in 2015, 0.2% in 2017, 0.32% in 2018, occupying the bottom lines of investment indicators (https://rosstat.gov.ru/enterprise_economy). According to the all-Russian agricultural census conducted in 2016, 55.4% of the share of small agricultural organizations, 44.2% of microenterprises, 24% of peasant households (farms) and individual entrepreneurs, and 21.8% of personal subsidiary farms have access to the Internet (Rosstat, 2018), not to mention information technologies as such, especially at the advanced and high-tech level.

However, it is the importance of the agricultural sector with still small investments that causes the problem to be posed as follows: how to make agriculture digitalization interesting for investors while maximizing the effectiveness of their investments.

We believe that to ensure this, it is necessary to proceed from the form of government of a particular country. For example, Russia is a Federation by its state structure. Accordingly, to solve problems of this level and scale, it is necessary to use a two-level integrated approach:

- Federal (national), which would form common digital space for the agricultural sector;
- regional, which would take into account the specific features of a particular region.

And while agriculture digitalization, as part of digitalization of the Russian economy, was set as national objectives in 2017, the decree of the RF Government "On approval of programme "Digital economy of the Russian Federation" of July 28, 2017 No. 1632-p, and separately, was included by the decree of the Government of the Russian Federation 8.02.2019 G. 98 as a departmental project "Digital agriculture" in the state program "Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials and Food", however, there are a number of problems that require serious study, especially since:

1) with the growing number of the world's population, the need for food will also increase, and this requires the transfer of agriculture to another level;

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2) global environmental problems cause the transition to environmentally friendly forms of nature management and, above all, technical technologies that reduce the negative impact on the environment in the process of anthropological activities in the implementation of agricultural work;

3) increasing the scale of agriculture digitalization requires an increase in the volume and variety of types of information technologies used in the agricultural sector, as well as a greater number of specialists who could implement these technologies (Digitalization of agricultural production in Russia for the period 2018-2025, 2018);

4) all this creates the problem of investment in agriculture (Mukhametova, 2016) while ensuring the guarantee of these investments.

3. Research Questions

The article discusses some aspects of the process of agriculture and agribusiness digitalization in the context of the relationship of the analysis of scientific, statistical and empirical evidence, namely:

the problem of inefficiency of the process of agriculture and agro-industrial complex digitalization and the factors affecting it is analyzed;

the most popular, including the respondents under the study of agribusiness representatives, sectors of agriculture and agro-industrial complex digitalization.

4. Purpose of the Study

The aim of the work is to study the general trends of agriculture digitalization as one of the state tasks in the medium term, if necessary, taking into account the characteristics and needs of the regional level, using a comprehensive approach to the study of this issue, on the basis of surveys of agribusiness representatives as well.

5. Research Methods

Given the scale and significance of the process of agriculture digitalization, it is necessary to use a scientific practice-oriented approach based on the integrated use of various methods of scientific research and practical activities, based on the set goals and objectives, as well as the level of implementation of information technologies. Within the frame of this work, taking into account the limitations of its scope, general scientific methods of cognition were used – the study of information sources, questioning, observation, logical analysis of the received information, deduction, induction, abstraction.

6. Findings

A survey of agricultural producers in such regions as the Krasnoyarsk Territory and the Republic of Khakassia carried out in the frame of this work, as well as analysis of scientific literature, showed the following:

1. Introduction of information technologies in agriculture is necessary. And we are talking about both technical provision of broadband Internet coverage (4G, 5G, Wi-Fi) for agricultural land, and the

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introduction of block chain technologies in the traceability systems of individual products, traceability of seed material and livestock products, end-to-end traceability from production to the counter, digitalization of breeding technologies and seed stock, genetic stock of livestock, digital chains to support logistics of supply and sales of products with parallel processes of digitalization of transport and logistics (Arkhipov et al., 2019), etc.

However, today there are a number of problems that hinder the effectiveness of this process:

- there are still shortcomings in the regulatory framework governing these issues, although the task of digitalizing agriculture in general was outlined about 10 years ago, in the context of digitalization of the Russian economy in general, and specified in a number of regulatory legal acts, which were triggered by the appeal of President of the Russian Federation to the Federal Assembly of the Russian Federation in 2016, where they were told about the need to digitalize the main spheres of life (President's Message to the Federal Assembly, 2016);
- it is necessary to reflect international standards in Russian legal documents to ensure the competitiveness of agricultural products in the world market, as well as to take into account foreign experience
- for the development of regional areas of agriculture using information technologies, it is necessary to have unified, national, information bases, systems, platforms (for example, for the collection and processing of telematics information, the formation of a federal narrow-band network using LPWAN technology);
- insufficient development of Russian technological developments for agriculture and agro-industrial complex with a high price component of imported technologies, which is further affected by negative changes in the foreign exchange market for the Russian ruble;
- inconsistency of cadastral, urban planning and other documentation data with reality, due to the fact that the information contained in these databases is often outdated;
- lack of personnel who could work professionally with information technologies in the field of agriculture and agro-industrial complex (Trashkova & Aisner, 2017).

Importance of this postulate is confirmed by the fact that the latest information technologies guarantee subjects priority not only in the economy, but also in culture. The peoples that are now the object of globalization rely on the appropriate educational level (Pfanenshtil et al., 2019).

2. There is a need for targeted training of specialists of different profiles and specialties, who would:

- receive education that meets the expectations of the labour market in the field of agriculture and agro-industrial complex, under the conditions of its digitalization;
- be not only narrowly focused (agronomy, animal science, etc.), but also reflecting the specific features of rural areas (for example, a lawyer or manager in the field of agriculture and agro-industrial complex, etc.);
- be practice-oriented to work with information technologies in the field of agriculture and agro-industrial complex;
- be sent to rural territories after receiving education with their employment for at least 3 (or better, 5) years.

3. The main, most popular objects of digitalization are:

- land use (planning a new and improving the existing agricultural landscape; use of land of different categories, etc.);
- various intelligent systems ("smart" field, garden, greenhouses, farms, etc.) that would ensure the efficiency of a particular production, taking into account the specific features of manufactured products, area, climate and other factors;
- management in the field of agriculture and agribusiness;
- management in the field of agriculture and agro-industrial complex (Kleymenov, 2016), as well as control and supervision of it.

4. There is a need to review the policy in the field of education, with regard to the organization of training of specialists in the field of agriculture, who have knowledge, including the use of information technologies. At the moment, while the process of digitalization of the agricultural sector is still slow, it already needs qualified personnel. Accordingly, educational institutions should have already taken into account the state policy on the transfer of agriculture to information technology, and prepared appropriate educational programs that would have already started their training for future employees of agricultural enterprises. First of all, we are talking about specialized institutions of higher education that prepare graduates in various areas of training and specialties related to the field of agriculture – agricultural universities. They have the main role to play in solving this issue, so it is necessary to create and implement educational programs that train specialists in the field of agriculture, including knowledge of IT.

7. Conclusion

When considering the issues of agriculture digitalization, it should be understood that this process is not limited to agriculture itself. In order to make the agricultural sector efficient and competitive, it is necessary to proceed from a comprehensive approach in implementing this. The following points should be named as a list of the main (but not complete) directions of agriculture and agribusiness digitalization:

- strengthening the role of the state in implementing this process (introduction of effective measures of state support; elaboration of the regulatory framework; effective management, as well as proper control and supervision, etc.);
- interaction with related sectors (banking and insurance, logistics, computer technology market, education system, etc.);
- development of the social sphere (Akhmetov & Galikeev, 2019);
- taking into account the peculiarities of regions (Magomedov, 2020);
- accounting for the policy of sustainable development of rural territories (Loginova & Strokov, 2019; Matveev, 2014) in the implementation of agriculture digitalization.

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