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## Digitalization of the Russian Agricultural Sector

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Tatyana M. Yarkova

Department of Agricultural Production Organization, Federal State Budgetary Educational Institution of Higher Education "Perm State Agro-Technological University named after Academician D.N. Pryanishnikov", Perm, Russia

Email: [tanyayarkova@ya.ru](mailto:tanyayarkova@ya.ru)

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### Abstract

In the conditions of the modern industrialization era, digitalization issues in all areas of the economy are becoming more significant and relevant. The foreign countries experience indicates the positive effect of such processes. All developed countries are actively striving to transfer from semi-automated or mechanized to the labor fully controlled by programs and engineering technologies. This approach was found as first of all in the industrial sphere, and then in the agro-industrial complex. Today in Russia there are acute questions at the state level related to the economy digitalization process. Experts objectively indicate the benefits of software engineering products in agriculture and the agro-industrial complex as a whole. Along with automation and robotization processes, an important place is occupied by information platforms that allow solving significant problems for farmers and consumers of agricultural raw materials, means of production, as well as food production and supply. This applies primarily to the exchange of goods. The expected positive digitalization effect on the agrarian economy is enormous and does not involve any risks and threats for Russia, but for all that it is a very long process. Speeding up the processes of solving such problems will require international mutually beneficial cooperation.

### Keywords

*IT-Technologies, Information, Digitalization, Agricultural Sector, Competitiveness*

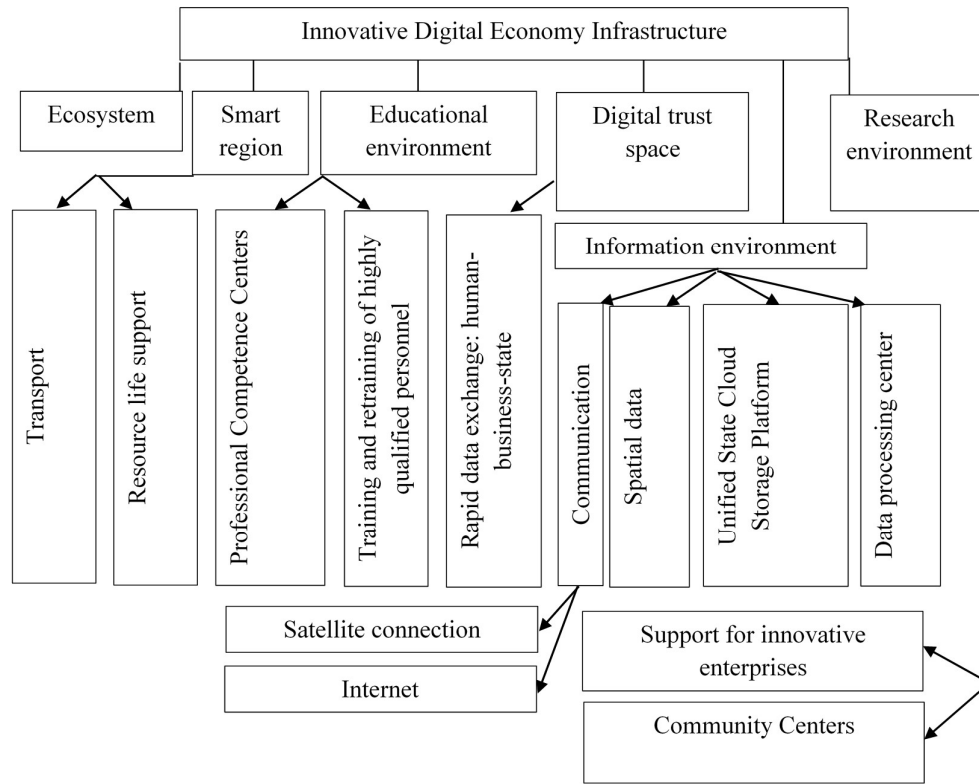
### Introduction

Information technology and the economy digitalization are forcing modern Russian society to radically change its view of the economy. Already today, one can observe how, due to some elements of digitalization, changes are taking place on traditional business entities. Of course, we are talking primarily about industrial enterprises. At the same time, considerable attention is paid by the state to the issues of digitalization in the agro-industrial complex.

The evolution of technologies used in a manufacturing economy in fact involves the formation of a significant influence on factors of production, production tasks, and also on the whole system of organizational, economic and managerial relations in business. The result of such changes is the emergence and "life" of a large array of information and data that give the most positive effect, when they are used and managed correctly. This reality suggests that operational, economic, regional, state and global control becomes digital due to expanding the information tools used [1].

In this regard, it can be stated that the almost universal transition to the digital economy is a priority vector of development in the Russian Federation. The meaning of the term "digital economy" is presented in the "Strategy for the Development of the Information Society in Russia for 2017-2030", which states that it is "an activity that has key production factors in the form of digital data, and their processing and use in large volumes, including their generation, can significantly increase the efficiency, quality and productivity in various types of production during storage, sale, delivery and consumption of goods and services" [2, 3].

Therefore, it can be noted that the implementation of strategic measures in the field of the digital economy will allow the creation of innovative infrastructure elements (Fig.1).



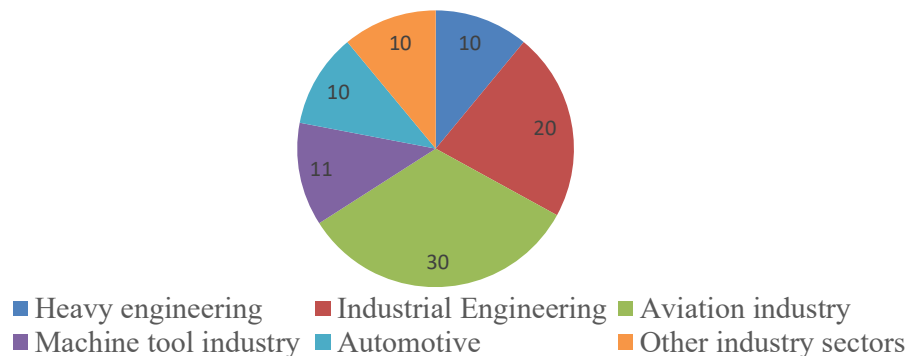
**Figure 1: Structural Elements of the Digital Economic Space**

In Russia, many of the elements of the structure represented in Figure 1 are already identified in the economic space of various sectors of the economy.

The most widespread are the information infrastructure in terms of communication from various sources, and the Unified State Information Cloud Storage Platform. As for the latter, the main user product for the Russian society was the “Public Services” system. If we consider the economy digitalization system as a model or a single mechanism, then it should be divided into two main blocks: production (products) and services. Services in this case should not be universal in nature, because they can be oriented both separately to economic entities, and to organizational and economic processes occurring between them, and to the consumer society as a whole.

The most dynamic is the development of digitalization observed in the economy at industrial high-tech enterprises. This fact is explained by the fact that the main factor ensuring functional industrial production is the availability of machine tools, machines, and other equipment.

In this regard, it is quite advisable to give some figures indicating the availability and provision of certain sectors of the economy with high-tech and digital equipment by 2018 (Fig. 2).



**Figure 2: The Share of Equipment with High-tech Equipment and Program Management in a number of Industries in 2018 (Compiled by the Author according to the source [3])**

The modern market economy requires a competitive result of labor. The industry is provided with the multi-cyclical nature of production, and a high level of physical facilities turnover. This area is quite popular in the labor market and often causes interest among investors, including the state. The positive nature of the digitalization development in industry is influenced by a set of factors and conditions:

- development of outsourcing and subcontracting;
- development of academic and applied networking between higher education institutions, research centers and business entities in terms of the development, testing and implementation of new equipment for industrial production;
- transformation of individual innovations using a digital shell and with the help of IT engineers;
- training, retraining and advanced training in universities with mandatory development of all necessary professional competencies;
- formation of a favorable environment at the state level (organizational, managerial, control, coordination, financial and administrative, regulatory and programmatic) for the development of digitalization in the economy;

Almost all of the factors and conditions for digitalizing the economy can be applied to the agro-industrial complex. A well-known fact is that the agro-industrial complex is a combination of interrelated sectors of the national economy, as well as with industry. Noting more specific figures, we are dealing with the functioning of more than 70 sectors and sub-sectors in the agro-industrial complex. Thus, the sustainable development of agro-industrial production is the strategic goal of the state in the development of the economy [4, 5]. Consequently, the tasks of digitalization are also entrusted to an unstable economy in the field of the agro-industrial complex.

World experience proves the effectiveness of the practical application of digital technology. Digital agricultural technologies can significantly save, first of all, the labor costs of agricultural production in crop production and animal husbandry. In Russia at present, labor saving does not in any way lead to the release of labor, since the lack of personnel, including highly qualified ones, is a serious problem of agricultural production in rural areas.

All these problems within the framework of digital information technologies can be solved through the use of elements of advanced foreign experience. In particular, two information platforms are of interest:

1. An information platform (analogue of the Bayer Forward Family software product) for efficient farming through rational nature management and environmental protection [6];
2. Information platform for ensuring effective trade in agricultural raw materials and foodstuffs within the country. Regarding the second element that underlies digitalization, it should be noted that it involves the stable development of the agro-industrial complex and the food market through the use of such tools as advertising, marketing promotion and ensuring of sales, as well as public relations [7].

But along with the effective informational aspect of the economy digitalization, high-tech digital tools should also be used, which, due to such qualitative transformations of the production process, can reduce production costs, increase the agricultural labor productivity, and contribute to the effective sale of products within the country and abroad. At the same time, orientation of agricultural production to competitive species only should be envisaged, which means that before mastering high digital technologies, including economic and information ones, it is necessary to review the existing specialization in all territories of the country. This approach is fundamental, and it minimizes the possible risks and threats of various geneses.

Only after identifying the most competitive types of agricultural activity in Russia, one should resort to the internationally known scientific and practical community of the "Agriculture 4.0" concept, which has established itself on the positive side in many developed countries of the world, and in some CIS countries.

In this regard, it is appropriate to cite the experience of Kazakhstan as a Russia-friendly country, where the State Program "Digital Kazakhstan" for 2016-2020 was adopted. The purpose of this Program is to increase the competitiveness of all types of economic activity, including agricultural. The implementation of this software tool is achieved through international cooperation, primarily with scientists from the United States (based in the state of Michigan) [8, 9].

It is fairly true, from the perspective of Russia's rating among the successfully developing countries with a market economy, that the implementation of such important tasks as the agro-industrial complex economy digitalization will achieve the desired success and effectiveness as a result of close cooperation with foreign countries that already have positive experience in this field.

This conclusion is based on:

- Firstly, a significant shortage of state support in Russia for farmers, the availability of weak agricultural production development rates, the lack of grant support for science-intensive high-tech projects in the agro-industrial complex, the impossibility of testing them, the lack of personnel, the unattractiveness of the rural territories due to their socio-economic underdevelopment, and so on. [10, 11, 12];
- Second, the need for significant financial resources intended for the economy digitalization in the agricultural sector;

- Third, IT specialists are required who have a knowledge in the agro-industrial complex, who will be able to develop computer programs and applications to ensure the maintenance of relevant equipment.
- Fourth, it is necessary to educate (train) highly qualified specialists in the agricultural sector (agronomists, engineers, livestock specialists) in the knowledge of computer programs and applications. Modern agro-industrial specialists should be able to develop such programs independently and put them into practice in the digital economy conditions, for example, in the field of precision farming, remote control of equipment, etc. [9].

### Conclusion

In general, we need to understand that the effect of introducing digital economy elements into the agrarian sector is expected and justified not only by international experience, but also by the domestic one. There are numerous cases of transition to digitalization among small businesses in the agro-industrial complex. Regional trading Internet platforms for farm or agricultural products are being created and enjoyed popularity; this gives a minimum price effect by reducing the trading margins formed on the market by reselling agricultural raw materials, agricultural products, and food.

Many foreign experts today are calculating not only the positive, but also the negative effect of the economy digitalization in the agricultural sector. Negativity is noted in the labor force being released due to automation and self-regulation of the agricultural production process, which leads to a glut in the labor market, and to unemployment.

For Russia at present, digitalization processes do not carry socio-economic risks and threats. On the contrary, the medium-term prospect is aimed at the significant effect of the digitalization elements introduction in the economy of the agro-industrial complex, which consists in increasing labor productivity by more than three times, reducing production and sales costs by 20-25%, expanding the agricultural business boundaries, and increasing profit margins from agricultural production.

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