

Digital economy in the agribusiness management and rural areas development

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Abstract—This paper presents the growing role of the digital economy in the management of enterprises and organizations of the agro-industrial complex, and the development of rural areas in terms of innovative agricultural development. The issues of the information infrastructure and security, are revealed, the formation of digital media, reduction of technical risks in the industrial sector, the issue of the competitiveness of agribusiness and food security of the Russian Federation, are revealed. The priority directions of modern agricultural policies are presented: management of enterprises and organizations of the agro-industrial complex and the development of rural territories in terms of innovative agricultural development based on the digital economy. Proposed for the implementation of the services of the and analysis in agribusiness management based on digital technologies. The following measures and mechanisms were proposed for the implementation of this project: staffing for IT-skills on the basis of business-administrative partnership, technical support, creation of competence centers and information and consultative support of services, introduction of management accounting and analysis in the management of agribusiness based on digital technologies. The key areas of the digitalization of agro-business are shown in this paper.

Keywords— digital economy, management, innovations, information infrastructure, competitiveness, agribusiness, rural areas

I. INTRODUCTION

The digital economy in the modern conditions of innovation development penetrates all spheres of the life of society and becomes the basis of the competitiveness of enterprises and organizations, agribusiness. In the Russian Federation, the program “Digital Economy of the Russian Federation” for the years 2017-2030 is adopted and implemented. The agro-industrial complex defines the possibilities of economic growth through the use of the digital economy as a large-scale system program of technological generation, the activities of which need to improve the work with electronic resources, as a necessary condition for the management of agribusiness and sustainable development of Russian regions, rural municipalities, settlements. To implement the measures provided for by the program “Digital economy of the Russian Federation” for 2017-2030 the government of the Russian Federation is developing a set of measures and directions for the creation and implementation of competitive domestic research competencies and technological reserves up to 2031, which will ensure the formation of information infrastructure and information security on the basis of

organizations subordinated to the Ministry of Agriculture of Russia, which will ensure the creation and development of the digital environment, reduce technological risks in the food sector, facilitate the solution of problems of competitiveness and national security of the Russian Federation [1]. The priority directions of modern agricultural policy are to ensure stable growth of agricultural production, including – organic products, protection and rational use of soil and water and other resources of rural areas, improving the efficiency of organizational and economic potential, regional problems of management of agro-business and rural areas. In this regard, it is necessary to develop strategies for territorial development on the basis of digital economy technologies that will contribute to the competitiveness of agribusiness, increase the efficiency of the economic potential of rural areas and their development. The digital economy assumes application in management of agribusiness of necessary information of scientific, digital, so-called Big Data concerning all spheres of activity of the economic subject and the relations in the course of reproduction and realization of goods and services.

In this article, the authors put forward and substantiate the scientific hypothesis: The digital economy is the real way to realize the main advantages of technical, technological and managerial innovations at the current stage of development of Russian agriculture and the entire agro-industrial complex, ensuring their competitiveness and export orientation.

II. RESEARCH RESULTS

Scientific researches show a strategic reference point of development of agrarian economy and rural territories – formation of economy of new type — “informational and global”. According to domestic and foreign scientists, the competitiveness of business and regions depends in many ways on the ability to produce and process “knowledge-based information” [14]. When it is impossible for every small enterprise, farm or cooperative to have its own IT Department or IT specialists, specialized firms providing information and communication services become more important. It is revealed that the share of information and communication services in GDP in Russia is about 3%, while in the EU more than 15%, and in the US – 25%. The share of employed in the production of information products and services (without telecommunications) does not exceed 1% in Russia, while in developed countries it is more than 20%. It is clear that the global nature of the development of information and consulting services and technologies is an objective process that ensures the formation and

development of the world economy, business competitiveness, the interrelated functioning of the world commodity markets, markets of information and knowledge, capital and labor. [2]. At the same time, specialized firms providing information and communication services provide services for the provision of online services, electronic payments, and e-Commerce, crowdfunding, analytical monitoring, market research and others.

The most advanced countries in terms of the digital economy are Singapore, the United States and China, with significant government support for the digitalization of the economy and the development of the IT sector. [3]. In agriculture of Russia, it is planned to use large databases and cloud computing, data processing software, information retrieval programs on phenotypes of purchased animals and plants, certain sensors, high-speed measuring technologies, remote sensing, decision-making technologies, navigation and control devices, robotics for monitoring the quality and movement of agricultural products, systems for collecting and processing information on crop production, systems for early warning of plant diseases, systems for managing cold logistics chains. Particularly important is the operational information of online services, which is necessary for the development of an effective action plan and justification of effective management decisions. Information technologies have expanded opportunities in management decision-making, in terms of management accounting and analysis in the centers of responsibility of organizations and business, including agribusiness, which allows to take into account changes in economic processes in detail, identify the factors and causes of economic omissions, losses, justify the strategic vectors of business development and territories [4, 11].

Studies show that the greatest success in the development of economies in a relatively short period of time reached the country, which paid special attention to improving the quality of national human capital, increasing the level of education, skills, and competencies of the economically active population, receiving innovative active and innovative

workers in all spheres of employment. Such countries as Japan, Singapore, South Korea, Hong Kong, Taiwan, some European countries have included the ideological, scientific and economic values of the West in the system of continuous education, the formation of human capital, taking into account national traditions, the creative mentality of the population of hardworking employees, educated on respect for work, and market traditions [5]. At the same time, the famous American economist Herbert A. Simon, while analyzing the processes of managerial decision-making, notes that almost always the person, the professional specialist, uses limited information and limited computational capabilities to solve the arising problems [6]. At the same time, the digitalization of the economy and other spheres of life help to expand the physiological capabilities of a person in solving emerging problems in a market economy.

The use of digitalization in the management of agribusiness and rural areas contributes to some increase in crop yields (Fig.1) and animal husbandry, the rational use of the resource potential of the territories, the achievement of competitiveness and efficiency of agriculture, the entire agro-industrial complex, the development of export-oriented food market.

Digitalization of agriculture and agro-industrial complex in the regions involves the creation of single centers of competence for the implementation of the strategy of digital transformation of the economy. In the systems of effective management of the agricultural sector, the Krasnodar region was the first in the country to create a single situation center for the agro-industrial complex, in which the program complex of satellite monitoring helps farmers to perform spectral analysis of the state of farmland, increase crop yields and significantly reduce their cost. The yields of the main crops in the farms using this system are getting higher by 10-20%. According to experts' forecasts, the use of information technologies will increase the share of agricultural products in the domestic regional product of the region to 22% [5].

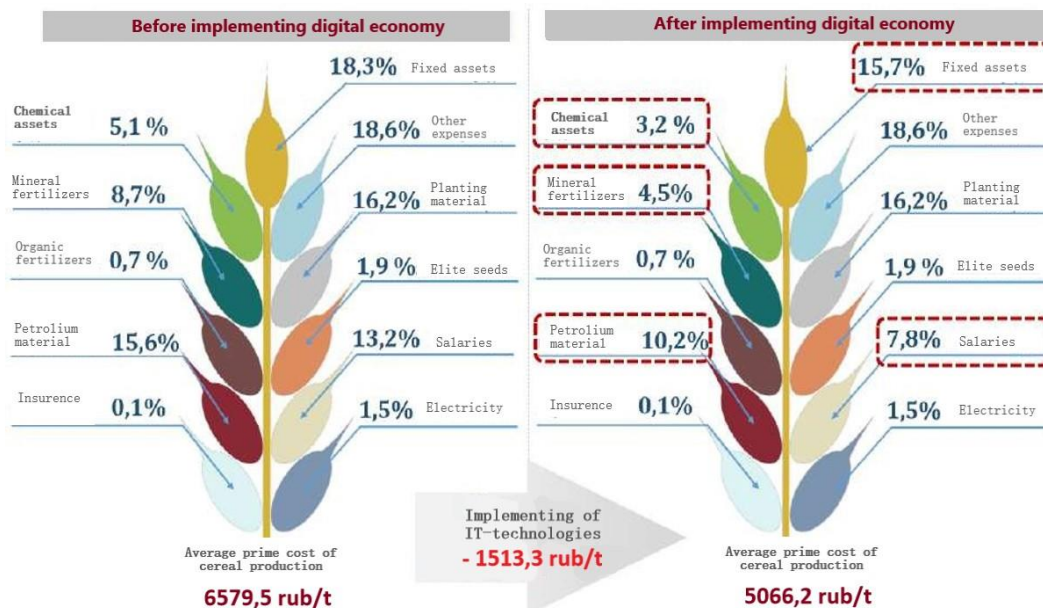


Fig. 1. Expected results after the introduction of the digital economy of grain production (according to the Ministry of agriculture) [8]

The Competence Center was opened in Altai State Agrarian University. The center provides services to justify the options and parameters of modern agricultural technologies of crop production, precision agriculture, the introduction of digital technologies in the organization and management of agribusiness and rural areas, the development of effective business projects and other issues. In the center at the Department of Agricultural Engineering and Technology was established the Training and Consulting Center “Altacom”, named after A. A. Ezhevsky. The center’s equipment (interactive information equipment, machinery, components, units, models, operating installations) was provided by 12 enterprises of agricultural machinery of the region, as well as by leading domestic and foreign partners, manufacturers of agricultural machinery. Agreements on cooperation and joint activities with the enterprises of the Altai cluster of agricultural engineering and farms, providing for participation in the educational process during the training of leading specialists of practitioners – machine builders and managers of enterprises, and the passage of students’ practice on the modern basis of enterprises. In general, the Competence Center, with the help of scientists of Altai State Agrarian University, provides advisory support to enterprises to monitor the market of equipment, promising areas of development of machines and technologies, development of machines, their testing, promotion of the development of enterprises of agricultural machinery industry, improvement of quality, conferences, seminars, and the “Field day” exhibitions.

In the process of implementation of the Program of the Government of the Russian Federation “Digital economy” on

the basis of the project “Exact Farming” provides an online service for the management of agricultural production with a lot of data that helps farmers on planning, control, economic component and prevention of losses in agricultural production[8].

One of the elements of the digital economy is the departmental state information resources in the field of agriculture. These information resources are formed by the Ministry of agriculture of the Russian Federation on the basis of statistical and other documented information on the state of agriculture and trends in its development. They are available to Federal Executive authorities, public authorities, subjects of the Russian Federation and local governments, interested legal entities and citizens, as well as subordinate organizations [9]. In the process of conducting research, we paid special attention to the formation of micro clusters of rural settlements, which provide the transfer of information, ideas and practical skills for more effective use of available information resources as an important and important component of agribusiness management and rural development [10]. The results of the research prove that the cluster initiative is appropriate at the level of individual settlements where there are no large agricultural organizations included in technological agro-industrial clusters [10]. Structurally, the rural microclusters include: the Center for Cluster Development (coordinating council) with information and advisory service; agricultural production and consumer cooperatives of rural manufactures; individual peasant farms; processing enterprises; specialized shops of farm products; small-sized businesses of entrepreneurs; multifunctional cultural centers and other (Fig.2).

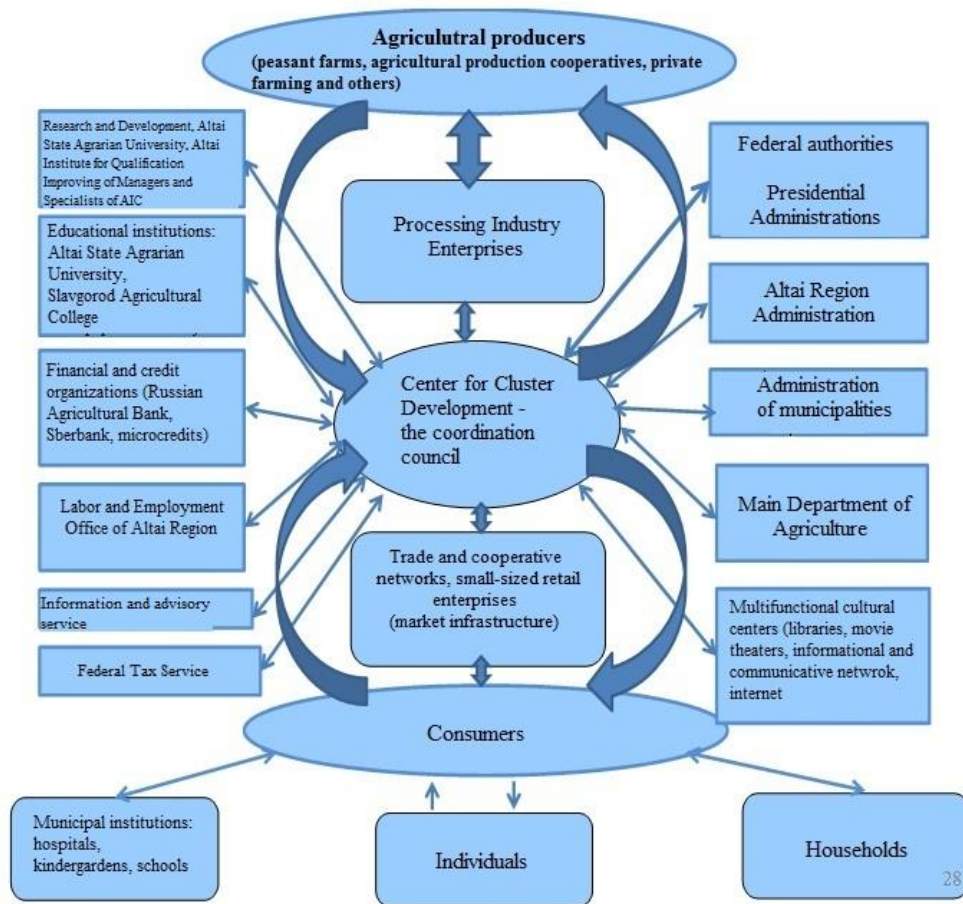


Fig. 2. Microcluster scheme of rural settlement of Burlin district of Altai region

The Center for Cluster Development works in cooperation with educational, scientific organizations, the Competence Center of the region, the biological laboratories, certification services and others.

For realization of this direction it is necessary, first of all, to solve the problem of the provision of professionals with the requisite qualifications, creating good living conditions in rural regions on the basis of realization of rural development programs; identifying organizations aimed at support and development of clusters in the district and region; providing of an appropriate legislative and regulatory basis; providing of financial support on the basis of business administrative partnership, sub-program financing at the expense of Federal and regional budgets, creation of mutual funds and venture innovation funds; information and consulting support of online services.

III. CONCLUSION

The digital economy, as an important resource and mechanism of influence on the management of agriculture and rural areas, is the accumulation of information technologies, digital technologies, knowledge and business processes for the effective management of multi-functional agriculture. With the help of the digital economy, the existing economic laws in specific conditions are implemented and the process of expanded reproduction in the agricultural sectors of the region is ensured.

The digital economy is defined by us as an indispensable condition for identifying strategic priorities for the development of the agro-industrial complex of the region, local rural areas in order to increase import substitution in the food supply of the country's population and export-oriented agriculture.

This requires not only the program of the digital economy, but as well as the program of smart management, smart government, based on the use of adaptive situational management systems grounded on logical and linguistic models. These control systems (developed by the teams of Perm branch of "Institute of Economics of Ural Branch of Russian Academy of Sciences" and St. Petersburg State Economic University) [12, 13] implement the functions of control and properties of expert systems, the properties of the prediction, rapid detection and offers problem-solving, risk management, detection of "alliances" and hidden motivation, hovering parasitic schemes and structures. In addition, each site gets the filling the system, taking into account the regional specifications.

The digital model sets new business standards, a new way of business life. The digital world creates new challenges and new threats to modern entrepreneurs, as well as new opportunities for business development. In the dynamic digital environment, the former factors of a company's competitiveness stop working and information technologies are coming to the fore. The question of how to create the best IT product is not only of interest to companies that specialize in information technology. It is advisable for IT companies and agribusiness, Competence Centers and territorial administrations to work together. The main purpose of the IT product of the future is to become an ally of business in the coming of new products and services, to become a driver for creating new business models and new forms of competition. This phenomenon is called "digitization".

Key areas of digitalization business are associated with breakthrough technologies. Studies show that the first direction of digitalization is the intellectual analysis of the data (data mining) and machine learning. Data about the client, environment, and competitors has always been of a great value. Companies spent their energy and resources on marketing research, and a large part of the effort was precisely the acquisition of this data. Currently, Internet users supply a huge amount of data about themselves and their preferences.

It is important to make the selection of necessary information and analyze the obtained data. The results of the analysis become the basis for the creation of qualitatively different products and services, for making effective strategic decisions for marketing techniques. The human mind cannot conduct such an analysis. Therefore, tools of intellectual data analysis and machine learning become one of the business allies for getting to a new level of competition [15].

The next direction in the use of breakthrough technologies by business is the cloud technologies. The use of Big Data and intellectual analysis in agribusiness requires developing of IT infrastructure companies. It can be deployed on its own data centers or rented from cloud service providers. Cloud services are actively used by organizations in the business sectors of Finland, Sweden, Japan and the United Kingdom; they also take place in Russia.

A competitive IT product must be part of big data architecture. Digital business model – is a new way of business life. The digital world creates new challenges and new threats to modern entrepreneurs, as well as creates new opportunities for business development. In a dynamic digital environment, the former factors of agribusiness competitiveness cease to work, and information technologies come to the fore.

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