

Digitalization of agriculture as an element of food security provision at present stage

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Abstract—This article discusses current issues related to the digital economy development in modern market conditions. Digitalization processes are being actively implemented and invested in practically all sectors of the market, but the agricultural sector is not yet covered in the necessary volume. There are several numbers of activities related to the digitalization of the agricultural process that are aimed at analyzing the investment area within the development of agriculture. Food provision is considered as the most valuable point for the Russian Federation. According to this study results, the current trends of “smart territories” and active digitalization of processes determine the development of agriculture in the framework of ensuring the transparency and comfort of the market in terms of minimizing costs, taking into account opinions of consumers and manufacturers. However, the development of these processes cannot reveal the main problem in the implementation of the Doctrine of Food Security of the Russian Federation at this stage, which is the price disparity between agricultural and industrial products. This inequality is especially noticeable within the production and sale of milk and dairy products. To a large extent, the urgency of this problem continues to exist because milk and dairy products are the only points of the Doctrine on which food security is not yet ensured. The results of this study indicate that the state needs to meet the needs of agricultural enterprises not only in the form of subsidies, but also in the form of investments in digitalization of processes and production facilities.

Keywords—digitalization of agriculture, digital platforms, “digit”, agro-industrial complex, price disparity, “smart office”.

I. INTRODUCTION

The strategic goal of implementing the “Doctrine of Food Security of the Russian Federation” is to provide the population of the country with safe food products in volume and assortment that meet the established rational norms of consumption necessary for an active and healthy lifestyle. An emphasis is placed on the ability of the state to solve the tasks set in the Doctrine not only in ordinary but also in extreme conditions, regardless of internal and external threats [1].

The problem of food safety management and efficiency of industry systems at different levels (macro, meso, and micro) is studied in the works of domestic scientists and specialists such as A. N. Semina, Yu. A. Lavrikova, N. N. Filippova, E. N. Yalunina, N. S. Yashin and others. The features of modern trends in summary, that any processes today are able to be improved via digitalization. Digital

technology has allowed people to convert a significant part of the “information work” into digital form. With the development of the “Internet of things”, thanks to the digital sensors, digitization and connectivity have spread to formerly analog tasks, processes, and operations, both, production and machine. Moreover, cloud computing provides almost unlimited computing power at a very low price, which allows us to consider food security as a task with specific parameters, transparency of processes and possibilities of instant and effective analysis in the state scale.

II. LITERATURE REVIEW

Domestic scientists at various times turned to the theoretical understanding of public administration. A significant amount of academics studied this issue; among them are L.I. Abalkin, S.A. Afontsev, N.A. Vasilyeva, G.L. Kupriyanin, A.I. Soloviev, T.A. Utkin, A. Denisov, V.G. Ignatiev, V.S. Mikhailov, V.N. Arkhangelsky, G. Belyaev, V.I. Koshkin, M.N. Atlaskirova, N.L. Hakupaeva. Today we are beginning to consider public administration as the foundation of digitalization. Prospective areas of the economy digital transformation are identified and partially defined including agriculture. (Fig. 1)

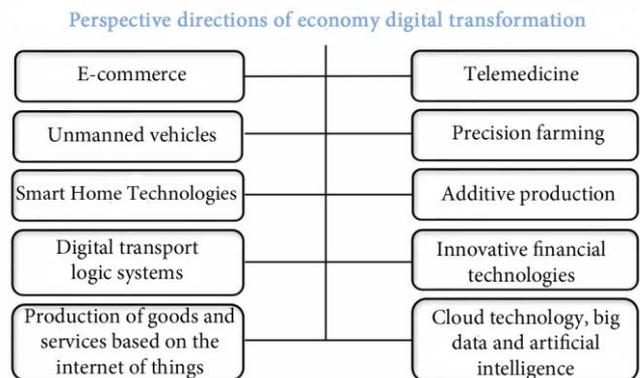


Fig. 1. Perspective directions of economy digital transformation

Recent evidence points out that digital transformation affects agriculture and agribusiness as part of “precision farming,” but there are other branches that are losing their economic positions on the Russian Federation’s territory. The last years for the Russian Federation proved to be very difficult because of droughts, floods, forest fires, and economic sanctions - all these phenomena had a negative impact both on the general situation in the state and on the well-being of individual citizens, but once again Russia

confirmed its readiness to effectively counter any threats. Within this confrontation, the “digit” is an effective tool and opportunity for global transformation of positive trends for the development of individual territories and the Russian Federation in general.

III. RESULT AND DISCUSSIONS

The agro-industrial complex participates in ensuring the country's food security more than any other branch. However, a significant number of problems remain that impede the solution to the posed problems. The first problem, according to the authors, is the inaccuracy of analytics and the slow speed of analysis in the processes of modification schemes creating. Digital technology is able to solve this problem due to its basic properties. First, digital technologies allow transmitting signals precisely, without error, in contrast to analog ones. The information field looks similar for citizens and analysts in different regions. Secondly, digital signals can be played endlessly without sacrificing quality - for example, displaying the same page to a million users. Third, by creating a network infrastructure, you can transfer the page to an ever-increasing number of customers with zero (or minimal) marginal costs.

Digitized work performed with zero marginal costs immediately cancels and replaces analog one, performed with high marginal costs (therefore, with the advent of e-mail and social networks, regular mail is gradually becoming a rudimental way of communication).

Due to these three properties, digital technologies allow people to increase the scale of production easier, combine new and old business processes, re-build the interaction of industries and professional communities in order to find new promising areas. The second problem, according to the authors, is the price disparity between agricultural and industrial products. This creates a significant obstacle for the agricultural industry and its development. More active use of digitalization will provide data transmission over long distances, allowing you to plan preventive repairs. Such data, in turn, will come to the divisions of Russian companies that are engaged in maintenance, or to independent parts suppliers. The speed of solving problematic issues and managing of many processes will increase dramatically, and comfort will prevail in the agro-industrial sector, which today works in many regions “old-fashioned”; modern requirements will be imposed on new organizational structures.



Fig. 2. Requirements for new organizational structures

These three fundamental properties in the context of spreading of digital technologies all over the globe are reflected in the requirements for new enterprises, starting the process of the agricultural sector transformation, ultimately working to fulfill food security indicators. Nowadays problems are solved with the easiest method, which is strict control. Such price control by the state for crop and livestock products weakly correlates with a sharp rise in the cost of machinery and equipment, spare parts, fuel and lubricants, fertilizers and pesticides, as well as bank loans.

According to Rosstat, the price indices of agricultural products manufacturers in January-February 2017 compared to the same period of 2016 were: 106.5% for raw milk and 111.0% for grain and leguminous crops. Over the same period, the cost of machinery and equipment production, including agricultural, increased by 17.3% [2]. Along with the growing disparity in producer prices, there is a significant imbalance in the distribution of the consumer value of food products between the producer, processor, and seller. This phenomenon is especially noticeable in the production and sale of milk and dairy products, for example: since February 2015 to February 2016 the prices of raw milk producers increased by an average of 6.5%, then over the same period consumer prices for this product increased by 16.5%.

To a large extent, the urgency of this problem continues to exist because milk and dairy products are the only points of the Doctrine on which food security is not yet ensured. Our production has decreased from 32,263 thousand tons in 2008 to 30445 thousand tons in 2014 and barely covers 80% of the needs, while the plan was to cover 90%.

Milk production is directly related to the number of cows, which was greatly reduced in the 1990s due to the general crisis in the country. The processes of urbanization, transferring of agricultural land for other needs, lack of qualified personnel, physical and moral deterioration of most productive assets - this is an incomplete list of the problems faced by agricultural producers in the past two decades. As explained earlier, in this situation it is highly important to develop such measures that would eliminate the disparity in prices, promote import substitution, stimulate the production of domestic products, ensure reliable financing and lending to farmers [3]. Digital technologies, according to the author, act as an actual weapon for establishing an effective provision of food security.

Agricultural enterprises urgently need state support not only in the form of subsidies but also as investments in digital production facilities: high-tech machinery and equipment, livestock farms, storage facilities, greenhouse plants with «Smart complex» technology, etc. The business model is defined by two things: the way the organization creates what is needed by consumers (market supply), and how it makes a profit (that is, how it makes money). Both components change as a result of a digital transformation, but investment flows into the agrarian sector are needed. According to the materials of selective research of organizations investment activity, which is conducted annually by the Federal State Statistics Service, the main factors limiting investment activity are: lack of own funds (62% of the total number of organizations); a high percentage of commercial loans (27% of the total number of organizations); investment risks (26% of the total number of organizations). The agricultural sector is no exception. Own reserves of agricultural enterprises for potential growth are

almost exhausted; help is needed in digitalization of processes and providing qualified personnel.

Over the past 10 years, the dynamics of investments in the fixed capital of agriculture and forestry had mainly positive values. Even taking into account the level of inflation, there was a significant increase in investments from 142,3 billion rubles in 2005 to 224,2 billion rubles in 2006, which is accounted as 57,5% increase. Investments in 2007 increased up to 1,5 times in comparison with 2006. The 2008 economic crisis suspended investments in the fixed capital of agricultural and forestry enterprises, which remained at the level of 304-400 billion rubles. However, the drought of 2010 forced the state and organizations to raise the limit for investment in fixed assets, as a result of which their level had increased by 2013 to 516.6 billion rubles. In the “State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food for 2013–2020”, the Government of the Russian Federation provides significant budget allocations, which also include part of long-term investments. Speaking about the period from 2015 to 2020, it is planned to allocate for the program implementation 1 758 398 069 thousand rubles. The list of expected results of the program implementation contains that the average annual growth rate of investment in agricultural fixed assets is 3.1% [4].

IV. CONCLUSION

Consequently, state participation in solving the tasks of the Doctrine of Food Security of the Russian Federation is inevitable today. Relying on the digitization of processes in this sector, stimulating investment flows in this direction, Russia in the foreseeable future will provide itself with domestic high-quality food in the required volume, and will also create an excellent base for exporting its products to world markets, taking into account quality requirements, speed of delivery, and other digitally-controlled issues. Nowadays the ability to hold the highest level of digital connectivity is the key to competitiveness in most sectors of the economy. The author has observed that digital transformation has nothing in common with the usual blasting scenario. The essence is not in the replacement old with new but in the possibility of interaction and regrouping. All operations and each interaction are represented in digital form, data is generated and analyzed in a new way, and a connection is established between previously scattered objects, people and activities, which allows increasing the efficiency of processes and achieving the transformation of information into process optimization.

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