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The digital model of developing economic relations of subjects of the agrarian sphere: research results and general trends

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Abstract. Improving the inter-sectoral economic relations of the subjects of the agrarian sector remains a pressing issue as a result of the growing processes of degradation in rural areas, as well as under the influence of a changing institutional environment. The purpose of the study is to identify the key parameters and build a digital conceptual model of increasing the equivalence of inter-sectoral economic relations in the agro-industrial complex. Research objectives: to determine the modern principles of interaction of economic entities in the agro-industrial complex; to identify the main problems in inter-sectoral interaction at various levels of the economy; based on the analysis of existing instruments of economic interaction, to analyze new elements aimed at ensuring the parity of inter-sectoral relations in the AIC. The theoretical and practical significance of the research is determined by the generalization of knowledge in the field of digitization of the agrarian economy; the use of sociological research methods to identify the dominant factors influencing the nature of economic relations and the settlement system in the agrarian sphere.

1. Introduction

Despite the positive results achieved in recent years in increasing the production and export of agricultural products and foodstuffs, the situation in agriculture remains tense. In official reports of the Ministry of Agriculture of Russia, when discussing strategic and current agricultural development tasks, the main problems are the lack of storage capacities for agricultural products and high-performance agricultural equipment, the lack of credit for seasonal field work, and the lack of professional staff [3]. The need for decisive steps towards increasing the sustainability of agriculture is constantly emphasized in the speeches and publications of agricultural economists; special attention is focused on the fact that “the management system of the industry should be changed, economic thinking should be chosen, a new course should be chosen in order to ensure the ongoing development of the economy...” [9].

To improve the efficiency of the economy of the agri-food sector, it is necessary to bring together institutional norms and results of the activities of economic entities – general actors representing the micro level of socio-economic systems. Depending on the ratio of large, medium, and small businesses, their interactions, various conceptual approaches can be applied, taking into account the technical and technological features and competitiveness of industries [2]. One of the ways to solve the problem is to develop new approaches to the development of information and communication technologies (ICT), which will objectively reflect the development of the reproductive processes in the field of agri-food [11].



The development of a strategy of “digitalization” of agriculture on the basis of ICT is necessary for the further development of its targets and priorities. In 2018, the FAO (together with interested organizations) prepared a Guide to the National Strategy for E-Agriculture [10]. This document contains the rules according to which directions are given for the integration of ICT in agriculture, including a wide range of services, from Internet technologies and touch tools to traditional devices, such as radio, fixed and mobile phones, and television. It is important that ICT stimulates economic growth in related industries, which leads to the development of new methodological approaches to the development of intersectoral interaction.

The solution to the problem of improving the inter-sectoral economic relations must be sought through increasing the confidence of market participants, which can be provided, in our opinion, with the tools of the digital economy, applying modern models and management methods. The purpose of the study is to identify key parameters and build a digital conceptual model of ensuring parity economic relations in the system of inter-sectoral interaction.

The research aims to:

- Identify key modern principles of interaction of economic entities in the agro-industrial complex;
- Identify the main problems in the field of coordination, partnership, and cooperation at various levels of economic management;
- On the basis of the analysis of modern and promising tools of economic cooperation, it is necessary to form a list of tools aimed at ensuring the parity of intersectoral relations in the agro-industrial complex;
- Develop a digital conceptual model of effective economic relations in the agro-industrial sector.

The theoretical and practical significance of the research is determined by the generalization of knowledge in the field of digitization of the agrarian economy and conducting economic and sociological research in the agrarian sector at the local level.

2. Literature review

The research on the processes of digitalization of the economy, the economic transformation due to new digital technologies is conducted by A. A. Azuan, I. A. Sokolov, and A. Genkin, etc. The solution to the problem of “trusting” market relations was developed in the works of foreign scientists, such as S. Covey, R. Kouz, D. North, J. Stiller, R. Taler, F. Fukuyama, J. Hodgson, etc. In domestic economics, the questions of confidence in the sphere of market interaction in relation to agriculture are covered in the publications of A.N. Semin, A.N. Popov, Yu. R. Lutfullin, I.T. Fazlaev, etc.

3. Methods

In the course of the study, general scientific research methods were applied, including sociological methods (survey and interview). The survey was conducted in October-November 2017. The total population consisted of small and medium agricultural producers operating in rural areas and using digital technologies, including blockchain and cryptocurrency. The sample consisted of 100 units for the survey and 5 units for in-depth interviews. The methodological premise has served to build economic relations on the principles of behavioral economics, in particular, the economics of trust. The system of electronic (digital) economy will work more efficiently if the organization of activity is built on the principles of cooperation, trust, and openness [4].

4. Results

In the course of the research, certain parameters of a manager or an entrepreneur applying modern technologies were determined. This is a person with a higher economic education who has two children, as well as an experimenter who uses trust and responsibility in his/her work. He/she is an active user of mobile devices, but someone who, at the same time, does not watch TV and prefers Internet resources (for at least 4 hours in a day).

Below are the answers of the respondents to the following question: “Assess the degree of satisfaction with the results of your work.” The scale is built from 1 to 10, where 1 is the lowest degree of satisfaction, 10 is the highest (Figure 1).

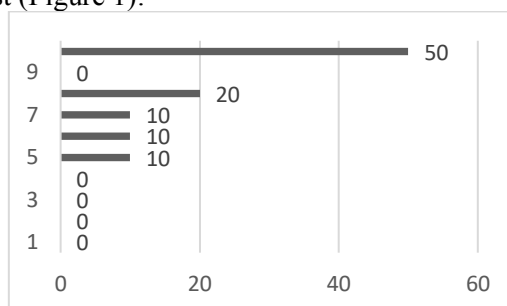


Figure 1. Distribution of respondents' answers to the question “Rate from 1 to 10 the degree of satisfaction from the results of your work,” in %. Source: authors own research.

The results are such that 50% of the surveyed small and medium-sized entrepreneurs engaged in the production of agricultural products and services of a socio-economic nature are completely satisfied with the results of their activities. This indicates the introduction of new elements in the organization of work, in communication with partners and other participants in market relations. Satisfaction with the results of work is the basis for a person to assess his level of quality of life. Satisfied with the results of the activities, the entrepreneur or the employee more quickly solves production problems, is more receptive to new ideas and technologies, builds relations in a dialogue format. These conclusions are confirmed by the respondents' answers to the question “Rate from 1 to 10 the significance of trust in life”. The results of the data show that trust in relationships is a key condition for the success of both self-realization and building business relationships (Figure 2).

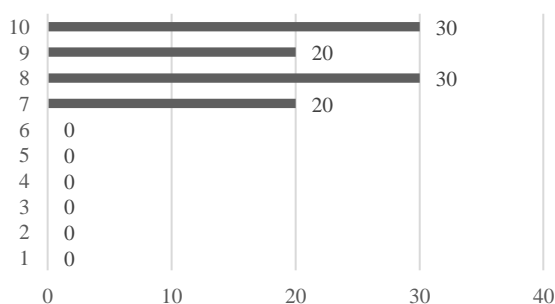


Figure 2. Distribution of respondents' answers to the question “Rate from 1 to 10 the significance of trust in life, where 1 means nothing, 10 is trust is the basis of existence,” in %. Source: authors own research.

Building trust between economic partners is a direct way to lower total social costs. The validity of this thesis can be demonstrated “from the opposite” (if we analyze the modern domestic experience). The lack of trust between partners, between the population and commercial structures, between the population and the state is a source of direct economic losses due to the low rate of private savings in banks, the diversion of funds for 100% prepayment, low stock prices of joint-stock enterprises, dollarization of savings, etc. [5, 11-13].

According to the Nobel laureate in economics Richard Thaler, the subjective quality of the transaction reflects the transactional utility [6], which consists in the evaluation by a person of the

effect of the transaction. When this occurs, there is a combination of economic and psychological (personal) factors. The economic sense of trust and trusting relationships is to increase labor productivity and, consequently, to increase profits [7]. Agricultural producers, primarily individual entrepreneurs working in agriculture and rural areas, are open to cooperation. They have an understanding of social responsibility and realize it through their participation in the life of their local community.

From the whole array of tools the digital economy offers, the modern domestic entrepreneurs in the agrarian sector are actively using cryptocurrencies (mostly small), they are widely using blockchain to form a high level of openness of their work in order to increase the marketing and investment components of entrepreneurial activities. Combined technologies are also used (for example, blockchain with GPRS) for carrying out monitoring works. Actively used are the mechanisms of Internet commerce, as well as the Internet of Things. In large and medium-sized agribusinesses in the organization of production, robotics techniques were used more intensively.

The use of blockchain technology, and cryptocurrency, ensures the formation of generalized trust in economic relations. Preserving the fundamental principles of interaction of subjects in market relations, this technology ensures the transparency of the system, its testing and stability, which increases the degree of confidence in innovations.

Bank of Russia outlined the prospect of piloting distributed registries in five areas for the period 2017-2019: a system of exchanging financial messages, a digital letter of credit, a depository registration of electronic mortgages, information exchange for KYC (know your customer), and digital bank guarantees [4].

Academician S. Yu. Glazyev, speaking at various research sites, focuses on the need to use the blockchain technology in economics and management. Considering that cryptocurrencies are speculative tools, this question is very controversial, since the “Bitcoin” cryptocurrency is the largest system built on the blockchain. According to experts actively supporting this payment system, Bitcoin serves as an example of its decentralization, since organizations can build relationships on equal terms [4, 8].

The use of new technologies is aimed at reducing operational costs and, in general, at a radical restructuring of the financial system [4]. Reducing transactional, institutional, and other types of costs is a key economic advantage of digital technology in a behavioral economy, as losses cause discomfort that is twice as great as equal profit gives pleasure [6].

The demand for settlements in cryptocurrencies is growing, especially among small entrepreneurs due to the inability to accept bank cards. About 20 million small businesses in Europe do not have the equipment to accept payment by plastic cards. One of the reasons is the high percentage of fees from banks for acquiring services [4]. Perhaps this, like other factors, served as an incentive for the use of cryptocurrency and blockchain in agriculture. In rural areas of individual regions of the Russian Federation, this is more typical for large centers, there are successful examples of the promotion and use of this currency in transactions in the agricultural market.

As an argument for the active promotion of cryptocurrency, it is considered to be the fact that their use ensures the attraction of financial resources to the development of the rural economy and makes it possible to determine as a promising tool for increasing the equivalence of inter-sectoral economic relations.

5. Conclusion

1. The main problems of the inter-sectoral cooperation in the agricultural sector exist (a) at the federal level (disparity of prices and low efficiency of state support, inadequate social infrastructure of rural areas, etc.), (b) at the regional level (low efficiency of the infrastructure supporting business in agriculture, reduction of social infrastructure in rural areas, institutional barriers to industry self-regulation); and (c) at the municipal level (monopolization of the

activities of trade networks due to the lack of an organized system of consumer sales and processing cooperatives, etc.).

2. Modern forms and mechanisms of organizational and economic interaction of economic entities in the agro-industrial complex should be based on the principles of trust and openness of relations, cooperation, digitalization of production and management systems.
3. Among the tools to ensure the parity of inter-sectoral relations in the agro-industrial complex in the digital economy are: (a) tools based on the blockchain technology (cryptocurrency; registries; exchanges; smart contracts; tools to ensure open planning, management, and monitoring, etc.); (b) tools for working with data (tools of cloud technologies for processing and storing information; building databases; tools for structuring, analyzing, and applying big data, etc.); (c) tools for the development and application of solutions in the framework of NBIC technologies (nano-, bio-, info, cognitive technologies); 4) the Internet of Things toolkit, in terms of software solutions for agricultural production and marketing.
4. The digital conceptual model of ensuring the parity of economic relations in the agro-industrial sector should include the principles of interaction between economic entities and key tools of the digital economy applicable to agricultural production and management.

In conclusion, we note that agriculture interacts with a large number of related industries and has a huge multiplicative effect. According to experts, the multiplier of agricultural production for the Russian economy is about 5 [9], which seems to be particularly significant for improving state support of subjects of the agrarian economy and state policy in respect of rural territories.

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