Corporate structure of innovative development management of economic entities in the agricultural sector of the regional economy

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Abstract. The paper presents an analysis of the features of innovative development of the agricultural sector of the economy on the example of the Perm region. Their managerial aspect is highlighted, and the basic structures that determine the possibilities of innovative development of the agricultural sector of the regional economy are shown. It is shown that the system of advisory services, attempts to create agricultural and technical parks, agricultural biological parks, including the prototype of the territories of priority development is based theoretically and methodologically refined algorithm of obtaining and transforming knowledge in innovation-oriented structure of the agricultural sector, which is contrary to the trends of the Fourth industrial revolution, which swept almost all economic activities. A model of the organizational structure of the system of innovation-oriented management of economic entities in the agricultural sector of the region is offered.

1. Introduction
The Fourth industrial revolution, which has already taken on a global scale, makes its own adjustments and the nature of the development of the agricultural sector, defining it as an innovative way of development [1].

E.V. Balatsky, analyzing the global challenges of the Fourth industrial revolution, draws attention to the impact of industrial revolutions as a result of their technological features on the labor force (table 1). At the same time, during the Fourth industrial revolution, after the mass displacement of physical labor that took place earlier, as a result of the widespread introduction of complex digital systems, a mass displacement of mental labor is expected with the transition to exclusively creative work.

Table 1. Industrial revolutions and their impact on the labor force.

| Stage of industrial development | Characteristics of the stage |
|---------------------------------|-----------------------------|
|                                 | Dating | Duration, years | Technological features | Impact on the workforce |

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The indicated trends of the Fourth industrial revolution suggest the formation of new innovative ecosystems based on new principles of their organization, motivation and informatization, ensuring a balance of social, economic, environmental and institutional components of development with technological development that is ahead of the needs of the population and market demands.

This, in turn, determines the task statement for all types of economic activity and in the agricultural sector of the economy.

Innovation and creativity in economic activity are already being observed in the agricultural sector of the economy. In the subjects of the Russian Federation, innovation-oriented structures are being formed in the agricultural sector of the economy, which are beginning to ensure the innovative development of economic entities. The key task of both the business and the state is to identify these trends and promote the formation of innovation-oriented structures. On the part of the scientific community, based on the analysis of existing practice and the corresponding theoretical and methodological basis, it is necessary to develop proposals on the structure of such formations and assess their effectiveness. These approaches are considered in this study on the example of the agricultural sector of the economy of the Perm region.

The study consisted in identifying the basic structures that determine the possibilities of innovative development of the agricultural sector of the regional economy on the example of the Perm region and development of proposals for the development of innovation-oriented structures of the agricultural sector of the regional economy, taking into account the trends that determine the nature of the Fourth industrial revolution.

2. Methods
The study used dialectical and empirical methods of cognition, system and situational analysis, general methods of analysis, synthesis, and statistical extrapolation.

To evaluate independently functioning agricultural organizations and as part of an integrated management partnership, the method of scientific comparison and contrast was used.

The territorial objects of research are the Russian Federation in general and the Perm region in particular.

3. Results
The Federal center for agricultural consulting of the agro-industrial complex [3], which is a structural division of the Russian academy of personnel support of the agro-industrial complex, serves as the basic organizational structure for the formation of innovation-oriented structures in the agricultural sector of the regional economy. It was formed in 2011. Based on it, the Federal network for the exchange of knowledge and technologies in agriculture was created, which in 2017 covered 63 subjects of the Russian Federation, 105 regional and 480 district (inter-district) organizations.
At the regional level, the Federal network for the exchange of knowledge and technologies in agriculture includes 28 state, 6 commercial, 8 non-profit organizations and 58 educational institutions (36 HPE, 20 APE, 2 SPE).

Regional (inter-district) consulting centers provided information and consulting services in 34 regions. They were created as structural divisions of state organizations (99 centers), agribusiness management bodies (156 centers), municipal institutions and enterprises (113 centers), and farm entities (76 centers). 36 regional centers operate as commercial enterprises.

Unfortunately, data on monitoring the provision of consulting assistance to agricultural producers and the rural population in the Russian Federation by the Federal center for agricultural consulting of the agro-industrial complex were not published since 2018 [4].

The activity of organizations that provide consulting services in regional agriculture varies and sometimes significantly. This is evident from the data presented in table 2.

Special attention is paid to the number of services per agricultural producer. In comparison with the number of services provided to farmers in the EU countries, which is an average of 27, we can talk about the practical lack of development of such a structure as the ICS today. This conclusion is confirmed by the activities of the Regional center for agricultural consulting of the Perm State Agro-technological University [5], the latest information about which dates back to August 2018.

To solve the issue of innovative development in the agricultural sector, Decree of the Government of the Perm region dated 23.12.2014 No. 350-rp approved the Concept of creating an agricultural technology Park “Perm” on the basis of the Perm State Agricultural Academy (currently – Perm State Agro-technological University).

The purpose of creating the Agricultural and technical park is to form the territory of advanced development of the agricultural sector of the Perm region, a single regional center of scientific, educational, production, and marketing resources based on the introduction of high-tech technologies and innovative processes in agriculture, animal husbandry, and agricultural product processing, and to activate the processes of attracting investment.

Table 2. Providing consulting services in the field of crop production and animal husbandry in the regions of the Russian Federation (2018).

| Region                  | Organization name                                                                 | Number of consultations, PCs |
|------------------------|----------------------------------------------------------------------------------|------------------------------|
|                        |                                                                                 | Plant growing | Animal husbandry |
| Udmurt Republic        | Izhevsk State Agricultural Academy, Faculty of Advanced Training of Udmurt center for agricultural consulting | 0              | 44              |
| Perm region            | Regional center for agricultural consulting (Perm State Agricultural Academy)    | 125            | 401             |
| Kirov region           | Kirov regional SBI “Center for agricultural consulting of “Non-Chernozem Clover” | 1241           | 1241            |
| Sverdlovsk region      | Ural State Agrarian University                                                   | 615            | 466             |
| Russian Federation     | Total services                                                                  | 84400         | 83957           |
|                        | Number of services per agricultural producer                                    | 0.50           | 0.49            |

Source: compiled and calculated by the authors according to the Federal State Statistics Service – https://rosstat.gov.ru/.

The main tasks of creating an Agricultural and technical park: assistance in modernizing existing technologies in the agro-industrial complex; conducting consulting activities; conducting research on
priority areas of agricultural development; organizing scientific and industrial conferences and exhibitions; organizing small and medium-sized innovative industries; creating new jobs; attracting public and private capital.

Expected results of this project: 4.9 billion rubles of investment in the creation of innovative structures in the agro-industrial complex of the Perm region; 3.2 billion rubles per year - growth of the gross regional product; 420 million rubles of tax deductions; 850 jobs.

In 2015, LLC “Small innovative enterprise “Agricultural and technical park “Permsky” was created (the founder – “Perm SATU”, the authorized capital is 21.3 thousand rubles, 2 employees). In 2017-2018, this company was no longer operating.

Agricultural biological technology park did not receive target development and created on base of the Perm Research Institute of Agriculture, is part of Perm Federal Research Center of Ural branch of RAS like structure, focused on enhancing innovation in the agricultural sector of the region.

The indicator of depreciation of fixed production assets confirms the low innovative performance of structures created in the agricultural sector of the Perm region. In 2014, during the creation of such structures, the Ministry of Agriculture and Food of the Perm region presented a Roadmap for the development of agriculture and sustainable rural development in the Perm region until 2020. As a program element, the section “Technical and technological modernization, innovative development” was presented, in which the key indicator indicates the degree of depreciation of fixed assets in agricultural organizations at the end of the year, i.e. a decrease from 37.5% to 28.8%. According to PERMSTAT, this indicator at the end of 2018 was 41.3% [6].

4. Discussion

The low activity in the innovative development of agriculture, is shown by the example of Perm region, where only a determined approach to the formation of innovation-oriented structures that can be correlated with other subjects of the Russian Federation, involves the study of methodological and practical recommendations on the formation of innovation-oriented structures in the agricultural sector.

In the methodological aspect, the question of what level of management should focus the functions of innovative development is of great importance. In Russia, traditionally, since the period of planned economy, for the agricultural sector, this structure was the state represented by regional ministries and departments. With the saturation of the market, including imported products and technologies, state management of this process is practically absent, limited to the development of priority development programs for industries. As the results of the authors’ own research have shown, only the planning function remains in the system of state management of innovative development of agriculture [7]. At the same time, the function of the organization responsible for the implementation aspect of innovations is not represented in almost any management structure of regional government bodies. The function of informatization, which in foreign practice is responsible for the Extension Service structures [8], has not received, as shown above, large-scale development in the conditions of the agricultural sector of the Russian economy.

The results of this study have shown that corporate structures have the greatest effectiveness in implementing the function of innovative development in the management system of economic entities in the agricultural sector. The integrated management partnership, a corporate-contractual structure created in the dairy and food subcomplex of the Perm region, was studied using the example of the Perm region. The partnership includes processing enterprises LLC “Nytvensky Creamery” and LLC “Yugovsky dairy products plant’ and 64 agricultural organizations.

Despite the conditionality of the average values per farm, the evaluation of the partnership’s activities for the period from 2012 to 2018 showed a more rapid growth of the main indicators that depend on the activity of innovation implementation by the economic entities in its composition in comparison with independently functioning agricultural organizations in the Perm region (table 3).
Table 3. Assessment of the effects of the integrated management partnership of economic entities of the dairy subcomplex in the Perm region.

| Indicators* | AO not a part of IMP | AO a part of IMP | Ratio of IMP and AO in 2018 |
|-------------|----------------------|------------------|----------------------------|
|             | 2012 | 2018 | 2018 in % to 2012 | 2012 | 2018 | 2018 in % to 2012 | by 2.1 times |
| Number of agricultural organizations | 302 | 195 | 64.57 | 31 | 64 | | x |
| Grain yield, C/ha | 13.0 | 16.0 | 123.08 | 12.8 | 18.5 | 144.53 | 115.63 |
| Milk yield per cow, kg | 5072 | 5640 | 111.20 | 5199 | 6475 | 124.54 | 114.80 |
| Power capacity, HP | 50.68 | 61.4 | 121.15 | 51.14 | 78.22 | 152.95 | 127.39 |
| Labor productivity, thousand rubles/person | 589.84 | 1084.3 8 | 183.84 | 609.81 | 1981.7 | 324.97 | 182.75 |

Note: * – the indicators presented in the table are calculated on average per household. AO – agricultural organization. IMP – integrated management partnership.

Source: compiled and calculated by the authors based on data from the Ministry of Agriculture and Food of the Perm region – a https://agro.permkrai.ru/.

These results are provided by the fact that during this period, the partnership enterprises 583 investment projects were implemented, including 457 projects related to the renewal of the machine and tractor fleet. The amount of investment from all sources, including state subsidies, amounted to 12.45 million rubles per year per organization in the partnership. On average, for agricultural organizations that are not part of the partnership, this figure is 7.14 million rubles per year.

Taking into account the matrix of functional differentiation between the main groups of participants in the integrated management partnership [9], a model of the corporate structure for managing the innovative development of economic entities in the agricultural sector of the economy at the regional level is developed (figure).
The model includes elements of an integrated management partnership of economic entities-participants of innovative-oriented agricultural clusters in the region, combining their efforts for the joint development of both agricultural organizations themselves and for the sustainable development of rural territories that are interconnected with them. The impact of the state represented by the regional Ministry of Agriculture is carried out through the definition of parameters of innovative development through the regional Extension Service system in Perm region presented by the Association of Perm SATU, Perm research Institute of Agriculture and the major associations of agricultural producers (Dairy Association of the Perm region “MolPerm”, SE “Association of milk farmers of the Perm region”, SO “Union of poultry farmers in Perm region” and the Association of beekeepers of the Perm region).

5. Summary
The main advantage of the proposed corporate structure consists of organizational-economic mechanism and the legal basis of participation and intersubjective interaction of economic agents within
agrocluster integration formations which act as an integrator of functions, innovative management business entities of the agricultural sector in terms of their innovation. Namely, managing the processes of studying the practices of innovative development; search, examination and selection of optimal innovations; development of programs for the use of innovations; forming the demand of business entities for innovations (replication of innovations); evaluating the effectiveness of innovation implementation; forming sources of collective investment to finance innovations and centralized interaction with the regional Extension Service system for organizing staff training and development.

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