Analysis of innovative activity in the agro-industrial complex of the Krasnoyarsk region

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Abstract. In the conditions of modern realities for Russian economy development, the main element that ensures the competitiveness of the economic system is the innovative component. The innovative nature of the development of the agro-industrial complex will allow Russia to ensure long-term food independence, which is very important, if not paramount in modern conditions.

1. Introduction
Innovative activity of enterprises reflects the readiness of organizations to update in all areas of operation, as well as the level of receptivity to everything new [1].

The analysis conducted in this paper show that the level of innovative activity of organizations in Russia are much lower than in the international community, in addition, a decrease in innovative activity by 2019, due to the need of investments, in particular, the total expenditures on technological innovations for the analyzed period in the Krasnoyarsk region has increased 2.4 times [2].

2. Questions and purpose of the research
The dynamically developing competitive market of the world community requires a new approach to improving the competitiveness of the economic system in each individual country, respectively, innovations are among the main factors of success, especially if we talk about the agro-industrial sector [3]. Technical renewal of this industry is a key factor for success and effective functioning.

The starting point of the study was the analysis of the current level in innovative activity [4,5]. The level of innovative activity in Russia in comparison with other countries is low. The high overall level of innovative activity indicates the creation of favorable conditions in the economy of foreign countries, and a high level of support from the state [6]. This determines the relevance of the study.

The purpose of the research is to analyze the main indicators of innovative activity in the Krasnoyarsk region.

3. Methods of research
Innovative activity reflects the readiness of organizations to update in all areas of operation, as well as the level of receptivity to everything new [7]. Let's imagine the level of organizations innovative activity in Russia and the Krasnoyarsk region, and show the data in table 1.
Table 1. Level of organizations innovative activity\(^{a}\).

| Indicators                                                                 | Years          |
|---------------------------------------------------------------------------|----------------|
| Share of organizations that implemented technological, organizational or marketing innovations - total | 2012 2013 2014 2015 2016 2017 2018 2019 |
| - Russia                                                                  | a a 10.1 9.9 9.3 8.4 8.5 |
| - Krasnoyarsk region                                                      | 10.0 10.2 9.5 11.2 9.3 8.8 7.1 7.1 |

\(^{a}\)Official statistics / Krasnoyarsk region / Entrepreneurship / Science and innovation.

As noted above, the level of innovative activity in Russian organizations is significantly lower than in the global community, in addition, there is a decrease in innovative activity, which is the result of a prolonged crisis in the Russian economy [8].

Let's analyze the level of organizations innovative activity in the Krasnoyarsk region in the context of realized innovations (table 2).

Table 2. Dynamics of organizations innovative activity of in the Krasnoyarsk region in the context of implemented innovations.

| Indicators                                                                 | Years          |
|---------------------------------------------------------------------------|----------------|
| Share of organizations that implemented technological innovations          | 2012 2013 2014 2015 2016 2017 2018 2019 |
| Share of organizations that have implemented environmental innovations    | 5.5 5.1 1.4 1.5 1.6 1.3 x 1.4 |

Table 2 shows a decrease in the implementing organizational innovations from 4.2 % to 2.3 %, implementing marketing innovations from 1.4 % to 1.0 % and implementing environmental innovations [9].

The peak of innovative activity aimed at introducing technological innovations into production was in 2013 – the share was 9.8 %, and then there is a significant decline in the using this direction of innovation in production. This situation is caused by the crisis of 2014, since the introduction of technological innovations into production is always associated with the need for significant investment injections, which are practically impossible during a prolonged crisis [10].

Table 3 shows the level of innovative activity by industry.

Analyzing the distribution of innovative activity by industry, table 3, we note that the share of organizations implementing innovations is higher in industrial production – 10.5 %, which is caused by its overall dominance in agriculture – 4.0 % [11].

Table 3. Level of organizations innovative activity of by industry in Russia (2016 year).

| Industry affiliation | Share of organizations that implement innovations in the total number of organizations, % |
|----------------------|------------------------------------------------------------------------------------------|
|                      | total | technological | marketing | organizational |
| For industrial production | 10.5 9.2 1.9 2.8 |
Within the segment the maximum implementation of technological innovations, particularly in industry – 9.2% and the minimum the introduction of marketing innovation is 1.9 %, and in agriculture technological innovation amounted to 3.4%, and marketing – 0.4 % [12].

Technological innovations in all spheres of activities are the most significant, since product and process technological innovations influence changes in the structure of the economy, contribute to business competitiveness, set the overall trend of growth and development [13].

**Table 4.** Dynamics of the volume of shipped innovative goods, works and services in the Krasnoyarsk region.

| Indicators                                              | Years      |
|--------------------------------------------------------|------------|
|                                                        | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
| Volume of shipped innovative goods, works, and services, million rubles | 4957.2 | 11694.6 | 35800.1 | 53874.8 | 49820.0 | 58836.9 | 63138.7 | 63160.7 |
| among them:                                           | 3262.4 | 6795.4 | 9329.2 | 29521 | 16639.7 | 31521.4 | 37808.9 | 53932.6 |
| - newly introduced or subjected to significant technological changes in the past three years | 743.8 | 3044.7 | 422.6 | 3639.2 | 4160.4 | 6005.9 | 8874.8 | 9224.0 |
| - improved over the past three years                   | 0.5 | 1.1 | 3.4 | 5.1 | 4.0 | 4.0 | 4.1 | 3.3 |

Despite the decrease in innovative activity, there is a tendency to increase the dynamics of volumes of shipped innovative goods, works and services. Overall, there is a 13-time increase in volume, which is partly due to inflation [14].

The introduction in any type of innovation is inevitably associated with costs. The cost of technological innovations in Russia for the period 2012-2018 doubled and amounted to 778 billion rubles [15].

**Table 5.** Dynamics of expenditures on technological innovations of organizations in the Krasnoyarsk region.

| Indicators                                                | Years      |
|----------------------------------------------------------|------------|
|                                                        | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
| Expenditure on technological innovation of organizations, mln. rub. | 14617 | 19643 | 24979 | 67700 | 84718 | 60049 | 38440 | 35017 |
| of these:                                                | 744.0 | 952.0 | 399.6 | 639.3 | 567.2 | 3.2   | 20.5  | 4.2   |
| - design (activity to change the shape, appearance or    |         |       |       |       |       |       |       |       |
The total cost of technological innovations for the analyzed period in the Krasnoyarsk region increased 2.4 times and amounted to 35017.7 million rubles [16].

In the structure of expenditures for technological innovations, 63.20 % is accounted for own development, 23.08% - for the purchase of machinery and equipment and 3.26 % - for the purchase of software, respectively, the direction "training and training of personnel related to innovation" is not ignored, but their share is minimal – 0.05 % [17].

4. Conclusion

Analyzing the distribution of innovative activity by industry, we note that the share of organizations implementing innovations is higher in industrial production – 10.5 %, which is caused by its overall dominance, in agriculture – 4.0 %. Within the segment, the maximum implementation of technological innovations, in particular in industry – 9.2 %, and in agriculture – 3.4 %.

Analysis of the agriculture situation in the Krasnoyarsk region indicates a decrease in the gross grain harvest, while in Russia there is a development of the industry. The main reasons for the reduction in production are a reduction in the area of grain crops and low productivity, which is due to low technical equipment, rare variety changes, so low innovative activity of the industry. The best solution is to invest in the technical re-equipment of the industry.

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