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RUSSIAN FOOD INDUSTRY INNOVATIVE DEVELOPMENT NEEDS

Irina Bogomolova [1*], Elena Krivenko [1], Irina Vasilenko [1], Victoria Malitskaya [2], Natalia Shatokhina [1]

[1] *Department of Management, Faculty of Production and Branch Economics, Voronezh State University of Engineering Technologies, 19, Revolution Ave., Voronezh, 394036, RUSSIA.*
[2] *Accounting and Taxation Department, Plekhanov Russian University of Economics, Moscow, RUSSIA.*

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ABSTRACT

The process of introducing innovations must go through several interrelated stages. Determination value of weight coefficient the reasons under consideration and establishment-level indicators that affect enterprise development carried out by the method of expert assessments. This method is based on five essential elements. The first element is the preparation of a plan and forecasts. The second stage carries out a feasibility study. The third stage includes consideration of the proposed options by the enterprise management. The fourth stage focuses on the achievement of the goals and objectives of the structural and functional units. At the final stage, the enterprise management carries out control, assessment, monitoring, adjustment, and addition of measures of an innovative type. For the case of food industry enterprises, after analyzing the obtained level, we revealed its rather low value. This low value confirms the negative influence of factors on developing food industry enterprises. Collected data indicates about the necessity to introduce organizational innovations into the enterprise's work. Using the presented methodology to identify the reasons affecting enterprise and assessing obtained options quality allows determining a crisis point. These points are identified at various stages of the enterprise's life cycle and require the introduction of innovations in production, management, and organizational processes. Based on the presented methodology can develop factorial methods to improve enterprise efficiency. Introducing this system to the JSC Diary Firm Moloko can increase its productivity by over 300%.

Disciplinary: Technology Development and Innovation Management.

*Corresponding author (Irina Bogomolova). Tel: +78612215845. Email: Bogomolova@vstuet.ru

1. INTRODUCTION

Innovation is the key to the success and profitability of the business. Innovations give leaders advantages reinforced with highly competitive strategies. Innovative methods and approaches to modern management allow not only to increase and diversify productions, increase labor productivities and economic efficiency but also to maximize the identification of all available potential and reserves that were not previously available. All this proves the prospective necessity and relevance of the formation of a stable trend of the innovative development path for the entire national economy, including for food industry enterprises. Today, domestic economic entities lag behind representatives of leading countries in terms of innovation activity, the number of innovative developments, their testing, and implementation in real production. This situation is inherent in many sectors and spheres of action of the national economy of the Russian Federation, including the food industry. Particularly acute problems are in the areas of technical and technological support, resource-saving, environmental safety, the use in real production of qualitatively new methods of planning, organization, and management of complex production systems and labor resources (informatization, programming, digitalization, automation). To date, foreign and domestic scientists of the past and present have formed a fairly good base of works devoted to the study of innovative processes and the development of food industry enterprises (development of a scientific base, testing of innovations and their implementation in practice, infrastructure development, state support system, financial support and organizational -management support, the promotion of innovative products to markets, etc.). Moreover, there are significant results not only in theoretical and methodological terms but also in the practical sphere of management.

Currently, innovations and innovative development of various kinds of homo- and heterogeneous socio-economic systems have acquired an extraordinary and polysemantic character of a permanent type. Today, this development factor is the most effective tool for qualitative and quantitative changes in the national economy and society as a whole. It is worth noting that this economic category "innovation" was first identified and defined by Schumpeter [14] and defined only at the beginning of the 20th century. Similar manifestations were earlier, and this applies to the theoretical level of scientific research, and methodological, as well as utilitarian. Qualitative changes existed before, and their description was valid and justified. Still, the issues of innovation, in the context of their multi-aspect report, were first framed in the scientific work "Theory of Economic Development" (1911) [14]. In this work of authorship, the essence of not only innovations but also the content and structure of the innovation process, development, and transformation, were clearly defined and substantiated quite clearly.

Schumpeter [14] defined innovation as a critical source of profit: "... profit is the result and the final result of the desired (new combination), which in itself is the embodiment of the formula: there is no development, there is no profit and vice versa" [14]. Currently, there are many definitions and interpretations of this category, but for the most part, they are identical and united by a single conceptual understanding. In the state document [7], innovation or innovation is the final result of the innovation activity of an economic entity, in the form of a new and/or improved product, new and/or improved technology that has been tested and used in practice." This definition is an official term concerning innovation and the development of socio-economic systems of the national economy of Russia. In this aspect, it is worth noting that the new and improved implies qualitative

transformations and changes of a new order, which have an explicit format for the implementation of scientific and technological progress and world scientific thought in all its manifestations. Thus, our author's position entirely coincides with the stated concept of understanding the essence of this subject area of scientific research.

The study identifies the features of the Russian organization of innovative activity in food enterprises and identifies implementation criteria and problems of managing the innovation process.

2. MATERIALS AND METHODS

In the course of basic scientific research in the field of economics and management, this study applies the systemic, situational, logical, dialectic, functional, and process. Based on the implementation, the used methods involve the empirical group (description, comparison, expert assessment), the theoretical group (idealization, analysis, analogy, synthesis, formalization, axiomatization, reflection, generalization, abstraction), and the general scientific group (abstract-logical, retrospective, economic -statistical, graphic). In particular, in the process of developing a comprehensive system for managing the innovation process at the enterprise used systemic, logical, and functional approaches, and the following scientific methods: description, expert assessment, idealization, analysis, formalization. This study used "JSC firm Moloko" as a case study for the construction of the production and economic model of the functioning.

3. RESULTS AND DISCUSSION

Currently, more than 1/2 of the gross domestic product of developed countries (E.U., USA, Canada, Australia) is formed through innovative solutions and achievements of the production and organizational-managerial type, implemented based on specific innovative projects [2].

At the moment, Russia has a very significant lag behind the world leaders in the field of innovative development in many positions (resource conservation, environmental safety, technical and technological support for the agrarian sector and industrial production, I.T. technology in the context of software and information support and management control various socio-economic systems). During the past 5-10 years, much more attention has been paid to the issues of innovative development of the national economy from government agencies [2, 3]. Today, there are specific results based on a hugely expanded and reasonable regulatory framework for public administration [1, 5, 5, 8, 9, 10, 11, 12, 13]. Following the critical provisions of the latter in our country in the next 3-5 years, an innovative economic system based on scientific knowledge and high technology should be formed. In particular, the application of innovative solutions with the introduction of specific developments and inventions should become a critical factor in increasing the functioning efficiency of all sectors of Russia's economy, in particular, ensuring labor productivity growth in the real area by 3-5 times and contributing to 1.5-2 times reduction in resource consumption. These target settings are very relevant and promising for the domestic food industry. The effective functioning of this sector of the national economy is an integral element of ensuring the food, economic, and national security of our state. It also takes place that it is the food industry that determines the level and quality of life in any country in the world and Russia, including.

*Corresponding author (Irina Bogomolova). Tel: +78612215845. Email: Bogomolova@vstuet.ru Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13Q http://TUENGR.COM/V11A/11A13Q.pdf DOI: 10.14456/ITJEMAST.2020.263

The format of the innovation process and all innovation activity at food industry enterprises should be permanent and comprehensive. It should include the whole range of measures for the implementation, development, and analysis of the effectiveness of innovative solutions and progress. All spheres and functional, structural units of industry entities should be grouped and integrated based on the implementation of targets and tasks related to increasing the level of manufacturability, progressiveness, and innovativeness of the latter. The following types of innovations are most often found and have more than others development at food industry enterprises: technological, organizational, marketing, environmental [2, 14].

For a general fact of innovation activity, Figure 1 shows the dynamics of changes in the innovation activity of organizations in our country (the proportion of organizations involved in technological, organizational, marketing innovations), in particular, enterprises engaged in food production [8].

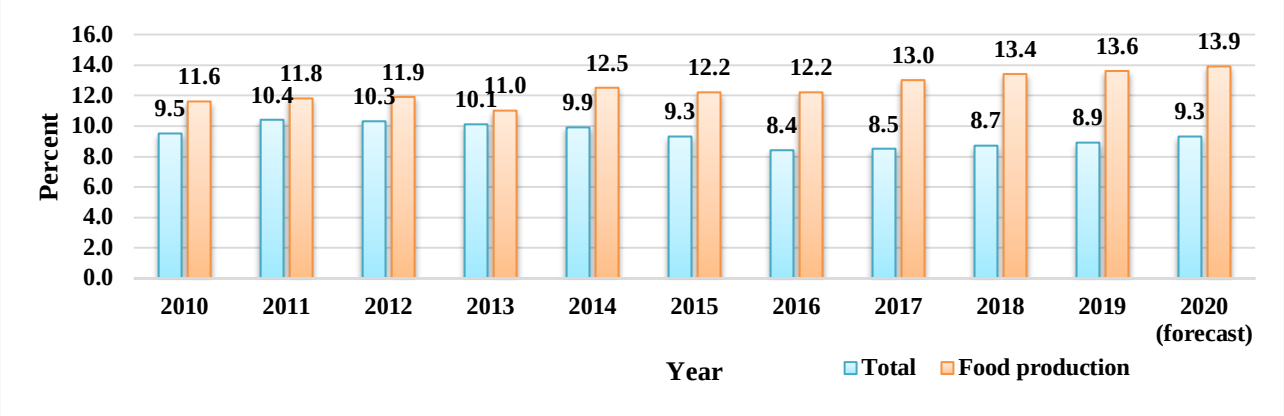

Figure 1: Innovative activity of organizations in Russia (the proportion of organizations engaged in technological, organizational, marketing innovations)

Figure 1 shows that the indicator of innovative activity in food production is higher than the average index for the economy, but in absolute terms, it (sign) has rather low values. It is also worth noting that the average index of innovative activity in the economy has a steady decline trend, and this is against the background of expansion, updating, and development of regulatory documents [4, 10, 12]. These contradictions determined not by the legislative criterion, but by a whole series of other approaches that have a direct impact on the innovative activity of business entities of the modern economy (financial security, profitability, technical equipment, staffing, highly specialized specialists capable of carrying out research and case studies). Thus, the main barrier and constraining factor for innovative activity of modern enterprises have a multidimensional structure based on the above criteria. Therefore, a regulatory study of this issue is not a guarantee of the level growth of domestic economy innovativeness and help to resolve this controversial situation. There is a more comprehensive approach is required on the part of state and industry management structures with an emphasis on the identified deterrence criteria and risk situations.

The proportion of organizations implementing innovations of surveyed the total number given in Table 1. The data show that technological innovations take the highest priority among the rest, and this type of innovation is more attention by industry management. All this is determined by the fact that management structures assigned technological and technological changes (modernization) plays

a crucial role in creating a productive innovation environment in the relevant sector of the national economy.

Table 1: Percentage of organizations implementing innovations.

Indicators/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 (forecast)
	Technological innovation										
Total economy	7.9	8.9	9.1	8.9	8.8	8.3	7.3	7.5	7.2	7.3	7.5
in food production	9.5	9.6	9.3	9	10.3	10.2	10	10.8	11.6	11.9	12.0
	Organizational Innovation										
Total economy	3.2	3.3	3	2.9	2.8	2.7	2.4	2.3	2.1	2.1	2.3
in food production	2.6	3.1	2.9	2.5	2.4	2.2	2.0	2.2	2.3	2.3	2.5
	Marketing innovation										
Total economy	2.2	2.3	1.9	1.9	1.7	1.8	1.4	1.4	1.3	1.3	1.6
in food production	4.5	4.8	4.3	4.4	4.3	4.1	4.0	4.2	3.5	3.6	3.8
	Environmental innovation										
Total economy	4.7	5.7	2.7	1.5	1.6	1.6	1.1	1.1	1.0	1.1	1.2
in food production	6.2	7.4	3.3	1.4	1.7	2.2	1.9	1.5	1.2	1.3	1.3

These trends also exist in other sectors and spheres of the national economy, which are confirmed by statistical observations and applied research. Another essential feature of the identified pattern is that for all types of innovations, including food production, and the economy as a whole, there is a decrease in the innovative activity of economic entities of the business environment, except for only 2018, when technological and organizational innovations implemented in food production, had a positive trend.

It is worth emphasizing that most of the technological innovations introduced are the result of their borrowing from the leading countries in this industry segment, and the share of domestic developments introduced in real production is less than 10%. All this is a consequence of the large gap and lag in local applied science from the world level of innovative transformations. The noted trends confirmed by the indicators of investments (costs) that local food industry enterprises have recently directed to technological innovations (Figure 2).

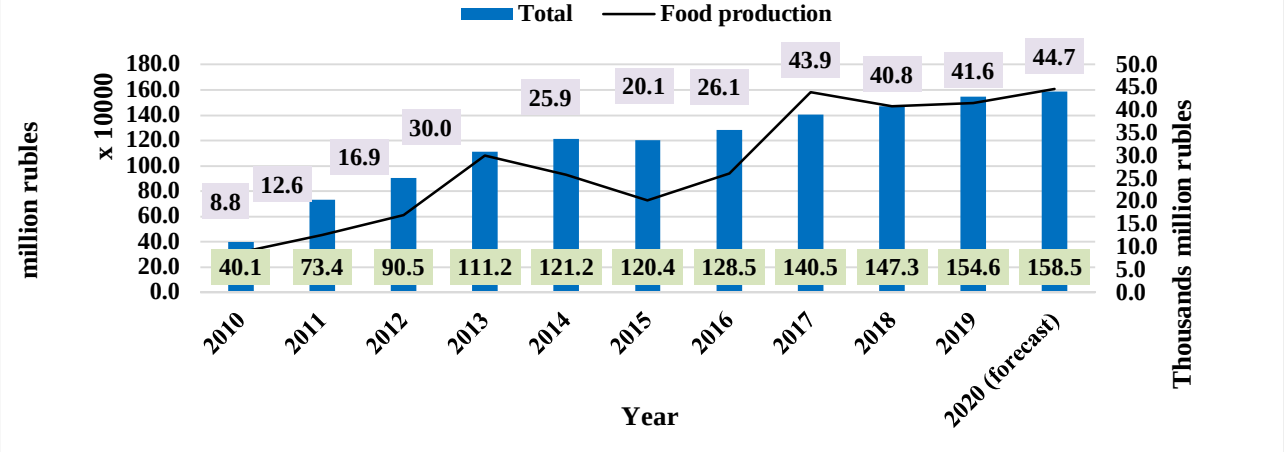

Figure 2: Costs of technological innovation in food production and the economy as a whole

In particular, in 2017, in the food industry, the number of costs for technological innovations

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amounted to 43.9 billion rubles, which is 68.2% more than the previous period. Over the same period in the economy as a whole, the costs of technological innovation amounted to almost 1.41 trillion rubles. In 2018, these indicators amounted to 40.8 billion p. and 1.47 trillion p. respectively.

As you can see, large amounts of money are being sent to these types of innovations today. All this became possible due to the implementation of several state program initiatives [2, 6, 7, 10, 11, 12, 13, 14]. These initiatives have a very effective mechanism to support new business entities that implement various kinds of innovative projects in the plan for co-financing, regulatory, organizational, managerial, and information and consulting support.

As the practice of research at most food industry enterprises shows, innovative initiatives (solutions) are discrete and point-like. At that time, an integrated approach should apply in the system of innovation transformation management. To implement this approach, it is wholly necessary to develop and justify holistic program activities in the form of business plans and strategic maps. The organization the innovation process will be considered on the example of the milk processing enterprise of the Voronezh region "JSC firm Moloko". The effectiveness of the implementation of innovative activities at this enterprise is primarily determined by several factors, the accounting and high-quality use of which will allow achieving the desired goals in this area of functioning. The latter, first of all, includes research work in the field of marketing, organizational, and managerial and technical and technological measures. A well-organized innovation process shortly will ensure the achievement of the planned result in the form of an increase in intellectual potential, production of products with improved consumer properties, as well as profit growth and increased levels of capitalization. The fundamental component of any innovation process is scientific and technological progress. It ensures the interconnected development of science and production, which makes it possible to achieve in practice a positive synergistic effect in the form of technical and technological modernization, creation of a new product, and improvement of the quality of scientific research conducted directly at the enterprise.

The main areas of scientific and technological progress inherent in the «JSC firm Moloko" are illustrated in Figure 1.

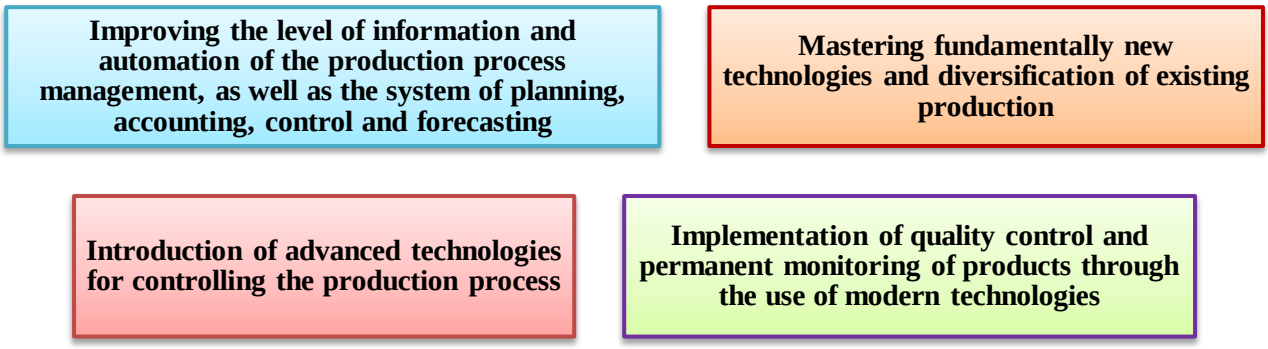

Figure 1: The main directions of scientific and technological progress inherent in "JSC firm Moloko"

For competitive development in an unstable and highly intermittent market environment, industry enterprises need to continually carry out modernization changes in the fundamental areas of operation (material and raw materials supply, the primary production process, marketing of finished products, bringing it to the consumer). Per this, we developed the integrated innovation process

management system for JSC firm Moloko (Figure 2).

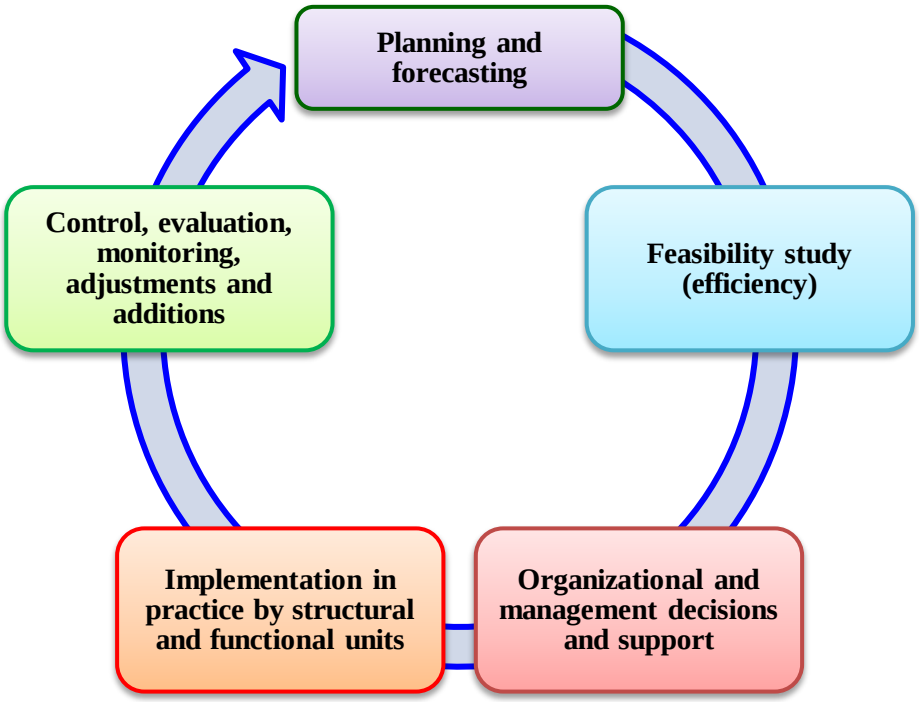

Figure 2: The integrated innovation process management system for "JSC firm Moloko"

This system is capable of activating innovative transformations at this enterprise.

First of all, this system implies the involvement of a significant number of employees in the development and implementation of innovations in production. The system is based on five essential elements. In particular, the first element is the preparation of a plan and forecasts. At this stage, the process of planning the implementation of the selected strategy (goals, objectives, timelines, tools, mechanisms, responsible, control numbers). It also on this stage makes forecasts (scenarios, indicators, risks, uncertainties, positive effect, determination). In the second stage, a feasibility study is carried out (calculation of the effect and performance indicators), here evaluated the necessary resources for the implementation innovation cycle. The third stage composes of planing the specific set of goals and tasks for the staff and enterprise. At the fourth stage, it carried out the achievement goals and objectives of the structural and functional units. At the final stage, the management of enterprise carries out control, evaluation, monitoring, adjustment, and addition of measures of an innovative type, if appropriate.

Based on the implementation of this system, the enterprise management will be able to determine the goals and the corresponding type of strategy, which will achieve high results in the production and sale of finished products. This system has high adaptive properties and can be considered a universal tool.

This system makes it possible to single out individual components in innovation, thereby providing the possibility of a phased implementation of end-to-end planning of innovative development from the stage of receipt of raw materials to the manufacture of finished products (Figure 3).

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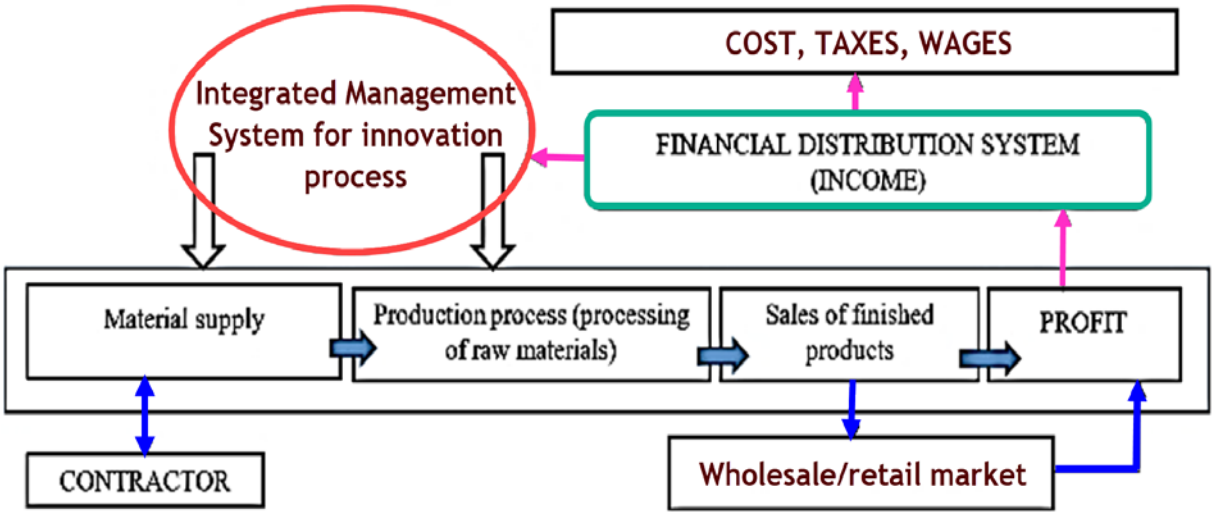

Figure 3: Adapted production and economic model for "JSC firm Moloko".

Here, using the method of expert assessments, we determine the value of the weighting factor of the reasons under consideration and establish the level of this indicator that can influence the development of the enterprise. For each goal, we will set the value of the weight coefficient - which measures the degree of influence a factor in enterprise development. Let's set the value in the range from 0 to 1, and the closer the parameter is to 1, the more critical it is from the expert's point of view. For each factor of the cause, we will establish a score on a 10-point scale. The higher the probability of a positive rating, the closer the evaluation is to 1, the lower the likelihood of a positive assessment, the closer the score is to 10.

Calculating the value of each parameter allows us to find their sum. Next, we calculate the level of positive or negative cumulative influence of these factors on the development of the enterprise (Table 2).

Table 2: Expert Assessment

Factor	Influence degree (x)	Factor assessment (y)	Value (x/y)
Financial condition	1	7	0.14
Technical potential	0.9	3	0.30
Scientific potential	0.9	3.5	0.26
Profitability	1	5	0.20
Implementation	1	6	0.17
Investment potential	0.9	1.5	0.60
Sales connections	0.9	6	0.15
Regional innovation activity	0.8	1.7	0.47
The population purchasing power	0.95	5	0.19
State regulation of innovation	0.65	2	0.33
TOTAL	x	x	2.80

Thus, the level of influence is $\frac{2.80}{100} = 0.028$. Note that the maximum possible level of influence is positive at a value close to 1, respectively. The lower this value, the more the importance of factors is negative, and at the 0.5 borders, it will be zero. As a result of the obtained level of the indicator, we have a rather low value, which thereby confirms the negative impact of these reasons on the development of food industry enterprises. It suggests the need to introduce organizational innovations into the work of the enterprise. Determining the quality of the obtained options using the presented

organization allows us to establish crisis points. These points are identified at various stages of the life cycle of an enterprise and require an immediate decision on the implementation of innovations in production, management, and organizational processes. Based on the presented organization, was developed factorial methods to increase efficiency. Next, we consider a modernization program in the production and management for "JSC diary firm Moloko" (Table 3).

Table 3: Modernization program in the field of production and management at "JSC firm Moloko"

Process name	Time indicator	Scope of implementation	The name of the structural unit where	Expected Result	
#1. Measures to improve the quality of system entry	Year	96%	Point of reception of raw materials	For the manufacturer: enhancing the quality of the process by reducing rejects	For the consumer: improving the quality and reliability of the finished product
#2. Measures to improve the quality of the process in the system	Year	94%	Department of chief engineer and mechanic	These measures will allow the manufacturer to effectively use the advantages of high-quality system entry, maximizing the competitiveness of their products	
#3. Activities to improve the quality of finished products	Year	100%	Production and Production Department (Production Manager)	Increase in labor productivity, reliability of execution.	
#4. Measures for the sale of goods	Year	100%	Marketing and sales department	The release of high-quality goods and maximum possible acquisition by consumers.	
#5. Consumer Activities	Year	100%	Customer Relations Department	The study of taste preferences, analysis of quality indicators, identifying consumer needs	

In Table 3 proposed for "JSC firm Moloko", five types of measures to implement in different structural divisions are determined by the multidimensional nature of the steps taken to maximize the economic effect of both the enterprise and the end-user. The first measure is the installation of a metering station for receiving milk of increased productivity at the stage of receiving raw materials, that will allow accurately taking into account the amount of milk received and filtering. The second event is improving professional staff skills, conduct training, seminars with participation highly qualified and narrow-profile experts. The third stage is modernizing the production process (upgrading equipment and technologies), in particular, the sterilization-cooling plant and the apparatus for ultra-pasteurization). The fourth stage was a consequence of the third stage because the installation of the ultra-pasteurization apparatus allowed JSC firm Moloko to carry out deep whey processing. This event made it possible to expand the products range through the production of the protein concentrates of whey, attract additional profit, and reduce the impact on the environment. In the fifth stage was a detailed study of the preferences of the modern consumer, for this, carried out surveys, collection of personal data, visits to exhibitions, and fairs. Such measures had been allowing us to find out the taste preferences and wishes of consumers and identified the next ways for innovation. One of the ways for the further development of JSC firm Moloko is the production of "organic" dairy products, but this requires innovation in the whole agro-industrial complex.

This system allowed singled out individual components for innovation, and we developed five methods to increase efficiency:

1 - installation a metering station for receiving milk of increased productivity at the stage of receiving raw materials;

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2 - improving professional staff skills, conduct training, seminars with participation highly qualified and narrow-profile experts;

3 - modernizing the production process by installation sterilization-cooling plant and the apparatus for ultra-pasteurizationж

4 - carry out deep whey processing;

5 - setting goals for further innovation.

The implementation of these measures allowed an increase in the company's profit by more than 300%, which is confirmed by the company's tax return for 2019 (Table 4).

Table 4: Statement of financial results (profit and loss) "JSC diary firm Moloko" (Rubles).

Indicator name	Code	2018	2019
Revenue	2110	3794844	4526973
Cost of sales	2120	3037717	2228896
Gross profit (loss)	2100	757127	1014862
Business expenses	2210	652824	505137
Administrative expenses	2220	208711	209610
Profit (loss) from sales	2200	43279	152428
Interest receivable	2320	13223	15688
Percentage to be paid	2330	-65	-395
Other income	2340	111016	160276
Other expenses	2350	157077	124272
Profit (loss) before tax	2300	54875	267126
Income tax	2410	17361	59573
Current income tax (until 2020 this is p. 2410)	2411	17361	59573
Change in deferred tax liabilities	2430	4164	1000
Change in deferred tax assets	2450	6496	0
Other	2460	2349	-134
Net income (loss)	2400	29884	212874

4. CONCLUSION

The retrospective analysis showed that Russia is on the third stage of scientific and technological progress. The key driver is an innovative transformation. At present, more than 1/2 of the GDP of developed countries formed through innovative technologies and innovative products. Russia today is significantly behind the world leaders in the field of creative development in many positions. Nevertheless, in the past 5-10 years, much more attention has been paid to issues of innovative development. So today, there are specific results based on a developed regulatory framework for management. Significant for the food, economic, and national security of our country is the innovative development of the food industry. Statistics department data indicates that creative activity in food production is higher than the average index for the Russian economy. Still, in absolute terms, it has rather low values. We also note that technological innovations take the highest priority among the rest, and this type of change is given more attention by industry management. Still, it is worth emphasizing that most of the technological innovations introduced are the result of export, and the share of domestic developments being introduced into real production today is less than 10%. All this is a consequence of the large gap and lag in local applied science from the world level of innovative transformations.

Further, this research was applied to a regional enterprise of the dairy industry "JSC firm Moloko". For JSC firm Moloko enhancing competitive advantages, we developed the integrated

innovation process management system. The system based on five essential elements (preparation of a plan and forecasts; carrying out a feasibility study; composes of planing the specific set of goals and tasks for the staff and enterprise; achievement goals and objectives of the structural and functional units; control, evaluation, monitoring, adjustment, and addition of measures of an innovative type, if appropriate). The implementation of these measures allowed an increase in the company's profit by more than 300%.

5. AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding author.

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Professor Dr.Irina Bogomolova is Head of the Department of Management, Organization of Production, and Branch Economics. She holds a Doctor of Economics. Her research interests include Managing the Sustainable Development of Agricultural and Processing Enterprises of the Agro-Industrial Complex, ensuring Food Security, current Trends in the Clustering of the Grain Product Complex, Innovative Development of Enterprises based on Resource Conservation, the use of Resource-efficient Technologies

Elena Krivenko is an Associate Professor of the Department of Management, Organization of Production and Branch Economics. She is a Candidate of Economic Sciences.
Her research interests are Innovative Development of Domestic Enterprises in the Food Industry, Integration of Agricultural and Processing Enterprises in the Agro-Industrial Complex, Management of the Assortment of Products of Food Enterprises based on Innovative Mechanisms, Resource Conservation as an Element of Development Management of Industry Enterprises

Irina Vasilenko is an Associate Professor of the Department of Management, Organization of Production and Branch Economics, She is a Candidate of Economic Sciences. Her research interests are Management of Innovation and Investment Activities of Industrial Enterprises, Food Security of the Russian Federation: problems and prospects, Increasing the Competitiveness of Agricultural Enterprises, Diversification Directions of Development of Industrial Enterprises in the Context of Import Substitution

Professor Dr.Victoria Malitskaya teaches at the Department of Economic Activity Analysis, the Russian Economic University named after G.V. Plekhanov. She holds a Doctor of Economics. Her research interests are research in the field of Accounting, Analysis, and Audit of Financial Assets in Russian and International Practice.

Natalia Shatokhina is an Associate Professor of the Department of Management, Organization of Production and Branch Economics. She is a Candidate of Economic Sciences. Her research involves Product Quality Management of Industrial Enterprises, Food Security of the Russian Federation: Problems and Prospects, improving the Competitiveness of Agricultural Enterprises, Diversification Directions of Development of Industrial Enterprises in the Context of Import Substitution