

FOOD ENTERPRISES INNOVATIVE ACTIVITY ORGANIZING

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Abstract

The purpose of the study is to analyze the ways of enhancing innovation activity and to substantiate the methodological and practical aspects of creating an effective system of food industry enterprises innovative activity management.

The main materials used in the paper were the statistics of the State Statistics Committee of Ukraine and the Odessa Regional Department of Statistics; data of the Ministry of Economy of Ukraine, Department of Food Industry, legislative and regulatory acts on management of investment activities; and data from domestic and foreign periodicals. The research used the following methods of processing statistical data - a method of statistical observation using financial and economic reporting of food industry enterprises with further grouping of the received materials, and analyzed the absolute and relative statistical quantities. The method of comparison and analogy is used to process media content.

According to the paper, the management system for innovative food business activity needs to be improved in accordance with modern conditions. The synthesis of levers, methods, legislation and information base should create an effective mechanism for managing the innovative activities of food industry enterprises and help Ukrainian food producers to take a worthy place on the world market.

The model of food enterprises innovative activity management in the conditions of the economic crisis in Ukraine is developed. The use of a clustered approach to combining enterprises as a factor for improving the efficiency of innovation activity management through intensive methods (introduction of innovations) is proposed by creating a cluster that would ensure the cooperation of food industry enterprises with agricultural enterprises in a certain territory.

Key words: *Innovation processes, Innovation process management system, Index of intensity of innovation processes, Cluster.*

1. Introduction

In the global environment, the processes of integration and globalization continue to spread in recent decades, which have a significant impact on the socio-economic development of developed countries, which position themselves as independent, competitive and innovative. These realities confirm the thesis that there is a need to accelerate the innovation and investment development of the Ukrainian economy, which requires the creation of its innovative model, subject to activation of the subjects at the macro, mezzo and microeconomic levels. Such a process involves qualitative transformations of power institutions, structural adjustment of the economy, relating to various spheres of management, the introduction of new approaches in the management of the food industry, which continues to be the dominant sector of the country.

The prevailing trend of the latest development in the world can be considered as an active implementation of advanced achievements of science and technological development, which provide an impelling impetus to structural changes in the economy and stimulate production of innovative high-tech products. So, today the activation of innovative activity is the most effective way to ensure the sustainable development of the enterprise, industry or country, and increase their competitiveness by intensification of their competitive advantages [1].

In the context of this emphasis is placed on the problems and prospects of the development of food

businesses, in particular on innovation processes (IPs), which should ensure cost-effective use of innovations in the form of new technologies, products or services, organizational and technical and socio-economic decisions of production, financial, commercial, administrative or other character. Thus, the problem of improving the management of innovation processes at domestic enterprises becomes of fundamental importance, its solution will contribute to the transition to the creation and use of higher-level technologies and, consequently, acceleration of the economic growth of the national economy and the construction of a modern innovation-investment model of society's development.

2. Innovative activity organizing of food companies

2.1 Analysis of innovative processes at industrial enterprises of the Odessa region

The analysis of innovation processes in food businesses should consist of several successive evaluation stages. In turn, it should be noted that innovation is the development based on the continuous search and use of new ways and spheres to realize the potential of the enterprise in changing environmental conditions within the framework of the chosen mission and the accepted motivation of activities related to the modification of existing and the formation of new markets sales. And the final stage will be the formation of conclusions about the state of management of innovation processes at various enterprises.

Nowadays the operation of enterprises is a key condition for successful competition, innovative processes, and for food companies, there are also innovative products. This should be understood by every head of the enterprise, which is why the innovative types of products offer almost every modern enterprise, which plans to successfully operate in the difficult conditions of competition. In such a situation, innovation processes should be the most intense, so the most important is not only the innovation, but also the intensity of the company's operation in this direction.

The intensity of innovation processes needs to be tracked not only through a single component, such as product volume, but also by the indicator of the innovation cost, which more closely characterizes the effectiveness of innovation [2]. In addition, the ratio of the innovation cost to total costs reflects not only the existing volume of financing of the enterprise of innovative processes, but also the development of marketing and management types of innovation processes, that is, allows you to analyze and predict the level of development of such areas of innovation development as the development of a new source of raw materials supply or semi-finished products and reorganization of

the organizational structure of management. It should also be noted that the share of implemented innovative types of products characterizes the technological innovation process, namely the activity of introducing new production methods, etc.

To calculate the index of innovation activity (IA), we suggest using the following formula:

$$IA = V_n k_n + V_a k_a + V_s k_s + V_i k_i + V_f k_f + V_e k_e + V_r k_r \quad (1)$$

Legend:

k_n - Volumes of products of the food industry, % from the previous year;

k_a - Applications for the issuance of security documents for the implementation of industrial designs are filed;

k_s - Number of specialists who carry out scientific work, thousand persons;

k_i - Number of innovative food companies,% of the total number of enterprises;

k_f - Amount of innovation activity financing in industry at the expense of the state budget,% of the total volume;

k_e - Expenses of organizations for the own resources of scientific and technical works per one researcher, thousand UAH (converted in euro);

k_r - Volume of realized innovative products, mln UAH (converted in euro).

The assessment of innovation processes at Ukrainian enterprises took place on the basis of statistical information on scientific and innovation activities in 2015 - 2017, as well as using the financial and economic reporting of a sample of food industry enterprises [3 - 5].

The analysis of innovative processes is proposed to be carried out with the help of cluster analysis, which allows grouping enterprises into clusters in order to determine their level of innovation. An expert method was used to substantiate the criteria for cluster analysis. The experts involved 63 leading food industry specialists, with the status of: managers - 18.2%, workers - 81.8%, who, by means of questionnaires, determined that criteria for conducting a cluster analysis would be useful to use the following indicators: efficiency ratio, return on equity and the index of innovation activity. The choice of these indicators completely satisfies the chosen scheme of analysis of the relationship of financial and economic status and the introduction of innovative processes. Characteristics of innovative processes at research enterprises is presented in Table 1.

Within the hierarchical clustering methods, Ward's method was used to estimate distances between clusters. The essence of this analysis is that all observations (in our case, these enterprises) are treated as points in the multidimensional space of signs. The classification procedure used has allowed the points that are closely spaced apart and group them into groups based on similar values of the signs [6].

As a result of the cluster division of enterprises, three clusters were formed. The first cluster hit the enterprises in which the greatest value of the coefficient of

Table 1. Indicators of the analysis of financial and economic activity and innovation processes of food enterprises

Enterprise	Year	Financial and economic indicators of activity				Indicators of analysis of innovative processes			Characteristics of innovative processes
		Coefficient of effectiveness	Production profitability, %	Return on equity, %	Assets profitability, %	Share of costs for innovation in total costs, %	Share of the volume of innovative products sales in the total volume of industrial products	The share of own funds in the total amount of financing of innovation costs, %	
LLC "Kazka"	2015	-0.016	-	-	-	0.42	0.0205	100	Creation of own design department (DD) for the development of plastic packaging for cakes, where design and development work is carried out
	2016	0.036	5.13	7.29	3.26	0.41	0.0467	100	
	2017	-0.002	-	-	-	0.39	0.0125	100	
LLC "Sunflower"	2015	0.04	6.06	16.89	5.59	0.14	0.0782	100	Technological equipment and organization of production of innovative products
	2016	0.038	7.7	11.39	5.94	0.13	0.1461	100	
	2017	0.036	8.85	43.3	9.54	0.1	0.0812	100	
LLC "Food platform"	2015	0.009	0.95	5.35	2.9	0.32	0.011	100	Development of innovative products for both own implementation and for sale
	2016	0.041	4.4	12.3	8.12	0.29	0.0951	100	
	2017	0.044	4.68	14.49	10.05	0.31	0.1025	100	
LLC "Grant"	2015	0.014	1.41	6.05	1.23	4.42	0.0906	100	Execution of applied research and design development. Tactical marketing and implementation
	2016	0.013	1.26	4.21	1.02	4.17	0.1151	100	
	2017	0.013	1.28	4.52	1.05	4.03	0.1213	100	
LLC "Renaissance"	2015	0.064	6.68	15.23	9.8	3	0.0621	100	Implementation of industrial design. development and experimental production of new products on the basis of market marketing
	2016	0.055	5.75	10.35	6.82	2.95	0.0666	100	
	2017	0.058	5.87	11.18	7.24	2.89	0.0652	100	
LLC "Start"	2015	0.131	17.32	14.22	12.47	0.21	0.2313	100	Conducting applied research on the basis of fundamental. Development of technical and economic, technological and operational documentation
	2016	0.112	12.67	10.33	9.62	0.2	0.1441	100	
	2017	0.048	7.9	7.53	6.85	0.17	0.1584	100	
LLC "Suzirya"	2015	0.166	33.57	14.98	10.47	0.17	0.1212	30.43	Modification and improvement of innovative processes, as a result of the participation of the company in international forums and conferences
	2016	0.129	18.4	12.05	8.61	0.17	0.0542	35.68	
	2017	0.138	20.03	15.88	11.29	0.25	0.1547	39.25	
LLC "Kus-Kus"	2015	-0.125	-	-	-	0.59	0.3334	100	Innovation processes are characterized by insignificant improvements due to the crisis situation in the enterprise
	2016	-0.078	-	-	-	0.58	0.1775	100	
	2017	-0.084	-	-	-	0.52	0.0985	100	
LLC "Patriot"	2015	0.021	2.78	9.5	3.16	8.32	0.1562	74.56	The activity covers all innovative processes characterized by deep technical and technological modernization, in addition to this a number of new generation of shops was created at the enterprise
	2016	0.092	9.72	48.21	17.9	7.41	0.2229	75	
	2017	0.065	6.95	25.79	9.19	8.22	0.2357	76.21	

efficiency of the enterprise, high index of innovation activity (enterprises of this cluster on the background of all investigated enterprises are conditionally characterized by high level of innovation development) and the average level of return on equity (LLC "Patriot", LLC "Suzirya", LLC "Start").

The second cluster includes enterprises (LLC "Renaissance", LLC "Food Platform", LLC "Sunflower"), which have average values of the coefficient of efficiency of the enterprise and the return on equity, and in which the index of innovation activity is medium (the average development of innovative processes in enterprises).

The third cluster is characterized by a low coefficient of efficiency of the enterprise and the return on equity, and the average index of innovation activity (the average level of innovation in enterprises). To this cluster were included - LLC "Kazka", LLC "Grant", LLC "Kus-kus". Summarized results of cluster analysis are in Table 2.

Consequently, the LLC "Patriot", LLC "Suzirya", LLC "Start", belonging to the first cluster, the high value of the efficiency coefficient was achieved due to high indicators of innovation processes, namely, the share of costs for innovation in the total costs of enterprises (0.17 - 8.32%), the share of the volume of sales of innovative products in the total volume of industrial products sold (0,12 - 0.23%), the share of own funds in the total amount of financing of the expenses for innovation (30.43 - 100%), the number of introduced innovative types of products (6 - 10) and the number of imported groom in the production of new technological processes (9 - 13). All this is due to the well-established production of innovative products, the efficient operation of the cost management system and marketing

services. To a certain extent, these enterprises can serve as a model for everyone else, but the results of the survey confirm the fact that there are a large number of areas that need to be improved.

The value of the indicators of the second cluster indicates the implementation of the policy of gradual introduction of innovative types of products, but it should be noted that, against the background of enterprises of the third cluster, the level of innovation processes in these enterprises is more intense and effective.

Describing enterprises of the third cluster, one can note the lack of orientation towards the active production of innovative types of products and the introduction of new technological processes. Therefore, they have to adjust the management of innovation processes, namely, to improve the production of innovative products and management costs in the innovation field to improve the existing state.

The conducted analysis and research of innovative processes at food enterprises of Odessa allowed developing methodical provision for improvement of management of innovative processes.

2.2 Methodical provision for improving the management of innovative processes

Management of innovative processes involves managing an enterprise based on its scientific and technical potential, orienting innovation processes to the needs of consumers, analyzing, modeling situations, on the basis of which regulates and timely changes in the enterprise that are in line with the state of the external

Table 2. Grouping of enterprises by cluster analysis and cluster characteristics

Enterprise	Indexes			Cluster	Cluster characteristic
	Coefficient of efficiency	Innovation activity index of processes	Return on equity		
LLC "Patriot"	0.065	2.4751	25.79	1	Conditionally high level of development of innovative processes in comparison with other investigated enterprises. Indicators of innovative processes of all investigated enterprises have the highest significance
LLC "Suzirya"	0.138	2.3086	15.88		
LLC "Start"	0.048	1.8687	7.53		
LLC "Renaissance"	0.058	0.9591	11.18	2	Average level of development of innovative processes: average value of coefficient of efficiency and return on equity, average index of innovation activity
LLC "Food platform"	0.044	0.4609	14.49		
LLC "Sunflower"	0.036	0.4275	43.93		
LLC "Kazka"	-0.002	0.2546	-	3	The low level of development of innovative processes, as evidenced by the gradual decrease in the volume of introduction of new types of products and technologies. Indicators of efficiency and return on equity are high enough, but indicators of innovation processes are significantly lagging behind, that is, these enterprises in their activity almost do not focus on innovation
LLC "Grant"	0.013	0.5092	4.52		
LLC "Kus-kus"	-0.084	0.2786	-		

Table 3. Recommendations for management of innovation processes at food enterprises

Stage of innovation process management	Recommendations		
	to enterprises of the 1 st cluster (LLC "Patriot", LLC "Suzirya", LLC "Start")	to enterprises of the 2 nd cluster (LLC "Renaissance", LLC "Food platform", LLC "Sunflower")	to enterprises of the 3 rd cluster (LLC "Kazka", LLC "Grant", LLC "Kus-kus")
Innovation creation	<p>The use of non-traditional methods of stimulating labor</p> <p>Development of an innovative type of organizational culture in order to increase the effectiveness of the research department</p> <p>Exact formulation of the concept of IP with an orientation to meet the future needs of the market (a list of specific tasks, the choice of the target market, the set of powers and positioning of the product)</p> <p>Creation of interdisciplinary groups and conditions for communication and exchange of ideas</p> <p>Clear distribution of responsibility of managers for each segment of the whole network of innovative processes of the enterprise</p>	<p>The use of non-traditional methods of stimulating labor</p> <p>Development of innovative type of organizational culture in order to increase the efficiency of the research department and design bureau</p> <p>Systematization of the coming ideas. Selection of revealed ideas and development of the idea (concept) of a new product</p> <p>Organization of processes based on parallel activities of integrated groups for the development of innovations</p>	<p>Determination of the existing organizational culture and the transition to an innovative type of organizational culture in order to increase the efficiency of the research and development department</p> <p>Systematization of the coming ideas. Selection of revealed ideas and development of the idea (concept) of a new product. Definition of the concept of own innovative processes</p> <p>Creation of interdisciplinary groups and conditions for mutual communication and exchange of ideas. Distribution of responsibility of managers for each segment of the whole network of innovative processes of the enterprise</p>
Analysis of the environment and possible markets	<p>Organization of marketing researches</p> <p>Activate the search for investors in the event of financing problems</p> <p>Assessment of the company's ability to provide production in the shortest possible time</p>	<p>Assessment of the company's ability to provide products in the shortest possible time</p>	<p>Organization of work of the marketing department.</p> <p>An assessment of the company's ability to engage in innovative processes and in the shortest possible time to ensure the production of products</p> <p>Determination of the time intervals necessary for the restructuring of production for the needs of the innovation process</p>
Incorporation of innovations, development of a prototype	<p>Increasing the effectiveness of the research department</p>	<p>Improving the effectiveness of the research and development department</p>	<p>Improving the effectiveness of the research department</p>
Manufacturing prototype products	<p>Improvement of management mechanisms to take into account all the features of the study of samples and their correction</p> <p>Deciding on the introduction of a new product into production (mass, serial) on the basis of a product marketing program</p>	<p>Improvement of control mechanisms to take into account all the features of the study of samples and their correction</p> <p>Decision on the introduction of a new product in production (mass, serial) on the basis of product marketing program</p>	<p>Improvement of control mechanisms to take into account all the features of the study of samples and their correction. Decision on the introduction of new products into production (mass, serial) on the basis of product marketing program</p>
Preparation for production	<p>Creating a mechanism for rational use of financial, labor and material resources</p> <p>Development of a system of plans for the development of new products. Restructuring of existing divisions and developing the structure of new production units</p>	<p>Setting up and finishing of the technological process</p> <p>Creating a mechanism for rational use of financial, labor and material resources</p> <p>Development of a system of plans for the development of new products</p>	<p>Setting up and finishing of the technological process.</p> <p>Creating a mechanism for rational use of financial, labor and material resources</p> <p>Development of a system of business relations both inside the enterprise and with the external environment</p>
Production	<p>Effective motivation of workers</p> <p>Effective use of working time by improving the organization and standardization of work of the staff</p> <p>Conformity of production opportunities and demand through ensuring the efficiency of enterprise management</p>	<p>Effective management of means of production, commodity-material, financial and information flows</p> <p>Effective motivation of work of workers</p> <p>Conformity of production opportunities and demand through ensuring the efficiency of enterprise management</p>	<p>Effective management of means of production, commodity-material, financial and information flows.</p> <p>Effective motivation of work of workers</p>
Output of a new product to the market and its sales	<p>Concentration of efforts on results through marketing strategy of promotion</p> <p>Consumer motivation: selling on credit, lowering prices for goods with their wholesale or regular purchases</p>	<p>Concentration of efforts on results through marketing strategy of promotion</p> <p>Consumer motivation: selling on credit, lowering prices for goods with their wholesale or regular purchases</p>	<p>Consumer motivation: selling on credit</p>

and internal environment, which aggregate allows the company to survive and reach its goal in the long run [7].

Simultaneously, to ensure the quality and safety of products is a necessary condition to restore the permanent state veterinary control of technological processes and certification under ISO 22000:2007 [8].

Organization of management of innovative processes causes the setting and solving of such tasks as:

- 1) Generation, initiation, control of new ideas, creation of conditions for the rapid output of innovative products to the market;
- 2) The formation of economic structures of innovation type, adequate to the requirements of the modern market.

On the basis of conducted cluster analysis of enterprises, developed recommendations for management of innovative processes at enterprises, which are presented in the Table 3.

An assessment of changes in the management of innovation processes after the introduction of the proposed recommendations was carried out using a questionnaire. The survey was conducted among respondents - employees of LLC "Patriot". The proposed questionnaire consists of five blocks: product, functional, resource, organizational and managerial units.

In order to reduce the likelihood of false answers, certain requirements were met during the survey: yes, it was emphasized that the research has a theoretical value (confirmation of scientific hypotheses); questionnaire was conducted anonymously; employees had the opportunity to refuse to participate in the survey.

When filling out the questionnaires, it was necessary to set estimates for each of the allegations on a scale: 5 - a very good state, fully satisfying the stated innovation goal, characterized as a very strong part of the innovation process; 4 - a good condition satisfying the normative model, does not require change - the strong side; 3 - the average condition, needs limited changes to bring to the requirements of the normative model; 2 - bad condition, requires serious changes, is classified as a weak side of the innovation process; 1 - very bad condition, requires radical transformations, very weak side.

In the questionnaire it was necessary to place assessments in two states: the past (the real state at the time of the research prior to the introduction of innovations), and the actual (real state at the time of research after the introduction of innovations and improvement of the innovation process at the enterprise).

The conducted survey revealed trends in the implementation of innovative models of processes and trace

features its implementation in the workplace. Analyzing the questionnaires revealed a tendency of states to improve the enterprises innovation process as a result of complex measures to improve innovation processes, suspended decline in production; updated range of products of LLC "Patriot", there was increasing its competitiveness in the domestic and foreign markets, bringing new jobs created and saved scientific and technological potential of the company.

Due to the fact that it was reasonable for us to evaluate innovative processes using an indicator such as the index of innovation activity, where the key indicators are the volume of innovation products and the cost of innovation, therefore the state of the existing system is proposed to be characterized by two variables - the level of stocks of innovative goods (in value estimation) and the volume of monetary resources after the implementation of the proposed recommendations. Analyzing the results, it can be argued that the cost of inventories of innovative goods will sharply decrease and stabilize already in a month, accordingly the volume of monetary resources will increase and stabilize at the level of 21,887.45 euros in a week. This indicates that the decline in the activity of the company is not expected, but on the contrary, it is planned to accelerate the turnover of capital, because the presence of smaller in volume, but more mobile stocks of innovative products means that the smaller amount of cash resources of the enterprise is in stock. In addition, the stability of the dynamics of the cost of inventories of innovative goods indicates the optimal balance of stocks necessary for the effective implementation of production and sales.

3. Conclusions

- In the course of the research, the main indicators, which allow to evaluate innovation processes, are analyzed, and it is suggested to use such indicator as index of innovation activity.
- The cluster analysis carried out in the work using hierarchical and iterative methods allowed grouping the investigated enterprises by the level of innovation activity into three groups.
- The proposed methodological guidelines for the creation of a model of management of innovative processes taking into account the peculiarities of the activity of the investigated food enterprises will allow their management to develop management recommendations for various stages of the innovation process, to forecast the development of innovative processes in the enterprise through the determination of causal relationships between changes in stocks of innovative goods, resources, the cost of implemented innovative products, the cost of innovation at the

stage of bringing a product to market, allowing the possibility to ground stability simulated system and make certain conclusions concerning future activities of the enterprise model provided the introduction of innovative processes and incorporate features of its implementation.

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