SYSTEM ANALYSIS OF THE MANAGEMENT OF THE COMPETITIVENESS OF AGRICULTURAL ENTERPRISES' PRODUCTS

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Abstract. *The study uses a systematic approach to form an information and analytical environment for managing the competitiveness of agricultural products in the context of innovative development.*

Keywords: *system analysis, competitiveness, dynamics, rate of change, assortment, factor, structure, rhythm, quality.*

I. INTRODUCTION

A powerful methodological tool that generalizes the methodology of the study of management pro-cesses in complex economic systems is the analysis and research of management systems, which are carrie-d out by methods, tools and technologies, combined by such areas as system analysis, system approach, operations research, and the theory of optimal management [1].

The system analysis of product competitiveness management plays a leading role, as it is a methodology that integrates various scientific approaches and directions for the research and analysis of the results of the economic activity of the agricultural enterprise.

II. LITERATURE ANALYSIS

The works of many Russian and foreign scientists are devoted to the theoretical and organizational and methodological issues of a systematic approach to the formation of an information and analytical environment for managing the competitiveness of products. The study summarizes the results of scientific research by leading scientists on the theory and practice of analyzing objects of economic systems: S. V. Dokholyan, E. A. Dadasheva, A. G. Efimenko, I. I. Panteleeva, G. V. Savitskaya, D. A. Kulitsky, S. N. Gnatyuk, and others [1-6]. In the studies of many authors, mainly methodological aspects of the system analysis of the competitiveness of the products of organizations without reference to the industry features of the processing enterprises of the agro-industrial complex prevail.

Based on the results of generalization and concretization of the works of previous named scientists, the study proposes an algorithm for assessing the competitiveness of products, which allows evaluating the competitiveness of goods through a system of refined qualitative and economic indicators adapted to the industry features of the agro-industrial complex and focused on finding innovative management solutions in the system of improving the competitiveness of products, in comparison with similar products presented in this market segment. The novelty of this study is the improved process of management decision-making, based on the logic of analytical procedures and the need for an innovative vector of development in the system of production intensification, lean production.

Today, 20 large meat processing plants and 9 organizations subordinated to the Ministry of Agriculture and Food are engaged in meat processing in Belarus, and there are also more than 450 enterprises of various forms of ownership. The range of meat products produced in the republic includes more than 1,200 items, including 800 types of sausage products, about 250 types of semi-finished products, and more than 150 types of canned food. The degree of concentration in the industry is high, which is a prerequisite for increasing competition in the market of meat and meat products. The main competitors of JSC «Mogilev Meat processing Plant» in the immediate environment are meat processing enterprises of the Mogilev region: JSC «Bobruisk meat processing plant», JSC «Alexandriyskoe», a branch of «BELMIT» CJSC «Servolux Agro», JSC «Agrokombinat «Zarya». Also in a significant measure in the market of meat and meat products in Mogilev region are represented such enterprises as JSC «Brest meat processing plant», JSC «Berezovsky masakan-servnoy plant», JSC «Vitebsk meat-packing plant», unitary enterprise «Glubokoe meat plant», OJSC «Gomel meat-packing plant», JSC «Kalinkovichi meat plant», JSC «AFIC PC «Zhlobin meat-packing plant», JSC «Oshmyany meat processing plant», JSC «Borisovskii Myasokombinat N1», OJSC «Minsk meat-packing plant», JSC «Slonim meat processing plant», JSC «Volkovysk meat-processing plant», etc. [2].

The regulation of analytical procedures for assessing the competitiveness of the meat product subcomplex of the agroindustrial complex includes some blocks presented by the algorithm on Fig. A.1 (Application A), which are adapted in the analytical part of the study. The study uses the methodological basis for constructing indicators and criteria for quantitative and qualitative assessment of the level of competitiveness of products, presented in the works of G. V. Savitskaya [3]. Competitiveness is most fully revealed through the system of its block of analysis of the production and sales of products and includes calculation of the annual average growth rate, the rate of growth of production and sales; the effect of product structure product output. In the system of product competitiveness management, a special place is occupied by the analysis of its cost price as a price-forming factor that determines the dynamics of marginal income and profit of the enterprise as a whole [3].

To study the reasons for changes in the cost of production itself, we analyze the reporting estimates for individual products, compare the actual level of costs per unit of production with the planned and previous years' data on the whole and by expenditure items. The complex method of assessing the competitiveness of products involves the calculation of the integral indicator of the competitiveness of the product in question in relation to the basic product in accordance with the system of individual, group and integral indicators. If the integral index of competitiveness of the analyzed product is greater than 1, then the analyzed product exceeds the basic model, if less than 1 – then it is inferior, less than 1 - is on the same level [3]. Assessment of the competitiveness of products allows you to identify the strengths and weaknesses of enterprises, which together determines the analytical justification of management decisions and the development of promising areas of innovative development of an economic entity: maintaining the competitiveness of its products or strengthening it.

III. OBJECT, SUBJECT, AND METHODS OF RESEARCH

The object of the study is economic relations in the management system of the

competitiveness of products of JSC «Mogilev Meat Processing Plant» with the vector of innovative development.

The subject of the research is an analytical platform for managing the competitiveness of the company's products.

The purpose of the research is to improve the efficiency of managing the competitiveness of products on the basis of the developed information and analytical platform and substantiate the directions of innovative development of agricultural enterprises. The objectives of the study are: the formation of theoretical foundations and practical adaptation of the methodology of analytical justification of product competitiveness management in the format of innovative development; improving the quality of analysis of the parameters of product competitiveness (the study of their internal relationship; a systematic approach to the assessment from the perspective of the producer and the consumer), which will eventually allow you to show the innovation and investment vector of sustainable development.

The methodology of system analysis is based on general scientific methods of analysis and synthesis, generalization, analogy, comparison, factor analysis, and matrix modeling.

IV. RESULTS

4.1. Financial and economic analysis of the innovative potential of the organization (analytical tables are provided in Application B).

The analysis of innovative potential on financial and economic indicators of activity of JSC «Mogilev meat processing plant» is made (table B.1, Application B). A decrease in the volume of production in 2019 in comparison to 2018 by 15.19% was established; the chain growth rate in 2018 was 115.63 %. The positive dynamics of costs per ruble of manufactured products was revealed: in 2019, the indicator was 0.914 rubles, which is 0.03% lower than in 2018, and 1.91% lower than in 2017. There is a tendency to reduce labor productivity in 2019 compared to 2018, respectively, by 15.43 %, in 2018 in comparison to the previous year, the growth rate was 14.64 %. The disparity in the rate of change in revenue and cost of sales determined the decline in gross profit and profit from sales of products (Table B. 2). In 2019, the gross profit (margin income) increased by 5.22 % , while the profit from sales decreased by 31.83 %. These figures indicate that production and sales volumes for operating activities are insufficient to cover management and sales costs. The indicators of profitability of products in 2017-2019: respectively 6,080; 9,049; 5,433 % - determine the dynamics of reducing the efficiency of the enterprise's production activities. In the system of assessing the innovation potential, a significant rank is assigned to the dynamics of the parameters of the financial condition of the enterprise (Table B.3). The current liquidity ratio in 2019 was 1.537, which is 18.25% higher than the standard value and corresponds to a positive growth dynamics of 29.34% and 47.14%, respectively. In general, it can be noted that JSC «Mogilev Meat Processing Plant» is a financially stable enterprise, in 2019 it worked economically efficiently and profitably. However, negative trends of decline in production volumes in the core activities, the growth of production from raw materials, which has caused imbalances in terms of efficiency of use of production capacity. The block of financial condition indicators revealed a

significant increase and positive dynamics of the parameters for diagnosing a potential bankruptcy of the enterprise.

4.2. Analysis of the competitiveness of products by production indicators (analytical tables and graphs are provided in Appendix B).

Average annual rate of change in volumetric parameters change the value of activity of JSC «Mogilev meat-packing plant» from 2016 till 2019 and determined in the amount of: 94,53; of 99.11 % (tables B.1). Graphical interpretation is presented by the information on the dynamics of production and sales companies in the table B.1 is shown in Fig.1. The analysis of the structure and dynamics of production and sales of products of JSC «Mogilev meat-packing plant» require the study of reserves of growth of their competitiveness in order to highlight the problematic items.

The saturation of the commodity nomenclature is characterized by a fairly deep assortment of sausage products (9 main items); endocrine-enzyme raw materials (6 main items, Table B. 2). A special group is secondary raw materials, which can be used for the production of additional products for food, feed and technical purposes. Harmony of the commodity nomenclature: the commodity nomenclature of the products of JSC «Mogilev Meat Processing Plant» is not harmonious, from the point of view of final consumption, because not all products are related to public nutrition (skins, endocrine-enzyme raw materials, collagen-containing raw materials, etc.). From the point of view of the equipment we used, production technologies, the nomenclature is also not harmonious.

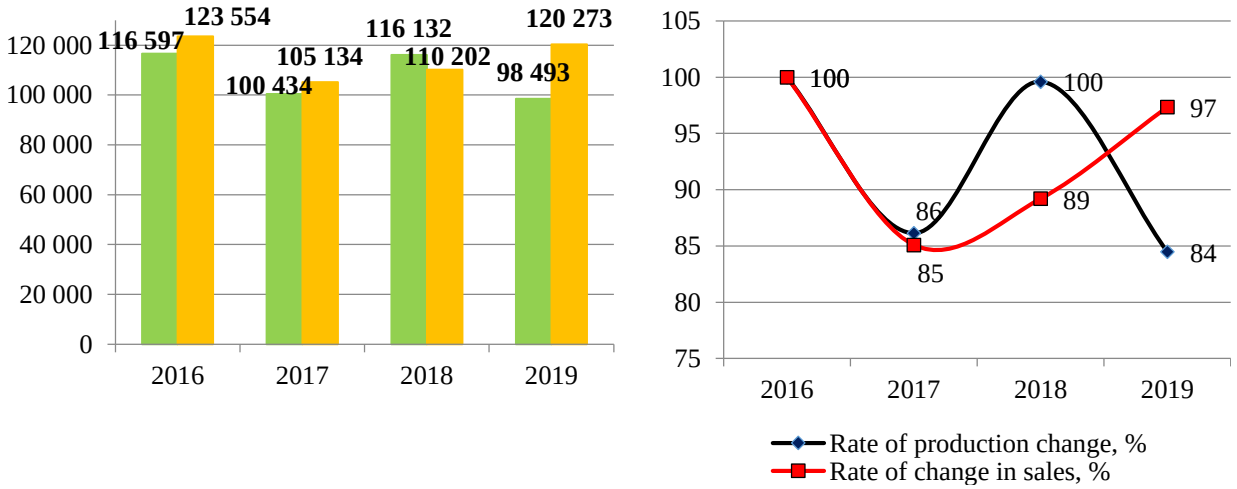


Fig. 1. Analysis of the dynamics of production and sales of products

According to Table B. 3, the largest increase was obtained for the following assortment items: hides, offal of the 2nd category, semi-finished products, endocrine-enzyme raw materials, sausage products. To characterize the intensity of structural transformations at the enterprise, the structural activity coefficient was analyzed: the coefficient was 10.93 %, which indicates a high level of sensitivity of the sales management system to market changes, timely updating of the product range. Coefficient of the compliance with the product range structure in 2018 is 0.895, which also determines changes in the range of products produced and sold.

The analysis of the components of the competitiveness of products based on the ranking of the positions of the manufacturer and consumer using the tools of combined ABC and XYZ analysis, the BCG matrix. ABC analysis showed: group A includes meat and offal, sausage products(37.59; 72.71%, respectively), group B-semi-finished products, hides and packaged meat (86.86; 91.51; 94.40%), group C includes technical products, other products, offal of the 2nd category, food fats, endocrine–enzyme raw materials (Table B. 4). The results of the ABC analysis are superimposed on the XYZ analysis, which focuses on the grouping of meat processing plant products according to the uniformity of the analyzed parameters (Tables B. 5, B. 6). A high share of group X products in the shipment structure (70%) is also noted. The result of the combined analysis of ABC - and XYZ is the information in table 1; the characteristics of the groups are listed in the table B. 7.

Table 1. Combining ABC – and XYZ-analysis results

Items' group	Amount of items	Sales percentage in general, %	Groups of the items
AX	1	37,59	Meat and offals
AY	1	35,12	Sausage products
BX	2	18,79	Semi-finished products, skins
BZ	1	2,89	Packaged meat
CX	4	4,75	Technical products, food fats, endocrine-enzyme raw materials, other
CZ	1	0,86	Offals of the 2nd category
Total	10	100,00	-

The use of combined ABC / XYZ - analysis has allowed to identify the groups of products that require characterization of their competitiveness and the development of measures for its improvement, in particular, sausages (move to the group S); technical products (improving competitiveness, efficiency and the solution of environmental problems of meat); to increase the effectiveness of the system of competitiveness management of the company's products; reallocate the efforts of the personnel in the management system of the KSP, depending on their qualifications and existing experience, according to the criterion of the significance of the production and sale of certain types of products.

In order to determine the strategy of competitiveness of products of JSC Mogilev meat packing plant in the identified groups built adopted matrix BCG criteria: the proportion of the product group in total shipments, the rate of change of sales. Distribution of product groups according to the quadrants of the BCG matrix has the following result: in the group of «stars» with a small introduction into the category of «cash cow» were meat and meat products (respectively Ren-stabilnosti production and sales of 12.6; 11,1 %) included; meat products (4,4; 4,2 %); the most saturated by the number of the items chosen group of «problem (question mark)»: semis (and hence the profitability and sales of 6.9; 6,3%); skins (product profitability and sales 0,7; 0,7 %); offals of the 2nd category (10,1; 9,2 %); endocrine-but–enzyme raw materials (10,3; 9,3 %); food fats (18,2; 15,4 %); nomencla-tural groups belong to the group of products

«dog»: the technical products (and hence the profitability and sales of 14.5; 12,6 %); meat vasavan-tion (block meat profitability of production and sales of 3.7; 3.6 percent); other products (5,9; 5,6 %). Due to the difficulties associated with finding information about competitors, an adapted BCG matrix is constructed in Fig. 2 in accordance with the initial data in Table B. 8.

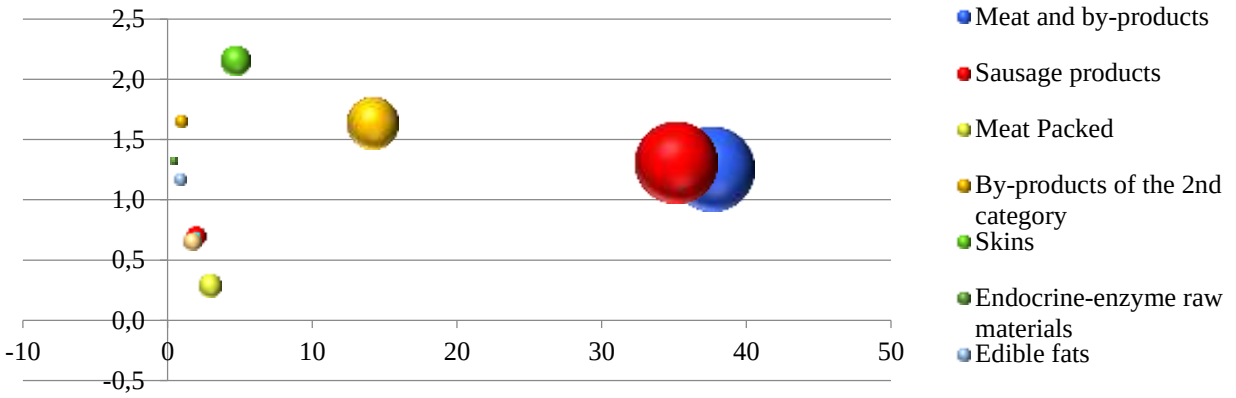


Fig. 2. Adapted BCG matrix

The following characteristics of the state of the assortment portfolio of products of JSC «Mogilev meat-packing plant»: the presence of groups of products (meat and offal, sausages) with a leading position in the market with low growth and transition in the category of «cash cows»; contains Mature product groups, designated as «DOI nye cow»; characterized by lack of sufficient «cash cows» to grow «stars» and Fund «questional signs»; the level of profitability of the portfolio shows sufficient for the crime of profit (profitability of the product portfolio of 8.05 %; Ren-stabilnosti sales of 7.27%); the level of profitability of production and sales in product categories of the BCG matrix: a «star» - 6,28; 5,66 %; «difficult children (issues concerning characters)»- 1,28; 1,16 %; «dog» - 0,48; 0,44 %.

«Star» products are market leaders who are usually at the peak of their product cycle; they bring in enough funds to maintain a high share of a dynamically developing market. Despite the strategically attractive position of the product groups-meat and sub-products; sausage products - their net cash income is quite low (the profitability of sales in the BKG matrix category is 5.66 %), as significant investments are required to ensure high growth rates. In this sense, it is not the current income that is important, but the future income of the «star» product: when the market growth rate slows down, the «star» products become «cash cows». The attractiveness of meat processing plant products in this category is explained by the fact that they do not require large investments and provide significant positive cash flows based on the experimental curve. The products of this group not only pay for themselves, but also provide funds for investment in new projects, on which the future growth of the enterprise depends. In order for the phenomenon of goods-»cash cows» to be fully used in the investment policy of the enterprise, it is necessary to competently manage the competitiveness of products. Competition in the meat and meat products market is quite fierce, so constant efforts are needed to maintain market share and search for new market niches. Classic «dog» products are products that have a low market share and do not have growth opportunities,

as they are located in unattractive industries. However, the peculiarity of the assortment portfolio of JSC «Mogilev Meat Plant» is that this group includes products of complex processing of raw materials in the meat industry, which determine the level of environmental friendliness of the meat processing plant. The amount of secondary raw materials formed depends on the type of processed primary raw materials and is: when processing cattle - up to 56.6 % of the live weight, small cattle-82.4 % of the live weight, pigs-39.7 % of the live weight. This product category requires recycling or recycling. The collection and rational use of these raw materials is of great importance for improving production efficiency and solving environmental problems. Unused raw materials are waste discharged into water, polluting the atmosphere and soil and causing irreversible negative changes in the environment.

Thus, sausage products and technical products were selected as the objects of research and evaluation of competitiveness in this study as problematic objects of management of the KSP. The recommended sequence for evaluating and improving the competitiveness of products is as follows: «problem» - «star» - « cash cow «(and inevitably: taking into account the high level of profitability, the need to ensure the ecological block of sustainable development of the meat processing plant)-» dog « (technical products). The implementation of such a sequence depends on efforts aimed at achieving a balanced portfolio, which includes a decisive rejection of unpromising products.

Analysis of the structural factor and its impact on sales revenue, profit and profitability of products. The results of the factor analysis of sales revenue are included in Table B. 10, based on the data in Tables B. 8, B. 9. The influence of the structural factor on the change in the total amount of sales revenue is positive and is determined by the amount of 88 thousand rubles. For the group of technical products, there was also a slight negative impact of 45 thousand rubles, which was offset by the size of the impact of volume and price.

The graphical interpretation of the results of the influence of factors on the shipment of products in the KSP management system is shown in Fig.3.

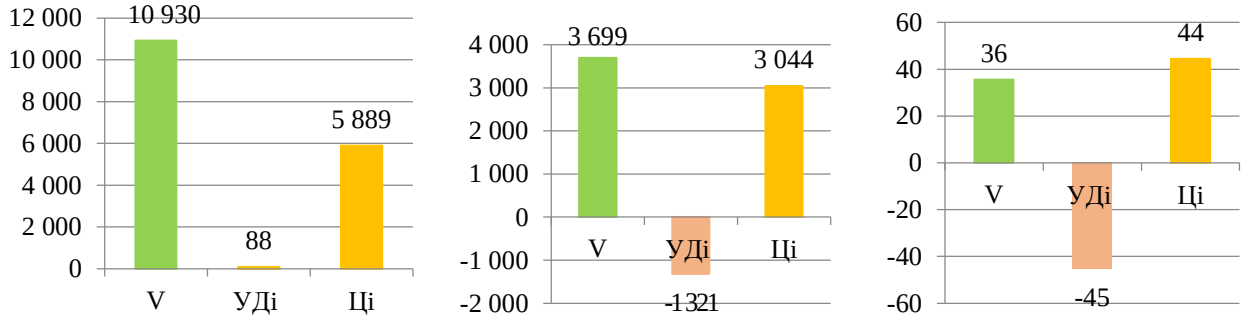


Fig. 3. Results of factor analysis of product sales revenue:
a) by company, b) by sausage products group, c) by technical products group

Thus, the data obtained indicate the possibilities of structuring the company's product portfolio and its transition to a new qualitative state. Varying factor structures within production (technical and process-ing capabilities) is recommended to achieve the redistribution structure factor to the structure by reducing the proportion of the

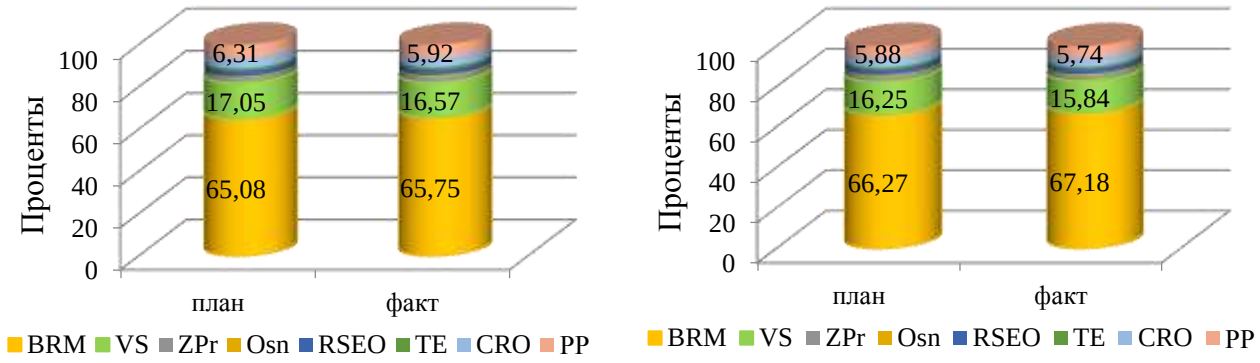
effect of prices that will provide an even greater positive effect of the volume (due to lower prices and increase the competitiveness of products).

Analysis of the quality of the products. The data in the table B. 11 show that in 2018 - 2019, the quality of products produced by JSC «Mogilev Meat Processing Plant» decreased slightly according to the presented indicators, which is largely determined by the decline in production volumes over the past two years. The products produced by the meat processing plant are quite competitive and in demand not only in the markets of the Republic of Belarus, but also abroad. Russia, Ukraine, Georgia, the CIS countries, as well as China are the main markets for meat processing plant products in 2019. The analysis of the quality of boiled sausage by the level of grade was carried out (Table B. 12). These analytical indicators negatively characterize the dynamics of the varietal composition and structure of boiled sausages, which corresponds to a decrease in the grade coefficient for 2018 – 2019 by 6.8 %. This situation can be seen in many types of products of the plant.

Analysis of the rhythmicity of product shipment. The volume of sales in 2019 exceeds realization for 2018 by 18.73 %, with most of the growth is due to the implementation of skins in size 116,31 %, the implementation of the offals of the 2nd category and semi-finished products, the increase was 65,74 and 63,94 %, respectively (table B. 13). A significant decline in shipments of packaged meat is observed on 71,14 %; also marked the annual decrease in shipments due to technical and other products by 29.93; 34,35 %, respectively. It is concluded that the shipment of products by quarter is not marked by pronounced seasonality. In 2019, the implementation of the shipment plan was quite rhythmic, as evidenced by the values of the rhythm coefficient (97.99 %); arrhythmicity coefficient (0.321); uniformity coefficient (90.03%). A high level of compliance of the volumes of the production volumes: the ratio of the feasibility of production has made 0,979; the correlation coefficient for credited products - 0,939; specific gravity is read – 94,75 %. The data show a high level of competitiveness of products in terms of sales parameters in the whole production portfolio and in the context of assortment positions.

Analysis of the dynamics of prices and production costs. The main part of the products is classified as inelastic (Table B. 14). The most elastic products by price are semi-finished products, hides: a decrease in the price of a group of these products by 1 % will lead to an increase in demand by 1,902; 1,399%, respectively. In the KSP management system, the previously mentioned problematic assortment positions of boiled and raw smoked sausages were selected as the objects of research in the sausage products group. According to the table B. 15, an absolute increase is established for all items of the cost of the considered assortment items. Structural diagrams of the cost of the selected types of products are constructed: Salami sausages from the Jordan farm; Salami sausages from the Dzyadulin Prysmak farm (Fig. 4). The largest share is accounted for by the main and auxiliary raw materials (in fact, in 2019, respectively, 82.32; 83.01%).

The high level of automation of the sausage production process indicates a low level of wages of the main workers in the structure of the cost of production (in fact, in 2019, respectively, 2.46; 2.45 %).



a) b)

Fig. 4. Structure of the cost of sausage products:
a) «Smoked salami s/k «Jordanskaya», b) «Smoked salami «Dzyadulin prysmak»

Structural shifts are almost invisible in the diagrams presented. In the group of cooked sausages, similar calculations were made for a comparative analysis of the implementation of the planned cost price for the calculation items (Table B. 16). The largest relative increase (cost overruns) for boiled sausage, «Mortadella» was obtained for fuel in the amount of 22.09 %; for basic raw materials-6.33 %; for shop expenses-5.91 %. It is noted that in accordance with the technology of production of boiled sausage, more additives are laid, marked by the line of auxiliary raw materials for technological needs. Thus, the directions of the search for the growth reserves of the KSP are considered technological innovations in the recipe for the production of sausage products. The cost of production is considered as a factor of growth of marginal income and increase of competitiveness of production of the meat processing plant.

Calculation of the quantitative factors of changes in the cost of a unit of production method of chain substitution on the basis of data tables, B. 20, B. 21 (Application C). The calculation of the influence of factors on the change in the cost of sausage products is summarized in the table 2.

Table 2. Factor analysis of the cost of 1 ton of sausage products

Sausage products	Changes in the cost price of 1 ton of sausage products, ruble			
	general	Including the expense of		
		output volume	fixed costs	specific variable costs
Smoked salami s/k «Jordanskaya»	760,37	570,81	-571,08	760,64
Smoked salami «Dzyadulin prysmak»	597,77	-93,17	119,82	571,12
Boiled sausage “Mortadella”	429,04	247,78	-216,39	397,65
Boiled sausage “Vetchinnaya”	545,21	338,96	-276,35	482,59
Total	2 332,39	1 064,38	-944,00	2 212,01

The overall change in the cost of production of the products under consideration is characterized by an increase relative to the planned calculations. In this case it was found: as a result of reducing the natural volume of production cost increase was, respectively, for «salami c / c «Jordanskaya» 570.81 ruble, boiled sausages

«Mortadella» - 247.78 ruble, «Vetchinnaya» - 338.96 ruble. The assortment Smoked salami s/k « Dzyadulin prysmak» is characterized by an increase in production and sales and, accordingly, a decrease in the cost of 1 ton of production by 93,17 ruble. The reduction of fixed costs per volume of the corresponding type of products contributed to the reduction of the cost of 1 ton of sausage products by type: Smoked salami s/k «Jordanskaya» by 571.08 ruble; cooked sausages «Mortadella» - by 216.39 ruble, «Vetchinnaya» - by 276.35 ruble. The increase of this factor for Smoked salami s/k «Dzyadulin prysmak» ensured an increase of the result indicator by 119.82 ruble

There is an increase in specific variable costs in the cost of 1 ton of the studied products, which corresponds to the negative impact of this factor and the increase in the cost of all assortment items under consideration. In general, the final line of the range of sausage products under consideration shows an increase in the cost of production due to a decrease in production volumes and an increase in specific variable costs. The analysis of the cost of the products themselves showed that the directions of increasing the competitiveness of sausages at a price supports innovation and investment vector to reduce the cost of production of 1 ton of sausage products in the framework of process and product innovations.

4.3. Analysis of the competitiveness of the organization's products from the positions of the manufacturer and the consumer (analytical tables and graphs are provided in Application D).

A comparative analysis of the cost of 1 ton of meat products of enterprises of the Mogilev region for 2018 is presented in Table D. 1. The lowest cost of production is observed at JSC «Bobruisk Meat Processing Plant», with the exception of beef, animal fat, meat semi-finished products, dry animal feed. The highest level of cost is in the BELMIT Branch of CJSC Servolux Agro, with the exception of such products as beef, offal of the 1st category, meat and offal of the 1st category packaged. Therefore, JSC «Mogilev Meat Processing Plant» has significant reserves to reduce the cost of production, allowing to increase its competitiveness. First of all, the reduction in the cost of production in the conditions of the reconstruction of production sites can occur as a result of reducing the cost of its production by saving on waste that occurs in the process of processing livestock. An assessment of the economic competitiveness of products is such an indicator as the profitability of sales (Table D. 2). It should be noted that JSC «Mogilev Meat Processing Plant» has lower profitability indicators of sales of its products, with the exception of pork, animal fat, canned food and dry animal feed, than its competitors.

In the study we performed an analysis of the competitiveness of certain products manufactured by JSC «Mogilev meat-packing plant». For this purpose, individual and group indicators of competitiveness are determined in accordance with. For JSC Mogilev meat packing plant, the analysis of the competitiveness of the sausages «Smoked salami «Jordan», boiled «chicken», the highest grade (a), which is 13,16 % and 8.6 % respectively in the total volume of production of smoked sausages and sausage cooked and in demand by consumers. The weighting factors are established on the basis of a survey of experts and their ranking of product indicators by the degree of importance. Analysis of the competitiveness of the Salami sausage produced by JSC «Mogilev meat processing plant»

with the products of JSC «Bobruisk meat processing plant» in accordance with GOST 16131-86 « Raw smoked sausages. Technical specifications» (Table D. 3). When analyzing indicators that do not have a quantitative assessment, the experts give a score on a 10–point scale. Quality assessed sausage «Smoked salami «Jordan» as the product of JSC «Bobruisk meat packing plant», but has a smaller mass fraction of salt that is bad for the consumer properties of the product and reduce its competitiveness: an integral indicator for the analyzed products was 0,994. In the block parameters of the economic price for 1 kg of sausage «Smoked salami «Jordan» above the competitor price by 1.9 %, which reduces its competitiveness and confirms the need for innovative development of technologies for the production of sausages.

Further, the analysis of the competitiveness of boiled sausage «Mortadella» of the top quality in comparison with boiled sausage «Mortadella» of the top quality, produced by JSC «Brest Meat Processing Plant», is carried out. The requirements for the production of boiled sausage are regulated by GOST R 52196-2011 « Boiled sausage products. Technical conditions», according to which the boiled sausage «Mortadella» is a boiled sausage product in an artificial shell. Analysis of the competitiveness of the cooked sausage «mortadella» top grade JSC Mogilev meat packing plant, in comparison with sausage boiled «chicken» highest grade, produced by JSC «Brest meat processing plant» is presented in table 4. For the estimated consumer options for sausage boiled «chicken», the highest grade (a) JSC Mogilev meat packing plant exceed the parameters of the cooked sausage «mortadella», produced by JSC «Brest meat processing plant» (in mass fraction of protein). The price for 1 kg of products of JSC «Mogilev Meat Processing Plant» is higher than that of a competitor product by 5.16 %. The integral indicator for the analyzed products was 0.964 (1.014/1.052). It is concluded that the sausage products of JSC «Mogilev Meat Processing Plant» are of high quality in accordance with the requirements of GOST standards and competitive in comparison with the products of similar manufacturers in Belarus. However, according to the price factor, the competitiveness of sausage products is inferior and requires the introduction of process innovations to reduce the cost of production. The cost of production of JSC «Mogilev Meat Processing Plant» as a price-forming element reduces the company's ability to compete in the market of meat and meat processing products.

Dry animal feed (meat and bone) is considered strategic in the block of technical products of the environmental safety system of the analyzed enterprise. The analysis of competitiveness meal of JSC «Mogilev meat-packing plant» and JSC «Belynichi protein plant», the results of the calculations are presented in the table 4. Conclusion: feeding flour of animal origin on organoleptic, physico-chemical and bacteriological indicators meet the requirements of GOST 17536-82 «Flour feed of animal origin. Technical conditions». At the same time, in many parameters, feed flour is inferior to a similar product produced by JSC «Belynichsky Protein Plant»: in terms of mass fraction of moisture, mass fraction of protein, mass fraction of ash, mass fraction of fat, mass fraction of fiber, etc., which requires additional research and solving the problem of waste processing. Also, the feed flour produced by JSC «Mogilev Meat Processing Plant» is inferior to the competitor in price: the integral indicator of competitiveness is set at 0.729 and determines the need to change the production technology of this product on the basis of an innovative and investment model to increase the CPR.

To calculate and analyze the competitiveness of the studied samples of sausage products, the problem of determining the list of parameters to be analyzed according to the criterion of materiality from the point of view of the consumer is solved. Based on this, sociological studies were conducted on the basis of the retail retail network of stores «Euroopt», «Kvartal» and «Perekrestok» in Mogilev, as a result of which the opinion of consumers regarding certain groups of parameters of consumer preferences was revealed. Based on the results of the survey, it was revealed that for buyers, the most important when choosing raw smoked, boiled sausages are taste and smell, color on the cut, appearance, consistency, degree of freshness, packaging and labeling, safety, brand image, price, and others. These signs are grouped according to the main criteria of attractiveness strategic SKUs meat from the buyer's point of view: organoleptic properties; product positioning; the image of the manufacturer; economic parameters (table D. 6). The assessment of the competitiveness of sausage products was carried out on the products of five producers of the Mogilev region, including JSC «Mogilev Meat Processing Plant». The results of the survey of consumers in the retail chain stores were later used to establish a rating of competitiveness and its risks in the group of selected enterprises in Mogilev. The next step in assessing competitiveness is the convolution of partial indicators into integral parameters (Table D. 7). Sausage products of JSC «Mogilev Meat Processing Plant» occupy a leading position among the producers of the Mogilev region (the closest competitors) in the following groups: organoleptic properties, assortment advantages, the image of the manufacturer. JSC «Mogilev Meat Processing Plant» is inferior to JSC «Bobruisk meat processing Plant», JSC «Alexandriyskoe», JSC «Agrokombinat» Zarya « in terms of price parameters and the activity of motivating purchases by consumers. In each group, the maximum integral indicator is selected and the ideal producer is determined [4]. Based on the table D. 7, a polygon of competitiveness of sausage producers is constructed (Fig. 5).

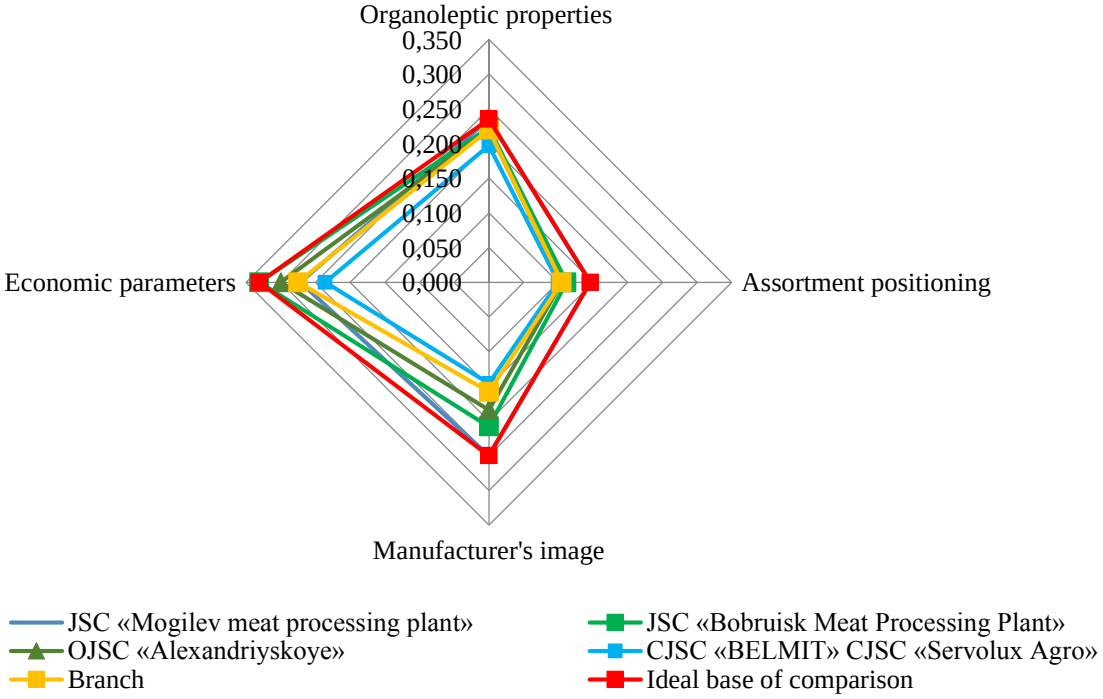


Fig. 5. The polygon of competitiveness of sausage products by consumer preferences among producers of the Mogilev region

The diagram clearly shows that the products of JSC «Mogilev Meat Processing Plant» are inferior to competitors in terms of price factor and superior in other parameters. To assess risks of the competitiveness of sausages JSC Mogilev meat packing plant, a comparison of the integral indicators of the characteristics of the analyzed company data ideal producer and to do this, a petal diagram was made (Fig. 6), putting the data on the competitiveness ofor the Mogilev meat processing plant and the «ideal» one on the axes.

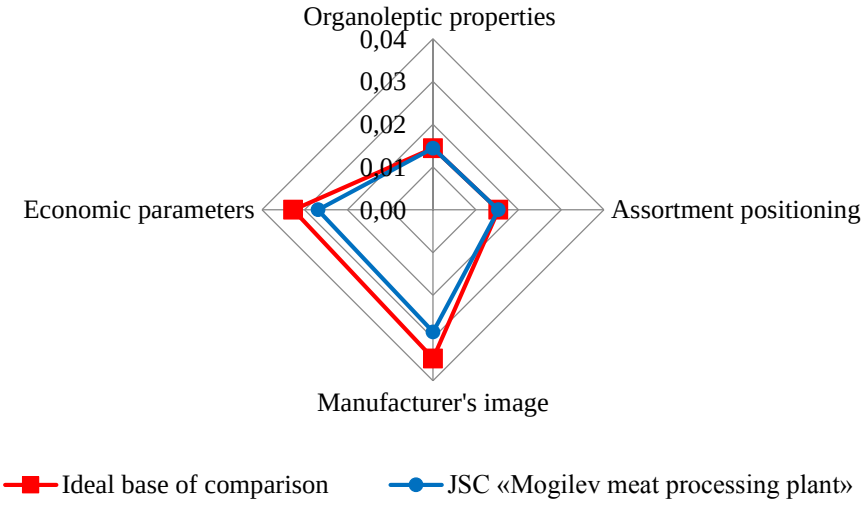


Fig. 6. Chart – radar of the competitiveness of sausage products of JSC «Mogilev Meat Processing Plant» and an ideal comparison base on the site of consumer preferences

Two figures are obtained, one of which characterizes the estimated meat processing plant, and the other – the ideal one. The final level of competitiveness installed by mapping areas of these figures (table D. 6). Thus, the integral of the potential competitiveness of sausages analyzed company below the ideal manufacturer by 12.24 %, which requires an appropriate orientation JSC Mogilev meat packing plant on marketing efforts in the sector of prices. The «cushion» of such management is the presence of a high level of marginal income, a low level of cost and prices.

V. CONCLUSIONS

System and comprehensive approach to the analysis of competitiveness of the products of OJSC «Mogilev meat processing plant» allowed to establish: a high level of susceptibility of the organization to innovative - investment activity as an effective factor and tool to improve competitiveness; moderate policy of financing investment projects. The competitiveness management system of OJSC «Mogilev meat processing plant» provides in general a competitive position of the enterprise and its sustainable development in the following areas: production of competitive products with consumer properties with the level of costs allowing to set prices at an acceptable level for customers; efficiency of use of production resources at a level not lower than the average level achieved in the industry; adaptation of the enterprise to changing factors and conditions of the environment.

The developed algorithm of the innovation approach to managing the competitiveness of products of agroindustrial complex organizations is adapted to «Mogilev meat-packing plant» OJSC. The results of this approach recommend structuring the product portfolio of the organization and its transition to a new quality state, characterized by an increase in the proportion of products with a high level of added value. Sausage products and technical products as strategic management objects were chosen as objects of research and evaluation of competitiveness. Varying the factor of structure within the framework of production (technical and technological capabilities) it is recommended to achieve redistribution of structural factor in favor of the structure by reducing the share of the influence of prices, which will provide even greater positive impact of the volume factor (due to lower production costs, prices and increased competitiveness of products).

The results of the analysis of the system of management of the competitiveness of products of JSC Mogilev meat packing plant, and generated informational analytical environment identified strategic groups of products that require characterization of their competitiveness and the development of measures for its improvement: meats (to move to the group S); technical products (with the aim of increasing the competitiveness of the product portfolio, production efficiency and solution of ecological problems of the factory). Based on the adapted BKG matrix, it is established that the feature of the assortment portfolio of JSC «Mogilev Meat Processing Plant «is that technical products (products of complex processing of raw materials in the meat industry) that determine the level of environmental friendliness of the meat processing plant are classified as» dogs», which is a classic problem group and is characterized by a low market share and lack of growth opportunities. But in the case of the company under study, a high level was established for the group of technical products: the profitability of products and sales (in 2019, respectively, in the amount of 14.5; 12.6 %), as well as the reliability of forecasting demand for products when building a combined ABC and XYZ analysis.

From an economic point of view, the growth of irretrievable production waste in meat processing leads to an increase in the cost of raw materials and, accordingly, finished sausage products, which reduces the level of its competitiveness in the domestic and foreign markets. In the analytical part of the study, a decrease in the competitiveness of the most capacious sausage products at a price as a result of an increase in cost. On the other hand, unused raw materials are waste discharged into water, polluting the atmosphere and soil and causing irreversible negative changes in the environment.

The amount of secondary raw materials formed depends on the type of processed primary raw materials and is: when processing cattle - up to 56.6 % of live weight, small cattle-82.4 % of live weight, pigs-39.7 % of live weight. This product category requires recycling or recycling. The collection and rational processing of these raw materials is of great importance for improving the competitiveness of the product portfolio, production efficiency and solving environmental problems. The product of processing of secondary raw materials (in particular, feed flour and fat) is an indispensable additive of high-grade feed for farm animals. An innovative and investment project for the production of feed flour and fat is analytically justified and recommended for implementation, which is characterized by marketing research,

research work related to the development of innovations; the need to assess the effectiveness of the project and possible risks in connection with the development of production and implementation of an innovative product. The implementation of the investment project will provide a systematic and integrated approach to improving the competitiveness of products.

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APPLICATION A

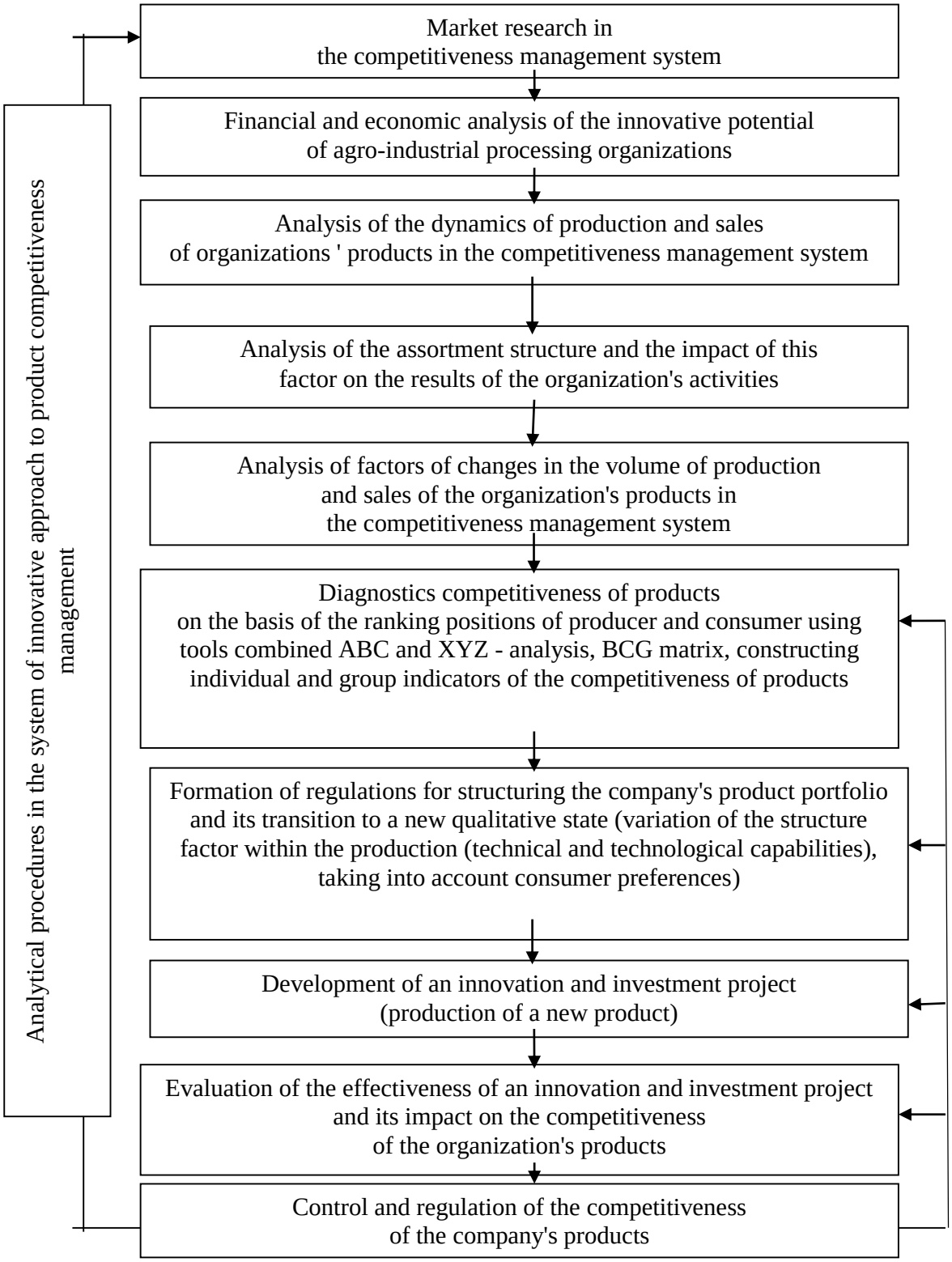

Fig.A.1. Algorithm of a systematic approach to managing the competitiveness of agricultural products based on innovations

APPLICATION B

Table B.1. Analysis of the innovation potential by the main economic indicators

Parameters	2017	2018	2019	Changes' rate, %	
				2018/2017	2019/2018
The volume of production (by the main type of economic activity), thousand rubles	100 434	116 132	98 493	115,63	84,81
Cost of sales, thousand rubles.	93 618	106 216	90 058	113,46	84,79
The cost of 1 ruble of manufactured products, p.	0,932	0,915	0,914	98,12	99,97
Fund return, r./r.	1,680	1,981	1,680	117,92	84,81
Material costs (for the main type of economic activity), thousand rubles.	79 299	90 162	74 119	113,70	82,21
Material consumption of manufactured products, r. / r.	0,790	0,776	0,753	98,33	96,93
Export volume, thousand US dollars	22 569	29 335	29 763	129,98	101,46
Import volume, thousand US dollars	660	5 795	6 293	878,05	108,60
Foreign trade balance, thousand US dollars	21 909	23 540	23 469	107,44	99,70
Value added, thousand rubles.	25 115	22 359	24 374	89,03	109,01
Average number of employees, people.	1 042	1 051	1 054	100,86	100,29
Average annual output of an employee, thousand rubles.	96,386	110,497	93,447	114,64	84,57
Average annual output of an employee by value added, thousand rubles.	24,103	21,274	23,125	88,26	108,70
Employees ' salary fund, thousand rubles.	9 565	10 484	9 610	109,61	91,66
Average annual salary of an employee, thousand rubles.	0,765	0,831	0,760	108,67	91,40

Table B.2. Analysis of innovation potential based on financial performance

Parameters	2017	2018	2019	Changes' rate, %	
				2018/2017	2019/2018
Revenue from sales of products, thousand rubles.	105 134	110 202	120 273	104,82	109,14
Cost of sales, thousand rubles.	88 499	90 512	102 770	102,27	113,54
Profit from sales of products, thousand rubles. Profit before tax, thousand rubles.	5 381	8 190	5 583	152,20	68,17
	2 613	5 674	2 323	217,15	40,94
Net profit, thousand rubles.	1 817	4 218	1 127	232,14	26,72
Average annual value of assets, thousand rubles.	59 033	77 618	101 707	131,48	131,03
The average annual cost of equity capital, thousand rubles	37 104	38 619	40 685	104,08	105,35
Product profitability, %	6,080	9,049	5,433	148,82	60,04
Return on sales, %	5,118	7,432	4,642	145,20	62,46
Return on assets, %	4,426	7,310	2,284	165,15	31,24
Return on equity	7,042	14,692	5,710	208,63	38,86
Capital turnover ratio	1,781	1,420	1,183	79,72	83,29

Table B.3. Analysis of innovation potential by financial condition indicators

Parameters	The value of the indicator on			Changes' rate, %	
	31.12. 2017	31.12. 2018	31.12. 2019	2018 2017	2019 2018
Current liquidity ratio	1,189	1,045	1,537	87,90	147,14
Coefficient of availability of own working capital	0,159	0,043	0,349	27,02	815,15
Asset security ratio of financial liabilities	0,420	0,559	0,634	133,01	113,40
Coefficient of financial independence (autonomy)	0,580	0,441	0,366	76,07	83,01

APPLICATION C

Table C.1 – Analysis of the dynamics of production and sales of products at comparable prices

Year	The volume of production of th.	Changes'rate		The volume of production of th.	Changes' rate	
		basis	chain		basis	chain
2016	116 597	100,00	-	123 554	100,00	-
2017	100 434	86,14	86,14	105 134	85,09	85,09
2018	116 132	99,60	115,63	110 202	89,19	104,82
2019	98 493	84,47	84,81	120 273	97,34	109,14
$\overline{Твп}$	-	-	94,53	$\overline{Трп}$	-	99,11
Designations: $\overline{Твп}$, $\overline{Трп}$ - respectively average annual production and sales rate						

Table C.2. Saturation of the product range of products

Product range group	Product range depth	Amount of items
Cattle meat	Bulls (chilled meat/frozen meat), cows (chilled meat/ frozen meat)	2
Sausage products	Boiled sausages(/s, 1 s, 2 s, b/s), sausages (/s, 1 C, 2 C, b/C), wieners (/s, 1 s, 2 s, b/s), semi-smoked sausages (/s, 1 s, 2 s, b/s), boiled smoked sausage products (in/s, 1 s, 2 s, b/s), smoked sausage products (a, 1 s, 2 s, b/s), dry-cured sausage products (in/s, 1 s, 2 s, b/s), non-fund products, smoked products	9
Tenderloin	Beef tenderloin	1
Endocrine-enzyme raw materials	Aorta, pituitary gland, glands, bile, blood, blood serum	6
Fat	Melted food fat (beef / pork)	1
Semi-finished product from skins	Wet–salted hides and skins, hides and skins	2
Technical products	Horns, hooves, bones	3
Semi-finished meat products	Dumplings, semi-finished products in marinade, beef cuts, pork cuts, meat semi-finished products (minced meat, cutlets, etc.)	5

Table C.3. Analysis of the structural dynamics of sales of the main types of products

Type of items	The volume of production of th..		Changes' rate , %	Structure of products sold, %		
	2018	2019		2018	2019	Structural dynamics
A	1	2	3	4	5	6
Meat and offal	37 203	46 775	125,73	35,50	37,59	2,09
Sausage products	33 345	43 708	131,08	31,82	35,12	3,31
Packaged meat	12 458	3 595	28,86	11,89	2,89	-9,00
Offals the 2nd category	645	1 069	165,74	0,62	0,86	0,24
Skins	2 673	5 782	216,31	2,55	4,65	2,10
Endocrine-enzyme raw materials	304	404	132,89	0,29	0,32	0,03
The food fats	897	1 053	117,39	0,86	0,85	-0,01

Continuation of table C.3

A	1	2	3	4	5	6
Technical products	3 432	2 405	70,07	3,27	1,93	-1,34
Semi-finished products	10 739	17 605	163,94	10,25	14,15	3,90
Other products	3 113	2 044	65,65	2,97	1,64	-1,33
Total	104 808	124 439	118,73	100,00	100,00	0,00
Coefficient of compliance with the product range structure 2018 [3]						0,895
The coefficient of structural activity [3]						0,109

Table C.4. ABC–analysis of the structure of products sold in 2019

Product range group	The volume of production of th..	Specific gravity, %	Cumulative percentage, %	Group of items
Meat and offals	46 775	37,59	37,59	A
Sausage products	43 708	35,12	72,71	A
Semi-finished products	17 605	14,15	86,86	B
Skins	5 782	4,65	91,51	B
Packaged meat	3 595	2,89	94,40	B
Technical products	2 405	1,93	96,33	C
Other products	2 044	1,64	97,97	C
Offals of the 2nd category	1 069	0,86	98,83	C
The food fats	1 053	0,85	99,68	C
Endocrine-enzyme raw materials	404	0,32	100,00	C
Total	124 439	100,00	100,00	-

Table C.5. XYZ-analysis results

Product range group	Sales volume for the quarters of 2019, thousand rubles.				The average value of the parameter	Coefficient of variation	Group of items
	1st quarter	2nd quarter	3rd quarter	4th quarter			
Meat and offals	13 185	11 535	10 828	11 227	11 693,75	8,85	X
Sausage products	8 884	10 782	11 600	12 442	10 927,00	13,92	Y
Packaged meat	1 500	675	694	726	898,75	44,66	Z
Offals of the 2nd category	761	226	77	5	267,25	127,89	Z
Skins	1 508	1 423	1 409	1 441	1 445,25	3,03	X
Endocrine-enzyme raw materials	91	98	106	109	101,00	8,04	X
The food fats	283	254	249	267	263,25	5,77	X
Technical products	553	580	606	666	601,25	8,06	X
Semi-finished products	4 322	4 397	4 384	4 502	4 401,25	1,70	X
Other products	585	494	491	474	511,00	9,82	X
Total	31 672	30 463	30 444	31 859	31 109,75	-	-

Table C.6. Results of the XYZ-analysis on the company's sales range for 2019

Group	Amount of items	Sprecific weight, %	Structure of the consumption
X	7	70	Group of items, characterized by a stable amount of consumption and a high degree of forecasting.
Y	1	10	Group of items, characterized by seasonal fluctuations and average forecasting capabilities. They require more attention.
Z	2	20	Group of items with irregular consumption and unpredictable fluctuations, therefore, predicting their demand is simply an unrealistic task.
Total	10	100	

Table C.7. Results of combining ABC – and XYZ-analysis

Group of items	Amount of items	Part of the realisation in general, %	Group characteristics	Groups of items
AX	1	37,59	high contribution to sales, high degree of forecast reliability due to instability	Meat and offals
AY	1	35,12	high contribution to sales, medium degree of forecast reliability due to instability	Sausage products
BX	2	18,79	average contribution to sales, high degree of reliability of the forecast due to the stability of consumption	Semi-finished products, Skins
BZ	1	2,89	average contribution to sales, low reliability of the forecast	Packaged meat
CX	4	4,75	low contribution in sales, a high degree of reliability of the forecast due to the instability of consumption	Technical products, The food fats, Endocrine-enzyme raw materials , Other products
CZ	1	0,86	low contribution to sales, low reliability of the forecast due to stochastic consumption due to instability	Offals of the 2nd category
Total	10	100,00	-	-

Table C.8. Initial information for constructing the adapted BCG matrix

Product range group	The volume of production of th..	Changes' rate , %	Share in sales volume, %	Profitability of products sold, %	Return on sales, %
A	1	2	3	4	5
Meat and offals	46775	1,257	37,59	12,6	11,1
Sausage products	43708	1,311	35,12	4,4	4,2
Packaged meat	3595	0,289	2,89	3,7	3,6
Offals of the 2nd category	1069	1,657	0,86	10,1	9,2
Skins	5782	2,163	4,65	0,7	0,7

Continuation of table C.3

A	1	2	3	4	5
Endocrine-enzyme raw materials	404	1,329	0,32	10,3	9,3
The food fats	1053	1,174	0,85	18,2	15,4
Technical products	2404,5	0,701	1,93	14,5	12,6
Semi-finished products	17605	1,639	14,15	6,9	6,3
Other products	2043,5	0,657	1,64	5,9	5,6

Table C.9. Dynamics of shipment of certain types of sausage products

Name of the product	Quantity of products shipped, tons		Change, (+/–)	Rate of change, %	Structure of shipped products, %		
	2018	2019			2018 г.	2019 г.	Change
Boiled sausages	2 092	2 080	-12	99,41	31,65	29,38	-2,28
Sausages	619	788	169	127,24	9,37	11,13	1,76
Wieners	280	459	180	164,39	4,24	6,48	2,25
Semi-smoked sausages	545	638	92	116,95	8,25	9,01	0,76
Boiled-smoked sausages	223	267	44	119,59	3,37	3,77	0,40
Raw-smoked sausages	667	581	-85	87,19	10,09	8,21	-1,89
Smoked sausages	829	837	8	100,99	12,54	11,82	-0,72
Others	1 354	1 429	76	105,59	20,49	20,18	-0,30
Sausage products total	6 609	7 080	471	107,13	100,00	100,00	0,00

Table C.10. The results of factor analysis of the proceeds from the sale of products, thousands p.

Parameters	Total Change ΔWR	including at the expense of		
		volume $\Delta WR_{(V)}$	structures $\Delta WR_{(УДі)}$	costs $\Delta WR_{(Ц)}$
Meat and offals	9 654,82	4 121,19	3 027,39	2 506,24
Sausage products	5 422,95	3 699,42	-1 320,87	3 044,40
Semi-finished products	6 871,43	1 191,27	5 841,21	-161,05
Packaged meat	-8 863,62	1 381,02	-10 070,40	-174,24
Offals of the 2nd category	424,15	71,51	1 314,09	-961,45
The food fats	156,77	99,62	148,02	-90,87
Technical products	34,65	35,57	-45,37	44,45
Skins	3 104,56	296,40	1 142,16	1 666,00
Endocrine-enzyme raw materials	101,10	33,75	51,75	15,60
Total	16 906,81	10 929,77	87,96	5 889,08

Table C.11. Analysis of generalizing indicators of product quality

Parameters	2018	2019	Change		Changes' rate , %
			absolut	relative, %	
1 Release of the production, thousands of rubles	116 132	98 493	-17 639	-15,19	84,81
2 Certificated production, th. of rubles.	66 079	52 211	-13 868	-20,99	79,01
- Sprecific weight, %	56,9	53,01	-3,89	-6,84	93,16
3 New production, th. of rubles	1 417	2 295	878	61,98	161,98
- Sprecific weight, %	1,22	2,33	1,11	90,98	190,98
4 Production, put on the realisation, th. of rubles	77 379	61 302	-16 077	-20,78	79,22
- Sprecific weight, %	66,63	62,24	-4,39	-6,59	93,41
5 Export to the CIS countries, th. of rubles	71 677	48 173	-23 504	-32,79	67,21
- Sprecific weight, %	61,72	48,91	-12,81	-20,76	79,24
6 Export to the non-CIS countries, th. Of rubles	5 702	13 129	7 427	130,25	230,25
- Sprecific weight, %	4,91	13,33	8,42	171,49	271,49
7 Complaints, th. of rubles	0,77	0,56	-0,21	-27,27	72,73
- Sprecific weight advertised products, %	0,0004	0,0002	-0,0002	-50,00	50,00

Table C.12. Analysis of the quality of boiled sausage by the level of mortality

Grade	Price for 1 tone, thousands of dollars		Realisation of products		Costs of the realisation			
					2018	2019	According to the highest price	
	2018	2019	2018	2019			2018	2019
Highest grade	5,84	6,69	1 127,5	995,4	6 589,72	6 663,97	6 589,72	6 663,97
First grade	4,00	3,13	214,6	177,8	857,99	557,00	1 253,99	1 190,04
Without grade	2,21	2,79	606,0	616,9	1 338,01	1 718,90	3 541,41	4 129,63
Second grade	2,66	2,74	143,9	290,0	382,68	794,56	841,26	1 941,13
Total	3,35	13,28	2 092,0	2 080,0	9 168,41	9 734,42	12 226,38	13 924,78
Quality parameters by grade: Grade 2018 = 0.750; Grade 2019 = 0.699; Dynamics = 0.932.								

Table C.13 – Analysis of the rhythmicity of product shipments for the quarters of 2019

Quarter	Realisation of the production per year, th. of rubles		Sprecific weight of products, %		Realisation of the plan, Coefficient	The percentage credited to the implementation of the rhythm plan, %
	plan	fact	plan	fact		
First	28 029,43	31 501,16	24,31	25,31	1,124	24,31
Second	29 182,43	30 481,34	25,31	24,50	1,045	24,50
Third	29 678,22	30 541,99	25,74	24,54	1,029	24,54
Fourth	28 409,92	31 914,51	24,64	25,65	1,123	24,64
Total per year	115 300,00	124 439,00	100,00	100,00	1,079	97,99
Coefficient of rhythmicity (by the sum of the shares credited to the implementation of the rhythmicity plan), %						97,99
Coefficient of arrhythmia (by the sum of deviations of the shipment plan execution Coefficient from 1, taken by modulo)					0,321	-
Coefficient of uniformity (standard deviation of 2 586.91 thousand rubles; Coefficient of variation 0.0897)					0,9103	-
Coefficient compliance of sales volumes with production volumes (119 353 / 127 078)					0,939	-

Table C.14 – Analysis of the coefficient of arc elasticity of products by price

Name of the product	Coefficient of the elasticity for 2019 by quarter			C average annual coefficient of elasticity
	2 / 1	3 / 2	4 / 3	
Meat and offals	-11,476	-5,824	0,740	-5,520
Sausage products	1,814	0,850	1,469	1,378
Semi-finished products	-1,902	-1,306	0,303	-0,968
Packaged meat	37,074	0,549	1,807	13,143
Offals of the 2nd category	-1,280	2,051	0,674	0,482
The food fats	-54,641	-5,870	0,368	-20,048
Technological production	0,838	0,071	0,066	0,325
Skins	-1,399	-1,172	74,645	24,025
Endocrine-enzyme raw materials	-15,120	0,937	0,000	-4,728

Table C.15. Analysis of the cost of production of raw smoked sausages by calculation items as of 01.09.2019 per 100 kg

Parameters	Salami “Jordanskaya”			Smoked salami “Dedushin prysmac”		
	plan	fact	absolute deviation	plan	fact	absolute deviation
Basic raw materials (BRM)	942,84	1 002,51	59,67	808,41	859,57	51,16
Auxiliary raw materials (VS)	246,99	252,59	5,60	198,17	202,66	4,49
Labor costs of production workers (ZPr)	30,73	37,52	6,79	28,95	30,11	1,16
Deductions for social needs (Osn)	10,66	13,01	2,35	10,04	10,44	0,40
Expenses for maintenance and operation of equipment (RSEO)	40,32	40,48	0,16	32,35	32,48	0,12
Fuel (TE)	16,30	17,80	1,50	14,50	14,28	-0,22
Plant-wide costs (CRO)	69,41	70,54	1,13	55,69	56,60	0,91
Production cost	1 357,25	1 434,45	77,20	1 148,10	1 206,13	58,02
Sales expenses (PP) Full cost price	91,39	90,23	-1,16	71,70	73,45	1,75
Total cost price, p.	1 448,65	1 524,68	76,04	1 219,80	1 279,58	59,78
Profit/loss	144,86	234,34	89,48	121,98	173,89	51,91
Selling price, p. / kg	15,94	17,59	1,66	13,42	14,53	1,12
Product profitability, %	10,00	15,37	5,37	10,00	13,59	3,59

Table C.16. Analysis of the cost of cooked sausages by calculation items as of 01.09.2019, per 100 kg, p.

Cost items	Boiled sausage "Mortadella"			Boiled sausage "Vetchinnaya"		
	plan	fact	абсолютное отклонение	plan	fact	абсолютное отклонение
Basic raw materials (OS)	424,36	451,21	26,86	514,64	538,77	24,13
Auxiliary raw materials (SUN)	180,63	184,72	4,09	242,40	260,06	17,66
Fuel (TE)	34,42	42,03	7,61	21,16	25,84	4,68
The cost of wages of production workers (DSD)	33,00	33,47	0,47	50,69	51,41	0,72
Deductions for social needs (Osn) Expenses for maintenance and operation of equipment (RSEO)	11,43	11,59	0,16	17,56	17,81	0,25
Smoked salami s/k «Jordanskaya»	35,59	36,17	0,58	50,66	51,49	0,83
Plant-wide costs (CRO)	37,80	40,03	2,23	55,10	57,38	2,28
Total production costs (ODA)	24,23	23,92	-0,31	27,78	27,92	0,15
Production cost	781,45	823,14	41,69	979,98	1030,67	50,69
Sales expenses (PP)	49,16	50,37	1,21	69,22	73,06	3,84
Total cost price, p.	830,61	873,51	42,90	1049,21	1103,73	54,52
Profit/loss	45,68	60,88	15,20	78,69	92,05	13,36
Selling price, p. / kg	8,76	9,34	0,58	11,28	11,96	0,68
Product profitability, %	5,50	6,97	1,47	7,50	8,34	0,84

Table C.17 – Initial data for the fact analysis of the cost of 1 ton of individual types of sausage products

Parameters	Plan	Fact 2019	Absolute devitation from plan
A	1	2	3
Smoked salami s/k «Jordanskaya»			
Output volume(V), tons	103,61	76,46	-27,14
The amount of fixed costs (Ai), thousand rubles.	166,60	122,93	-43,67
The sum of variable costs per product (b i), p.	12 878,49	13 639,13	760,64
Cost of 1 ton (Si), r / t	14 486,46	15 246,83	760,37
Sausages «Smoked salami «Dzyadulin prismac»			
Output volume(V), tons	55,78	60,18	4,40
The amount of fixed costs (Ai), thousand rubles.	71,05	78,26	7,21
The sum of variable costs per product (b i), p.	10 924,17	11 495,30	571,12
Cost of 1 ton (Si), r / t	12 198,03	12 795,80	597,77
Boiled sausage "Mortadella"			
Output volume(V), tons	71,70	58,64	-13,07
The amount of fixed costs (Ai), thousand rubles.	79,72	67,04	-12,69
The sum of variable costs per product (b i), p.	7194,23	7591,88	397,65

Continuation of table C.17

A	1	2	3
Cost of 1 ton (Si), r / t	8306,07	8735,12	429,04
Boiled sausage “Vetchinnaya”			
Output volume(V), tons	29,42	24,06	-5,36
The amount of fixed costs (Ai), thousand rubles.	44,75	38,10	-6,65
The sum of variable costs per product (b i), p.	8971,09	9453,68	482,59
Cost of 1 ton (Si), r / t	10492,07	11037,27	545,21

Table C.18 – The results of calculating the cost of 1 ton of sausage products in the variants of the combination of fact and the method of chain substitution, p.

Cost price of 1 ton	Sausage products				Total
	Smoked salami “Jordanskaya”	Raw-smoked salami “Dzyadulin prismac”	Boiled sausages “Mortadella”	Boiled sausages “Vetchinnaya”	
According to the plan(C_0)	14 486,46	12 198,03	8 306,07	10 492,07	45 482,63
At the planned cost price and the actual statement ($C_{усл1}$)	15 057,27	12 104,85	8 553,86	10 831,03	46 547,01
In fact, when planning the level of final changes ($C_{усл2}$)	14 486,19	12 224,68	8 337,47	10 554,68	45 603,02
Actual (C_1)	15 246,83	12 795,80	8 735,12	11 037,27	47 815,02

APPLICATION D

Table D.1. The cost price of 1 ton of products of meat processing enterprises of the Mogilev region [13]

Product Type	Total cost of 1 ton of products, thousand rubles				Deviation of the data of JSC «Mogilev Meat processing Plant»		
	JSC «Mogilev meat factory"	JSC "Bobrow-sky meat factory"	JSC « Alek-sand-riy-skoe»	Branch «BELMA ZAO Servo-Suite agro»	JSC " Bobruisk meat factory"	JSC "Aleksand-riyskoe"	Branch «BELMA ZAO Servo-Suite agro»
Beef	6,58	5,89	5,60	6,20	0,69	0,98	0,37
Pork	5,61	5,24	5,98	6,16	1,34	0,59	-0,55
By-products of the 1st category	2,52	0,94	2,44	1,48	5,64	4,14	1,05
Sausage products	5,58	5,24	6,42	7,10	1,34	0,15	-1,52
- cooked	4,34	4,76	5,39	6,18	1,82	1,19	-1,83
- sausages, wieners	7,46	5,00	5,36	5,73	1,57	1,21	1,72
- semi-smoked sausages	6,78	6,52	7,07	7,11	0,06	-0,50	-0,33
- raw-smoked sausages	16,23	13,88	10,34	16,63	-7,31	-3,76	-0,40
- smoked sausages	9,54	7,51	8,73	7,86	-0,94	-2,15	1,68
- animal fats	0,63	1,42	1,30	-	5,16	5,28	-
Semi-finished products	4,87	5,31	7,29	8,85	1,27	-0,72	-3,98
Dry animal feed	6,58	5,89	5,60	6,20	0,69	0,98	0,37

Table D.2. Profitability of sales of products of meat processing enterprises of the Mogilev region [13]

Product Type	Return on sales of products, %				Deviation of the data of JSC «Mogilev Meat processing Plant», p. p.		
	JSC «Mogilev meat factory"	JSC «Bobrow-sky meat factory"	JSC « Alek-sandriy-skoe»	BEL-MIT branch of Servolux Ag-ro CJSC»	JSC " Bobruisk meat factory"	JSC "Aleksand-riyskoe"	Branch «BELMA ZAO Servo-Suite agro»
Beef	3,0	18,4	9,3	19,4	-15,4	-6,3	-16,4
Pork	19,0	12,0	-15,5	10,6	-9,0	18,5	-7,6
By-products of the 1st category	-6,5	4,6	-3,6	-	-1,6	6,6	-
Sausage products	-13,4	17,1	7,0	-0,2	-14,1	-4,0	3,2
- cooked	-12,4	17,0	4,3	-7,0	-14,0	-1,3	10,0
- sausages, wieners	-11,1	14,8	4,9	-6,7	-11,8	-1,9	9,7
- semi-smoked sausages	-11,1	12,9	4,9	-8,7	-9,9	-1,9	11,7
- raw-smoked sausages	-12,4	17,4	21,5	4,5	-14,4	-18,5	-1,5
- smoked sausages	-9,5	17,2	6,8	19,2	-14,2	-3,8	-16,2
- animal fats	44,9	2,9	12,8	-	0,1	-9,8	-
Semi-finished products	-16,6	-	10,3	-	-	-7,3	-
Dry animal feed	64,7	-241,3	17,1	-	244,3	-14,1	-

Table D.3. Analysis of the competitiveness of Salami sausage from the «Jordanskaya» joint Stock Company «Mogilev Meat Processing Plant» and the sample product

Parameters	JSC «Mogilev meat factory"	JSC «Bobrow-sky meat factory"	qi	ai	G
1 Quality					
1.1 appearance (score)	A loaf with a clean, dry surface, without stains, slips, damage to the shell, or stuffing (10)	A loaf with a clean, dry surface, without stains, slips, damage to the shell, bursts of minced meat (10)	1,00	0,10	0,10
1.2 consistency (point)	Dense (10)	Dense (10)	1,00	0,10	0,10
1.3 cross-section view (point)	Pieces of white or light pink spire with a diameter of at least 3 mm (10)	Pieces of white or light pink lard with a diameter of not more than 3 mm (10)	1,00	0,10	0,10
1.4 taste and smell (score)	Pleasant, characteristic of this type of product, with a pronounced aroma of spices and smoking (10)	Pleasant, characteristic of this type of product, with a pronounced aroma of spices and smoking (10)	1,00	0,10	0,10
1.5 Mass fraction of moisture,%, no more	25	25	1,00	0,10	0,10
1.6 Mass fraction of table salt,%, no more	5,8	6	0,96	0,15	0,14
1.7 Mass fraction of sodium nitrate,%, max	0,003	0,003	1,00	0,15	0,15
1.8 Presence of pathogenic microorganisms	нет	нет	1,00	0,20	0,20
Group Parameters by Quality group					0,994
2 Economic					
2.1 price for 1 т, thous.rub	17,59	17,27	1,019	1	1,019
Group Parameters by Economic group					1,019
Integral Parameters of competitiveness					0,976
Notation: qi-unit parametric Parameters; ai-weight Coefficient; G-group Parameters.					

Table D.4. Analysis of the competitiveness of boiled sausage «Mortadella» of JSC «Mogilev Meat processing Plant» in relation to the product of JSC « Brest meat Processing Plant»

Parameters	JSC «Mogilev meat factory”	JSC «Brest meat factory”	qi	ai	G
1 Qualitative					
1.1 appearance (score)	Loaf with a clean,	Loaf with a clean,	1	0,05	0,05
1.2 consistency (point)	Tender, juicy (10)	Tender, juicy (10)	1	0,05	0,05
1.3 cross-section view (point)	Uniform pink or light pink minced meat (10)	Uniform pink or light pink minced meat (10)	1	0,05	0,05
1.4 taste and smell (score)	Pleasant, characteristic of this type of product, with a pronounced aroma of spices (10)	Pleasant, characteristic of this type of product, with a pronounced aroma of spices (10)	1	0,05	0,05
1.5 Mass fraction of fat,%, no more	28	28	1	0,15	0,15
1.6 Mass fraction of protein,%, not less	12	11	1,091	0,15	0,164
1.7 Mass fraction of table salt,%, no more	2,0	2,0	1	0,15	0,15
1.8 Mass fraction of sodium nitrate,%, max	0,005	0,005	1	0,15	0,15
1.9 Presence of pathogenic microorganisms	нет	нет	1	0,20	0,20
Group Parameters by Quality group					1,014
2 Economic					
2.1 price for 1 т, thous.rub	9,38	8,92	1,052	1	1,052
Group Parameters by Economic group					1,052
Integral Parameters of competitiveness					0,964

Table D.5. Analysis of the competitiveness of feed flour of JSC «Mogilev Meat Processing Plant» in relation to the products of JSC "Belynichsky Protein Plant"

Parameters	JSC «Mogilev meat factory"	JSC « Belynichsky Protein factory"	qi	ai	G
1 Qualitative					
1.1 appearance (score)	The product is free-flowing without dense lumps with a diameter of no more than 12.7 mm, a length of no more than two diameters, a crumbling capacity of no more than 15 % (10)	The product is loose without dense lumps with a diameter of no more than 12.7 mm, a length of no more than two diameters, a crumble of no more than 15 % (10)	1,00	0,05	0,050
1.2 smell (score)	Specific, but not putrid or musty (10)	Specific, but not putrid or musty (10)	1,00	0,05	0,050
1.3 fineness of grinding (point), not more than	particle residue, not more than 3 mm 5 %; 5mm no	particle residue, not more than 3 mm3 %; 5mm no	0,60	0,05	0,030
1.4 Mass fraction of foreign impurities, not more than	metallomagnetic in the form of particles up to 2 mm in size 200 kg * million-1 (mg per 1 kg of flour); ash, insoluble in hydrochloric acid 1%	metal-magnetic in the form of particles up to 2 mm in size 150 kg * million-1 (mg per 1 kg of flour); ash, insoluble in hydrochloric acid 1%	0,75	0,10	0,075
1.5 Mass fraction of moisture,%, no more	9	10	0,90	0,10	0,090
1.6 Mass fraction of protein,%, not less	50	30	0,60	0,10	0,060
1.7 Mass fraction of fat,%, no more	13,0	20,0	0,65	0,10	0,065
1.8 Mass fraction of ash,%, not more than	26	38	0,68	0,10	0,068
1.9 Mass fraction of fiber,%, no more	1	2	0,50	0,10	0,050
1.10 Mass fraction of antioxidants to the mass of fat in flour,%, no more	0,02	0,02	1,00	0,10	0,100
1.11 Presence of pathogenic microorganisms	no	no	1,00	0,10	0,100
1.12 toxicity	no	no	1,00	0,05	0,050
Group Parameters by Quality group					0,788
2 Economic					
2.1 price for 1 т, thous.rub	23,27	21,54	1,080	1	1,080
Group Parameters by Economic group					1,080
Integral Parameters of competitiveness					0,729

Table D.6. Assessment of consumer properties of sausage products from manufacturers of the Mogilev region on a 10-point scale

Private Parameters (Indicators)	Coefficient weights (di)	JSC «Mogilev meat factory”	JSC «Bobrow-sky meat factory”	JSC « Alek-sand-riy-skoe»	Branch «BELMA ZAO Servolux Agro”	CJSC «Agro-combinat “Zarya”
Organoleptic properties of sausage products						
p_i	0,25					
Taste and aroma		9	8	9	7	8
Color and cut		10	10	10	10	10
Appearance		10	10	7	7	6
Consistency		9	8	8	5	7
Degree of freshness		10	8	9	7	9
Safety		10	10	10	10	10
The quality of the product		9	8	8	7	8
Assortment positioning						
p_i	0,15					
The breadth of the product range		10	8	7	5	6
Product Range depth		10	9	5	5	5
Convenience of packaging		7	8	5	5	5
The importance of packaging as an element of advertising(packaging as an element of advertising impact						
Indicator level		10	7	6	7	7
The manufacturer's image						
p_i	0,25					
The reputation of the manufacturer (the brand prestige)		8	7	7	5	7
The prestige of the brand		9	7	6	5	5
Mention of the product, the manufacturer's brand in the media		10	8	8	5	5
Brand image		8	7	6	4	4
Availability of awards		10	8	7	7	6
Participation in exhibitions, competitions, fairs						
Indicator level		10	7	5	5	6
Economic parameters						
p_i	0,35					
Price level		8	8	9	7	9
Availability of discounts (tools for price motivation of purchases)						
Indicator level		7	7	5	4	4

Table D.7. Integral Parameters in groups of consumer preferences of sausage products

Integrated indicators (I)	JSC «Mogilev meat factory»	JSC «Bobrow-sky meat factory»	JSC «Alek-sand-riy-skoe»	Branch «BELMA ZAO Servolux Agro»	CJSC «Agro-combina t «Zarya»	The perfect base of compariso n
Organoleptic properties	0,235	0,223	0,220	0,197	0,220	0,235
Assortment positioning	0,146	0,112	0,105	0,100	0,105	0,146
The manufacturer's image	0,250	0,208	0,184	0,146	0,158	0,250
Economic parameters	0,272	0,331	0,300	0,236	0,275	0,331
Method of calculation [4]: $p=\frac{p_i}{p_{max}}$; $I=\frac{\sum_{j=1}^{n} p_{ij}}{nj}\cdot d_i$.						

Table D.8. Integral Parameters in consumer preference groups of JSC «Mogilev Meat Processing Plant» - « Ideal comparison base»

Related indicator groups	The area of the figure of the ideal manufacturer	The area of the shape JSC “ Mogilev meat factory”
1-2	0,0144	0,0144
2-3	0,0153	0,0153
3-4	0,0348	0,0286
4-1	0,0327	0,0269
Total	0,0972	0,0853
Integral potential of competitiveness, % : $P=\frac{\sum_{a.b} a\cdot b\cdot \sin 2\pi/n}{\sum_{a.b} d_a\cdot d_b\cdot \sin 2\pi/n}\cdot 100$		87,76