Ministry of Education and Science of Ukraine

ODESSA NATIONAL ACADEMY OF FOOD TECHNOLOGIES

International Competition of
Student Scientific Works

BLACK SEA SCIENCE 2021

PROCEEDINGS

ODESSA, ONAFT 2021

Ministry of Education and Science of Ukraine

Odessa National Academy of Food Technologies

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Proceedings

Odessa, ONAFT 2021

UDC 001.8(063)

Recommended for print by the Academic Council of
Odessa National Academy of Food Technologies
on April 6, 2021, Protocol No. 13

Black Sea Science 2021: Proceedings of the International Competition of Student Scientific Works / Odessa National Academy of Food Technologies; B. Iegorov, M. Mardar (editors-in-chief.) [*et al.*]. – Odessa: ONAFT, 2021. – 731 p.

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2. ECONOMICS AND ADMINISTRATION

BUSINESS MODEL OF DEVELOPING INNOVATIVE PRODUCT (FOR FORAGE PRODUCTION OF THE REPUBLIC OF BELARUS)

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Abstract. *The article analyzes the current state of the forage production in the Republic of Belarus. There is a brief description of the enterprise of Belarusian agro-industrial complex (OJSC Gastellovskoe) given. Furthermore, it presents a product, the production of which is planned in the near future. The innovative technologies that create the value proposition of the enterprise are described. An economic assessment of the project's effectiveness is evaluated.*

Keywords: *innovation, business model, forage production, agribusiness.*

I. INTRODUCTION

In a market economy, the survival of enterprises has become largely dependent on their innovation activities. In the context of modernization, the problems of competitiveness and sustainable development of enterprises on the basis of a fuller use and increase of their innovative potential are becoming urgent. The embodiment of innovation processes in new products, technology is the basis of socio-economic development, which will increase profits in the current market competition.

Livestock products play an important role in ensuring the country's food security. In the accelerated increase in the production of livestock products, the primary role belongs to the creation of a solid forage base, the quantitative and qualitative improvement of which is aimed at ensuring the effective use of the livestock of animals and increasing their productivity. To reduce the cost of livestock products, it is necessary to reduce the cost of feed, and this is achieved by creating a solid feed base based on our own production. Thus, the topic of the work is relevant.

The purpose of this work is to develop and substantiate the economic feasibility of the implementation of an innovative project for the production of our own compound feed at the agro-industrial complex of OJSC Gastellovskoe. The choice of this enterprise as an object of research is due to its importance for the economy of the Republic of Belarus from the point of view of ensuring the economic and technological security of the country, as well as increasing the standard of living of the population.

II. LITERATURE ANALYSIS

The information base of the study was the data of the National Statistical Committee of the Republic of Belarus, general information about OJSC Gastellovskoe taken from its business development plan, organizational structure of enterprise management, balance of the organization with applications for three years, forms of state statistical reporting compiled by the enterprise.

With regard to the objectivity of this concept, a discussion is unfolding among domestic and foreign scientists. According to some authors, feed production is

considered only as a system of measures for the production of feed. The opinions of other authors agree that forage production is a separate independent branch of agriculture.

A.P. Pichugin defines forage production as an integrated system of farming together with livestock breeding, inextricably linked with crop production [1].

B.I. Yakovlev emphasizes that fodder production is the main link in the fodder base, which is a system of agrotechnical and organizational-economic measures for the production and preparation of fodder, taking into account the specific conditions of an agricultural enterprise [2].

A.A. Shelyuto understands by fodder production a scientifically grounded system of organizational, economic and technological measures for the production, processing and storage of fodder grown on arable land, hayfields and pastures [3].

The opinions of other scientists agree that fodder production should be considered as a separate branch of agriculture, which is engaged in the production, procurement and storage of various types of fodder obtained on sown and natural forage lands, as well as on arable land. V.M. Kosolapov, N.V. Parakhin, V.V. Berdnikov, V.G. Gusakov, and V.I. Gaiduk believe that this is the most large-scale and multifunctional branch of agriculture, which has a significant impact on the solution of key problems in the development of crop production, agriculture and animal husbandry, as well as rational nature management, conservation of valuable agricultural land, reproduction of soil fertility, improvement of the ecological state of the territory and environmental protection [4-8].

Taking into account the above approaches and opinions of the authors, fodder production can be defined as an agricultural industry, which includes organizational, technical and technological measures aimed at obtaining a certain amount and composition of fodder from on-farm sources, which is based on the use of soil fertility.

III. OBJECT, SUBJECT, AND METHODS OF RESEARCH

Livestock products play an important role in ensuring the country's food security. Thus, the topic of the work is relevant.

The subject of the research work is the production of feed at the enterprise. The object of this work is OJSC Gastellovskoe.

The work is aimed at development of an innovative project for the production of feeds at OJSC Gastellovskoe.

To achieve this goal, the following tasks are set and solved:

– to analyze the current state of feed production in the Republic of Belarus;

– to develop a business model for organizing the production of an innovative product at an agro-industrial enterprise;

– to conduct the economic assessment of project effectiveness.

To solve the problems of the course work, the following research methods are used:

– analysis of the theory on the topic, synthesis;

– comparison;

– modeling;

– forecasting.

IV. RESULTS

4.1. Market analysis

In 2019, the situation in the feed industry of the Republic of Belarus remained stable. It should be noted that over the past 5-6 years, agriculture has remained among several branches of the real sector, which show positive dynamics against the background of general stagnation and decline in business activity.

The industry continues to develop, the total feed production increased by 3 % compared to the previous year. At the same time, the production of premixes for cattle shows the best dynamics: for two years in a row, this sector continues to grow steadily, which in 2019 amounted to 27 %.

The trends of the last year remain relevant in 2019: imports remain at a fairly high level, exports continue to develop, but at a slow pace. The main trends in the industry are production enlargement and digitalization. The growth in feed production is directly related to the relatively favorable situation in the livestock sector. The production of commercial milk in January-October 2019 increased by 3 % compared to the corresponding period of 2018 and amounted to 1.9 million tons. At the same time, according to preliminary forecasts, by the end of the year, production may grow to 2.1 million tons due to the introduction of new complexes, an increase in the milk productivity of cows and the level of marketability. In 2020, the long-term growth trend in the production of commercial milk will continue against the background of the introduction of new complexes and the intensification of production.

At the end of 11 months of 2019, the production of pork and poultry decreased to 270 thousand tons (-5.7 %) and 430 thousand tons (-4.3 %) compared to the same period in 2018. At the same time, beef production increased by 5.5 % and amounted to 27 thousand tons.

It should be assumed that in the future the feed market will only grow, mainly due to its own production. This is due to the state's policy of self-provision with meat and meat products. According to official statistics, this indicator was about 78%. In this regard, consumption and, accordingly, the production of compound feeds are increasing.

If we talk about the development within the industry, then the main growth drivers are compound feed for cattle and pigs. This fact will give an impulse to increase the production of the corresponding compound feed. It would also be quite logical to further reduce the volume of produced bird feed.

4.2. Main consumer segments

The main signs of segmentation of consumer segments of consumers of compound feeds for animals are:

– geographical location (by region - Minsk region, neighboring regions);
– business size (small, medium and large).

Considering these features, we can distinguish six consumer segments (table 4.1).

Next, we will conduct a qualitative analysis of the attractiveness of the organization's sales market segments.

Table 4.1. Consumer segments by geographic location and business size

Segmenting criteria		business size		
		small	middle	large
business geography	Minsk region	1	2	3
	other regions	4	5	6

The following variables are used in the qualitative analysis process:

1) segment size (capacity);

2) the actual or projected share of the organization in the segment;

3) dynamics of development of the segment and forecast of trends in its change in the future;

4) the basic requirements of consumers for products (services) in the segment from the point of view of the components of the marketing complex;

5) the advantages of the organization over competitors.

A qualitative analysis of the attractiveness of the organization's sales market segments was carried out using expert assessments and is presented in Table 4.2.

Segments as complex phenomena of reality cannot be fully assessed by any one criterion, therefore, the assessment was made using one integral indicator.

The data in Table 4.2 were used as criteria for assessing the attractiveness of market segments.

Table 4.2 – Qualitative analysis of the attractiveness of the sales market segments of JSC Gastellovskoe

Attractiveness criterion	No.1	No.2	No.3	No.4	No.5	No.6
1. Segment capacity	low	middle	high	low	middle	high
2. The actual share of the company in the segment	middle	low	low	middle	low	low
3. Forecasted market growth rate	low	middle	middle	low	middle	middle
4. Basic consumer requirements for products in the segment in terms of the components of the marketing mix	high	very high	very high	high	very high	very high
5. Enterprise advantages over competitors	low	middle	high	low	middle	middle

Thus, among the target segments of the enterprise, one can distinguish medium and large livestock farms located in Minsk and neighboring regions (such as RUSP SGTs Zapadny, SPK Voskhodyashchaya Zarya, RUSP Belovezhskiy, RUSPP Ptitsefabrika Mednovskaya, OJSC Komarovka), as well as intermediaries specializing in the sale of this product. Thus, in this business model, only two of these segments are analyzed.

4.3. Value proposition

The value proposition is common for the selected target segments (large enterprises in Minsk and neighboring regions) due to their similarity.

Successful sales of the company's products are planned to be ensured through the following factors:

1) A high level of sterility of compound feed due to innovative methods of drying and disinfection of grain (ozonation and IR irradiation), which leads to:

– increasing the storage time of grain by 3 times;

– the absence of microflora that negatively affects the health of animals.

2) High level of nutritional value of feed while maintaining the natural composition:

– contain stimulators of the growth of microbial protein, the cow consumes 60% of it, and processes it by 85%;

– the assimilation of feed is 40% higher than that of competitors, the eatability is higher, which immediately affects the volume of milk produced. In practice, already on the 3rd day there is an increase in milk yield by 3-4 liters, in calves - an increase in weight gain by 50-70%;

– when feeding a cow or calf, the animal always chooses new generation extruded feed versus concentrates that are on the market.

– fodder reduces the time for heifers to be covered from 18 months to 12 months.

The compound feeds of the Gastellovskoe will allow consumers to provide:

– reducing the cost of livestock products by reducing the share of feed in the structure of production costs;

– reducing the need for feed due to their greater nutritional value.

Also, consumers will be able to get rid of fears associated with the seasonal nature of the work of competing enterprises. So, the processing of orders and deliveries will be carried out by the enterprise all year round. There are no competitors like this feed.

A value proposition based on the Alex Osterwalder template (Figure 4.1) allows you to visually show the distinguishing properties, benefits of the product and the impression of its use.

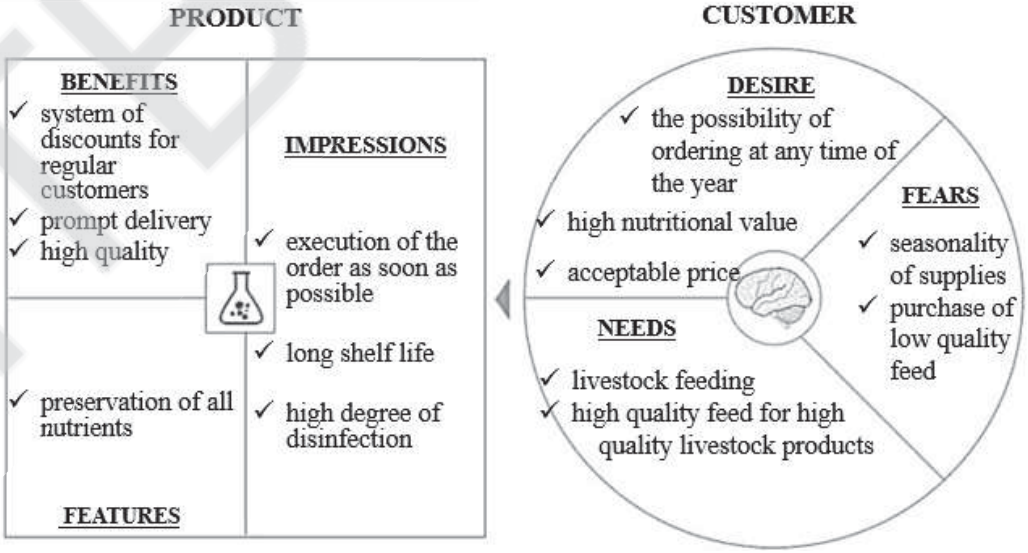

Fig. 4.1. Value proposition

Describing the characteristics, benefits and experiences of using the product meets the desires, meets the needs of the target audience, and dispels their fears.

The company's offer and the client's needs are in perfect harmony.

Thus, the value proposition of compound feed for cattle is as follows:

– high nutritional value of feed, which reduces the enterprise's need for a feed base;

– long shelf life due to complete sterility of feed.

4.4. Distribution channels

On the basis of independence, the enterprise will have two types of intermediaries - its own distribution bodies (sales department of the organization) and trade intermediaries. Since the enterprise uses two ways of transferring goods to the consumer, the distribution channel is mixed. The organization pursues a policy of intensive distribution, that is, strives for the greatest coverage of the market and the creation of the best conditions for the purchase of goods by end consumers.

The system of relationships with consumers is presented in Table 4.3.

Table 4.3. Customer relationships

Channel types	**Channel phases**			
	1. Awareness	**2. Evaluation**	**3. Purchase**	**4. Delivery**
Sales department	Seasonal fairs	Customer reviews, certificates	Website	Freight transport, pickup
Reseller				

The analysis of the attractiveness of product distribution channels in each of the identified potential sales markets is shown in Table 4.4.

Table 4.4. Distribution channels

Characteristics of buyers, goods, enterprises	**Target sales market**	
1. Characteristics of target buyers	**Segment 1**	**Segment 2**
1.1. Market size	ic	ic
1.2. Territorial concentration of buyers	ic	ic
1.3. The size of the purchased batch of goods	ds	ds
1.4. Regularity of purchase	ds	ds
1.5. Prompt delivery requirement	ds	ds
2. Product characteristics		
2.1. Storage period	ic	ic
2.2. Severability of consignments	ic	ic
2.3. Technical complexity of the product	ic	ic
2.4. Purpose (consumer / production)	ds	ds
3. Enterprise characteristics		
3.1. Financial condition	ds	ds
3.2. Flexible pricing strategy	ds	ds
3.3. Full market coverage strategies	ds	ic
3.4. Brand awareness	ic	ic
Total:		
a) direct sales channel (pc)	7	6
b) indirect short sales channel (cc)	6	7
Distribution channel recommended:	direct channel	indirect short channel

Thus, the most attractive distribution channel for the first segment is the direct channel (the sales department of the organization), and for the second segment it will be the indirect short channel (the sale of goods through resellers).

4.5. Customer relationships

First of all, the company will carry out a targeted search for clients.

Customer acquisition mechanisms:

– use of professional advertising tools. The appeal will be posted in such media as: press, television, Internet, as well as billboards, streamers, signs and other outdoor devices. The compound feeds will both have their own advertising and be a part of advertising campaigns for other products of JSC Gastellovskoe;

– implementation by the sales department of JSC Gastellovskoe of periodic direct telephone contacts with potential consumers.

The following incentive techniques will be used to retain customers:

– discounts, promotions, seasonal sales;

– encouragement of regular customers.

– a premium, for example, free shipping when buying a certain amount of feed.

Strengthening customer relationships will be carried out:

– through feedback (for example, polling customers by mail, on the website and in social networks to identify their needs and wishes, as well as to find out opinions on the quality of the feed produced);

– the establishment of partnerships.

4.6. Key resources

In order to produce and convey value propositions to the consumer, maintain connections with consumers and make a profit, a company will need the following main types of resources: labor, material, intellectual, financial.

Let's consider each type of resource separately.

The key resources of Gastellovskoe involved in the implementation of this model are shown in Figure 4.2.

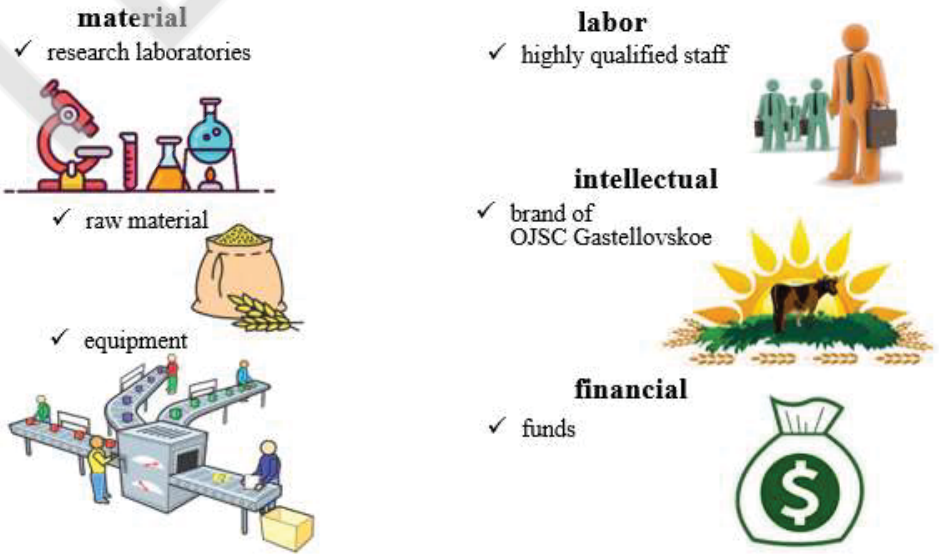

Fig. 4.2. Key resources

Thus, in order to create its own value proposition, OJSC Gastellovskoe first of all needs labor, material, intellectual and financial resources.

4.7. Key activities

The types of activities carried out by OJSC Gastellovskoe are divided into main and auxiliary. The complete structure of the value chain through which the products pass can be clearly seen in Figure 4.3. However, not all activities involved in the production of products are involved in creating value.

The key activities of OJSC Gastellovskoe that directly create value for the consumer are:

– technology development (R&D);

– production.

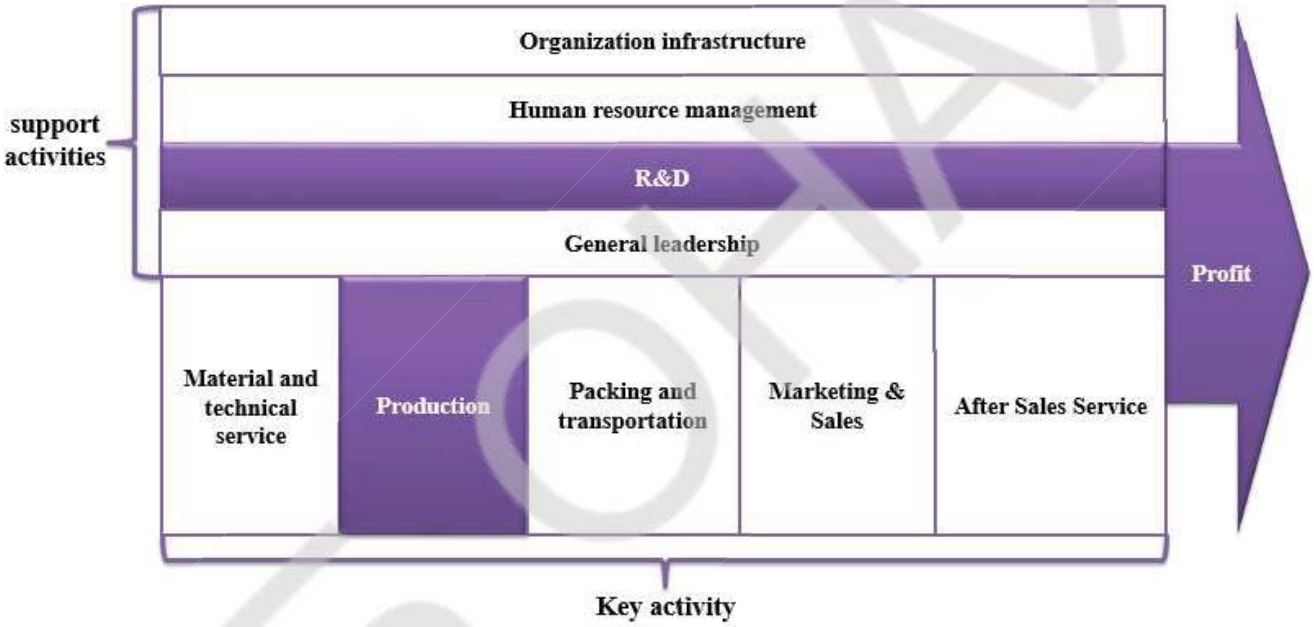

Fig. 4.3. Key activities

The key activity in this model is feed production. It, in turn, involves the following main stages:

– ozonation and processing of primary raw materials;

– grinding of primary raw materials;

– division into doses and the addition of appropriate trace elements;

– mixing and obtaining a homogeneous mass;

– cooling;

– technological control;

– packing and storage of finished products.

The production process of OJSC Gastellovskoe is distinguished by the use of innovative technologies for drying and disinfecting primary raw materials – ozonation and infrared irradiation, which creates the following advantages:

– the period of safe storage is increased by 2-3 times;

– production losses are reduced by 20-30%;

– spoilage and loss of products is prevented due to the destruction of molds and parasites, which multiply during storage;

– high quality products by increasing the sugar and amino acid composition;

– lower storage costs.

Thus, constant work on improving the quality of feed and the use of innovative technologies in the production process are one of the main factors in the formation of product value.

4.8. Key partners

OJSC Gastellovskoe has a network of suppliers and partners that allow the company to optimize its activities, reduce risks and, most importantly, obtain the necessary resources for the production of products.

Key partners of OJSC Gastellovskoe involved in the implementation of this model are shown in Figure 4.4.

Fig. 4.4. Key partners

Thus, the establishment of partnerships with such enterprises as JSC ASB Belarusbank, LLC Agrodezinfektsiya, LLC Remkom and UE Agrokombinat Zhdanovichi will allow OJSC Gastellovskoye to optimize its activities, reduce risks and, most importantly, get the necessary resources for the production of products.

4.9. Business model assessment. Business environment analysis

Based on the information provided in the previous sections, we will fill in the Osterwalder and Pignet business model template (Figure 4.5). It consists of 9 blocks that allow you to simply and visually present the activities of the organization.

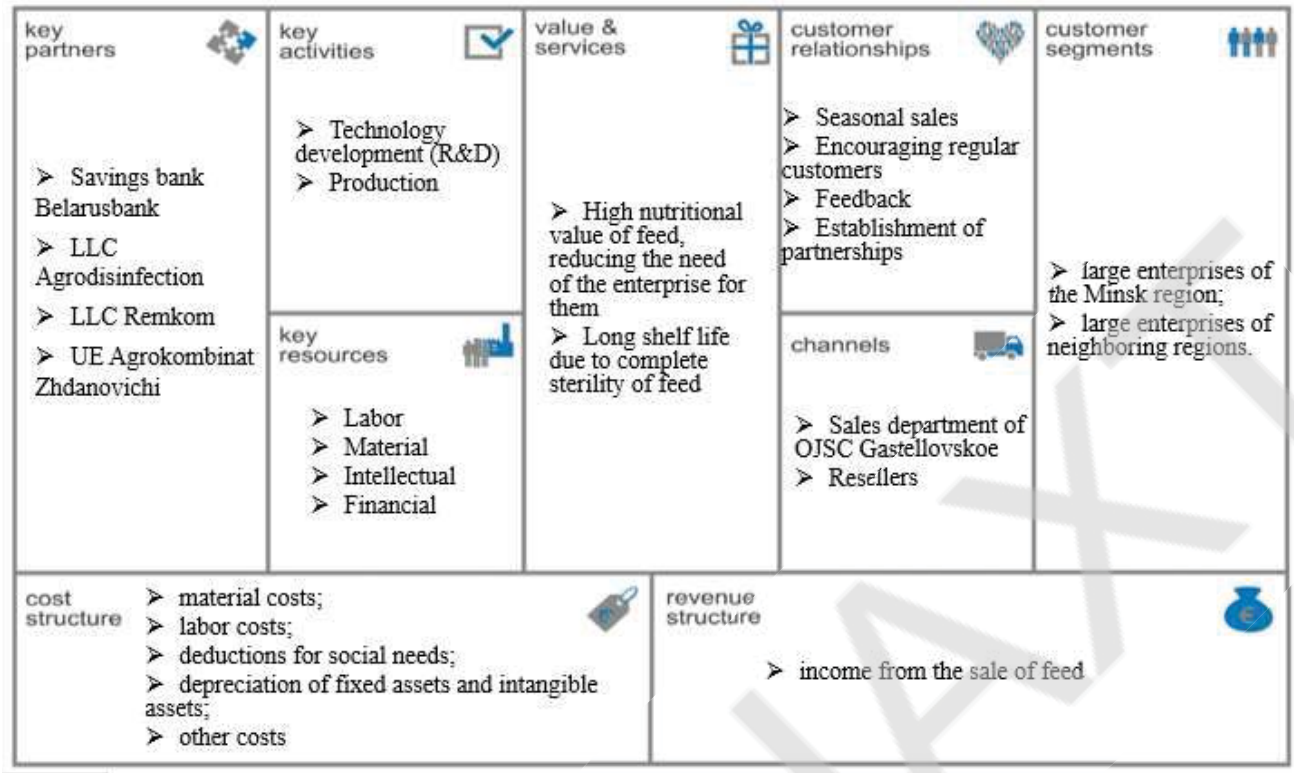

Fig. 4.5. Business model

The developed simulation economic model of the functioning of OJSC Gastellovskoe allows, if necessary, to provide multivariate alternative calculations to obtain objective assessments of the possible development of the project in a specific economic situation.

Potential risks of the project with this development forecast are presented in Table 2.11.

Table 4.5. Potential risks of the project

Risks	**Way out**
The emergence of competitors producing a similar product	Conversion to other types of products, the ability to switch to other compositions of feed, expanding the range. Potential opportunities for expanding the range of products on this equipment: feed with a high content of plant fibers.
Lack of raw materials due to low yield due to drought or floods	To work on tolling raw materials. Possibility of replacing up to 50% of raw materials with low-grade components: hay, straw, husks, cake.
Supply of low quality raw materials	The equipment makes it possible to disinfect low-quality raw materials (rotten, with mold) and process them into sterile, high-quality products.
Decrease in purchasing power of product consumers	To work on tolling raw materials: payment for products can be taken with raw materials. To enter other markets (pet food, fish food, etc.)

Measures to reduce production risks are effective control over the course of the production process and increased influence on suppliers through diversification and duplication of suppliers.

The conducted SWOT analysis of the enterprise allows to identify its strengths and weaknesses, opportunities and threats. The data obtained during the SWOT analysis determine the critical (key) points of the enterprise.

The results of the SWOT analysis, obtained in the study of the market situation and the potential of OJSC Gastellovskoe, are presented in Table 4.6.

Table 4.6. SWOT analysis of the enterprise

	POSITIVE SIDES	NEGATIVE SIDES
INTERNAL FACTORS	**Streghts** - years of experience in farming; - availability of a production base, land plot and agricultural land; - availability of machinery and equipment for feed production; - availability of a permanent customer base for product sales; - competitive products; - government support for the industry.	**Weaknesses** - expansion of production facilities; - expansion of the sales network for finished products; - minimization of costs at all levels of production; - reduction of climatic and epizootic risk factors - the implementation of the project will contribute to the creation of new jobs; - the possibility of further expansion of production.
EXTERNAL FACTORS	**Opportunities** - competition in the sales market; - high cost of concentrated feed; - high cost of fuel for machinery and transport; - dependence on climatic and epizootic factors.	**Threats** - competitors producing similar products; - an increase in the cost of production due to an increase in prices for raw materials; - the likelihood of death of livestock due to climatic and epizootic factors; - fluctuations in product prices.

Thus, the benefits created by the implementation of this project make it possible to significantly increase the efficiency of the enterprise, to maintain the level of profitability and profitability of the organization in the face of rising energy costs.

4.10. Economic assessment of the efficiency of an innovative project

The economic calculations of this business model take into account the preliminary parameters of the project, which include the estimated cost of the project.

The investment project is planned to be implemented during 2022.

Basic information on the project is presented in table 4.7.

Table 4.7. Basic information on the project

Basic information on the project	Значение
Calculation horizon (years)	3
Discount rate (%)	8,00 %
Project start date	01.01.2022
Calculation currency - monetary unit of the project (Belarusian ruble, freely convertible currency (hereinafter - FCC)	BYN; USD
The official exchange rate of the Belarusian ruble per unit of hard currency as of the date of drawing up a business plan	2,63
Date of preparation of the business plan	10.01.2021

The net cash flow calculation is shown in table 4.8.

Table 4.8. Net cash flow calculation

BYN thousand

Types of income and costs	2020	By years of project implementation		
		2021	2022	2023
CASH FLOW				
Revenue from the sale of products (works, services)	0	990	1,132.8	1,234.2
Other income related to the implementation of the project	0	0	0	0
Full inflow	0	990	1,132.80	1,234.20
CASH OUTflow	0	0	0	0
Capital costs (investments in fixed assets)	16.85	0	0	0
Net working capital gain	0	73.99	9.9	7.02
Production and marketing costs (excluding depreciation)	0	554.06	584.9	616.32
Revenue taxes	0	164.87	188.67	205.57
Income taxes	0	48.25	64.12	73.67
Repayment of interest on long-term loans	0	4.21	3	1.79
Full outflow	16.85	845.38	850.59	904.37
Flow balance (net cash flow)	-16.85	144.62	282.21	329.83
Cumulative net cash flow	-16.85	127.77	409.98	739.81
Discount factor (at a rate of 25%)	0	0	0	0
Discounted inflow	0	792	724.99	631.91
Discounted churn	16.85	676.3	544.38	463.04
Discounted investment	16.85	59.19	6.34	3.6
Discounted Net Cash Flow	-16.85	115.7	180.62	168.87
Cumulative discounted net cash flow (net present value)	-16.85	98.84	279.46	448.33
Payback period, years	0.38			
Return on investment,%	196.41			
Internal rate of return,%	217			

The payback period of the project is less than one year (0.38 years) with the proposed implementation volumes. The return on investment for this project is 196.41 %, and the internal rate of return is 217 % (which is significantly higher than the discount rate of 25 %). This is primarily due to low investment in equipment (OJSC Gastellovskoe already owns most of the machinery and equipment) and rather low prices for raw materials at significantly higher prices for the finished product. This project is economically efficient.

Thus, as a result of evaluating the effectiveness of an investment project for the production of an innovative product, it can be concluded that it is advisable to implement it at OJSC Gastellovskoe. After the introduction of raw materials processing technology for the production of compound feed, the new products will be fully competitive in terms of price and quality in the domestic and foreign markets. Thus, not only the products of the enterprise, but also it itself will be able to adequately compete with other enterprises of the country's agro-industrial complex.

V. CONCLUSIONS

Thus, as a result of the study, a business model of production was obtained, reflecting the development of an innovative project for the production of own feeds at OJSC Gastellovskoe.

The most attractive segments of the enterprise are large enterprises in the Minsk region and large enterprises in neighboring regions. In this business model, the analysis is done for them.

The company offers the consumer the following values:

– high nutritional value of feed, which reduces the company's need for a feed base;

– long shelf life due to the complete sterility of feed.

The most attractive distribution channel for the first segment is the direct channel (the sales department of the organization), and for the second segment the most attractive one is an indirect short channel (the sale of goods through resellers).

Strengthening customer relationships will be carried out:

– through feedback;

– the establishment of partnerships;

– holding promotions, seasonal sales;

– encouraging regular customers.

In order to produce and communicate value propositions, maintain connections with consumers and generate profits, a company will need the following basic types of resources:

– labor (highly qualified personnel);

– material (research laboratories, raw materials, equipment);

– intellectual (brand of OJSC Gastellovskoe);

– financial.

The key activities of OJSC Gastellovskoe that directly create value for the consumer are:

– technology development (R&D);

– production.

The production process of OJSC Gastellovskoe is distinguished by the use of innovative technologies for drying and disinfecting primary raw materials – ozonation and infrared radiation, which creates the following advantages:

– the period of safe storage is increased by 2-3 times;

– production losses are reduced by 20-30%;

– damage and loss of products is prevented due to the destruction of mold fungi and parasites that multiply during storage;

– high quality products by increasing the sugar and amino acid composition;

– lower storage costs.

Key partners of OJSC Gastellovskoe involved in the implementation of this model: OJSC ASB Belarusbank, LLC Agrodesinfection, LLC Remkom and UE Agrokombinat Zhdanovichi. These partnerships allow the company to optimize its activities, reduce risks and, most importantly, obtain the necessary resources for the production of products.

Potential project risks:

– the emergence of competitors producing a similar product;
– lack of raw materials due to low yield due to drought or floods;
– supply of low quality raw materials;
– a decrease in the purchasing power of consumers of products.

Measures to reduce production risks are effective control over the course of the production process and increased influence on suppliers through diversification and duplication of suppliers.

The SWOT analysis showed both positive and negative aspects of the model. It should be noted that the benefits created by the implementation of this project can significantly increase the efficiency of the enterprise, maintain the level of profitability and profitability of the organization in the face of rising energy costs.

In the last section, an economic assessment of the project's effectiveness was carried out. A simple payback period of the project was found, equal to 0.38 years. The internal rate of return for this project is 217 %, which indicates that the project has a margin of safety. The profitability index is 196.41 %, which indicates the return on investment in the project.

Thus, we can draw a conclusion about the economic attractiveness of the project. The project is quite reliable and cost-effective with the projected production volumes, tariffs and production costs. The successful implementation of this project creates favorable prospects for the development of the enterprise.

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