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DRAFTING A BUSINESS PLAN ON COMMERCIALIZATION RESULTS OF MASTER'S STUDENT RESEARCH

Study guide

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It contains instructions for writing a feasibility study for the final qualification work of undergraduates in technical areas of training.

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INTRODUCTION

A teaching manual is intended for students of ETU "LETI", working on master's thesis on the technical fields of study. The recommendations aim to provide guidance to undergraduates in the development of a feasibility study (FS) of the final qualifying work (WRC), to consolidate the students' theoretical knowledge and practical skills of economic calculations necessary in the process of substantiation of economic feasibility and attractiveness of the implementation of the developed engineering projects, and the commercialization of any scientific and technical products.

Recommendations are universal and can not take into account all the peculiarities of the economic activities of specific organizations, enterprises and institutions, on the basis of which carried out his master's thesis. Therefore, the development of a feasibility study WRC should make full use of technique execution of economic calculations and regulations in force in a particular organization, which developed materials master's thesis, as well as tax rates and the value of other economic indicators, existing at the time of writing the WRC.

1. GENERAL PROVISIONS ON THE FEASIBILITY JUSTIFICATION OF MASTER'S THESES

Execution of the master's thesis is the final stage of preparation of masters in technical disciplines, in which the student demonstrates the acquired knowledge and skills to take effective engineering solutions, finding ways to achieve a specific application of technical tasks.

A feasibility study may be one of the thesis topics, aimed at proving the effectiveness of engineering solutions, as well as to assess the economic attractiveness of the project under development or commercialization of the results of scientific activity.

The list of issues, as reflected in the feasibility study, depends on the purpose and content of the WRC, which are determined by the terms of reference approved by the graduating department. Given the diversity and the different character of final qualifying works, the methodology and the content of the feasibility study are set for each operation individually in consultation with the consultant on the feasibility study. For individual tasks on a feasibility study of undergraduates should do the following:

– in the terms established by the timetable for the implementation of WRC to submit their job counselor approved by the scientific supervisor or the head of the educational program, in which he is trained to present the objectives and the main content of the work;

– in the preparation of the technical parts of the master's thesis to fulfill all the necessary calculations related to the economic justification accepted engineering solutions, and align them with the consultant on the feasibility study;

– prepare the section "Feasibility study of the project" based on the data of guidelines and recommendations of the consultant for the feasibility study.

The volume of the section on the economic feasibility of master's thesis depends on the content of the draft and the average may be 12-16 seconds.

Material economic justification must be accompanied by links to sources of information, and performed economic calculations - the necessary explanations and comments. The main results of feasibility study submitted for display and / or dispensing the materials used in the protection of final qualification operation.

2. GUIDELINES ON THE LIST "FEASIBILITY STUDY SCIENTIFIC AND TECHNOLOGICAL PROJECT (WORK)"

See "Feasibility study of the project of scientific and technical (work)" indicating the section of concrete object study (product, technology, method and so on. N.) In the title is being developed in a master's thesis, which conducted research and development applied research, carried out the development of scientific and technical products, assesses the effectiveness of the commercialization of research results. Contents section depends on the purpose and subject matter discharge operation. Below is a recommended content of the section "Feasibility study of scientific and technological project (work)":

1. Description of the project.
   1.1. Summary.
   1.2. Description of production.
   1.3. Analysis of the market.
   1.4. Competitor analysis.
2. Marketing plan.
   2.1. Sales plan.
   2.2. Trade policy.
   2.3. Price policy.

2.4. Sales policy and activities.

3. Production plan.

4. Financial plan.

In general, the economic rationale for developing scientific and technological products is a business plan for the production and market realization of scientific and technical products. The following procedure for the development of this section may be recommended for the purpose of the master's thesis:

– Research suggests markets for products (research) in terms of the key market parameters: market volume, capacity, availability of demand, describe the potential consumers, etc. These studies are conducted in order to determine the target consumer groups, assessment of forecast sales volumes (of research results);

– development of a marketing plan for marketing and promotion of products with the formation of specific measures to stimulate the market demand and the definition of realizable value of the products or results of scientific activity;

– Development of the plan of production (research) in order to determine the volume of the necessary material, human and financial resources for the organization of production or commercialization of research results. Necessary part of the equipment are defined in terms of production, list of materials and components for production, labor costs and other necessary expenses. The result of the development of the production of the plan is to determine (the studies) the cost of developed products;

– the development of a financial plan, which includes a forecast of revenues and expenses associated with the production of products under development (the study), as well as cash flow forecasting and calculation of performance indicators of the project.

In addition to the above-mentioned sections of a business plan study the development of scientific and technical production or commercialization of the results of scientific activity can contain and other necessary areas, development of which is determined by the specific goals and objectives of the graduate qualification work.

The overall structure of the sections of the business plan, as well as a summary of the tasks to be solved and are listed in table. 2.1.

Specific requirements and recommendations for content specified section consultant TEAS-specific specific discharge operation.

Table 2.1

A list of sections of the feasibility study

№	Section title	Content of section	Analysis and evaluation tasks
1	Summary	fundamentals the proposed project. Objective of the project. Novelty products. Data on sales volume, revenues, expenses, profit	Analysis and evaluation of sales. Cost analysis. Risk assessment. Assessment of profit
2	Products	Product Description: consumer properties, differences from products competitors, degree protected by patents, price and cost forecast for production.	Evaluation of product properties (Research). Analysis of competitors' prod- ucts. Analysis of prices and costs of the production
3	Sales market	The state of affairs in the indus- try. Potential consumers. Market conditions. Market Information	Assessment of the state of affairs in the industry. Analysis of growth rate products. Analysis of potential consumers. Analysis of market research
4	Competition	Description of potential competitors. Description similar products on the market, it comparative characteristics	Comparative analysis performance competitors. Analysis of objectives, strategies competitors. Analysis of the developed product's strengths and weak- nesses
5	Marketing plan	Prices. Sales channels. Advertising policy. Forecast sales of the new products. Pricing. Price indicators. Sales budget	Analysis of market conditions. Analysis of price changes. Analysis of internal and external factors. Analysis of effectiveness advertising. Analysis of the production opportunity
6	Production schedule	Manufacturing process. Budget production in real terms. Equipment, buildings, structures. Labour force. Production costs products	Analysis of the basic foundations and capital-labor ratio. Analysis of raw materials. Analysis of the labor force. Cost analysis production (conducted studies)
7	Organization plan	Organizational chart	Analysis of effectiveness

		implementation of the project. Description of the control system. Sources and methods attracting professionals their wages	management. Analysis of the rhythm production. Identification and measurement internal resources
8	Financial plan	Forecast sales volumes. Cash expenditures and receipts. Budget revenues and expenditures. Cash flow budget. Schedule breakeven	The financial analysis of the company. Analysis of cash movements funds. Analysis breakeven. Analysis of income and expenses
9	Strategy funding	Determination of and sources of financing. Rationale for a full refund assets and income	analysis of sources financing. Analysis solvency. Payback period analysis investments. Estimation of investment effectiveness
10	Risk assessment and insurance	Weaknesses of the project. The probability of the emergence of new technologies. Alternative strategies. Measures of risk prevention. insurance program	Risk analysis by source of origin and reasons. Mitigation measures consequences of the offensive risks. Scenario analysis
11	Apps	Copies of contracts, licenses, contracts, agreements, and others.	-

2.1. Summary of the project (research)

It is a summary of the essence of the presented project. Resume objective - to draw the attention of those who addressed the business plan, and give a clear view of the preliminary draft. The summary should be short - 1-2.

Summary is the first section of the business plan, but it is written in the last instance, after the development of all other branches.

A summary can contain the following information:

– the name of the development project and its purpose;
– a summary of the project developer;
– the main essential characteristics of a project;
– timing and implementation phases of the project;
– the amount of investment in the project structure and financing;

– a brief description required for the project resources and sources of their attraction;

– the main results of the project and performance of its effectiveness (discounted payback period, NVP, IRR).

2.2. Description of production (research)

This section provides a description of the product, which is developed in the final work, or the results of research activities, the commercialization of the use of which is expected. The purpose of this section - to give a clear idea about consumer properties of products (results of studies) and their competitive advantages.

In the development of this section should be guided by a list of key issues that should be covered in the description of the products or research results (table 2.2.).

Table 2.2

A list of the key issues under "Description of the production (Research) "

№	Key matters	Comments
1	Product name (Research)	Indicate the name of the product, for example, in accordance with the GOST, or TU Ost
3	Main characteristics products (results studies)	Given description and key features product (technical etc.), e.g. in accordance with the requirements of GOST, skeletons or TU. It notes the presence of certificates quality and other documents describing the products. Considers the stage of product development: conducting applied research, development activities, preparation for industrial development and innovations m. p.
4	Consumer properties products (results studies)	Indicated specific gain (advantage), received by consumers from using products. Given the quality indicators, reliability, security, ease of maintenance and repair, and others. Notes, what it is innovation and the uniqueness of the product
5	Primary competitive product benefits (Research)	Indicated competitive advantages products in comparison with commercially available analogs, namely: - production of the nearest competitor; - the best domestic and foreign samples

6	The main consumers and intended use products (results studies)	States used products for final use or further processing. Indicated willingness products to market implementation
7	Assortment and Structure output	Indicate the planned range and output structure (in natural and value)
8	Legal protection products (results studies)	Indicated the presence of product security as a whole and its separate elements (patent trademark, license, etc.).
9	Additional service services	A brief description: terms of delivery, service and others.

An example of product descriptions

Product: Inverter module type voltage.

An apparatus for converting DC to AC with changing a voltage value. The inverters are designed to provide quality and reliable supply of communications and telecommunications, information technology equipment, industrial equipment, as well as any other electrical equipment.

Specifications:

- alternating voltage output 15 ... 380 1 ... 150 Hz;
- input voltage DC 15 ... 380 V;
- power of 1000 watts, 3000 watts maximum (for 5 s);
- operating temperature range of -55 ... + 40 ° C.

the product is unique in its versatility. The product is similar to the children's designer «LEGO». With specific details, in this case, the modules can be assembled various designs, in this case, the types of inverters.

2.3. The market analysis of the products (research)

The purpose of this section - to analyze the potential market for future products sales on various parameters: volume, capacity, size of demand, the level of competition, size of consumer segments.

This section is one of the most complex and significant sections of the business plan as it involves conducting various market research. Making decisions about which products, to what extent and at what price will be received by the market and implemented, is the basis for the formation of the future marketing strategy, production planning and calculation of financial and economic indicators of the business plan of the financial section.

This section should give a description of the market as a whole and its promising target segments, to determine the value of the characteristics of these segments, as well as the opportunities that they provide.

Recommended key questions in this section and market analysis procedures are given in table. 2.3.

Table 2.3

A list of the key questions section "Analysis of the market sale"

№	Key matters	Comments	Expected result
1	Who is the consumer (customer) products / services?	Segmentation market	Defining the target market and its consumers
2	What are the main segments of the market? What users or groups They are the most attractive financially? In some market segments there is a strong demand for the product / service?	Choose your target segments	Identification of the most attractive target segments
3	What are the commodity particular target segments and their assortment content? How the company will position your product?	Positioning	Identify what products and which markets will be delivered
4	What are the demand and capacity assessment The market in general and by segment? What kind The market price? What share of the company He is going to hold?	Analysis and evaluation appeal market	Assessment of demand and market potential. Assessment of market share

Market segmentation is to separate the analyzed segments of the market and evaluation of demand for the products in each market segment. segmentation procedure includes:

– description of the market, an estimate of its size (sales), stage of development (emerging, growing, mature, or falling), a brief description of products sold in the market with an indication of the period of a product's life cycle in the market;

– analysis of the requirements of different groups of potential buyers to the products sold on the market;

– group of potential buyers in the market segments in which there is similarity between the requirements of potential buyers to products and ready to buy it;

– assessment of demand for the products in each segment of the market with regard to the number of potential buyers, the frequency of purchases made, as well as changes in demand trends.

Selecting a target market segment is based on the analysis of the competitive position of new products in various market segments, evaluation of opportunities and threats, promotion of the product in each market segment. To select a target segment should implement the following:

– provide an analysis of the competitive position of developed products compared with products sold in each market segment, with an indication of improved parameters or disadvantages of the developed products, as well as the effect of these parameters on consumer choice;

– analyze potential barriers at the entrance to a particular market segment, highlighting the opportunities and ways to overcome these barriers;

– to choose the most attractive segment of the market (or multiple segments), taking into account factors such as the attractiveness of the segment in terms of its profitability, stability, on the one hand, and on the other - high competitive position, which may take new products to market.

Thus, this section of the business plan is necessary to define some initial assessment of the market (in terms of number of users (clients), sales of products, sales). If possible, identify the change in the target market size over the past 5 years, and try to predict it in the next 5 years.

What are the potential customer groups offer the best long-term opportunities for the realization of future products or commercialization of research results?

2.4. Competitor analysis

The purpose of competitive analysis - an idea about your competitors, identify their strengths and weaknesses, opportunities and threats to the environment, and also to show the competitive advantages developed products (research).

It is necessary to collect information indicative of competitors' products: the quality of the conditions of sale and rebates offered by the guarantee and after-sales service and so on.

The results of the competitive assay can be represented as a table. 2.4.

Table 2.4

Competitor analysis

Competitors	Main advantages	Main limitations	Main assortment groups	Marketing offers	used business strategy
Competitor 1					
Competitor 2					
Competitor 3					
Competitor 4					
Own production					

The results of the analysis of competitors and competition are:

– General considerations with respect to competition in the market;

– a list of major competing firms and the characteristics of their products;

– clarification of their competitive advantage;

– the expected impact of competition on the implementation of a development project.

EXAMPLE competitor analysis is shown in table. 2.5.

Table 2.5

EXAMPLE competitor analysis

Competitors	Age group	Number of persons in Group	Description	Cost
Computer courses: Robotics «Arduino» in the educational center "Yunium"	Pupils	10-12	preliminary knowledge is required. Component Kits and Card issued only on the lessons	cost of is not specified, the course lasts 16 weeks, 1 lesson in Week
Robotics Club "Asimov"	10-13 years	Up to 8	preliminary knowledge is required. for training using Scratch. Component Kits and Card issued only on the lessons	12100 on p. 3 months (2 classes in Week), t. e. 504 p. for engaging in
Children's clubs robotics "Robotrek"	12-14 years	Up to 12	preliminary knowledge is required. Kits, Boards and components bought pupils independently and disorganized	450 p. for engaging in (classes conducted during six months)

Robotics and programming "Sharobot"	13+ years	To 10	preliminary knowledge is required. Component Kits and Card issued only on the lessons	5000 p. 8 lessons per month, t. e. 625 p. for engaging in
Circle of Robotics "Robiks"	Pupils	Not indicated	preliminary knowledge is required. Component Kits and Card issued only on the lessons	450 p. for engaging in (Or 10 800 r. 3 months, 2 lessons in Week)
our policy using Ardublock	10-15 years	Up to 12	previous knowledge not required. To each the child is given individual set components and boards, who is he After completion of the course	6000 p. per month (2 classes in Week), t. e. 750 p. for engaging in

2.5. Marketing plan

The marketing plan includes a sales plan, product policy, pricing and marketing policy and promotional activities.

In terms of marketing the following aspects should be reflected:

– target of sales figures (sales volume, market share and so on.);
– concept and marketing strategy;
– used marketing methods;
– ways to promote products;
– list of marketing activities, with costs, timing, and results.

Sales plan. Forecast sales plan (annual, quarterly or monthly) is formed in physical terms, but also includes a forecast of revenue in terms of value.

For the formation of the sales plan is used, as a rule, three main methods of prediction:

1. Statistical forecasting method. It involves extrapolation of trends in previous years, taking into account the expected trends and internal analysis of the company. On the basis of statistical data for the number of periods of construction trend. However, this method is not suitable for new businesses that do not have sales statistics.

2. Method of expert evaluations. This method is based on the opinions and estimates of experts (marketing managers, and others.) Regarding the sales of each product for each of the customers or market sectors. This method is used in cases where:

– There are no historical data on sales;

– there is a possibility of constructing a forecast for an individual product, customer or market sector on the basis of data on individual sales.

3. Forecasting the method of breakeven. Applicable for new plants or new activities when the goal is to identify and to achieve a break-even level of production and sales. When using this method to determine the forecasted sales volume you must first determine the amount of variable and fixed costs of production and sales.

Thus, to produce a reliable forecast should be considered:

– characteristics and actual market capacity demand level (in natural and value);

– key market trends (growth, saturation, decline);

– competition;

– habits and preferences of consumers;

– break even;

– seasonality factors;

– marketing strategy.

Forecasted sales plans can be developed in three scenarios: pessimistic, base and optimistic.

Sales plan drawn up for each product, and can be prepared by consumer groups. It identifies the types of products, price, sales volume and revenues.

An exemplary form of the sales plan is presented in table. 2.6.

Table 2.6

An exemplary form of the sales plan

Indicators	Quarter				Total
	I	II	III	IV	
Product Type 1					
Expected sales, units					
Price with VAT, thousand rubles					
Revenue with VAT, thousand rubles					
Net revenue (excluding VAT), thousand rubles ((Rev. with VAT/120)*100)					

The amount of VAT, thousand rubles ((Net revenue*VAT)/100)					
Product Type 2					
...					
Product Type N					

Table. 2.7 shows an example of the sales plan.

Table 2.7

Sales plan (example)

Indicators	Quarter				Total
	I	II	III	IV	
half-bridge inverter					
Expected sales, units	600	1000	1200	1200	4000
Price with VAT, thousand rubles	5	5	5	5	-
Revenue with VAT, thousand rubles	3000	5000	6000	6000	20000
Net revenue (excluding VAT), thousand rubles	2542.4	4237.3	5084.7	5084.7	16 949
The amount of VAT, thousand rubles	457.6	762.7	915.3	915.3	3051

Trade policy. Trade policy is based on market segmentation and learning capabilities of the product with respect to each segment.

1. As far as the proposed products (services) meet the requirements of consumers (segment).

2. What is their utility?

3. What are the advantages of the product over competing products?

4. What is the quality of production and its role in the assessment of the product by the consumer?

5. What is the service value, warranty, etc.?

In the preparation of investment projects related to the development of scientific and technical products (commercialization of research), it should be borne in mind that the project is justified from a financial point of view only in the event that the result of its implementation is of value to the consumer, ie. E. If the product will be sold in the market.

Example description of trade policy

Complex products: an annual license to use the system for voting on the basis of BlockChain technologies and corresponding technical product support.

Quality: The product is fully consistent with modern software standards, has a certified level of data protection, has an intuitive interface.

Design and trademark product: will be specified in the design process.

Maintenance: release updates, contact technical support for advice on the system, assistance with the initial installation and setup are included in the cost of the annual license.

Sales service: the company is not responsible for problems in the system, due to hardware failures, helping to restore the system after a hardware failure is included in the license.

Price policy. This subsection is indicated on the product price structure, and its justification. Describes methods of pricing and discounts. If possible, analyze the sensitivity of the demand for the price, that is. E. The impact of prices on sales.

Example description of the pricing policy

Pricing method: constant base component + variable component proportional to the number of votes.

Product price: 15 000 p. + 30 p. for every vote.

Specials:. Possible discounts when purchasing annual licenses of more than 10 thousand people. -. 25%, more than 100 thousand people. - 50%, more than 1 million people. - price is negotiated separately.

Payment Terms: one-time payment or installments for 3 months.

Forms of payment: bank transfer, online payment.

Terms and conditions of the loan: payment is not provided on credit.

Sales policy and promotional activities. This subsection disclosed sales channels, organization and development of sales network, the formation of supply personnel, used methods of delivery and sale of goods.

It also describes the methods chosen to attract the attention of buyers to the products. Determined set of measures to promote the product and achieving the planned sales volume, as well as the estimated costs of these activities (tab. 2.8).

Tools to promote products are:

- advertising;
- target communication;
- personal selling;

– sales promotion.

Among the important elements of marketing complex include: terms of delivery (delivery time, means of transport, optimization of transport routes, the organization of warehouses), inventory control, safety during transportation of goods.

Table 2.8

Advertising costs (example)

Platform	Massive advertising, p.	Supportive advertising, p.
VK	10000	5000
YouTube	20000	7500
Twitch	20000	7500
Total	50000	20000

Example description of marketing policy

The main task of marketing policy - defining the most favorable marketing channels. «3DReality» The main distribution channels for the company are the direct sales and the Internet.

In order to successfully consolidate the market at an early stage it is necessary to carry out massive promotional activities, and most of the Internet, as we plan to work mostly through the Internet. It is planned to run ads on those platforms where youth is as follows:

– social network VKontakte";
– YouTube;
– Twitch.

The main objective of advertising is to let people know about us and remember, but it needs to create an advertising Promo video and corporate identity, which would be conspicuous. The first months of advertising should go massively, later, as soon as the customers, mass can be replaced by maintenance, and the costs will fall.

2.6. The production plan

The purpose of this section - to present the developed strategy of production, to determine the required resources for the organization of the production process.

The significance of the contents of this section and its level of detail depend on several factors.

Firstly, they are determined by the selected activity. When it comes to industrial activity, the description of the production and the technology used can be quite complex and detailed. The business plan related to the commercial activity or services sector, this section may be less detailed.

In the description of the manufacturing process and provide justification of its production resources necessary to answer the following questions:

1. What are the main processing steps of the production process?

2. What operations will be carried out independently, and which will be transferred to sub-contract?

3. Some production equipment is required to purchase (rent)?

4. What are the necessary initial investment?

5. Who and on what conditions will be purchased raw materials?

6. What is the demand for production resources and what is the assessment of production costs?

7. What are the operating company's competitive advantages?

Description of the production process. For a brief description of the production process must be in an understandable way to show what the main manufacturing operations underpin the process of manufacturing products.

For the operations to be performed forces of the enterprise, you must submit a summary of the characteristics of the production process. If some operations is expected to entrust subcontractors, it is necessary to explain what it is and why. Required to indicate how it will affect the results (eg, in the form of cost savings, reducing the duration of the technological cycle, improve the quality of products or services, etc.).

The main operation enlargement may be presented in tabular form (Table. 2.9).

Table 2.9

Characteristics of manufacturing operations

№	Name performed operations	Name of equipment used	Name of equipment used	Name of equipment used	Number of employed workers	Norms of working time for operations, man-hours	Production rates per unit time, units / h
1	1.1. operation A						
2	1.2. operation B						

	…etc.						
	Total						

Rate production quotas expressed in physical measurement units number (work, operations) produced per unit of time:

$$B_H = (\Phi_C \cdot P) / t_H,$$

where Φ_C - the length of time for which the rate of generation is set (hour, shift, ten days, one month, etc...), h, min; P - the number of workers involved in performing the work in question (surgery); t_H - time allowed to complete the work (operations) chel.-ch.

For equipment indicated its production capacity - the maximum possible amount of output in real terms, which can be made within a certain period of time.

The planned volume of production. For simplicity, we assume that the production schedule coincides with the planned sales.

Calculation of the planned production volume can be presented in Table. 2.10.

Table 2.10

The production plan

Indicators	Quarter				Total
	I	II	III	IV	
The planned volume of production, Vred					

Investment costs. The estimate of total investment costs equal to the total demand for the creation of business investment (investment costs for fixed assets and pre-production costs) and investment needs for current operations (current assets necessary for the formation of the initial inventory, and others.).

Pre-production costs associated with the cost of starting a new venture (state registration, production printing, opening a bank account, obtaining necessary licenses and so forth.), To conduct preparatory studies (feasibility studies, functional studies), and also include pre-production marketing costs, costs on promotion, the creation of a marketing network, training of staff and others.

Investment expenditures on fixed assets:

– buildings and facilities (production, storage, administrative);

– machinery (basic manufacturing equipment, accessories, office equipment, and others.);

– vehicles.

Data information in the basic resource requirements can be summarized as follows (Table. 2.11 and 2.12).

Table 2.11

Characteristics required of buildings and structures

№	Name room	Area	conditions for obtaining (Rental or purchase)	Cost	Period of receipt
1	Production				
2	Warehousing				
3	Administrative				
	Total				

Table 2.12

The list of necessary equipment

№	Name	Way of receipt	Cost without VAT	Cost, incl. VAT	Sum VAT	Period of receipt
1	Main equipment					
2	Accessories equipment					
3	Transport facilities					
4	Office equipment					
5	Other					
	Total					

The most accurate and complete assessment of the total investment cost is determined by the method based on the cost estimates of the direct account for the purchase or creation of each fixed asset.

The cost of production and the calculation of depreciation. The cost of production is a collection of current expenses of the organization (enterprise) for the production and sale of products. These costs are usually determined in the calculation unit, as that depends on the industry may make units the batch of products (for example, in the electronics industry), a ton of metal (steel production), and so on.

The calculation of the cost calculation unit (unit of production) is carried out by accounting articles determined by taking into account the purpose and cost centers. A list of the main items of the calculation is given in the Table. 2.13 The composition of the main items of the calculation.

Table 2.13

Main article calculation

Articles calculation	Formulas for calculating	Symbols
1. Raw materials (Excluding returnable waste)	$З_{Мi} = \sum_{j=1}^{n} G_{ji} Ц_j \left(1+\frac{Н_{т.з}}{100}\right) - О_в$	j - an index of raw material or material; G_{ji} – consumption rate j- th material per unit ith product; $Ц_j$ acquisition price j-th unit of the material, p./ед.; $Н_{т.з}$ – norm of transportation and procurement expenses; $О_в$ – - recyclable waste, are determined $S_{отхi} \cdot Ц_{отхi}$; $S_{отхi}$ – rate of return (Sold) waste tension, нат. ед.; $Ц_{отхi}$ – waste price, p./ед.
2. Purchased components products and semi-finished products	$З_{пi} = \sum_{j=1}^{n} N_{ji} Ц_j \left(1+\frac{Н_{т.з}}{100}\right)$	N_{ji} – Is the rate of expenditures of j component parts or semi-finished product; $Ц_j$ – Is the unit price of the jth component parts or semi-finished product, p. / pcs; n – is the number of types of component parts included per unit of i-th product;
3. Summary wage production working	$З_{осн i} = t_i Р_{ср\ i} \left(1+\frac{Н_{пр}}{100}\right)$	t_i – the complexity of manufacturing i-th product, n.h; $Р_{срi}$ – average rate on the i-th operation, which is determined taking into account the complexity and the nature of the operation (hourly tariff rate), p / n-h; $Н_{пр}$ – percentage of premium paid on current premium system
4. Additional salary		$Н_{доп}$ – percentage of additional salary determined organization-

		wide (to the enterprise); $Ф_{допi}$ – annual additional salary fund, p.; $Ф_{осн}$ – annual main fund salary, p.
5. Deductions for social needs	$З_{соцi} = (З_{основi} + З_{допi})\frac{Н_{соц}}{100}$	$Н_{соц}$ - rate deductions for social needs (tariff insurance premiums),%
6. Expenses on content and operation equipment		- average costs computer time equipment unit *i*-th product mash.-h .; - average cost machine operation equipment, p. / mash.-hours
Sum of direct costs	$З_{прi} = З_{мi} + З_{пi} + З_{основi} + З_{допi} + + З_{с.нi} + З_{о.эi}$	$З_{прi}$ - the sum of direct (variable) costs of the i-th article, p.
7. Production costs (Shop)	$З'_{о.прi} = (З_{основi} + З_{допi})\frac{Н'_{о.пр}}{100};$ $Н'_{о.пр} = \frac{S_{о.пр}}{Ф_{осн} + Ф_{доп}} \cdot 100\%$	$Н_{о.пр}$, $Н'_{о.пр}$ - overhead expenses%; $S_{о.пр}$ - annual statement general production expenses of the organization, thsd. p .;
Department costs	$С_{цi} = З_{прi} + З_{о.прi}$	-
8. General business costs (Works general)	$З'_{о.хi} = (З_{основi} + З_{допi})\frac{Н'_{о.х}}{100};$ $Н'_{о.х} = \frac{S_{о.х}}{Ф_{осн} + Ф_{доп}} \cdot 100\%$	$Н_{о.х}$, $Н'_{о.х}$ - general running costs, %; $S_{о.х}$ - annual statement overheads organization, th. p.
Manufacturing cost	$С_{прi} = С_{цi} + З_{о.хi}$	-

9. Commercial costs	$З_{комi} = С_{прi} \frac{Н_{ком}}{100};$ $Н_{ком} = \frac{S_{ком}}{V_{т.пр.с}} 100\ \%$	$Н_{ком}$ - commercial costs, %; - annual statement selling expenses organization, th. p .; $V_{т.пр.с}$ - annual volume marketable products organization calculated by production cost thousands. p.
Total full cost price	$С_{пi} = С_{прi} + З_{комi}$	-

When calculating the cost and results of operations should know depreciation.

The initial cost of fixed assets comprises its purchase price (buildings), transportation costs for the delivery and installation costs.

The residual value is the difference between the initial value of the fixed assets and the amount of wear (depreciation).

The investment project used linear form of calculating depreciation. Depreciation is charged only after the period of investments.

project depreciation calculations results are shown in table. 2.14.

Table 2.14

Amortization and depreciation of the project

Groups of fixed assets (OPF)	Step number		
Buildings and structures, thous.	0	...	*n*
Initial cost, thousand units			
Depreciation deductions, thousand units			
Residual value, thousand units			
Machinery and equipment, thous.			
Initial cost, thousand units			
Depreciation deductions, thousand units			
Residual value, thousand units			
Total depreciation			

2.7. Financial plan

A financial plan is a key section of the business plan, which integrates information from the previous sections. In financial terms, in value terms compared costs and projected revenues and determines whether the profitable activities to implement.

The financial plan reflects the financial results of the project cash flows, as well as performance indicators are calculated.

In financial terms, it should also be described all significant assumptions and the assumptions on which will be carried out financial calculations and prognoses.

Assumptions used may relate to the following main aspects of the development of the financial plan:

- determination of the planning horizon (billing period), which covers the period from the start of the project until its completion. As a final point in time may make the duration of the creation and operation of future products; achievement of predetermined characteristics of the project (revenues, profits, payback), etc .;

– determination of planning interval (calculation step), which corresponds generally to some calendar period (month, quarter, year). The initial period of the project (0.5-1 years), usually seen in monthly breakdown, and then the intervals may coarsen;

– definition of the project and its monetary unit of measurement (as a rule, the Russian ruble). other currency unit can be used in the implementation of international projects;

– the need to take account of inflation. For long-term projects may require consideration of inflation, which is used to price growth index components of income and expenses (on production rates, commodity prices and materials and other resources, the value of wages, etc...) By planning intervals;

– determining the methods of accounting and recognition of income and expenses, the tax base, tax rates, periodicity of payment of taxes, taxable items. May also indicate the method of calculating the depreciation of objects of fixed assets, the accounting methods the cost of materials and methods of pricing;

– determine the financial settlement terms: justification in the discount rate, the value of interest rates on loans.

After the formation of the forecast plan cash flows (tab. 2.15) is a calculation of the main indicators characterizing the economic efficiency of the project in question for the production and realization of scientific and technical products or the commercialization of scientific results.

To assess the effectiveness of the project, developed in the master's thesis, it is recommended to use the following performance indicators: return on investment; the net present value of the project; internal rate of return; discounted payback period.

Index return on investment (ROI - Return an On Investments) is defined as the ratio of the average annual income to total investment cost in the project.

Table 2.15

Calculating discounted cash flow

Indicators	Step number		
	0	...	*t*
Operating activity (OA)			
1. Revenue from sales			
2. Production costs			
3. Depreciation			
4. Taxable income (p.1-p.2-p.3)			
5. Income Taxes (p.4*Tax)			
6. Net profit (p.4-p.5)			
7. Cash Flow from OA (p. 3 + 6)			
Investing activity (IA)			
8. Investments			
9. The residual value			
10. Cash Flow (CF) of the IA (P. 8 + 9)			
11. CF project (pp. 7 + 10)			
12. CF cumulative (NP)			
13. Discount factor (r)	1	$1/(1+r)^t$	$1/(1+r)^t$
14. discounted CF (DCF) (P. 11 · 13)			
15. DCF accumulated result (NDP)			

Return on investment can be used for comparative assessment of project performance with alternatives to invest. For example, if the return on investment, expressed as a percentage, higher than the average rate of return on deposits in commercial banks, it can be argued that the investment in the project is more attractive at a comparable level of investment risk than keeping the funds in deposit accounts.

Net Present Value of the project (NPV - Net Present Value) is calculated as the difference between the discounted cash flows of receipts and payments, made in the implementation of the project for the entire investment period:

$$\mathrm{NPV} = \sum_{t=0}^{T} \frac{\mathrm{CIF}_t}{(1+\mathrm{R})^t} - \sum_{t=0}^{T} \frac{\mathrm{COF}_t}{(1+\mathrm{R})^t},$$

where CIF_t- receipt of funds associated with the project, in the interval t (cash inflows); COF_t- payments of cash related to the implementation of the project, in the range t (cash outflows); R - the discount rate adopted for the evaluation of the analyzed project; T - time of the project, defined as the number of intervals of the investment period, ie, the number of interest periods, after which the accrual of interest is made... If the interest period is accepted year, T determines the number of years during which the project (the project life cycle) is realized.

In particular, if the investment in a lump sum, NPV produced by the project can be calculated as follows:

$$\mathrm{NPV} = \sum_{t=1}^{T} \frac{\mathrm{CIF}_t}{(1+\mathrm{R})^t} - I_0,$$

where I0 - recurring costs in investment committed (zero) range; NCFt = (CIFt - COFt) - net cash flow.

A positive value of NPV indicates the advisability of making a decision on the funding and implementation of the project, and the comparison of alternatives investments economically advantageous is the option with the highest net present value of the stream.

If the NPV is negative, it means that the analyzed project is unprofitable and does not deserve further consideration.

Meaning NPV, zero, it indicates a special value on a discount rate, which refers to IRR.

Indicator of internal project rate of return (IRR - Internal Rate of Return) determines a discount rate at which the present value of the cash flows of the project is equal to the present value of the payments:

$$\sum_{t=0}^{T} \frac{\mathrm{CIF}_t}{(1+\mathrm{IRR})^t} = \sum_{t=0}^{T} \frac{\mathrm{COF}_t}{(1+\mathrm{IRR})^t},$$

where the IRR - the required internal rate of return of the project rate.

The project is considered cost-effective if the internal rate of return exceeds the minimum level of profitability established for the project. In addition, this indicator defines the maximum lending rate (cost of capital), where project financing is carried out without any loss, t. E. Without the use of payments for the loan part of the profits earned on their own investment.

Discounted payback period (T_{OK}) (The period of repayment) determines the time interval from the moment of the initial capital investment in the project until the cumulative total of the total net present value becomes zero. To determine the return period can use the data cash flow forecast and set investment interval after which index, defined as the net cumulative total of the discounted cash flow becomes positive. This interval determines the payback period. Obviously, the smaller the period of return on investment, the more economically attractive is the project.

CONCLUSION

Study and development of the theory, methodology and techniques of business planning is relevant for today's engineers and technicians for a number of reasons.

Development, implementation and commercialization of the results of scientific and technological activities require an evaluation of the opportunities and prospects for the implementation of various projects from the economic point of view.

Implementation of investment and innovation projects should be based on careful planning activity, modeling of various courses of action and influence of the environment, assess the consequences of decisions.

Obtaining financing of business projects, participation in competitions for grants requires the ability to prove the effectiveness of the business idea in accordance with generally accepted national and international standards.

The purpose of these guidelines is to present the main issues and challenges that must be addressed in the process of business planning and feasibility studies of

the projects, show the methods used, the procedure and business planning technology. Considered a typical structure of a business plan and the content of the key sections and the method of their development.

LIST OF RECOMMENDED LITERATURE

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