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ABOUT THE ADVANTAGE OF PRODUCING MULTI-ASSORTMENT PRODUCTS BASED ON FLEXIBLE TECHNOLOGICAL PROCESSES THAT HAVE PREFERENCES AND PRIORITIES AMONG CONSUMERS OF THE SOUTHERN FEDERAL DISTRICT AND THE NORTH CAUCASUS FEDERAL DISTRICT

Abstract: *in the article, the authors analyze the need to transition to a market economy and the fundamental changes in economic relations associated with them, which inevitably require domestic shoe companies to work in a new way, according to the laws and requirements of the market, adapting all aspects of their production, economic and marketing activities to the changing market situation and consumer demands, while competing with competitors. At the same time, the problems of forming a competitive assortment of shoes based on marketing information and studying the regional characteristics of consumer demand remain relevant for the formed conditions for shoe enterprises in order to guarantee themselves stable TEP and a stable financial condition.*

Key words: *quality, import substitution, demand, competitiveness, market, profit, demand, buyer, manufacturer, financial stability, sustainable TEP, attractiveness, assortment, assortment policy, demand, sales. paradigm, economic policy, economic analysis, team, success.*

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Introduction

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It is known that the concept of competitiveness can be applied to various objects: documentation of technology, products, production, etc. of all categories of philosophical, social, psychological, market, economic competition, market and economic are of unconditional importance for production, since they characterize its ability as a complex open organizational and economic system to predict its future, produce specific products and thereby ensure a profit sufficient for normal functioning and development. The competitiveness of an enterprise is determined by external and internal factors. The factors of an organization's competitiveness determined by the external environment are elements that must be taken into account when forming the flexibility of a production system of any kind, but in the future only the influence of internal competitive advantages is considered.

The market and economic categories of competitiveness of enterprises and their industrial products are studied in detail in the works of M. Porter, J.-J. Lamben, V.J. Stevenson, et al. Thus, M. Porter identifies new technologies, new or changed customer requests, the emergence of a new segment of the industry, changes in government regulation, changes in the cost or availability of production components as innovations that allow creating a competitive advantage of production or its products. At the same time, the changed requests of buyers, the emergence of a new segment of the industry, changes in government regulation, changes in the cost of production components are classified as Zh-Zh. Lambena to external factors that do not affect the costs of production itself.

The actions of buyers manifest themselves in completely new requests or their estimates change dramatically, which serves as an impetus for the design and release of new or modified products. The emergence of a new segment of the industry allows you to reach a new group of buyers. Changes in the cost of components, changes in government regulation are undoubtedly factors of external influence on production efficiency.

Then the changes in production components and new technologies highlighted by M. Porter should be considered as the reasons for which internal factors of the competitive advantage of the enterprise appear. Indeed, changing technologies create new opportunities for the development and production of goods. For an existing production, replacing the entire technological process is an expensive measure, and improving individual stages provides real opportunities to increase the level of competitiveness

of the enterprise. In any case, updating the technology is almost always associated with additional costs.

V. J. Stevenson suggests forming the competitive advantages of an enterprise through price, quality, specific features of goods or services (production or service orientation), mobility (flexibility) of production, time or timing of processes (timing of certain operations). Of these factors, the internal ones should include price, quality, production flexibility, time and timing of the manufacturing processes of finished products. The quality of products, the flexibility of production and the duration of processes are mainly determined by the technical and organizational level of the enterprise. At the same time, there is a clear influence of flexibility on the price of products and the duration of its production cycle. Indeed, flexibility provides a quick adjustment to the production of a new range of products, which leads to a reduction in the duration and costs of its production. R.A. Fatkhutdinov suggests taking into account structural, resource, technical, managerial and market factors as internal factors. Structural factors formed during the design of the organization include:

- production and organizational structures of the enterprise;
- the mission of the organization;
- specialization specialization and concentration of production;
- accounting accounting and regulation of production processes;
- information information and regulatory and methodological base of management, etc.

Resource internal factors for achieving a competitive advantage of an organization are related to the specifics of relationships with suppliers, taking into account and analyzing all types of resources, with functional and cost analysis of products, optimization of resource efficiency, etc.

The technical factors of the competitive advantages of the organization are realized through technical innovations, including: the possession of patent novelty or know-how of products and technologies, an increase in the proportion of advanced technological equipment and a decrease in its average age, etc.

Managerial internal factors of an organization's competitive advantage: these are the managers themselves, their level of qualification, as well as the functioning of management systems, information support for decision-making, quality management in the organization, etc.

The increasingly fierce competition in the international consumer goods market poses new challenges to the shoe industry. This is the problem of the criticality of the time required to create a product and organize its sale, and improving the quality of

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design and production processes, and problems associated with competition in the maintenance market, and problems associated with direct cost reduction (direct capital; wages in production, etc.).

The results of a study on the state of shoe enterprises in Russia and the Southern Federal District, in particular, showed their inability to cope with the increasing difficulties from the external and internal environment. Having embarked on the path of transition to market relations, shoe companies faced a crisis of their economic systems.

The old trends in the management of a shoe factory that are born in the internal environment (organization of production, cost reduction, efficiency of use of all resources, labor productivity growth, etc.) do not give a way out of the current situation. It is necessary to develop and use new approaches in the field of economic management of the enterprise, including marketing and development of the competitive status of the enterprise, facilitating adaptation to the external environment.

Thus, the success of a shoe company depends on how quickly the threat to its existence is determined. This once again confirms the main conclusion based on the results of the study of the state of shoe enterprises that their adaptation to the external environment, with the absolute importance of the internal environment, should become paramount and manifest itself in strategic forecasting and flexible development of the enterprise.

It is important for shoe companies to be able to orient themselves in using the achievements of scientific and technological progress in order to identify new trends in time, work out the concept of developing these achievements for specific production conditions, prepare for their implementation and ensure implementation.

The flexibility of an enterprise is the ability of an enterprise to obtain the necessary result, allowing it to master a natural (necessary) number of new shoe models in a certain period of time, without a radical change in fixed production assets, which can be demanded by the market and, in turn, allow it to obtain the necessary result in the future period, ensuring the survival and development of the enterprise.

The structure of shoe production is quite complex and is distinguished by a variety of assortment of raw materials and finished products. A feature of the shoe industry is the frequent change of production facilities (assortment). The design of new shoe samples involves the development of technological processes for their manufacture. This work should be carried out in a short time and with minimal costs, and the optimal production option is chosen, because at the design stage of the technological process, the intensity of the functioning of the enterprise is set in advance, i.e. the possible level of technical and economic indicators of its work. At the design stage, the foundations of product quality are laid, because its properties largely depend not only on appearance, functional purpose, fashion compliance, etc., but also on the manufacturing process.

In this regard, it would be more correct to talk about the need to create a structural model of shoe production that would ensure the functioning of a flexible technological process with the mandatory implementation of the main requirement - to ensure the manufacture of shoes in an assortment that meets the needs of the market and implements the requirements of competitiveness. A generalized block diagram of the flexible development of a shoe company is shown in Figure 1.

The structural model of shoe production will also be effective if the behavior of the proposed range of shoes in its "life" is taken into account, i.e. all stages of the product life cycle (LC) will be implemented

- marketing marketing and market research;
- designing design and development of technical requirements for the products being created;
- financially material and technical supply;
- preparation preparation and development of technological processes;
- production;
- control control, testing and surveys;
- packaging and storage;
- sales or distribution of products;
- installation, operation;
- technical assistance in maintenance (repair, etc.);
- disposal after the end of use of products.

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Figure 1. Generalized block diagram of the flexible development of a shoe company: D is a mathematical dependence that provides a scheme for the development of a flexible technological process for manufacturing a range of shoes; U_{об} - resistance (result) to renewal in various cycles of development of this production; S_{об} – the ability to update in various cycles of development of this production

A distinctive feature of light industry industries is the short life cycle of products, since the clearly defined desire of people for individuality in clothing, shoes, accessories makes it necessary to produce a wide range of products. This leads to frequent changes in product models, a reduction in the size of manufactured batches and an increase in the frequency of their launch.

The organization of a multi-assortment production of shoes with the maximum use of the capabilities of the equipment used, labor resources and production areas and the possibility of periodic change and updating of shoes with minimal time and money spent on organizing its production are the main requirements for modern shoe production.

In general, the average manufacturing time of a TEP unit is determined by the average time of operations T, the average amount of preparation for the launch of the corresponding batch of TK, the average production preparation time for this CCI model, the average number of batches of

manufactured products over the life cycle B, the average value of batch A. The expression for determining TEP has the following form:

$$T_{\text{TEP}} = T + T_3/A + T_{\text{ПП}}/AB. \quad (1)$$

The preparation time for the launch of a batch of TK includes labor costs for the selection of materials, equipment adjustment, production planning of a batch of products, etc. and is calculated at a time for each batch. The production preparation time of the CCI includes: model selection, design, technological preparation, cost calculation, pricing, production planning, which are calculated at the same time, but for the entire production program of this model.

In the shoe industry, there is a concept of a basic model, for which the main design and technological developments are carried out, specified for working models, the so-called model features. In this regard, the concept of the conditional life cycle of the basic model overlaps the life cycles of working models (Figure 2).

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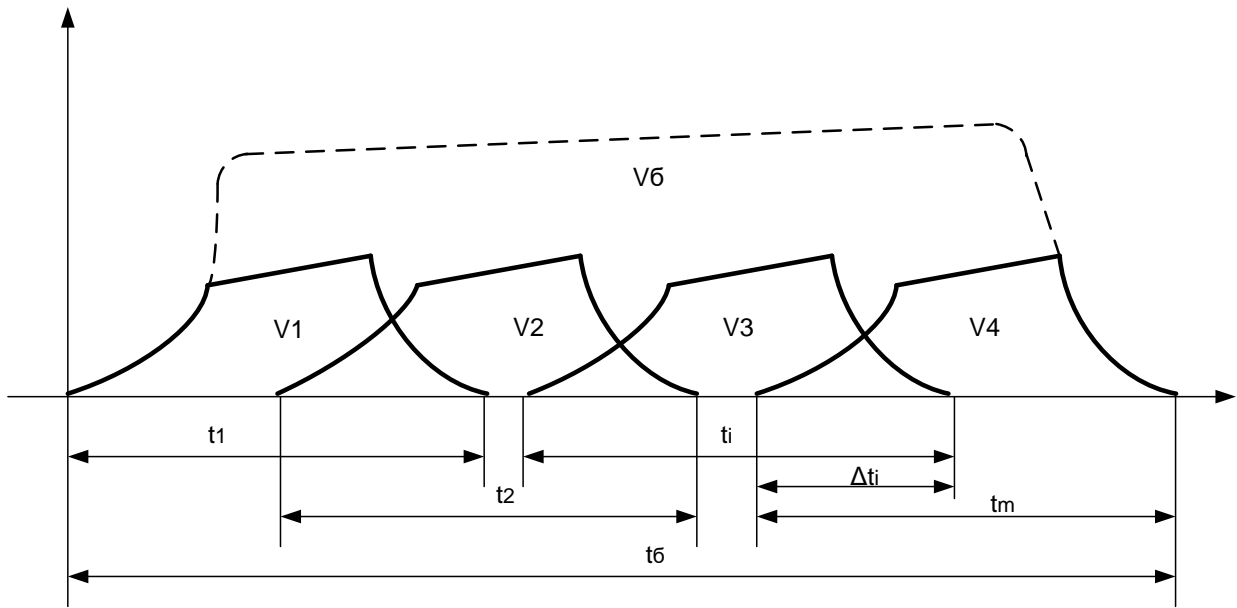


Figure 2 - Relationship of the life cycle of the basic model with the life cycle of working models

It is obvious that the total volume of production of products based on the basic model V_b is determined:

$$V_6 = \sum_{i=1}^m V_i, \quad (2)$$

where V_i is the production volume of the i -th working model;

m is the number of working models released based on the basic one.

In turn, you can write:

$$\sum_{i=1}^n T_{\text{EП}i} = \sum_{i=1}^n T_i \cdot A_i \cdot B_i + \sum_{i=1}^n T_{3i} \cdot B_i + \sum_{j=1}^k (T_{\text{ПП}6j} + \sum_{x=1}^l \Delta T_{\text{ПП}p_x}), \quad (4)$$

$T_{\text{ПП}6j}$ – where is the pre-production time of the j -th base model;

$\Delta T_{\text{ПП}p_x}$ – changing the pre-production time of the x -th working model based on the j -th base;

l is the number of working models released based on the j -th base.

The influence of the components of TK and CCI on the total labor costs is determined by the level of seriality. With a small serial production, the value of total labor costs is significantly influenced by the second and third components of the formula (4) for determining the average production time of a unit of heat production. They become comparable in size to the first component, since they are one-time and are distributed to a small number of batches and products in each batch.

In this regard, the change in the average time of the main work operations performed cannot

$$t_6 = \sum_{i=1}^m t_i - \sum_{i=1}^m \Delta t_i, \quad (3)$$

where t_b is the conditional life cycle of the base model;

t_i – life cycle of the i -th model;

t_i is the time of combining the life cycles of working models.

When launching n models per year based on k , the basic total labor costs for production will be:

significantly affect the total labor costs. Hence it becomes obvious that with a low serial number, the level of automation and specialization of equipment cannot significantly change labor costs. This corresponds to the internal structure of a small enterprise.

In mass and large-scale production, the change of models during the year is relatively small, i.e. products are produced in large batches and for a long time. Enterprises of this type mainly produce specialized shoes that have practically no product variability (for military personnel, etc.). In this case, the second and third components do not significantly affect the total time of launch preparation and the production preparation time is distributed over a large number of products. The determining influence on the total labor costs is exerted by the average time of operations. Based on this, the selection of equipment

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and the qualification of personnel should be carried out.

The implementation of the concept of flexibility becomes possible with the rapid execution of various volumes of orders from small-scale, almost single, to orders with significant seriality, for example, with the level of medium-scale production. This entails the need not so much to reduce labor costs for the preparation of production and the preparation of the launch of batches, as to reduce the time of these preparatory works. Therefore, the technological process of manufacturing products should be easily reconfigurable. This implies the unconditional use of quickly established and sufficiently specialized and automated equipment. The qualifications of operators and maintenance personnel should be relatively high in order to ensure high productivity of everyone at various workplaces. The flexibility of restructuring not only the technological process, but also the entire staff should be ensured. In this case, all three components of the average production time of a unit of production become significant and manageable.

The characteristics of the requirements for increasing the flexibility of shoe production in conditions of frequent assortment changes are shown in Figure 3.

Due to the large volumes of products and the small number of models produced, the principles of flexibility in application to mass and large-scale production are not significant. As for small-scale and single production, it is already flexible in its internal organization. Consequently, the concept of flexibility is significant for medium-scale production, in which models of a wide range are manufactured with sufficiently large volumes.

For the successful operation of enterprises, a high level of updating of the range of shoes is necessary. The main objects of renewal are the means of labor (equipment, tools, labor items, basic and auxiliary materials, components), production technology, organization of production and labor, and, finally, the shoes themselves. The renewal of the first three objects is directly reflected in the renewal of the shoe assortment. Socio-economic factors also play a significant role in updating the range of shoes: the level of income of the population, the degree of saturation of the market with shoes, consumer demand and fashion. Under the influence of fashion, not only the shape of shoes, the number of parts and their location changes, but also the nature and methods of

processing parts and their connections, finishing, materials used, etc. Factors determining the renewal of shoes are shown in Figure 3.

The directions of updating the assortment of shoes are determined by various combinations of factors. Thus, under the influence of scientific and technical factors, the release of new shoes is possible using new technology on existing equipment using previously used or new materials, using existing technology on existing equipment using new materials, using new technology on new equipment, etc.

The renewal of production is of a chain nature. Thus, a change in technology is usually accompanied by a complete or partial change in the design of shoes; the introduction of new equipment requires technology improvement, and the latter is related to the design of the product.

The large variability of socio-economic factors of product renewal, as well as the influence of socio-economic factors, make it possible to distinguish three types of product range renewal that are characteristic of shoe companies.

The first type of updating of the shoe assortment is characterized by the introduction of fundamentally new products in terms of design and technology, which were not previously produced at any enterprise and are the result of research and design work. These products are distinguished by new consumer properties and technical and economic indicators, because they are manufactured using new technology with the use of new materials based on nanotechnology and on new equipment with the use of innovative technologies.

The second type of product range renewal is characterized by the fact that the company creates modifications of previously manufactured products to extend the maturity phase of their life cycles.

The third type of renewal of the product range is characterized by the development of the production of fashionable novelties and high-quality products, fashionable elements of shoe tops, fashionable styles of pads, new types of materials, the production of particularly elegant shoes in small batches. Seasonal change of the product range also belongs to this type of renewal. The third type of renewal of the shoe assortment is most closely related to the change in fashion, it contributes to the growth of the competitiveness of the enterprise and the formation of a positive innovative image.

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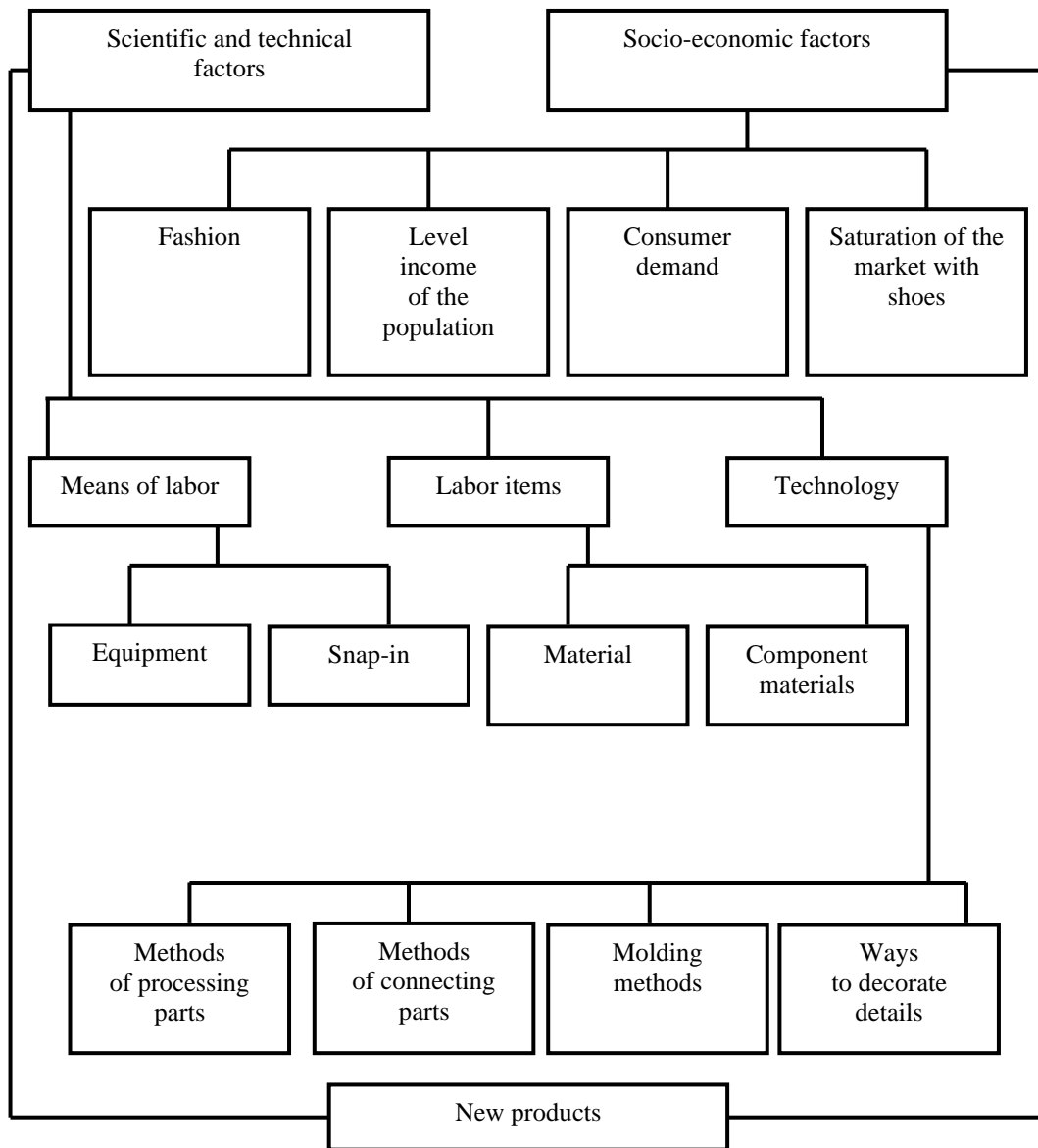


Figure 3. Factors determining the feasibility of updating shoes

Each of these types of updating the assortment of shoes is characterized by its own set of works, organizational features, duration of development, etc. Each type of update is also characterized by its own time intervals, within which the chosen direction of updating is relevant. After a certain time, new, more advanced technological, technical and constructive solutions appear, therefore, the production of products based on previous solutions will lead to a decrease in the technical and aesthetic level and deterioration of economic characteristics; such products of the enterprise will not be in demand among consumers.

In order to solve the problems of domestic shoe enterprises related to the renewal and expansion of the product range, the organization of the production of products that meet the requirements of consumers,

research is needed in the field of managing the process of developing and launching a new product range.

Shoe assortment management is the impact on the development processes, the formation of the composition and structure of the manufacture and sale of products in order to maximize consumer demand with high technical and economic indicators of production.

The development and implementation of control actions aimed at satisfying consumer demand for shoes must be carried out within the framework of the shoe assortment management system.

If we take into account that the control actions are carried out through various kinds of measures, then the subsystem for managing the assortment of shoes can be understood as a set of interrelated organizational, technical and social measures for the

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development, formation of composition and structure, manufacture and sale of products in order to maximize consumer demand.

Among the main functions of the shoe assortment management system are the following:

□ formation of the composition and structure of products;

organization and operational regulation of production with the aim of the fastest possible transition to new models and the development of the necessary production volumes;

organization of product sales.

In addition, the system performs the functions of collecting, processing and preparing information necessary for the implementation of the main functions. These include:

analysis of manufactured products;

analysis of the assortment policy of the main competitors;

making proposals on the feasibility of producing a new type of product and decommissioning non-demand types of products;

analysis of the attitude of consumers to new types of products.

An important criterion for the competitiveness of shoes in the market is its cost with the corresponding quality, as well as the purchasing power of the population.

The instability and dynamism of the external environment force enterprises to abandon the method of long-term planning based on extrapolation of existing conditions, and switch to management methods based on anticipating changes, setting goals for the development of the enterprise.

Despite the individual nature of market research conducted by a particular shoe company, in the process of comprehensive market research, it is necessary to perform the following independent, but interrelated and complementary studies

□ filling with goods;

□ market and its segmentation;

□ customer behavior and consumer demand;

□ analysis of competition conditions;

□ forms of marketing activities and measures to generate demand and stimulate sales.

Market research is conducted using a rich arsenal of various analytical methods, including questionnaires, various surveys, methods of patent information analysis, methods of system dynamics, correlation and regression analysis, etc.

The main task of developing a marketing (market) strategy is to ensure the sustainable commercial success of the enterprise, the effectiveness of product sales over a long period of time.

The market strategy is determined by the factors of demand, the level of competition and the general market situation and should provide an opportunity to

realize the existing and potential advantages of a shoe company.

The availability of high-quality, competitive goods is a necessary prerequisite for the highly efficient functioning of the enterprise. From this point of view, marketing can be considered as a system of measures for the mutual adaptation of goods and the market in order for an enterprise to achieve sustainable commercial success.

In marketing theory, a product is a means by which you can satisfy a certain need, i.e. a set of useful properties of a thing. So, F. Kotler, a well-known specialist in the field of marketing, identifies the following components of the product, grouping them into three levels.

The first level is the fundamental characteristic of the product – its functional purpose, i.e. the idea or intent of the product. The product in real execution has a number of characteristics that form the second level of product characteristics. These are characteristics such as the quality level, specific design, brand name, packaging. And finally, the third level is a set of additional services offered together with the product: after-sales service, warranty system, terms of delivery and payment for the product, accompanying documentation and the so-called "image" of the product, i.e. the image of the product and the image of the manufacturer of this product from the consumer of the product.

Solving problems related to the development of new products causes, first of all, the need to clarify and clarify the economic meaning of the concept of "new products".

The art of planning an assortment of shoes consists in the ability to embody existing and potential technical and material capabilities in products that bring profit to the manufacturer, have consumer value that satisfies the buyer.

Assortment planning begins either from the moment the needs are identified, or from the moment when, as a result of market research or on the basis of other information, the basic idea of the product has been formed. Regardless of the source of the origin of the idea of a new product, it is necessary to conduct market research sooner or later to find out whether the conceived product meets a conscious or still unconscious need.

When forming the assortment policy of shoe production, it is necessary to take into account intra-production capabilities that allow you to diversify the assortment, satisfy the consumer and take into account the risk of non-demand for goods.

Network schedules of assortment planning, which can be developed at enterprises, allow you to determine the time from the moment of the appearance of the product concept to the beginning of its implementation in the region, with wide observance of the sequence of stages included in assortment planning. The duration of the entire cycle

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can be shortened, but subject to the involvement of additional resources and the application of additional efforts at critical stages.

Highlighting the main characteristics of the product is of fundamental importance, because they determine the direction of creating a new one. To make a new product, sometimes it is enough to change at least one characteristic. Here it is important to consider those characteristics of goods, the difference in which leads to differences in the marketing activities of enterprises.

The formation of assortment policy based on product assortment planning is a continuous process that continues throughout the entire product life cycle, starting from the moment of conception of its creation and ending with withdrawal from the product program.

Creating a new product is a complex constructive task associated not only with achieving the required technical level of the product, but also with giving its design such properties that ensure the maximum possible reduction in labor costs of materials and other means for its manufacture, but at the same time meet the requirements of buyers.

At the same time, it should be borne in mind that all production sites are included in the work in a certain technological sequence, which depends on the technological complexity of the new product and the duration of certain operations, as a result of which a new order of operations is created. Due to the lack of production skills among workers when performing new operations, there is a decrease in labor productivity and the quality of work performed in the first days of production of new products, i.e. during their development.

Designing a product of the proper level involves the need for criteria to evaluate its results. As such, indicators of the manufacturability of the design can act.

The development of principles and methods of design work, including creative ones, related to the analysis of analog models, the initial conditions for the formation of product requirements, the preparation of technical proposals and the selection of the best, the evaluation of the quality of the product, is essential for increasing the productivity of designers, reducing the number of similar models and low-quality products in the shoe industry.

Modern requirements for the organization of the process of developing new shoe models clearly show the shortcomings of the methods of analysis, analysis and justification of decisions, inflexible and insufficiently coordinated with each other, based on the experience and intuition of the designer.

Designing shoes for various purposes is a traditional field of engineering work, in which considerable development experience has been accumulated. Therefore, shoe design involves the use of previous experience, which is concentrated in

recommendations for the selection of basic design solutions, descriptions of previously designed models, standard design techniques. When analyzing analog models, it is necessary:

to study fashion trends in the development of shoes;

to carry out a qualitative assessment of analog models - compliance with the specific purpose of the designed model, ergonomic compliance, perfection of the composite solution.

Obtaining high-quality shoe model designs largely depends on the quality of the analysis of possible solutions to the design problem, establishing the feasibility of designing a new model.

Many firms seek to improve the efficiency of the mechanism for developing new products, realizing that there is a complete relationship between the success of new products and the financial well-being of the enterprise.

The creation and introduction of new products to the market contains significant elements of risk. Research data show that out of 58 serious ideas of new products, only four are fully developed, two are introduced to the market, and only one succeeds.

In addition, many new products fail already on the market: 40% - for consumer goods; 20% - for industrial goods; 18% - for various services, i.e. there is a high degree of market uncertainty.

The search for ideas about new products should be carried out systematically, and not on a case-by-case basis. The main sources of ideas for creating new products are:

1. Fundamental research (aimed at obtaining new knowledge and indirectly leading to the emergence of ideas for new products) and applied (purposefully using scientific methods to develop ideas about new products).

2. Observations of related goods at exhibitions and fairs.

3. Reports and offers of sales agents, sellers, dealers.

4. Trends in the development of new products by competing firms.

5. Supplier information.

6. Expert opinions.

7. Information in patents, catalogs, advertising messages, etc.

Identifying the shortcomings of the products also allows you to form new ideas for its improvement.

Upon completion of the development of a new product and the creation of prototypes, preparations begin for the final stage - production and marketing. The most effective method by which to assess the chances of success of a particular product is a trial (experimental) sale of small batches of the product on a controlled market in real competitive conditions. Trial sales are designed to test in practice the demand for a new product for the market and to work out the

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technique of its sale. This makes it possible to reduce the risk when organizing commercial production.

The positive results of testing new products on the market are the basis for starting the final stage of the process of implementing an idea into a specific new product - the stage of its production development. A detailed plan for the production of a new product is being developed: sources of supply of materials, components, equipment are being investigated, working drawings are being prepared, products are being put into production.

All stages of creating a new product should be carried out in a short time. Shortening the development time increases competitiveness, because the cost of a new product must pay off before it becomes obsolete and loses demand due to the appearance of new competing products on the market.

Any product, regardless of its degree of novelty and quality, goes through a certain life cycle. Knowledge of the product life cycle features is a necessary condition when working with the assortment.

The main part

The concept of the product life cycle can be summarized as follows: any product lives (i.e. stays on the market) for a limited time - maybe for many years, or maybe for several months or weeks. The volume of its sales and the amount of profit generated during the life cycle change, and the nature of the change is similar for different products. Over time, these values first slowly increase, then grow rapidly, then growth slows down, their value is delayed at a certain level and begins to fall, first slowly, then rapidly.

The period from the appearance of a product on the market to the cessation of demand for it is called

the life cycle of the product. There are several stages in it:

- 1 - introduction of the product to the market;
- 2 - growth of sales volume and profit;
- 3 - maturity of the product;
- 4 - decline in sales and profits.

The life cycle of the product ends with its withdrawal from production due to lack of demand for it. The division of the life cycle curve into parts and the allocation of stages is conditional, therefore, in the special literature on marketing there are descriptions of different options, but most often these four are distinguished.

It is quite common in the domestic and foreign methodological literature to consider the classical curve of the product life cycle (LCT). The stages of the LCT are analyzed in detail and a forecast of the stages is proposed based on experimental data of similar products and their extrapolation over a short period of time. The classical LCT curve is the relationship between the volume of sales of goods and the corresponding time periods, reflected in the classical two-dimensional coordinate system along the "x" axis, in which the current time is positively postponed, and on the "y" axis - sales volumes. In the standard adopted in the domestic and foreign literature, the product life cycle curve is divided into a number of intervals characterizing the product (usually 5 of them), which are assigned the appropriate names. In most cases, they are called "product origin", "introduction to the market", "market development", "market saturation" and "sales decline".

The average life cycle of consumer goods is represented by the graph in Figure 4 and in Table 1.

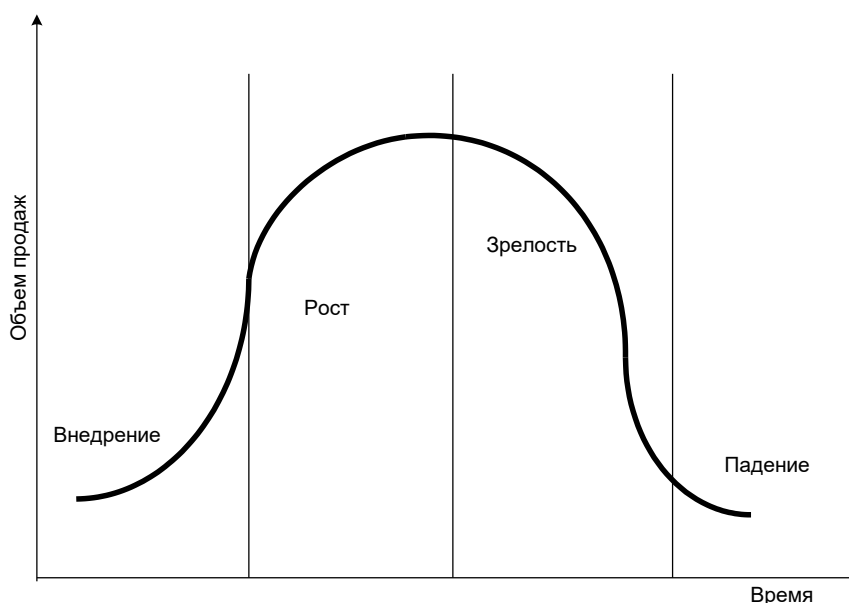


Figure 4 - The average life cycle of the manufactured range of shoes

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Table 1. The average life cycle of the manufactured range of shoes

Phase	Description of the phase from the point of view of flexible development
1. Implementation	From the start of production to the break-even limit
2. Growth	From the break-even point to the middle of the life cycle
3. Maturity	From the middle of the life cycle to the beginning of the development of a new range of shoes
4. The Fall	From the beginning of the production of a new range of shoes to the end of the production of this manufactured range of shoes

The life cycle of a product in a real situation may not be expressed on the graph of the traditional classical curve, in which the periods of the publication's introduction to the market, growth, maturity, saturation and decline are clearly defined. Depending on the specifics of individual goods and

the characteristics of demand for them, there are various types of LCT, differing both in duration and in the form of manifestation of individual phases.

In addition to the classical form of the product life cycle (Figure 5), the practice of various enterprises provides examples of its specific modifications.

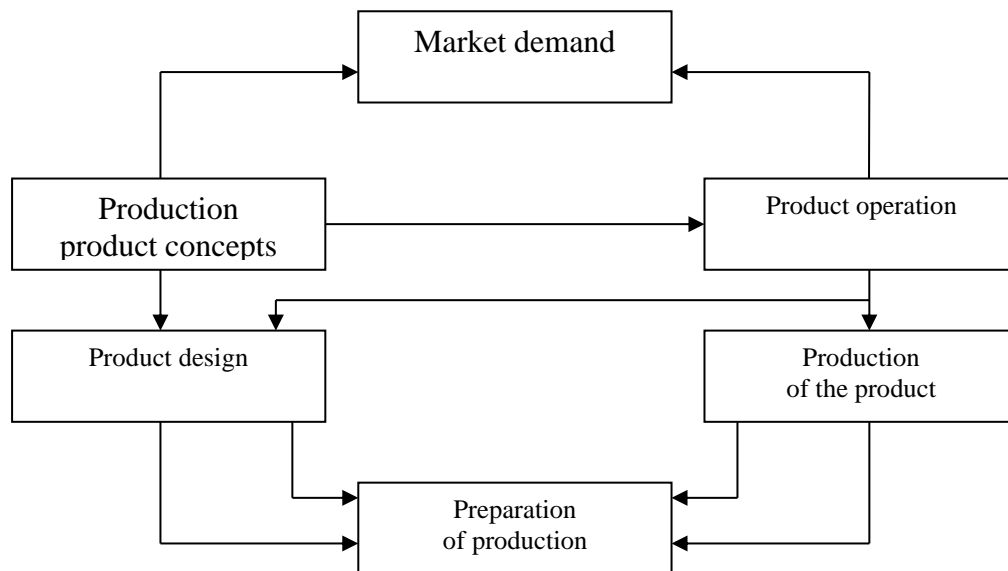


Figure 5 - Product life cycle stages

Effective marketing activity makes it possible to achieve high sales and profit growth even at the first stage, and in the following – to maintain a significant volume of sales (the curve called "boom"). The "boom" curve (Figure 6) describes a very popular product with stable sales for a long time. In the case of such a product life cycle curve, the company produces goods and makes a profit for a long time.

The life cycle of a publication can be expressed as a "hobby" curve, when sales of the publication increase sharply, and then fall sharply.

The passion curve (Figure 7) describes a product with a rapid rise and fall in sales. Often such a curve has a fashionable, popular product.

"Long-term passion" implies a rapid increase in sales of products, then a rapid decline, but with a residual average level of sales. The long-term hobby curve (Figure 8) also describes a popular product, but this product is still preferred by some consumers.

The fashion curve, or seasonal curve, refers to the life cycle of publications experiencing periodic, time-varying repeated ups and downs in demand, etc. The curve of such a product that sells well for certain periods of time is shown in Figure 9.

The curve of a new start or nostalgia (Figure 19). The demand for this product is falling, but after a while it resumes. An example would be a return to women's platform shoes, which were popular in the 70s.

The failure curve (Figure 11). Characterizes a product that almost immediately ceases to be in demand among buyers.

The curve of new rises (Figure 12). Such a curve is provided by goods whose sales stop growing, but after a small improvement and the appearance of additional useful properties, the company manages to increase sales again.

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The curve of unsuccessful withdrawal (Figure 13). This curve is the case for products whose market launch was unsuccessfully planned and carried out, but they were a great success when they were re-launched.

In the theory of flexible enterprise development, the interest in the concept of the product life cycle lies in the field of replacing goods that are at the stage of decline with new ones.



Figure 6 - Boom curve



Figure 7 - Hobby curve

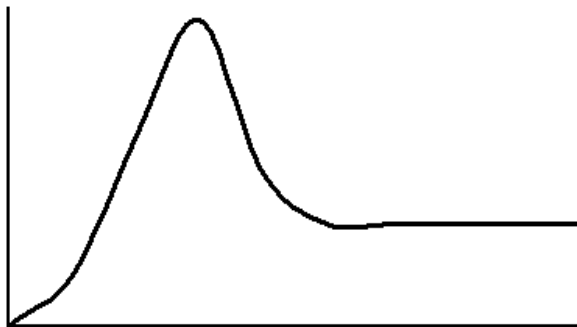


Figure 8 - The curve of prolonged infatuation

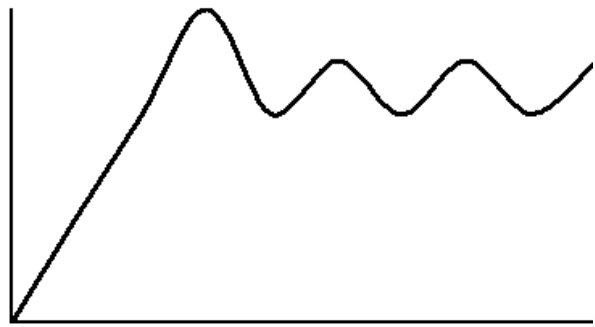


Figure 9 - Seasonality curve

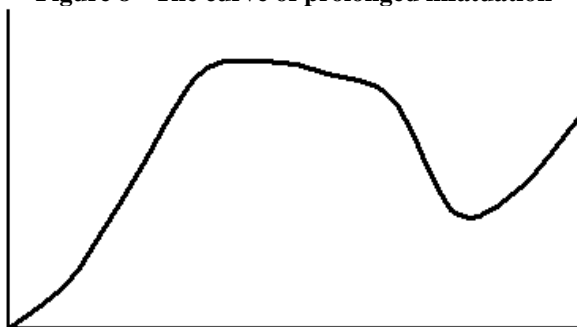


Figure 10- The curve of a new start or nostalgia

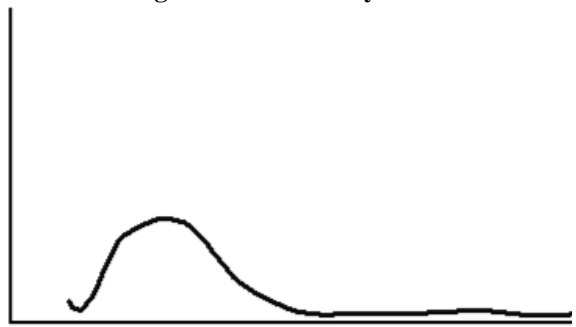


Figure 11 - Failure curve

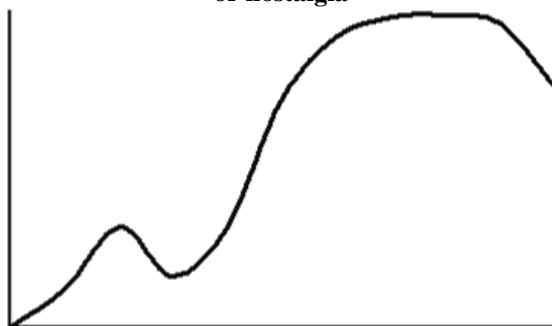


Figure 12 - The curve of new rises

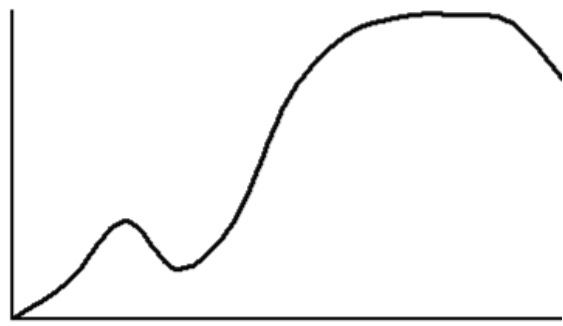


Figure 13 - The curve of unsuccessful withdrawal

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All other things being equal, a change in the production period (the duration of the product life cycle) will affect the value of the optimal number of shoe models under development. At the same time, the longer the life cycle, the fewer products the company needs to develop and, conversely, the shorter the life cycle, the more such products.

The assessment of the phases of the life cycle allows you to plan the cyclicity of their changeability, the timeliness of product replacement and the development of analogues, thereby reducing the degree of risk and, ultimately, allows for flexibility in the development of the enterprise.

The experience of leading foreign firms shows that the economic efficiency of their activities is largely determined by innovation activity, i.e. the creation and introduction of new products that provide an average profit of 28% higher than traditional. According to the definition given by F. Kotler, new products include products that have undergone any changes in shape, content or packaging that may be important to the consumer and serve as the basis for forming his preferred attitude to the products of this company. When introducing new products, firms try to find the optimal solution that meets both the requirements of the market and the available capabilities of equipment and technology.

Thus, the study and consideration of the stages of the product life cycle allows you to optimize the structure of the product range accordingly.

A necessary condition for the effective operation of the enterprise is the rational planning of production that meets the needs of the market.

The formation of the assortment of a shoe company should be based on representative information about the prevailing requirements, their possible dynamics and customer preferences.

Marketing research is used to improve the efficiency of the existing management system at enterprises, to adjust production and sales programs that allow responding to changes occurring in the market.

Marketing research is the main regulator of the company's product policy when choosing development directions. Marketing research should be

understood as the systematic determination of the range of data required in connection with the marketing task facing the enterprise, their collection, analysis and report on the information received, conclusions and recommendations.

A survey was chosen as a marketing research method. The survey, used most often in various types of research, is a universal method of conducting marketing research. It has a high degree of objectivity, high accuracy of the data obtained, and relatively low cost. The most accurate data has a mass survey, i.e. a survey of a large number of respondents.

One of the most important stages of planning a mass survey is the formation of a sample. A separate representative of a certain population group acts as a unit.

When determining the sample size, it should be borne in mind that the purpose of the survey is to obtain data characterizing the so-called general population, i.e. all carriers of an important feature.

The main idea of sampling is to judge the general by part, so the sample size should be such that its representativeness is ensured. The questionnaire is a kind of survey method. The study involved one hundred randomly selected men aged 18 to 55 years, the survey was conducted in shoe stores in Shakhty and Rostov-on-Don.

The purpose of the survey is to identify preferences in men's shoes for further research of technological processes of its production for the population of the Southern Federal District and, in particular, the Rostov region. Shoes should be in real demand, and their design and aesthetic characteristics should most fully correspond to the consumer preferences of this population group.

The results of data processing are presented in Figures 14-21.

Seasonal preferences by type of shoes are as follows: shoes (half-boots) occupy a significant place in the wardrobe of a modern man, regardless of the time of year, sports shoes are also a necessary element, especially for respondents of the first age category (18-24 years). Considerable preference was given to strappy sandals and boots in the respective seasons of operation (Figure 14).

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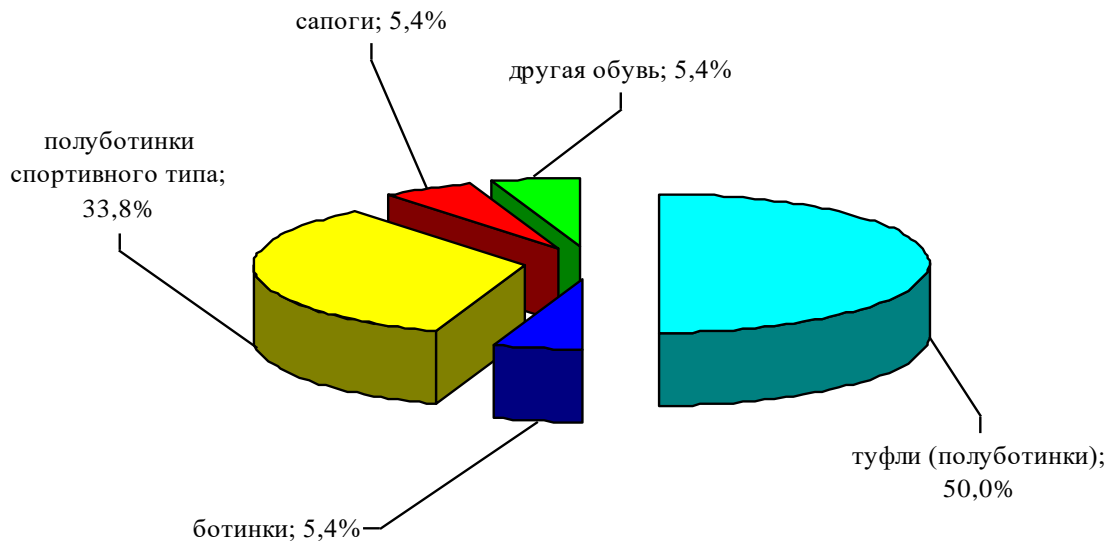
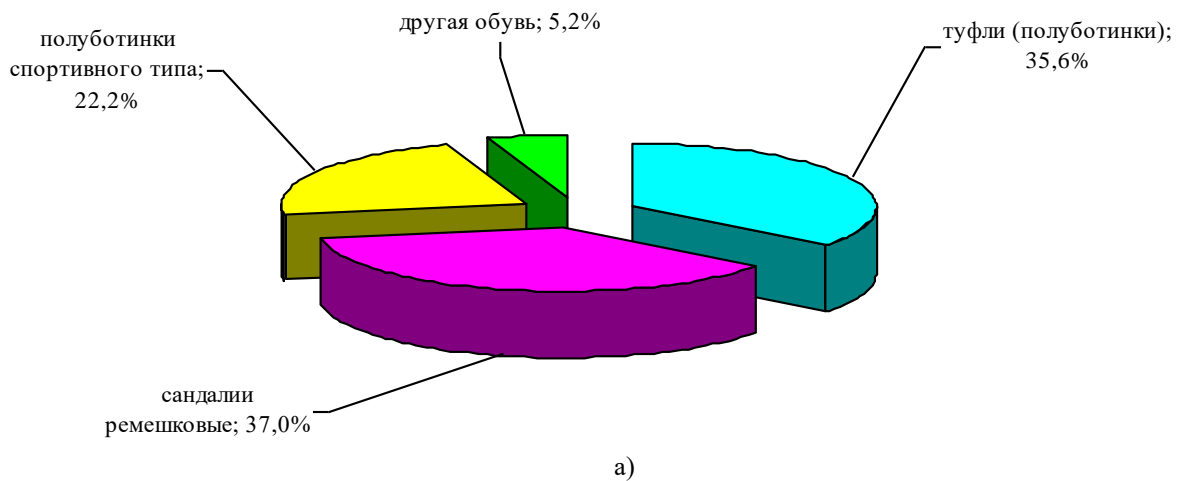


Figure 14 - Diagrams of consumer preferences of various types of shoes by season:
a) summer socks; b) autumn-spring socks; c) winter socks

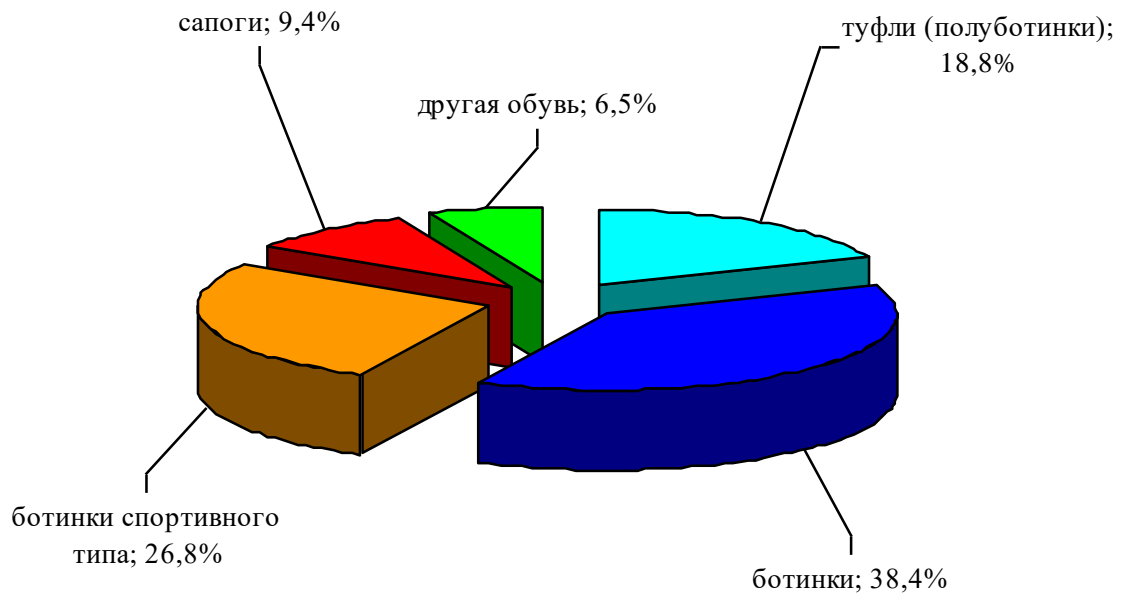


Figure 15 - Ending

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The vast majority of respondents prefer to buy shoes with uppers made of natural materials, which, in their opinion, is more comfortable and prestigious. If natural materials were almost unanimously chosen for the top of the shoes, then in the materials of the bottom of the shoes attention was paid to the seasonality of

operation, which was expressed in approximately equal parts of the diagram presented. Most of the respondents showed significant awareness of the purpose of the sole materials, but at the same time, about a tenth found it difficult to answer the question (Figure 16).

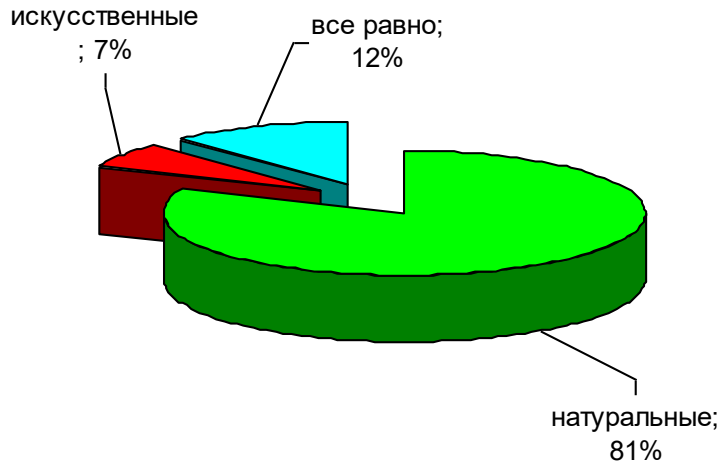


Figure 16- Characteristics of shoes based on upper materials

More than half of respondents prefer shoelaces as a way of fixing shoes on the foot, elastic bands and velcro tape are in second and third places by a significant margin (Figure 17).

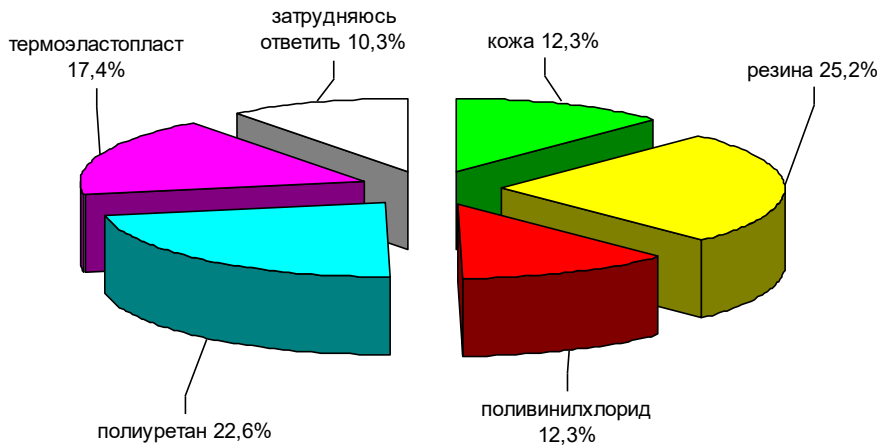


Figure 17 - Characteristics of shoes based on the materials of the bottom

According to the results of the survey, the optimal number of external parts in the shoe top preparation turned out to be the smallest and average,

which is probably explained by the respondents' attraction to the classical trends of shoe fashion (Figure 18).

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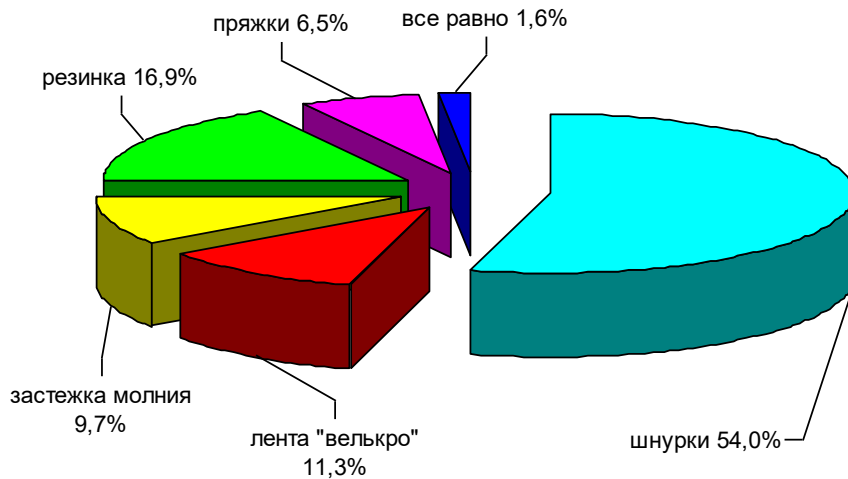


Figure 18 - Characteristics of the preferences of ways to fix shoes on the foot

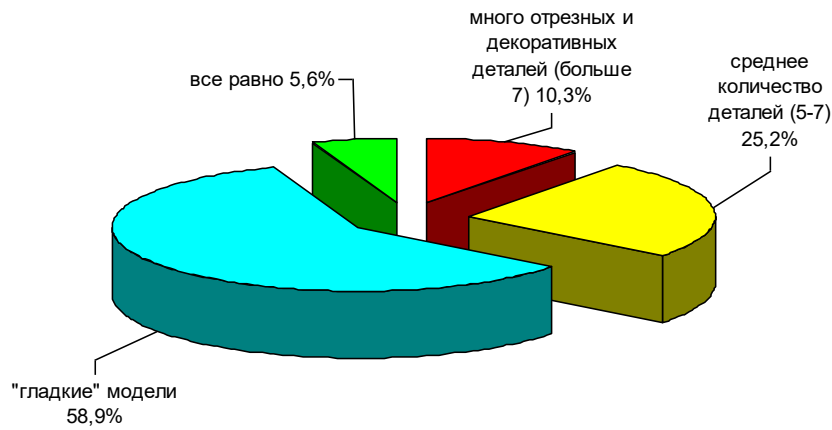


Figure 19 - The number of external parts in the shoe top blank

The distribution of preferences by type of finishing of the outer parts of the shoe top blank is shown in Figure 20.

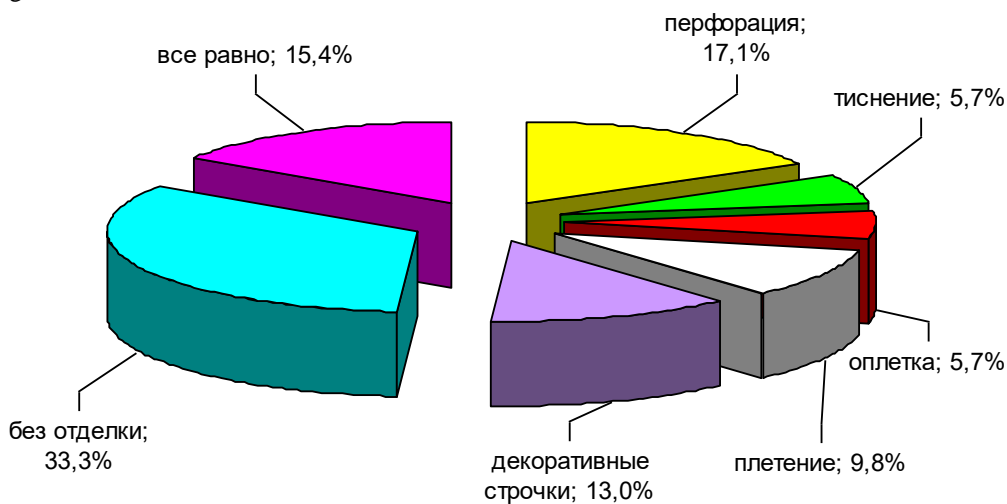


Figure 20 - Types of finishing of the outer parts of the shoe top blank

The diagram of the respondents' age categories is shown in Figure 21.

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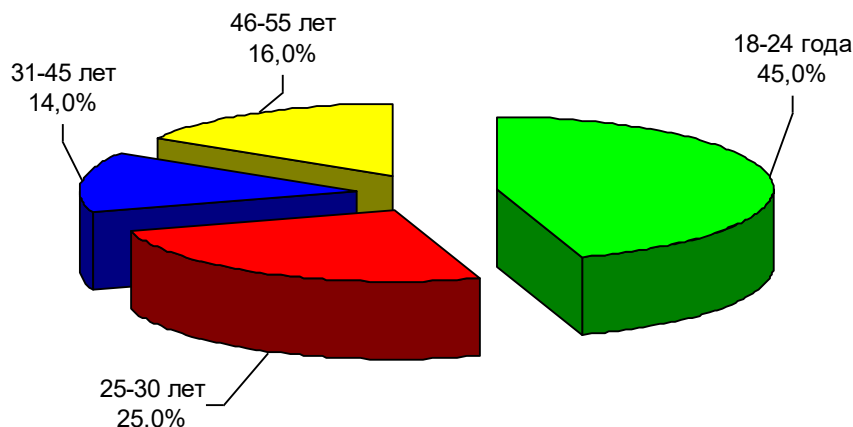


Figure 21- Distribution of respondents by age categories

Based on the results of the study of consumer preferences, an assortment of shoe models meeting the requirements of consumers is proposed.

Models on a single basic basis differ in the materials used for the top and bottom of shoes and the degree of processing of parts and assemblies. In addition, changing the color scheme of each of the presented models will allow you to transform the presented assortment to infinity, instantly responding to market requirements, and match the fashion trend.

Thus, externally similar models are manufactured according to various technological processes, which has a significant impact on their cost. As a result, the price of manufactured models varies in a wide range, which allows the company to react faster to fluctuations in demand and increase its market share, and, consequently, improve its economic performance.

When developing an assortment of children's shoes, it is necessary to take into account the factors that form consumer demand: compliance with the main fashion trends, economic, social and climatic specifics of the Southern Federal District.

According to its natural and climatic conditions, the Southern Federal District occupies a unique position in the Russian Federation. The geographical location, proximity to the three seas and the diverse relief with the presence of highlands predetermine a significant diversity of climate. In the eastern part, the continentality of the temperate climate is clearly manifested: winter is cooler here, summer is hotter (the average temperature in July ranges from +25 to +28 0C, January - 4-8 0C), the amount of precipitation is not great; The climate of humid subtropics with a lot of precipitation prevails on the Black Sea coast, the average temperature in January is +2-5 0C.

Such mild natural and climatic conditions of our region suggest a great demand for shoes of the spring-autumn and summer period of socks (sandals, shoes, half-boots, autumn half-boots and boots). Winter shoes are less in demand. In accordance with MGOST 26165-84 "Children's shoes. Technical conditions", the use of textile and artificial materials along with

natural and in combination with them is the most relevant for such shoes, allows the most complete satisfaction of consumer demand for families with different income levels.

Thus, shoe companies, when developing assortment policy, should focus on both external (price and consumer niche, competing enterprises, market conditions, etc.) and internal factors, such as sales volume, profitability, coverage of basic costs, etc. However, it is impossible to take into account and foresee all the situations that may arise when selling shoes, i.e. some shoe models are not in demand at a certain stage. In this case, another side of marketing, usually not advertised, should manifest itself: if the shoes, even without taking into account the requirements of the market, have already been produced, then it must be implemented. For this purpose, in order to respond to the lower prices of competitors, it is necessary to reduce too large stocks, get rid of damaged, defective shoes, eliminate the remnants, attract a large number of consumers, stimulate the consumption of shoes, using discounts for this. There are about twenty types of discounts, but for shoes the most common are the types of discounts that are used at various levels of the enterprise, sales organizations, trade. In addition to using discounts, an enterprise can take the initiative to reduce prices when production capacity is underutilized, market share is reduced under the onslaught of competition from competing enterprises, etc. In this case, the company takes care of its costs, developing measures to reduce them by improving equipment and technology, introducing new types of materials into production, constantly improving the quality of products. And all this requires large financial costs from enterprises, but, nevertheless, contributes to increasing the competitiveness of certain types of leather products and the enterprise as a whole. In addition, the larger the number of shoe products produced, the more production costs are reduced, which leads to lower prices, and most importantly, creates such conditions for the functioning of the market that would not allow

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other competing enterprises to enter it and would cause a positive reaction from consumers.

Currently, for the production of competitive high-quality shoes that are in demand on the market, a frequent change of assortment is necessary. The flow-conveyor form of the organization of shoe production is justified in the production of shoes of the same type for a long time. When organizing production according to the principles of conveyor flow, various types of conveyors are used as a means for automatic transportation of labor items from operation to operation (from the launch point to the release of the finished product) and as a means of organizing the work of a team of workers.

The layout of the enterprise is understood as a symbol on the scale of the relative location on the enterprise plan of production, administrative, auxiliary and utility rooms. When planning workshops, the following requirements are provided for:

- economical use of space;
- minimization of the length of cargo flows and transitions of workers;
- ensuring the safety of workers, as well as the isolation of workplaces with harmful working conditions from other workplaces;
- compliance with the norms of the area per workplace;
- ensuring effective maintenance of workplaces, their availability, creating conditions for equipment repair.

When planning an enterprise on a scale of 1:100, a grid of columns is applied to the enterprise plan and the dimensions of the entire enterprise, workshops and those premises that are available in it are indicated. The grid of columns is uniform for the entire production building.

When assembling equipment in the workshop, the minimum permissible distances should be observed. The work on specifying the dimensions of the designed workshop begins with specifying their length. To do this, millimeter paper is applied in a technological sequence to workplaces separately for assembly and procurement sites, taking into account the rational organization of workplaces, the installation dimensions of equipment and the distances between workplaces allowed by safety regulations.

One of the most important issues that is solved during the layout of the equipment of the production shop is the layout of the workplace in accordance with the requirements of the labor organization. At the same time, they determine rational methods and methods of work, the posture of workers, provide for equipping workplaces with auxiliary equipment, technological and organizational equipment. The layout of the enterprise includes the availability of new equipment, at the shoe assembly site, a new division of assemblers into workers performing

operations preceding molding, molding operations, operations for attaching the workpiece top to the bottom of shoes, operations for finishing and packing shoes has been carried out. This division ensures high-quality shoe assembly.

To implement this project of developing a strategy for the production of competitive leather products, it is advisable to develop a layout of technological equipment on the basis of which it is possible to form a technological process for both the production of men's and children's shoes with an optimal capacity of 500, 600 and 700 pairs per shift, regardless of the production area and the form of production organization. It should also be noted that the developed technological chains can only be used for the production of shoes by the adhesive method of fastening.

The assortment of children's shoes should focus on buyers with different income levels, for this purpose, in the production of shoes, you can use leather of different quality: expensive, such as chevrolet or cheaper - pigskin, shoes from which you can wear to the "exit", and, when you come home, take them off so that the child's legs rest.

Also, when developing the assortment, it should be taken into account that more girls are born in the Southern Federal District than boys, so that shoes for girls should be produced in a larger volume than shoes for boys.

If manufacturers of shoes for children will be guided by all of the above, then buyers will have the opportunity, depending on their financial situation, to give preference to products of a particular price category, made taking into account the climatic characteristics of the Southern Federal District and the generic characteristics of its population.

One of the most important requirements of Russians to buy shoes in general and children's shoes in particular is their compliance with the latest fashion trends. Moreover, recently it has begun to spread not only to models for schoolchildren, but also for school and toddlers. And this applies both to the products of famous foreign brands and domestic manufacturers. Of course, there are different price niches in all shoe markets of the world, but also the peculiarity of our Russian: a huge sector of cheap shoes, relatively small – of average cost and very small – expensive. The second, no less important feature: a large fork between cheap shoes (up to 9 euros per pair) and expensive (from 200 euros per pair).

The first sector employs not only firms from Southeast Asia, but also Russian wholesalers placing their orders in China. In the second, middle, there are Russian factories, as well as enterprises in Eastern Europe and Turkey that produce shoes under their own or licensed brands. In the third – well-known world manufacturers and even fashion houses.

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At the junction there are collections of European production from natural materials adapted to the Russian market, but also of moderate cost.

Representatives of the most extensive cheap sector, where the level of competition is very high, are trying in every possible way to reduce the cost of their products by producing at cheaper factories, as well as the materials used.

It should be noted that now parents' requirements for the hygienic properties of children's shoes have sharply increased, namely, the naturalness of the upper material, because many manufacturers from the inexpensive market segment, in an effort to reduce the price, make only an insole and lining from genuine leather. In order for a child's foot to remain healthy, everything should be thought out in shoes for children-sliders, down to the details.

If you only think that the growth of the foot is completed on average by about the age of 18, then you can imagine how important it is to have suitable and healthy shoes from the very beginning. During the growth of the legs, a transformation takes place: since at first the child begins to crawl, he still has crooked legs in the shape of the letter O. With the disappearance of these crooked legs, which is caused by growth, crooked legs appear in the form of the letter X, when the sides of the knees touch each other from the inside. Until about the age of 6, the leg of a small child grows, keeping the X shape. Learning to walk, the child tends to align the body vertically, and the feet are subjected to a heavy load. The feet and legs begin to develop, as they begin to have a functional load on the muscles, ligaments and tendons, begin to adapt to each other. During the period when the child begins to get up spontaneously, the foot must necessarily be able to develop freely. This also applies to further stages of development and in older children. Shoes, from a hygienic point of view, should protect the body from cooling and overheating, protect the foot from mechanical damage, help the muscles and ligaments to keep the arch of the foot in a normal position, provide a favorable microclimate around the foot, contribute to maintaining the necessary temperature and humidity conditions under any microclimatic environmental conditions. Shoes must meet hygienic requirements: be light, comfortable, do not restrict movement, match the shape and size of the foot. Then the toes are placed freely and they can be moved. But it can cause a large number of deformities and diseases of the feet.

Tight and short shoes make it difficult to walk, squeezes the foot, disrupts blood circulation, causes pain and changes the shape of the foot over time, disrupts its normal growth, deforms fingers, promotes the formation of hard-to-heal ulcers, and in the cold season – frostbite, increases sweating. Too loose shoes are also harmful. Walking in it quickly tires, and scuffs may occur, especially in the lifting area.

The support area and stability are sharply reduced. The torso leans back. Such a deviation at an age when the pelvic bones have not yet fused causes a change in its shape, changes the position of the pelvis, which in the future may adversely affect the generic function. In this case, a large lumbar bend is formed. The foot rolls forward, the fingers are compressed in a narrow sock, the load on the anterior part of the foot increases, as a result of which flattening of the arch of the foot and deformation of the fingers develop. In high-heeled shoes, it is easier to twist the leg at the ankle joint, it is easy to lose balance.

The sole should bend well. A rigid sole makes walking difficult (the bending angle is limited, the heel of the shoe is pulled off the heel), reduces the performance of the ankle joint muscles, increases the temperature of the leg skin and sweating.

As much as it is necessary to ensure maximum mobility of the forefoot, it is also necessary to ensure maximum stability of the heel. The backdrop should be strong, not allowing the foot to slip. The backdrop should protect, tightly cover the heel, prevent its deformation.

In winter, shoes must be warm. For this purpose, fur, felt, cloth, felt are used. On cold winter days, at least -10 ° C, schoolchildren can wear boots and boots on porous rubber, insulated with synthetic fur (dacron with cotton) or on wool or felt lining. With chronic cooling of the legs, vascular spasms occur and serious nutritional disorders of the leg tissues develop due to difficulty in blood flow. In the summer months, light open shoes with a wide neckline are the most hygienic - sandals, sandals, leather shoes or leather-soled shoes with tops made of textiles and other materials with a porous structure (matting, denim, etc.). Such shoes contribute to good ventilation and rapid evaporation of sweat due to air circulation around the foot (thanks to the selection of material, but more often the openwork pattern of the top of the shoe).

In wet rainy weather, rubber boots or shoes with soles made of waterproof materials, rubber, rubber, nylon, etc. are comfortable. However, these shoes are characterized by low breathability, so it is necessary to wear them only with insoles that absorb sweat well: felt, cloth, and in summer - from woven straw or cardboard. It is necessary to ensure that the lining does not become wet.

Shoes that meet hygienic requirements help to avoid unpleasant, sometimes painful phenomena. Thus, shoes should not compress the foot, disrupt blood and lymph circulation, interfere with the natural development of the foot. There should be a space of 0.5-1 cm in front of the thumb.

Hygienic requirements for shoes for children and adolescents consist of requirements for the design of shoes, due to the peculiarities of the structure of the foot during the growth period, and to the materials from which shoes are made. The size, style and

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rigidity of the bottom of children's shoes should not hinder the development of the foot.

The foot of a child at an early age differs significantly from the foot of an adult in anatomical and physiological structure. The children's foot is characterized by a radial shape, in which the greatest width is marked at the ends of the fingers. The foot acquires a fan-shaped shape. A different ratio of the heel and forefoot: children have a relatively longer back (heel), which should be taken into account when designing shoes. The skeleton of the foot in childhood is formed by cartilage. Ossification ends only with the end of growth (approximately 21 g.), therefore, the child's foot can easily deform under the influence of mechanical action. In this regard, qualities such as thickness, flexibility of the sole, weight of shoes, as well as heat-protective properties are subject to hygienic rationing.

The main elements of the shoe cut are the upper - this is the toe part, the back, the union, the ankle and the boot, and the bottom is the sole, insole, heel. The toe part should be wider than the bundle (part of the foot at the level of the metatarsophalangeal joints). A sock is an outer part of the upper part of the shoe, covering the surface of the toes to the level of the metatarsophalangeal joints. A toe cap is a top detail located between the lining and the top in the toe part to preserve its shape. It protects the toes from injury, and its length should not exceed the area of the metatarsophalangeal joints. The backdrop is a detail of the upper part of the shoe, located in the heel part to preserve its shape. The backdrop should protect the heel, prevent its deformation, prevent the foot from sliding upwards and posteriorly. Thicker genuine leather is used to make the backdrop. The production of shoes without a backdrop is allowed for children over 11 years old. The union is a leather patch on the toe and the rise of the boot, as well as the front part of the shoe blank. The boot is the part of the boot covering the shin.

The height of the shoe is normalized depending on its type and kind. The bottom of the shoe (insole, sole, heel) should have optimal stiffness indicators: resistance (expressed in N / cm) to bending along the line of the connecting head and metatarsal bones to an angle of 25 degrees. "The flexibility of shoes is regulated and should be 7 N/cm for hussar shoes, 10 N/cm for preschool shoes, 9-13 N/cm for boys' school shoes, 8-10 N/cm for girls' school shoes."

The sole is the main element of the bottom of the shoe. The sole should have optimal flexibility, thickness, weight and thermal protection properties. The heat-protective properties of plantar materials depend on their thermal conductivity. The lower the thermal conductivity, the higher their thermal protection properties. Porous rubber is significantly superior to leather and monolithic rubber in terms of thermal protection properties. At the same time, with an increase in ambient humidity, the heat loss of

natural wool leather (felt boots) increases, and the heat-protective properties of porous rubber do not change. This creates the advantage of using porous rubber soles in children's shoes, which can provide not only heat-protective properties, but also thickness, flexibility and anti-slip properties of shoes. In summer, wearing shoes with rubber soles, including microporous ones, leads to increased sweating of the feet due to the complete lack of steam and air permeability. For children's shoes, thread and combined fastening methods are allowed, providing greater flexibility in the beam area, ease in the use of porous rubber, polyurethane and other materials, it is possible to use adhesive and injection molding fastening methods that ensure the water resistance of shoes, which is necessary in the autumn-spring and winter periods. The thickness of the sole is normalized depending on the materials and type of shoes.

The insole is an internal part of the shoe that has contact with the skin of the foot and contributes to the creation of a comfortable temperature and humidity regime in the shoe space. It must have high air and steam permeability. It should be made only of genuine leather.

The heel artificially increases the arch of the foot, increasing its springiness, protects the heel from bruises on the ground, and also increases the wear resistance of shoes. When relying on an unshod foot (without a heel), most of the load falls on the posterior part of the foot. The absence of a heel is allowed only in shoes for young children (booties), while the child is not walking. In shoes with a 2 cm heel, the load is distributed evenly between the front and back of the foot. In shoes with high heels, that is, higher than 4 cm, most of the load falls on the front of the foot (with a heel height of 8-10 cm, the load on the front of the foot is 7 times greater than on the back). Heel height: for preschoolers - 5-10 mm, for schoolchildren 8-10 years old - no more than 20 mm, for boys 13-17 years old - 30 mm, for girls 13-17 years old - 40 mm.

Children's shoes should have a reliable and comfortable fastening on the foot, which does not interfere with movements. For this purpose, various types of fastening are used: lacing, Velcro, belts, zipper, etc. Open shoes without fasteners (such as "pumps") are not allowed for school shoes. The weight of the shoes depends on the materials used, the design and the type of fastening. The norm of the weight of shoes is normalized.

Natural leather is recommended for the upper of children's shoes for seasonal use, because it has high air and steam permeability, softness, flexibility and heat-shielding properties. For summer shoes, along with leather, various textile materials or their combinations with leather are used: matting, denim, etc. In insulated shoes for the upper, cloth, drape, wool and woolen materials, felt, felt, etc. are recommended. Natural leather and cotton materials are recommended for lining. For the manufacture of children's shoes,

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polymer materials or natural materials with the attachment of chemical fibers can be used, which are regulated by sanitary norms and rules. Shoes for everyday wear on the street or at school should be simple, comfortable in shape, with a wide low heel (1-2 cm). Then walking will not be tedious. The weekend shoes of older girls can be on an average, but necessarily stable heel, no more than 3 cm high.

There are also specific requirements for the color of children's shoes, and they differ depending on the age of the child (models for toddlers are always brighter, cheerful, and for older children – darker, practical). Our parents are not too fond of branded light shades (they can only be in girlish summer shoes and sandals), as well as non-standard tones suitable for clothes of a strictly defined color. Yellow is especially disliked, although according to all forecasts it will be relevant this season.

The colors preferred by boys include black, gray, dark blue and brown, as well as beige-sand and marsh-green. I don't like the traditional-boyish blue and bright green. Among older boys, another, more radical color scheme is already popular, including red and orange, and the latter are increasingly used not only as bright finishing touches, but also as the main two. School-age children can be divided into two subgroups: primary school-age children and adolescent children.

To revive the production of children's shoes in the Southern Federal District, first of all, it is necessary to create a number of shoe industry enterprises in the following subjects of the district with a pronounced socio-demographic situation and employment of the population in the republics: Chechen, Dagestan, Ingush, Kalmyk.

Newly created enterprises need state support, because they do not have enough of their own funds, and borrowed funds are not available due to the high cost. It is necessary to solve at the enterprises the general tasks of technological renewal of the industry, replenishment of working capital, increasing the efficiency of scientific and technical support of production for the manufacture of high-quality and affordable children's shoes.

It is necessary to intensify the work of regional and municipal social protection bodies to organize targeted assistance to children and their parents, including large and single-parent families.

We believe that this is a problem not only for private business, but also for the state, since the trend of falling oil prices is becoming persistent, which worsens the economy and, if measures are not taken in industry, may lead to a decrease in the real annual GDP growth rates (due to a decrease in profitability). This will lead to serious negative consequences in the economy. The positive development of the economy could have been without shock if the state had provided "initial" assistance in the revival of light industry, because today, the light industry remains in

crisis, which explains unemployment and poor quality of life, especially in small towns, where city-forming sewing, shoe, etc. enterprises necessarily functioned until 1992.

It should be noted that in the volume of light industry output today, only a fifth is produced by small enterprises. Reasonable expectations are paradoxical here: according to the proposals of the Chamber of Commerce and Industry of the Russian Federation and the Russian Union of Industrial Enterprises, it is obvious that in 2022 the permissive scale of restrictions on the production volumes of small enterprises will significantly increase (!), after the introduction of which the volume of shoe production by small enterprises will grow to at least 60-70% of the total production volumes

For what reason is this growth not systematic? After all, there is the main thing: an immense market (the taxable base for the import of goods and light industry products increased by \$ 746 million; loyal consumer; capacity; qualified personnel; competitive advantages (easing tariffs for electricity/ energy, water, land, etc.) and other reserves. According to the achieved production volumes and its dynamics, it is realistic to predict the successful completion of the industry in 2025, but everything is in the hands (minds) of the business community, since it is not necessary to count on preferential conditions from the state.

I want to believe that the order of the Prime Minister of the Russian Federation will be fulfilled at least in terms of reducing the volume of shadow (counterfeit, falsified and contraband) products on the market, and domestic shoes will find their consumer.

Development of an assortment of children's shoes

The acute situation regarding the production of children's shoes at most Russian shoe enterprises, including in the Southern Federal District and the North Caucasus Federal District, is associated with the cancellation of subsidies from the federal budget, with imperfect taxation of the children's assortment and insufficient production of pads for its production. In the consumer market of the Southern Federal District and the North Caucasus Federal District of goods for children, domestic manufacturers have been replaced by foreign manufacturers who supply cheaper shoes made of low-quality materials. However, this product, for the most part, does not have certificates of conformity and hygiene certificates.

Providing children with properly selected, physiologically sound shoes is one of the main tasks for domestic manufacturers. Domestic children's shoes are manufactured in accordance with strict standards. This is also ensured by the interstate standard GOST 26165-2003 "Children's shoes, put into effect in 2003. General technical conditions", which defines general requirements for shoe manufacturers both in Russia and in the CIS countries.

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Children's shoes are divided into groups according to gender and age characteristics:

- 1) for toddlers;
- 2) little nursery;
- 3) preschool;
- 4) for school girls;
- 5) maiden;
- 6) for school boys;
- 7) boy's.

Age group (0-4 years)

In toddlers, motor-tactile forms of cognition of the surrounding world come to the fore. Shoes for this age, first of all, should be easy to put on and fasten on the foot. Accessories will attract the child's attention only by their functionality. Contrasts in the lines of articulations and color remain attractive for the attention of the baby.

Age group (5-9 years old)

In preschool and early age children, perception becomes meaningful, purposeful, analyzing.

The perception of the child, specially organized by the designer, will contribute to a better understanding of the phenomena of the surrounding world.

Therefore, the maximum manifestation of the principles of harmony should be present in the created shoes for children.

Age group (10-14 years old)

The third age group of children - school-age children - can be divided into two subgroups: children of primary school age and adolescent children.

It is advisable to use a stylized image of a shoe model for primary school children in order to promote the development of the child's thinking process: to stylize the image of cars, plants, insects. Decorative finishing becomes a compositional center, so various buckles, brooches and other accessories significantly "refresh" the model and give it uniqueness. A buckle of a simple geometric shape (square or circle), but with a small intricate pattern will make the child look at it, and therefore concentrate his attention. Designers can use geometrically complex fittings, and through the use of various colors, help the child to isolate simpler geometric bodies from the overall complex shape. Such developments in various variants will help train children's thinking to determine a complex form. Bright and colorful colors that activate attention remain relevant.

A teenager is an observer, contemplating the world from the outside, studying it as a complex phenomenon, perceiving not so much the diversity and availability of things as the relationship between them. He already clearly knows what kind of shoes and for what purposes are needed, and from the presented models of a certain purpose, in his opinion, chooses the best, while thinking about how it will look in the eyes of his comrades. In adolescence, the emotional background is uneven, unstable. The child is eager for adulthood, claiming equal rights with his

elders, he considers himself a unique person, but at the same time he does not want to differ from his peers in any way. The new position is manifested most often in appearance, including shoes: a teenager likes adult models, but in brighter and bolder manifestations. That's why youth fashion is so specific. A fashion designer should take all this into account, but remember that the child's foot is still developing.

Shoes for this group should be, on the one hand, beautiful, meet fashion trends, and on the other – comfortable, comfortable, taking into account the fact that they have not yet completed the formation of the foot and shoes should exclude the development of pathologies. It must necessarily have distinctive features, that is, it must be shoes that their peers are wearing today. Shoes may differ in color, the style of the sole, there may be differences in design features both when assembling the shoe top and fixing it on the foot, that is, shoes may have an individual distinctive feature. Teenagers are not recommended to walk in narrow shoes. Wearing it often leads to curvature of the fingers, ingrown nails, the formation of calluses and contributes to the development of flat feet. Flat feet are also observed when walking for a long time in shoes without any heels, for example, in slippers.

Teenagers aged 15-17 years

A separate group is a group of teenagers aged 15-17 years, shoes for which are created as a separate group, in which designers must take into account the peculiarities of youth fashion, somewhat repeating adult models, but without a high heel and a strongly narrowed toe part, so as not to damage the almost formed foot. Consumers of men's and women's footwear groups are very young children. Thus, boys acquire men's shoes from the age of 11 (9%), by the age of 13 men's shoes are used by 40 to 60%, and from 15 years and older – almost 100% of teenagers. The situation with shoes for girls is even more complicated. Women's shoes are purchased by 40 to 70% of 10-year-old girls and almost all girls aged 13 years and older. Shoes for this age group should not only correspond to fashion, but be produced in a wide range so that a teenager can emphasize his individuality with its help. Shoes can vary both in color and in the shape of the sole, various design features of the upper of the shoe and ways of attaching it to the foot can be used.

The consumer is always faced with a choice of what is a priority for him - the level of comfort of shoes, hygiene, durability, resistance to external influences or price. Currently, artificial membrane materials have been developed that successfully compete with natural ones. The main advantage of these materials is their layering. They provide the same protection from moisture as genuine leather.

Children's shoes should have a reliable, comfortable fastening on the foot, which does not interfere with movement. For these purposes, modern fashion uses different types of fasteners: belts, zippers,

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rubberized inserts that fasten quickly and look modern. However, doctors recommend using shoelaces for school shoes. With their help, you can adjust the height of the lift, which means that you can provide more comfortable conditions for the foot.

Teenagers have their own requirements for choosing shoes. They prefer what is fashionable among adults. Therefore, classic, sporty, and extravagant shoes are in demand - for "advanced" teenagers.

Teenagers prefer sports-style half-boots. Modern models of sports shoes have a specially designed ventilation system: sometimes a mesh is used or valves built into the sole, sometimes the supinator of the model has holes that allow the foot to "breathe",

so more and more often sports shoes are offered as school and teenage.

Currently, an important trend in children's shoe fashion remains - the desire for maximum comfort. Everything is involved: constructive solutions, modern materials, the latest technologies. High platform-like soles have gone out of fashion (which is very harmful for a weak child's foot), rounded, acquiring comfortable outlines, toe parts. Teenage model shoes have small but pronounced heels. Exquisite accessories, elegant materials, leather with textured embossing, metal coating, etc. The tops of winter boots for girls, just like their mothers, are decorated with fluffy fur edges, applications of mink fur, buckles and chains with rhinestones.



Figure 22 - Assortment of winter children's shoes

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Figure 23 - Assortment of spring children's shoes

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Figure 24 - Assortment of summer children's shoes

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Figure 25 - Assortment of autumn children's shoes

In order to form an idea about the assortment of the footwear market of the Rostov region, we analyzed the assortment of children's shoes in the Shakhty retail chain, which is shown in Table 2.

Table 2. The structure of the assortment of children's shoes at prices

Shoe manufacturing companies	Types of shoes	Price categories, rub.							
		up to 100	100–300	300–600	600–900	900–1200	1200–1500	1500–1800	1800–2000
"Antelope", Moscow	Scandalous-strap			x					
	Boots					x	x		
	Sports shoes				x				
"Kotofey"	Orthopedic shoes				x				

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,Yegoryevsk, Moscow region	Boots			X	X	X			
	Boots							X	
	Low shoes				X	X			
"Foma", Moscow region	Shoes of little children			X					
	Shoes of little children			X					
Bombini", Moscow	Teenage shoes			X					
	Teenage boots						X		
	Teen ankle boots					X			
"Bagheera", Voronezh	Shoes						X		
	Boots							X	
	Boots								X
RIL, Rostov-on- Don	Scandalous-strap		X						
	Czechs	X							

The layout of technological equipment and workplaces is shown below in Figures 45-46.

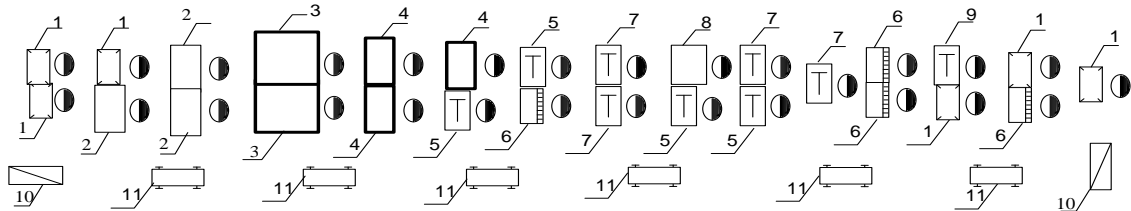


Figure 45 - Diagram of the technological process of assembling a blank of children's shoes (capacity - 562 pairs per shift)

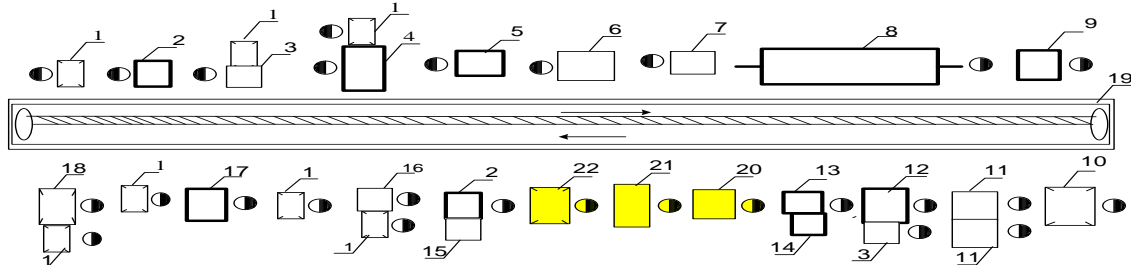


Figure 46 - Diagram of the technological process of assembling shoes for children's school shoes (capacity - 562 pairs per shift)

Based on the analysis of the assortment of children's shoes entering the retail network, it can be concluded that, basically, the demand for shoes is met at the expense of manufacturers from other regions.

2. Features of the development of a range of women's shoes

Women's shoes are produced in accordance with the interstate standard GOST 19116-2005 "Model shoes. Technical conditions".

When drawing up a new assortment, the company's management should remember that tangible and intangible parameters are combined in the product to meet consumer demand. A new product implies a modification of an existing product or innovation that the consumer considers significant. In order for a new product to succeed, it must have desirable parameters for consumers, be unique.

Such parameters for model shoes are the following signs:

- beautiful appearance (namely: feeding (silhouette), material, color, jewelry, design (execution), interior decoration), grace, elegance, compliance with the direction of fashion;

- plasticity, lightness, flexibility;

- the comfort of the shoes in the toe, which is due to the correspondence of the shape and size of the shoes to the shape and size of the foot;

- the ability of manufactured shoes to maintain the external and internal shape and dimensions throughout the entire service life.

Of particular importance in shoes for the buyer is the conformity of the proposed models to the fashion trend, which now calls for moderation and restraint, restoration of ties with nature.

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Platforms, combining contrasting colors or different shades of the same color are returning to fashion from the 40s and 70s of the XX century. Shoes differ from previous seasons mainly by changes in style and volume, they use fewer accessories compared to previous periods. The shape of the toe part is getting narrower, and the high heel is increasingly striving for stability. Classic stiletto heels, triangular and rectangular stable heels are in fashion. A lot of heels with inserts made of mirror materials of different sizes. Metal heels or half-made of metal are still fashionable.

Velour and suede are the leaders among the materials. It doesn't matter whether the materials are natural or artificial – the main thing is that the shoes look spectacular. Extremely popular in the shoe fashion of today is patent leather. Also, new models often combine different materials or high-quality natural with artificial ones.

Black color returns to the color palette with the addition of red, white, silver, bronze decor or an unexpected explosion of red gold. The black color is followed by brown, beige, as well as caramel and cognac shades, which have acquired some depth and often tend to red and purple, dark red, mustard, wine, elegant dark blue. Often the palette consists of muted tones interspersed with bright purple and scarlet.

In the assortment of shoes for winter, classic boots with low heels with decorated multi-colored details or a freely draped boot are relevant. Boots with or without a high stable heel are also in fashion. Laces, straps, buckles, buttons, various metal accessories are welcome as decor.

In the assortment of women's shoes for spring and autumn, ankle boots are an absolute favorite. They can be very diverse: with fur trim, textile inserts, V-neck, all kinds of straps, buckles, decorative buttons and buttons... Height, as a rule, to the ankle, and quite loose, with a narrow or brown nose. There are options in retro style with a slightly rounded and raised toe part.

Fashion for summer provides broader and more interesting update opportunities. The models are based on designs with open heel and shift parts. Widely used combinations of straps, different in thickness, as well as crisscrossing and T-shaped.

Special requirements are imposed on elegant women's shoes. Actual design solutions – "boat" shoes, half-boots. Modeling compositions of this style boils down to the development of a purely constructive basis of the model, often with the rejection of excessive decorativeness and a return to strict and clear lines. The fittings are distinguished by the complexity of shapes and jewelry finishing with the use of precious stones.

According to GOST 19116-2005, leather according to GOST 939-88 is used for the outer parts of the upper of shoes: yalovka, outgrowth, chevro with a natural front surface, smooth, with a raised surface,

with finishes "nubuck", "velour", as well as according to GOST 9705-78 patent leather.

For the inner parts of the upper, in particular for the lining, leather is used for lining shoes according to GOST 940-81, a bike according to GOST 29298-92, natural fur according to GOST 4661-76. For winter shoes, insole inserts consisting of two layers are used. In this case, the first layer is natural fur according to GOST 4661-76, the second layer is cardboard according to GOST 9542-89, which are glued and lined around the perimeter.

According to the interstate standard GOST 19118-2005 "Model shoes. General technical conditions" thermoplastic materials according to TU 17-21-592-87 with good elasticity and rigidity are used for the tray. Thermoplastic materials according to TU 17-21-958-73 are also used for backdrops.

For the details of the interlocking, the thermal bond TU 17-21-92-76, bumazeyu-cord according to GOST 19196-80 are used.

For women's winter boots, molded soles based on thermoplastic elastomers according to TU 17-21-492-84 are used, since this material is resistant to abrasion, highly elastic, frost-resistant, does not slip on snow-covered roads. For summer and autumn-spring shoes, leather fiber soles are used according to OST 17-92-71.

Heels of various heights and shapes made of ABS plastic are used according to OST 17-331-80.

The main insoles are made of shoe cardboard of the SOM brand according to GOST 9542-89. The main half-insoles are used to strengthen the heel-and-diaper knot in the shoes of the adhesive method of fastening on medium, high and extra high heels, which are made of cardboard of the PSM brand according to GOST 9542-89.

Cardboard of the PR brand according to GOST 9542-89 is used for the sheet, which has low rigidity, i.e. it is resistant to repeated bending, stretching and compression.

Foam rubber is used as a soft podpyatochnik in accordance with TU 06-1688-78.

For the diaper, metal is used according to OST 17-24-83.

The range of women's model shoes that can be offered to a shoe company for the summer, autumn-spring and winter season is shown in Figures 5-10

As an example, consider the technical description of women's winter model boots (model B).

Technical description of model B:

- rod - women's shoes;
- view - boots;
- purpose - model;
- the design of the shoe top blank - the tuning detail of the union, the decorative strap of the boot;
- difficulty category - second;
- the nature of the processing of the visible edges of the outer parts of the top - in the bend;
- method of fastening on the foot - zipper;

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- shoe STYLE - 845281M:
- 8 - for WOMEN's shoes;
- 4 - for insulated shoes;
- 5 - the height of the heel elevation is 50 mm;
- 2 - the shape of the sock is medium;

81- the serial number of the pad in the series;
 M – for model shoes.

Table 3 shows the range of shoes with an indication of the time of release of models during the year (by month).



Model A



Figure 26 - Assortment of women's summer shoes

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Model B



Model B



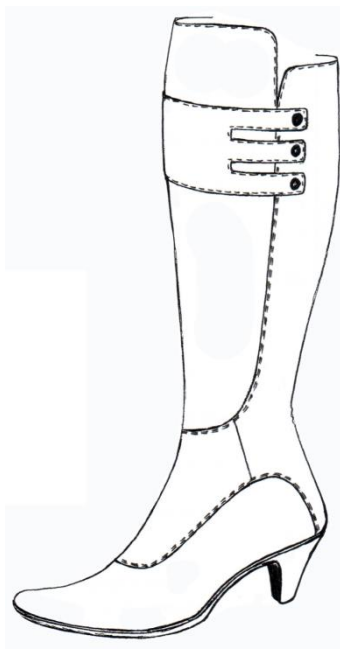
Figure 27 - Assortment of women's autumn shoes

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Model C



Figure 28 - Assortment of women's winter shoes

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IBI (India) = 4.260
OAJI (USA) = 0.350



Model D



Figure 29 - Assortment of women's spring shoes

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Figure 30 - Office shoes

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GIF (Australia) = 0.564	ESJI (KZ) = 9.035	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350



Figure 31 - Outdoor shoes

Table 2. Assortment of women's shoes

Kind, type, purpose of shoes	The symbol of the shoe model	The release time of the shoe model during the year
Women's summer shoes	Figure 4.5 (Model A)	April - May
Women's autumn boots	Figure 4.6 (Model B)	June - August
Women's Winter Boots	Figure 4.7 (Model C)	September - November
Women's Spring Shoes	Figure 4.8 (Model D)	December - february

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From the presented assortment, the basic model B was selected: model boots for the winter season socks, since it is the most labor-intensive.

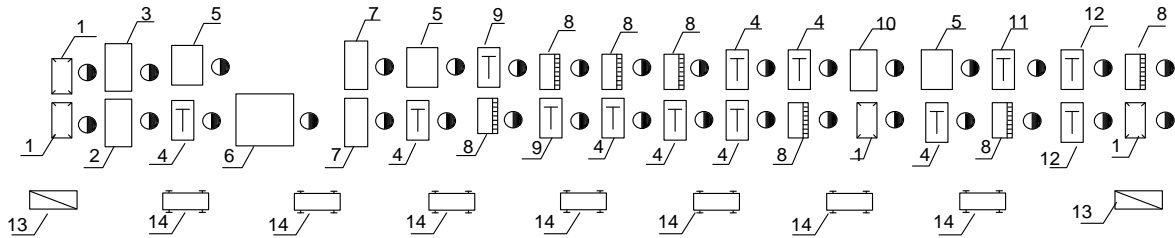


Figure 47 - Diagram of the technological process of assembling a blank of women's shoes (capacity - 471 pairs)

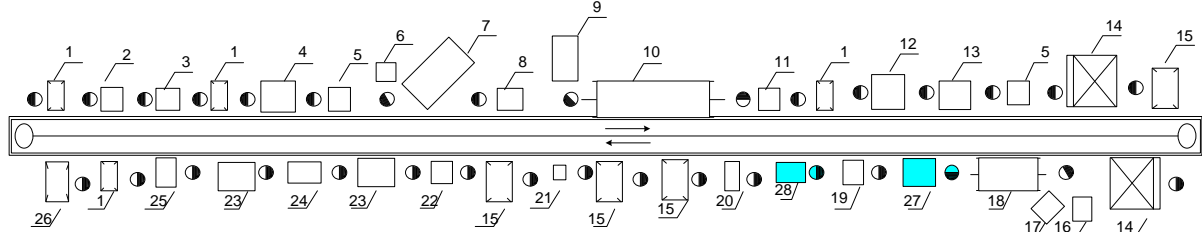


Figure 48 - Equipment diagram for the presented scheme of the technological process of assembling women's shoes (capacity - 471 pairs)

3. Features of the development of a range of men's shoes

When developing a competitive assortment of men's shoes, manufacturers need to take into account many factors affecting consumer demand: compliance with the main fashion trends, economic, social and climatic features of the subjects of the Southern Federal District.

It is quite difficult to find differences in the men's shoe fashion of individual seasons – the difference is barely noticeable. The most intensive period of men's fashion development is the last 10 years. Due to the ongoing changes in the habits of the new generation, "formal" men's shoes, exactly like clothing, have gone beyond the usual "urban" and "fashionable" in the traditional sense of these words.

Serious changes will take place in the men's shoe fashion of the autumn – winter 2008-2009 season. They will touch on the shapes of pads, materials, colors and decor. But the main changes will still affect the style of the collections: slightly forgotten retro and newfangled techno-sport style will come to the fore.

Men's shoe fashion will continue to develop in three stylistic directions: classic, comfortable and sporty, but the influence of retro will become very noticeable next season. Along with the "eternal" classics – Oxford, derby and Chelsea designs – such long-forgotten shoe details as gaiters will return to fashion. Two more novelties from the "new is well-forgotten old" series are boots with a wide, removable strap -pad, fastened with two small buckles, as well as loafers. The latter - half-boots with an oval insert (most often imitated) - are sometimes decorated with an overhead strap or a lace with a tassel. However, retro will manifest itself not so much in the borrowing

of old designs, as in the typical decor and finishes for this style, such as patterns of perforations and others.

Another relevant style is techno-sports, which has an increasingly active influence on urban fashion. Monochrome sneakers of brown, gray and greenish-marsh shades are relevant, which may not be shiny, but made of smooth leather in combination with velour or nubuck. Today it is customary to wear this very comfortable and practical type of shoes even with a classic suit.

Significant changes will also occur in the shape of the pads of men's shoes. Perhaps, no season has brought such a variety of their species and such a number of innovations before! All types of socks are relevant: rounded, pointed, brown-shaped, rounded-trapezoidal, rounded square, etc. At the same time, many models have a stylish hump in the toe or union part of the pads, so a pronounced square with a hump in the area of the union or narrow noses with a convex "influx" at the very tip look very unusual.

The bottom of the shoe will also change: the soles thicken, noticeable welts and corrugation appear on the running surface.

In the spring-summer season of 2022, men's fashion will not undergo drastic changes. However, it is also impossible to say that absolutely no changes will happen. The men's wardrobe will noticeably expand due to shoes, expensive sneakers and summer sandals, often resembling female models.

Along with classic lace-up shoes, stylish shoes will appear in summer men's fashion. These are moccasins and loafers with a low oval insert or tongue, noticeably lightweight, soft, comfortable, on a thin studded or leather sole with plastic breaks.

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Shoes are beautifully decorated with embroidery, including contrasting, and sometimes gold threads, mainly on heraldic or nautical themes, and moccasins are decorated with bridles, lifting straps (made of contrasting material or striped turnip ribbon), tassels, flags. In moccasin-type shoes, the oval insert is often made of exotic leather (a hand-painted python is especially fashionable) or leather with embroidery or embossing. Plaits, both real and stamped on leather, and frequent figured perforations are also popular.

Being sporty is always fashionable. Equipment for different sports is being introduced into everyday life. And first of all it concerns shoes. Sneakers, sneakers, sneakers, pantolets are worn not only for training, but also to the office, school, institute, and, very importantly, they look stylish and trendy at the same time. The toe parts of sneakers, sneakers, sneakers are rounded, without characteristic elevation; lacing, as a rule, understated, close to the toe part, dominates from the fastening elements. Structurally, half-boots and shoes are relevant, with the exception of only some types of sneakers with high boots. In the assortment of shoes for outdoor activities, many fabrics are used: cotton, linen, mixed with fashionable floral, abstract (pop art), animalistic (under the skins of wild animals) stuffing. Smart "sports" materials, nets, breathable climatic membranes, perforated artificial leather are also relevant. For men, we offer textiles in a cage, stripes, pie-de-bullets, with drawings in the style of graffiti, etc.

Shoes resembling sports sneakers are sewn from genuine leather, often with inserts of gold, bronze or silver metallic leather, which effectively contrasts with a matte toe or edging of suede or velour. Also, typically sports elements or materials, nets, for example, or customized decorative strips are made of leather. The solution of the shoe bottom is also interesting: along with the typically sneaker, massive sole, some models have a leather, opanochny type, with plastic breaks through the skin or a rubber sole consisting only of the toe and heel parts. Some sneakers resemble sneakers made of leather, including embossed lacquer. In summer, white and beige models with inserts of gold, silver, black, blue, red or brown colors will be especially relevant.

Strap sandals are gradually being introduced into the conservative men's wardrobe, which have significantly displaced the positions of sandals. Unlike the latter, the sandals are noticeably more open and consist entirely of a variety of interlacing straps. Especially relevant are models with a strap wrapping around the thumb (the other keeps the foot in the ascent), and sandals with an interdigital jumper, resembling flip-flops made of leather. However, their color scheme is still quite conservative: black, white, brown and a variety of beige shades.

Noticeably lightened men's lace-up boots for the summer season. They are made of thin soft leather,

sometimes without lining, and also have a thin sole, including leather with plastic islands. Both oxfords (with customized berets) and derbies (with a customized sock) are relevant, finishing - frequent perforations are very fashionable this season. But the main highlight is the bright, unusual for men's classics, the color of half-boots, for example, pink, blue or purple. Two-tone models are also relevant, especially black-and-white, white-gray, gray-blue and beige-brown.

The range of men's shoes relevant in this region is shown in Figures 11-18. The proposed range of men's shoes is made in accordance with GOST 26167-2005 "Casual shoes. General technical conditions" and in accordance with GOST 19116-2005 "Model shoes. General technical conditions". Adhesive methods of fastening parts of the top and bottom of shoes with the development of chemical production have become widespread. Currently, the adhesive method has become the main one, it produces up to 85% of all shoes.

Its advantages include:

- high labor productivity;
- simplicity of equipment;
- wide possibilities of mechanization and automation of production;
- weight of the product.

In addition, a distinctive feature of adhesive joints is their ability to highly elastic deformations while maintaining high strength throughout the entire service life.

The disadvantages of this method include the dependence of the strength of adhesive joints on low or high temperature, as well as the need for occupational safety measures at work due to the constant evaporation of solvent and other harmful substances from adhesive compositions, which requires significant material costs. But by choosing the right glue and bonding technology in accordance with the design of the product and the mechanical properties of the materials to be bonded, the disadvantages of this fastening method can be minimized.

The organization of shoe production in a wide range will make it possible to turn today's subsidized regions of the Southern Federal District and the North Caucasus Federal District into self-supporting, thereby increasing the level of income of the population, will provoke the creation of new jobs; it will ensure the development of small businesses and the maintenance of legal private entrepreneurship, as well as create a basis for the exit from the shadow of a significant part of the turnover of the real sector of the economy in order to form the budget of the region, since the proposed project for the development of a strategy for the development of the production of competitive leather products in the Southern Federal District and the North Caucasus Federal District carries economic, political and social effects.

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A

Figure 32 - Assortment of winter men's shoes

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Б

Figure 33 - Assortment of autumn men's shoes

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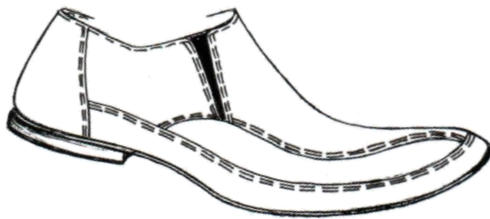


Figure 34 - Assortment of men's spring shoes

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Figure 35 - Assortment of summer shoes

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ICV (Poland) = 6.630
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 IBI (India) = 4.260
 OAJI (USA) = 0.350



Figure 36 - Assortment of shoes for outdoor activities

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ICV (Poland) = 6.630
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Figure 37 - Assortment of men's work shoes and safety shoes

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GIF (Australia)	= 0.564	ESJI (KZ)	= 9.035	IBI (India)	= 4.260
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Figure 38 - Assortment of men's strap - sandal shoes



Figure 39 - Office men's shoes

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Table 4. Assortment of men's shoes

Kind, type, purpose of shoes	Symbols of the shoe model	The release time of the shoe model during the year
Men's summer clogs with leather upper on molded sole adhesive fastening method	figure 4.14, model G	January - March
Men's winter boots with leather upper on molded sole made of TEP, adhesive fastening method	figure 4.11, Model A	July - September
Men's autumn half-boots with molded sole made of PU, adhesive fastening method	figure 4.12, Model B	April - June
Men's spring shoes with a leather upper with side elastic bands and a customized union on a molded PU sole, adhesive fastening method	figure 4.13, model B	October - December

Table 5. Specification of equipment for assembling the billet of men's boots

01	ST-B (Russia)	Basic table	07	Pfaff 591-726 (Germany)	Sewing machine for fastening parts with automatic thread cutting
02	SS20 «Comelz» (Italy)	Machine for lowering the edges of the top parts	08	01276/P12 (Czech Republic)	A machine for smoothing the seam with simultaneous gluing of the braid
03	A2000 «Selmac» (Italy)	Duplication of the top with an interlayer and insertion of a thermoplastic tray	09	GP 2 «Colli» Italy	Sewing machine for fastening parts with simultaneous trimming of excess lining
04	RPP67TE «Sagita» (Italy)	Machine for bending the edges of parts with simultaneous application of hot melt glue and gluing of reinforcing tape	10	СЖ-2	Shelving
05	Pfaff 574-900 (Germany)	Sewing machine for fastening parts with a double-row seam	11	TO.059-76	Shoe cart
06	CT-Б c hood (Russia)	Table for spreading and gluing parts	12	F81 C.M.C.I. (Italy)	Moccasin Stitching Machine
The coefficient of mechanization is 0.643. The number of workers is 28 people.					

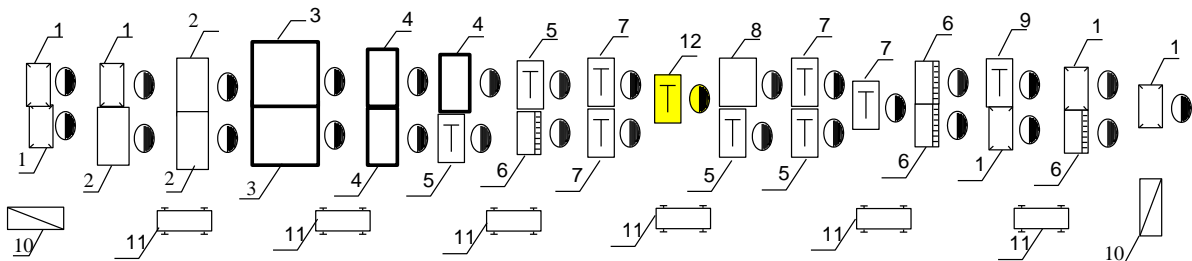


Figure 49 - Diagram of the technological process of assembling a billet of men's boots (capacity - 650 pairs per shift)

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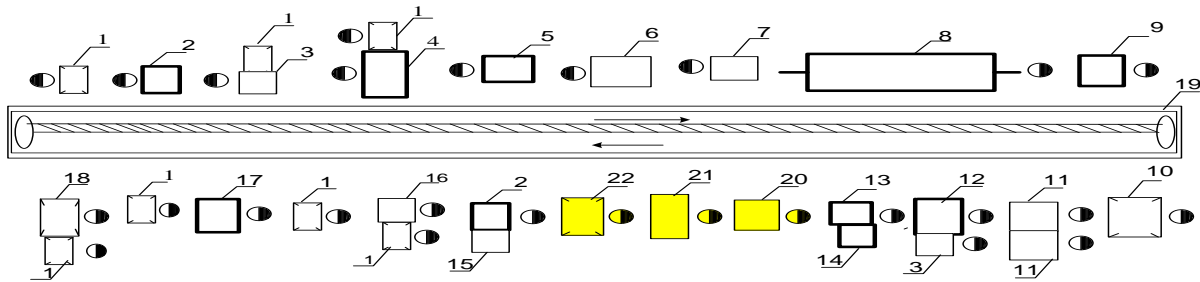


Figure 50 - Flow diagram of the technological process (capacity - 650 pairs per shift)

In shoe production, scientific and technological progress is manifested in equipping it with new technical and automatic means, improving the technological process and production management system, expanding the use of new materials, methods of quality control of finished products and production processes. The use of new equipment and advanced technologies determines the specifics of performing a number of shoe manufacturing operations, increasing requirements for the properties of materials, using more advanced forms of organization and production management.

The use of flexible technological processes is justified by their high maneuverability and the possibility of using former premises that can be adapted for the production of shoes.

Therefore, for the effective operation of domestic shoe enterprises for the production of competitive products, it is advisable to provide for the use of flexible technological processes, a variety of fastening methods, to deploy shoe production, the production of technical equipment, accessories, the production of auxiliary materials, which will reduce the cost of its production and increase the competitiveness of manufactured shoes not only in the markets of the Southern Federal District and the North Caucasus Federal District, but also in the domestic markets of Russia, guaranteeing its steady demand and sale, thereby providing a less painful and more effective replacement of one shoe model with another.

When developing a strategy for the production of competitive leather products, the production of shoes will be organized using mechanized innovative technological processes, using nano technologies, but, perhaps, in this case, the use of manual labor, which is due to the desire to satisfy the demand for exclusive products for both elite consumers and mass satisfaction. Science and production in the light industry have become very disconnected from each other in recent years, and today the task is to "close" the priorities of industry with the developments of scientific schools and institutes.

Financial and economic assessment of the effectiveness of the decisions taken

The break-even point is the minimum size of output at which equality of income from sales and production costs is achieved.

The break-even point is found by graphical and analytical methods. Graphically, the break-even point lies at the intersection of the line of sales volume and total production costs (in the breakdown of the latter into constants and variables). Analytically, the break-even point, pairs, is determined by the formula:

$$T_{6,y} = \frac{Y\Pi3 \cdot B}{\Pi_{eд} - Y\Pi\Pi3}, \quad (5)$$

Figure 51 shows the break-even graph for the annual release of the basic model of winter women's boots (model B).

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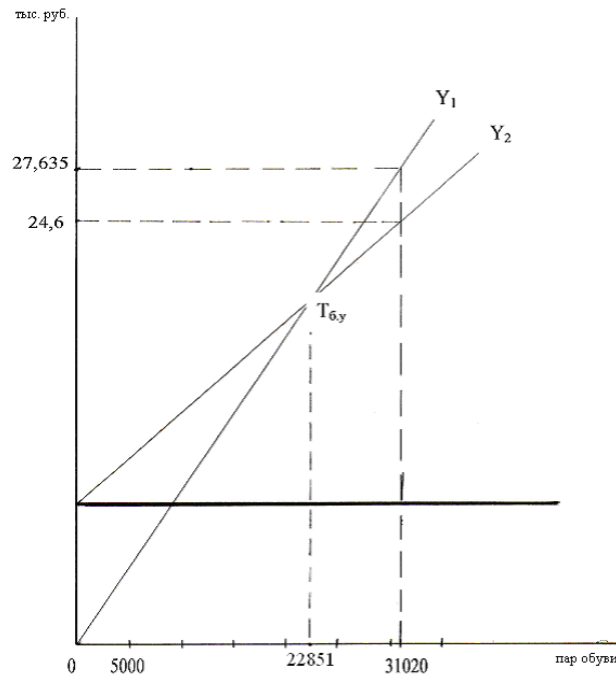


Figure 40- An example of obtaining the break-even point of Model A

Figure 41 shows obtaining the break-even point of Model B.

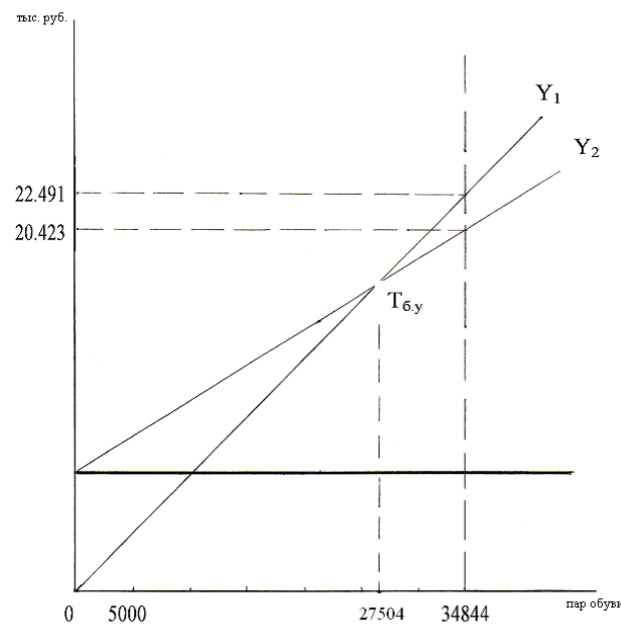


Figure 41- Obtaining the break-even point of Model B

Figure 42 shows obtaining the break-even point of model B.

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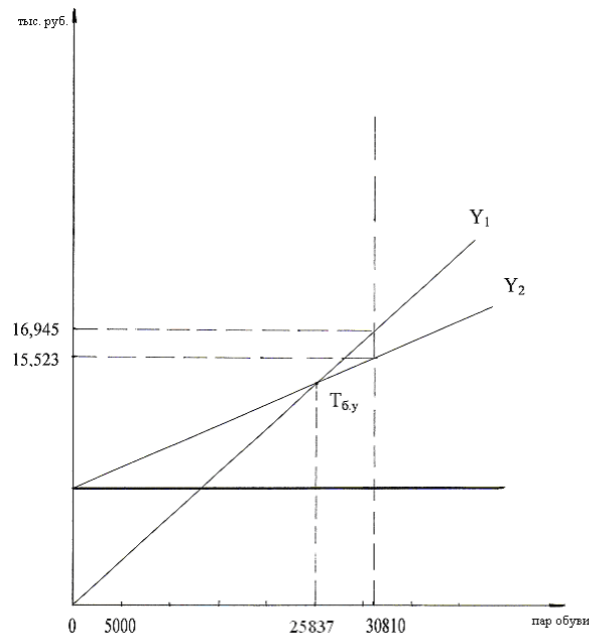


Figure 43- Obtaining the break-even point of the model In

Figure 44 shows obtaining the break-even point of the model G.

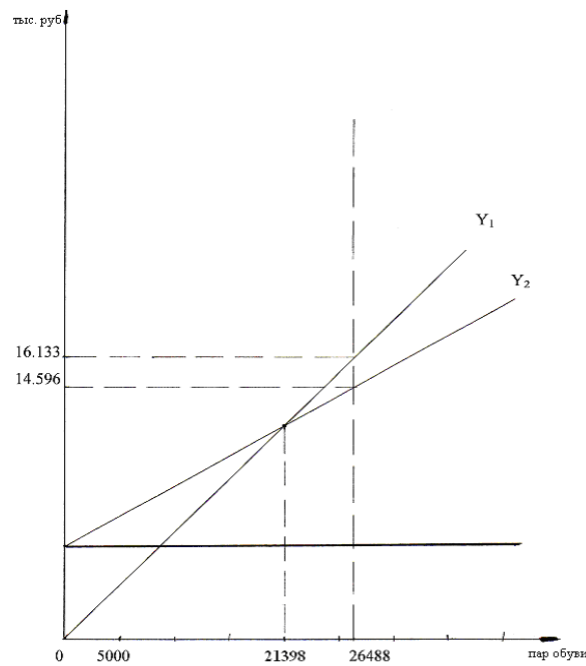


Figure 44- Obtaining the break-even point of the G model

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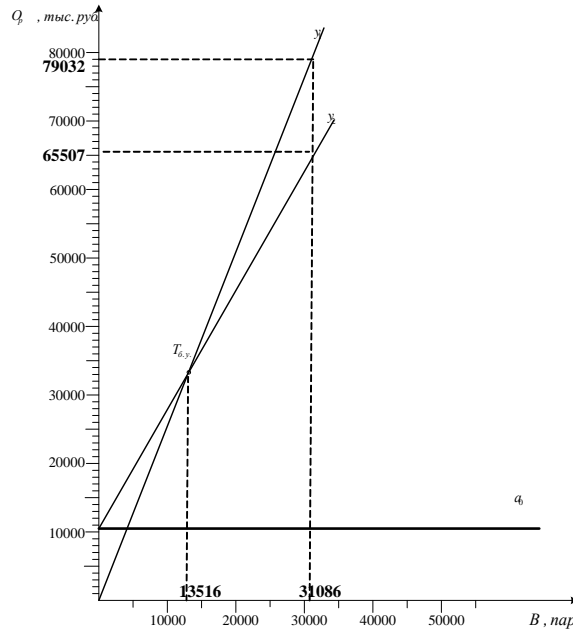


Figure 51. Break-even chart for the annual release of the basic model of winter women's boots (model B)

Figure 52 shows the break-even chart for the monthly release of the basic model of winter women's boots (model B).

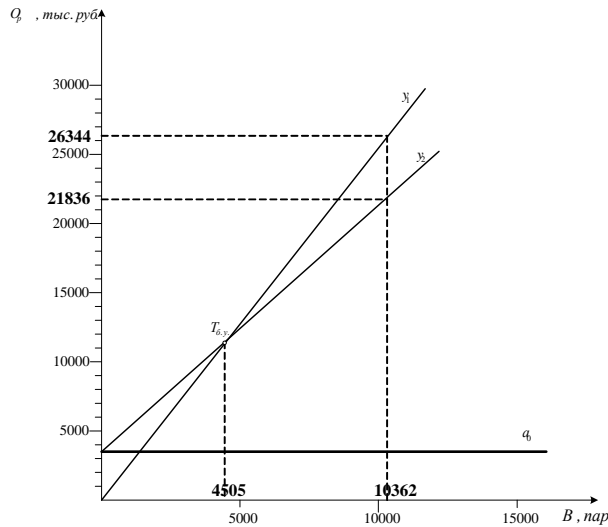


Figure 52. Break-even chart for the monthly release of the basic model of winter women's boots (model B)

These tables indicate that with 100% of shoe sales, compensation is provided not only for the production and sale of shoes, but also net profit remains, which indicates the effective activity of the enterprise for the analyzed month, as well as the correct marketing assortment policy of the enterprise. Such a result of work will allow the company to purchase the necessary materials, components, tools in a timely manner, pay salaries to employees, i.e. provide opportunities for the manufacture of new products and the creation of planned production stocks.

If we have a case when the sale of this type of footwear is not in full, then such a result negatively affects the performance of the enterprise. In this case, the presence of remnants of unrealized shoes reduces the total amount of revenue, increases expenses and leads to additional costs for storing goods.

Figure 53 shows the break-even chart for the annual release of the basic model A (summer shoes).

Figure 54 shows the break-even chart for the annual release of the base model B (autumn boots).

Figure 55 shows the break-even chart for the annual release of the base model G (spring shoes).

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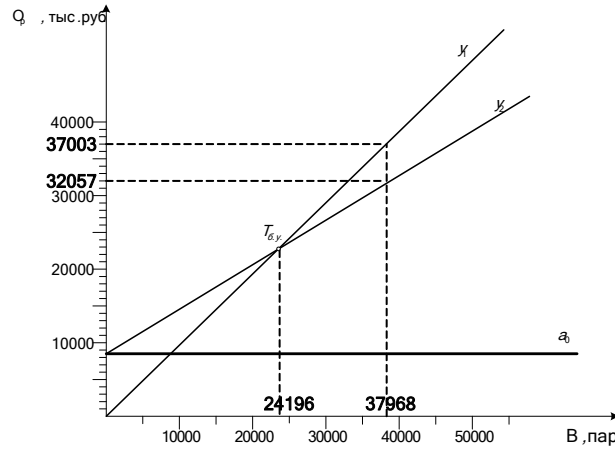


Figure 53- Break-even chart for the annual release of the basic model A (summer shoes)

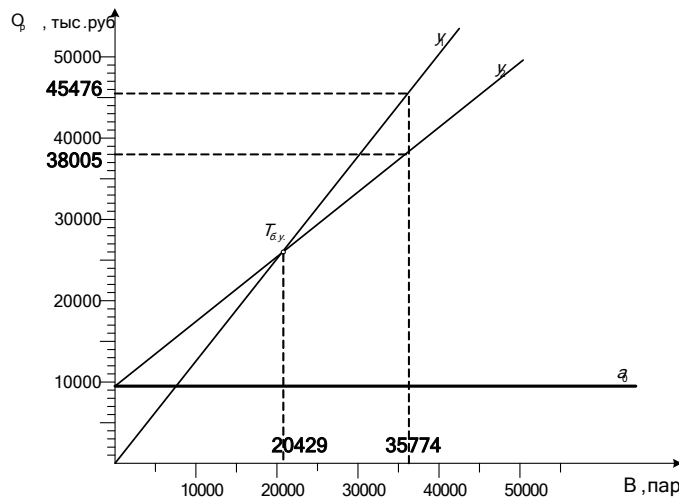


Figure 54 - Break-even chart for the annual release of the base model B (autumn boots)

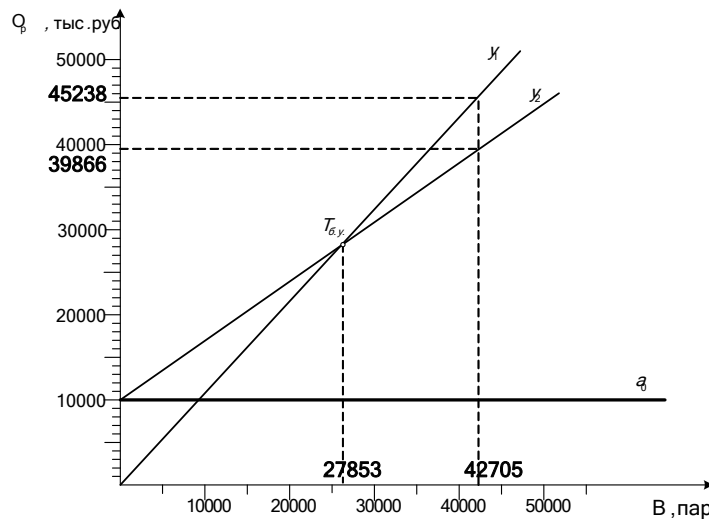


Figure 55 - Break-even chart for the annual release of the base model G (spring shoes)

Figure 56 shows the break-even chart for the monthly release of the basic model A (summer shoes).

Figure 57 shows the break-even chart for the monthly release of the base model B (autumn boots).

Figure 58 shows the break-even chart for the monthly release of the basic model G (spring shoes).

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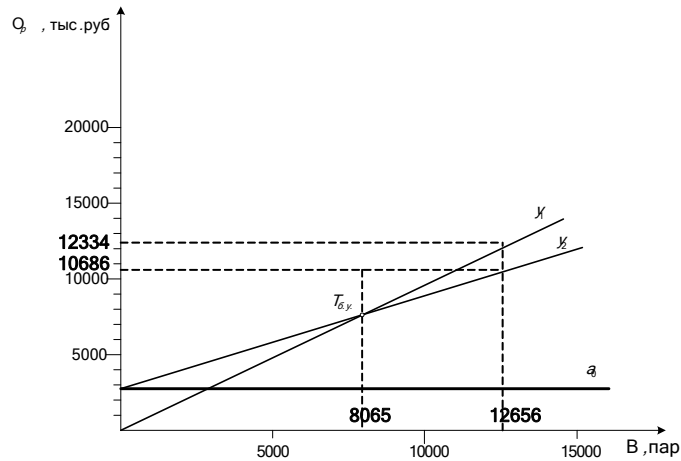


Figure 56- Break-even chart for the monthly release of the basic model A (summer shoes)

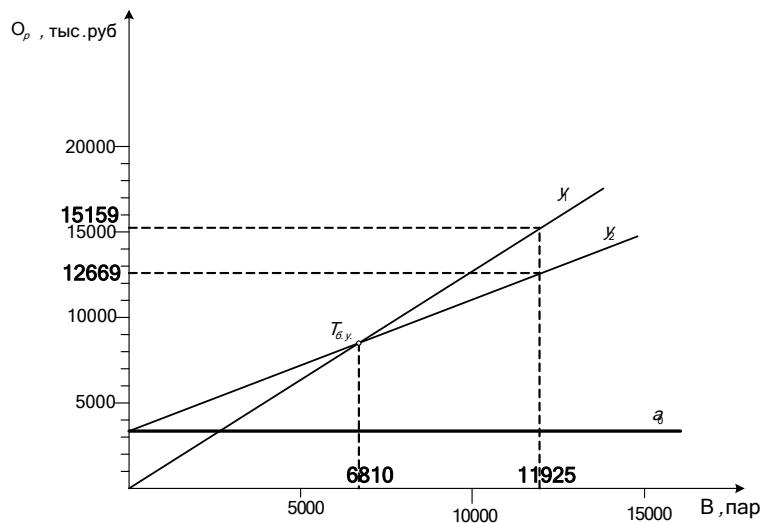


Figure 57- Break-even chart for monthly issue basic model B (autumn boots)

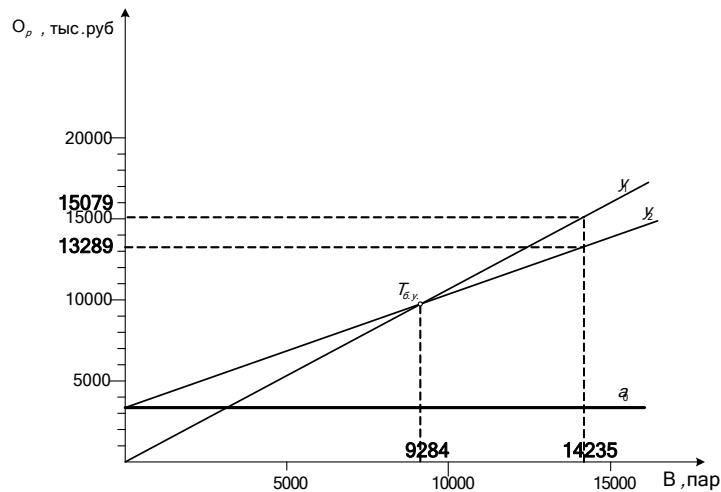


Figure 58 - Break-even chart for the monthly release of the base model G (spring shoes)

Figure 59 shows an example of obtaining a break-even point by the graphical method of the annual issue of men's half-boots.

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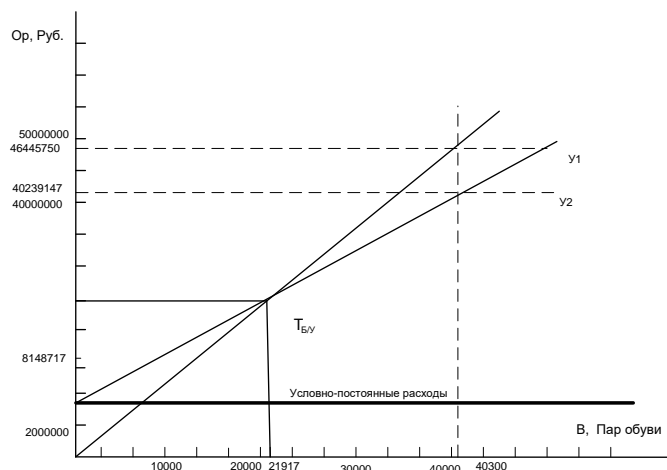


Figure 59 - An example of obtaining the break-even point by the graphical method of the annual issue of men's autumn boots

Financial and economic assessment of the effectiveness of the decisions taken %. Most often, the company sells shoes through stores with payment after sale, concluding contracts with trade indicating the timing of receipt of funds to the manufacturer's accounts. In this case, if the shoes are in demand and are fully sold, then the company receives money on time, which is also necessary for the payment of wages, the purchase of working capital and other expenses to ensure the development of production. With the full sale of manufactured shoes, the profit (Ppr) with the current profitability of 16.05% will amount to 188930 rubles per month. If shoes are not in demand, then the company can reduce sales per month by the value of the safety indicator - the excess of real sales over the volume of equilibrium sales.

The main tasks of control and analysis of sales are to find reserves for the fullest satisfaction of

customers, increasing the volume of sales of products, the maximum possible use of the production capacity of the enterprise, material and labor reserves, improving the efficiency of production and economic activities.

In the process of monitoring and analyzing sales, the degree of fulfillment and dynamics of production and sales of products are assessed, the influence of factors on the change in the magnitude of these indicators is determined, the identification of on-farm reserves and the development of measures for their development, which should be aimed at accelerating the turnover of products and reducing losses, which will achieve a significant economic effect.

Table 6 shows the relationship between revenue, costs and production volume, managing which, you can analyze the financial results of the company.

Table 6. Financial results for various sales volumes of autumn boots (model B)

Indicators	The value of the indicator for different sales volumes per month (%)					
	100	80	60	54,4	40	30
Sales volume, pairs	13433	10746,4	8059,8	7307,55	5373,2	4030
The price of one pair, rub.	1152,5	1152,5	1152,5	1152,5	1152,5	1152,5
Revenue from the sale, thousand rubles.	15481,53	12385,22	9288,91	8421,95	6192,61	4644,17
Unit cost, thousand rubles.	998,5	998,5	998,5	998,5	998,5	998,5
Total cost, thousand rubles, including:	13412,72	11223,5	9034,27	8421,95	6845,07	5750,57
Conditionally fixed expenses, thousand rubles.	2466,57	2466,57	2466,57	2466,57	2466,57	2466,57
Conditionally variable expenses, thousand rubles.	10946,15	8756,92	6567,7	5954,7	4378,5	3284
Profit (+) Loss (-) from sales, thousand rubles.	2068,81	1161,72	254,64	0	-652,46	-1106,4

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Taxes, thousand rubles.	413,76	232,34	50,93	-	-	-
Net profit, thousand rubles.	1655,05	929,38	203,71	-	-	-

Thus, shoe companies, when developing assortment policy, should focus on both external (consumer enterprises, competition, market conditions, etc.) and internal factors, such as sales volume, profitability, coverage of basic costs, etc. However, it is impossible to take into account and foresee all the situations that may arise when selling shoes, i.e. some shoe models are not in demand at a certain stage. In this case, another side of marketing, usually not advertised, should manifest itself: if the shoes, even without taking into account the requirements of the market, have already been produced, then it must be implemented. For this purpose, in order to respond to the lower prices of competitors, it is necessary to reduce too large stocks, get rid of damaged, defective shoes, eliminate the remnants, attract a large number of consumers, stimulate the consumption of shoes, using discounts for this. There are about twenty types of discounts, but for shoes the most common are the types of discounts that are used at various levels of the enterprise, sales

organizations, trade. In addition to using discounts, an enterprise can take the initiative to reduce prices when production capacity is underutilized, market share is reduced under the onslaught of competition from competing enterprises, etc. In this case, the company takes care of its costs, developing measures to reduce them by improving equipment and technology, introducing new types of materials into production, constantly improving the quality of products. And all this requires large financial costs from enterprises, but, nevertheless, contributes to increasing the competitiveness of certain types of leather products and the enterprise as a whole. In addition, the larger the number of shoe products produced, the more production costs decrease, which leads to lower prices, and most importantly, creates such conditions for the functioning of the market that would not allow other competing enterprises to enter it and would cause a positive reaction from consumers (Tables 7-9).

Table 7. Financial results for various sales volumes of winter boots (model A)

Indicators	The value of the indicator for different sales volumes per month (%)					
	100	80	60	48,1	40	30
Sales volume, pairs	15752	12601	9451	7576,71	6300	4725
The price of one pair, rub.	1186,44	1186,44	1186,44	1186,44	1186,44	1186,44
Revenue from the sale, thousand rubles.	18 688,8	14 950,33	11 213,04	8989,31	7474,57	5605,93
Unit cost, thousand rubles.	1007,07	1007,07	1007,07	1007,07	1007,07	1007,07
Total cost, thousand rubles, including:	15 863,36	12 690,1	9517,82	8989,31	8952,2	6583,86
Conditionally fixed expenses, thousand rubles.	2607,66	2607,66	2607,66	2607,66	2607,66	2607,66
Conditionally variable expenses, thousand rubles.	13 255,72	10 082,44	6910,16	6376	6344,54	3976,2
Profit (+) Loss (-) from sales, thousand rubles.	2825,44	2260,23	1695,22	0	-	-
	-	-	-	-	-1477,63	-977,93
Taxes, thousand rubles.	565,088	452,05	339,044	-	-	-
Net profit, thousand rubles.	2260,35	1808,2	1356,2	-	-	-

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Table 8. Financial results for various sales volumes of spring boots (model B)

Indicators	The value of the indicator for different sales volumes per month (%)					
	100	80	60	45,6	40	30
1	2	3	4	5	6	7
Sales volume, pairs	15426	12340,8	9255,6	7034,26	6170,4	4627,8
The price of one pair, rub.	1033,8	1033,8	1033,8	1033,8	1033,8	1033,8
Revenue from the sale, thousand rubles.	15947,4	12757,91	9568,44	7272,01	6378,96	4784,22
Unit cost, thousand rubles.	856,77	856,77	856,77	856,77	856,77	856,77
Total cost, thousand rubles, including:	13216,7	11030,4	8844	7272,01	6657,8	5564,6
Conditionally fixed expenses, thousand rubles.	2285,2	2285,2	2285,2	2285,2	2285,2	2285,2
Conditionally variable expenses, thousand rubles.	10931,5	8745,2	6558,8	4984,76	4372,6	3279,4
Profit (+) Loss (-) from sales, thousand rubles.	2730,7 -	1727,51 -	724,44 -	0 -	-278,84 -	-780,38 -
Taxes, thousand rubles.	546,14	345,5	144,88	-	-	-
Net profit, thousand rubles.	2184,56	1382,01	579,56	-	-	-

Table 9. Analysis of financial results for various sales volumes of summer clogs (model G)

Indicators	The value of the indicator for different sales volumes per month (%)					
	100	80	60	55,5	40	30
Sales volume, pairs	15512	12409	9307	8609,16	6204	4653
The price of one pair, rub.	754,23	754,23	754,23	754,23	754,23	754,23
Revenue from the sale, thousand rubles.	11699,61	9359,24	7019,62	6493,28	4679,24	3509,43
Unit cost, thousand rubles.	643,72	643,72	643,72	643,72	643,72	643,72
Total cost, thousand rubles, including:	9985,84	8415,7	6896,15	6493,28	5276,01	4491,32
Conditionally fixed expenses, thousand rubles.	2137	2137	2137	2137	2137	2137
Conditionally variable expenses, thousand rubles.	7848,76	6278,7	4709,15	4356,06	3139,01	2354,32
Profit (+) Loss (-) from sales, thousand rubles.	1713,77 -	943,54 -	123,47 -	0 -	- -596,77	- -981,89
Taxes, thousand rubles.	342,75	188,71	24,7	-	-	-
Net profit, thousand rubles.	1371,02	754,83	98,77	-	-	-

Figures 60-61 show examples of obtaining the break-even point by the graphical method of the annual production of men's shoes.

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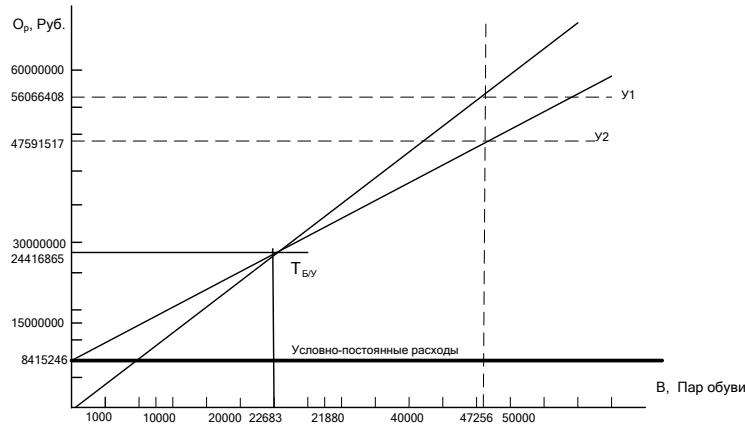


Figure 60. is an example of obtaining the break -even point by the graphical method of the annual production of winter men's shoes

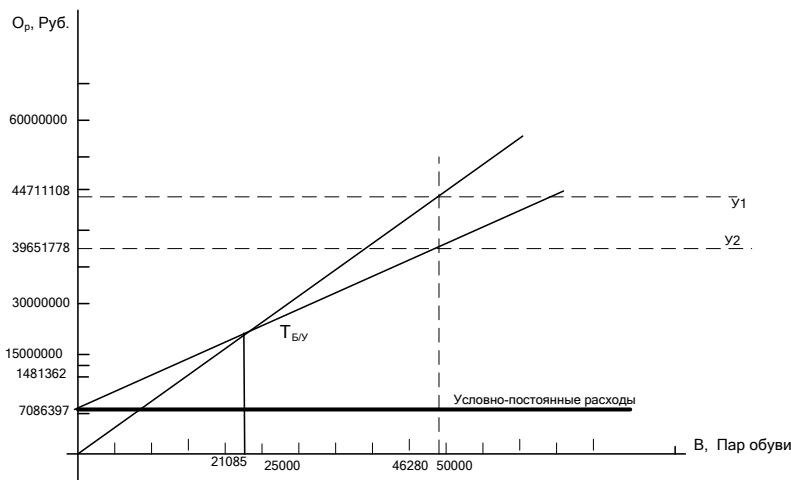


Figure 61. is an example of obtaining a break-even point by the graphical method of the annual release of men's spring boots

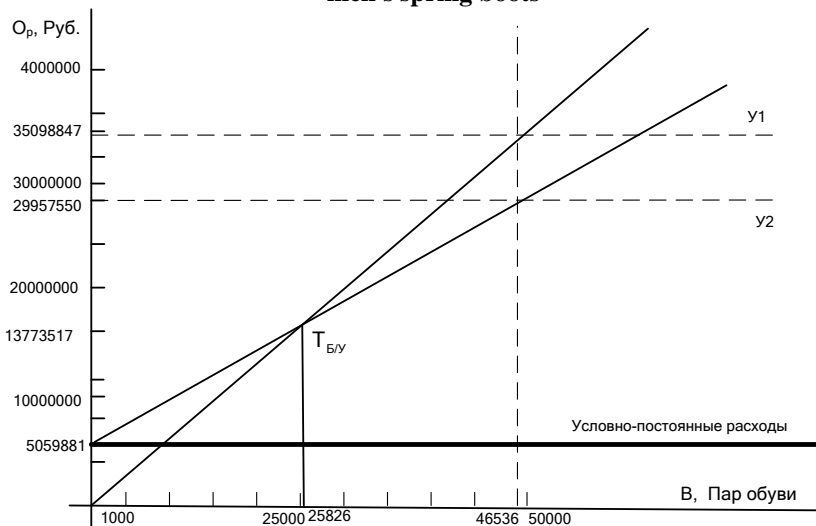


Figure 62. - An example of obtaining the break -even point by the graphical method of the annual production of men's summer clogs

Conclusion

The shoe market of the Southern Federal District and the North Caucasus Federal District is over

saturated with types of shoes of the same purpose. Therefore, the head of the enterprise needs to know exactly what will be in demand on the market and how

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it should be implemented so that the developed range of shoes is chosen by the buyer, withstanding the fierce competition that generates new offers.

For all this, it is important to build an assortment policy so that if shoes of the same type arrive on the market, they should differ significantly in price, but meet the requirements of the standard.

The most important task of building the elements of the operational management system of the shoe company's assortment is the choice of technology that can effectively implement the intended goals in a complex multi-level hierarchical management system. The use of mathematical methods and optimization theory makes it possible to make effective decisions not only in those conditions when the system parameters are known, or they can be represented as fixed values.

The paper proposes new approaches to determining the total number of shoes produced, depending on the market situation, prevailing prices and demand, and developing an optimal plan for the production of shoe models.

To determine the total number of shoes produced, depending on the market situation, prevailing prices and demand, it is proposed to apply elements of the theory of blurred sets. The theory of blurred sets has been used for a long time, mainly for use in systems that mimic human behavior, such as image recognition systems, linguistic analysis, search for solutions and others, in which there is no access to the complex mathematical apparatus necessary to describe complex production control systems and were highly specialized systems. This approach allows in each case to coordinate the requirements of the task and the necessary degree of accuracy of its solution.

The methods based on the provisions of the theory of blurred sets make it possible to use approximate, but at the same time having a sufficient degree of efficiency, methods for describing non-deterministic systems, for the analysis of which it is impossible to use standard quantitative mathematical methods. At the same time, all the theoretical justifications of this approach are quite accurate and are not in themselves a source of uncertainty (fuzzy logic and IC).

Unlike traditional mathematics, which requires precise and unambiguous formulations of patterns at each step of modeling, fuzzy logic offers a completely different level of thinking, thanks to which the creative modeling process takes place at the highest level of abstraction, in which only a minimal set of patterns is postulated.

The basic idea of fuzzy logic is that it is impossible to define rules for all occasions. These rules represent discrete points in a continuum of possible situations and decisions are made by approximating them. Known rules for similar situations are combined for each case. This

approximation is possible only in cases where there is flexibility or blurriness in the words by which these rules are defined. To use the possibilities of human logic in production processes, a mathematical model is needed. To implement such a model, fuzzy logic was developed, which allows describing the decision-making process and its search in an algorithmic form.

When solving problems that contain fuzziness in their formulation and have an uncertainty of goals (multi-criteria) "maximum income with minimum costs", it is possible to operate with fuzzy input data, namely:

continuously changing values over time (dynamic tasks);

values that cannot be set unambiguously (results of statistical surveys, advertising companies, etc.).

There is a possibility of fuzzy formalization of evaluation and comparison criteria: operating with the criteria "most", "possibly", "predominantly", etc.; the possibility of rapid modeling of complex dynamic systems and their comparative analysis with a given degree of accuracy. Operating on the principles of system behavior described by fuzzy methods, it does not take much time to find out the exact values of variables, compile descriptive equations and evaluate different variants of output values.

The developed system allows you to build a control model with an unlimited number of input parameters and control units and thereby describe the behavior of rather complex control objects.

Let's consider the construction of elements of a fuzzy expert system. The control algorithm is implemented programmatically using the MATLAB – Fuzzy Logic Toolbox extension package; the assessment of the planned shoe release is made according to the standards of shoe removal from 1 m² of the shoe assembly area and ranges from 0 to 2.8 pairs/m²; the price of shoes, demand and market saturation are estimated from 0 to 1 (0 is the worst estimate, 1 is the best).

The system under development has three inputs and one output. Based on established customs and intuitive ideas, we assume that the problem of finding the optimal output is described by the following assumptions:

1. If the demand is low, the price is high and the saturation of the market is high, the assortment requires updating and the output is reduced to 20-50% of the standard.

2. If the demand is average, the price is average and the saturation of the market is average, the assortment requires some modification and the output is up to 40-70% of the standard.

3. If the demand is high, the price is low and the saturation of the market is low, the assortment does not require changes and the output is up to 60-100% of the standard.

The construction of this system is performed using the Mandani output algorithm.

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The structure of the expert system and the final set of rules are shown in Figures 63-64.

The logical conclusion of any case (Figure 63) is carried out in four stages: the introduction of fuzziness

(phasification), logical conclusion, composition, bringing to clarity - defazification (defuzzification).

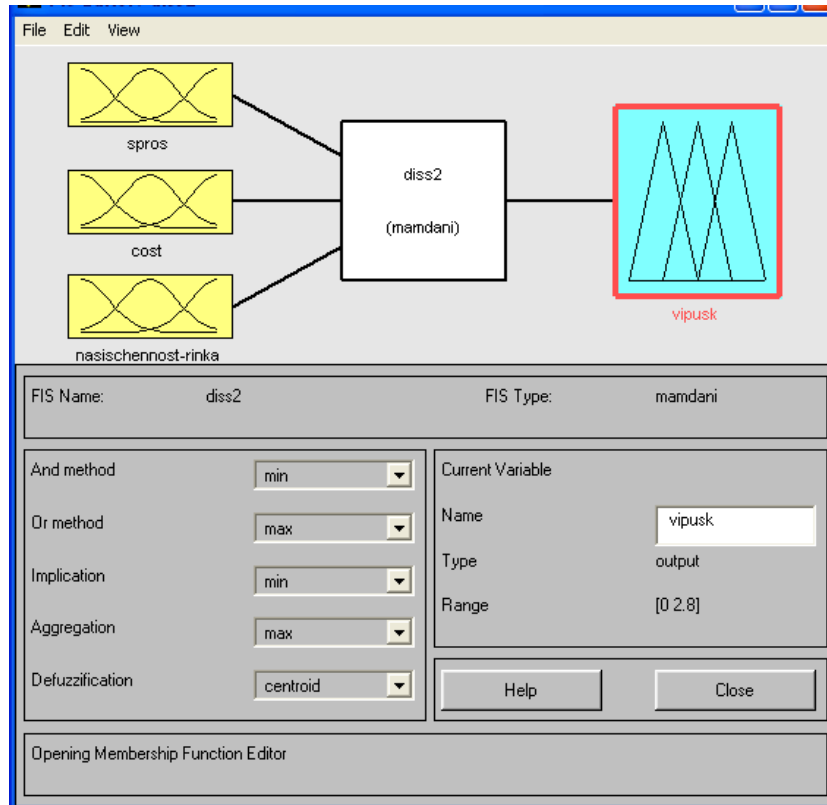


Figure 63 - Structure of the expert system

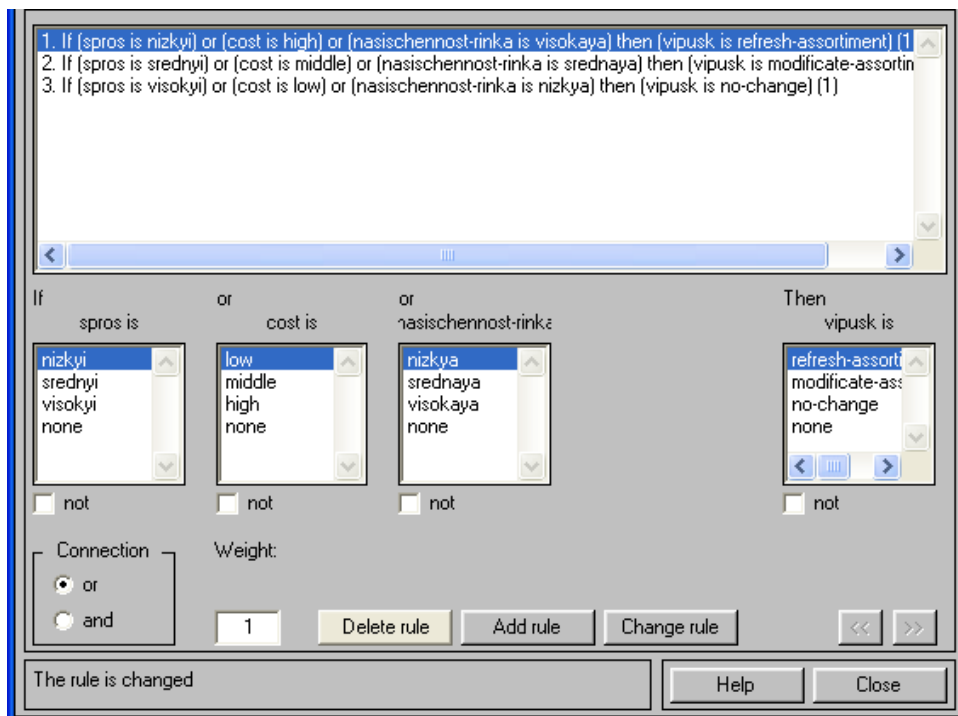


Figure 64 - The final set of rules

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For greater reliability of the results obtained when optimizing the total number of shoes produced, depending on the market situation, prevailing prices and demand, using modern mathematical methods, it

is necessary to build a geometric image of the process under study and use it to choose the most rational decision on the volume of output (Figures 65-68).

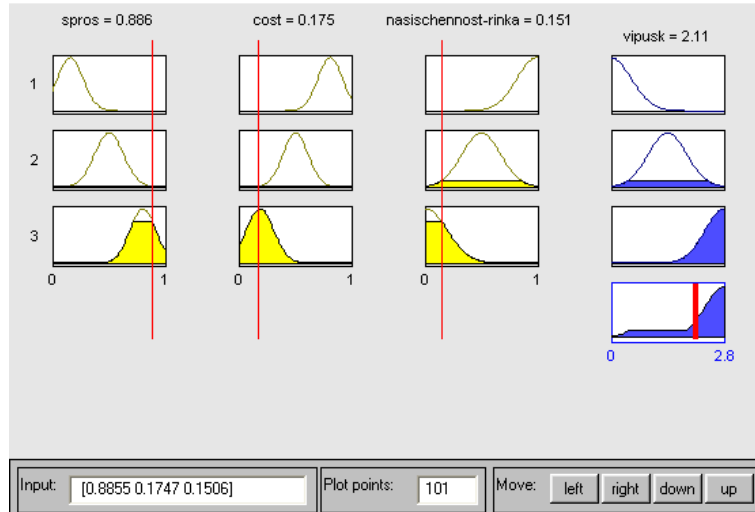


Figure 65 - The procedure of logical inference according to the Mandani algorithm (high demand S=0.886, low price C=0.175, low market saturation N=0.151, estimated output - 2.11 pairs/m²)

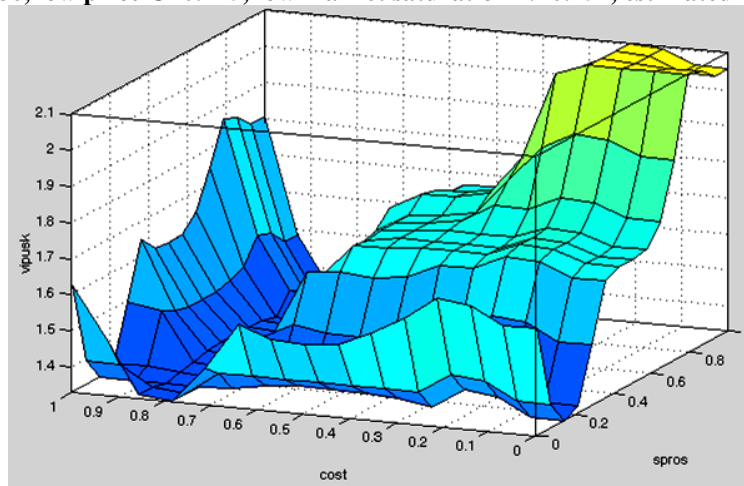


Figure 66 - Geometric image of the dependence of the calculated output on demand and price with a fixed variable "market saturation" N=0.151

The constructed geometric image of three factors with a fixed value of one factor allows us to determine the influence of two other factors on the output volume and choose an extreme ratio between the number of shoes produced and the value of the factors of price, demand and market saturation within the permissible price and marketing restrictions.

So, in order to achieve the maximum value of the volume of shoe production with a fixed saturation of the market at a low level, the enterprise needs to achieve high demand for products and reduce its cost by regulating pricing.

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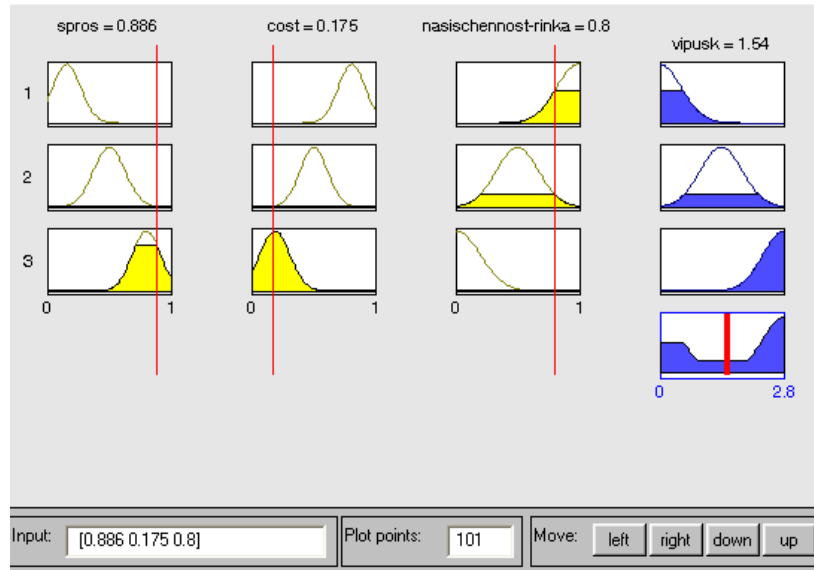


Figure 67 - The procedure of logical inference according to the Mandani algorithm (high demand S=0.886, low price C=0.175, high market saturation N=0.8, estimated output - 1.54 pairs/m²)

With a high saturation of the market, the maximum production volume is at the level of 1.4-1.5 pairs / m² and can be regulated by the introduction of new types of shoes into production. With high cost

and low demand for manufactured models, it is necessary to consider reducing production costs by updating the design and using new materials.

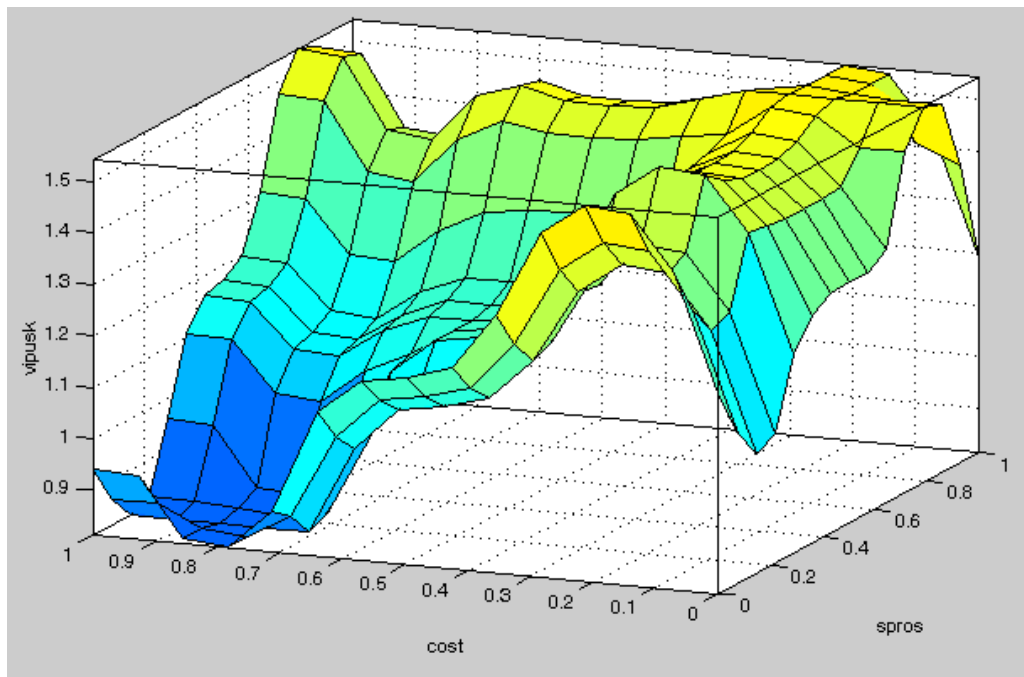


Figure 68 - Geometric image of the dependence of the calculated output on demand and price with a fixed variable "market saturation" N= 0.8

Determining the production plan in order to maximize profit from the sale of manufactured products is a linear programming task and is solved using the Microsoft® Excel "Solution Search" option.

The development of an optimal plan for the production of shoe models is based on taking into account the profitability coefficient and the

production costs of specific models that occupy the largest share in the cost of production and are conditionally variable expenses. These include the following costs:

- raw materials and basic materials costs;
- costs of auxiliary materials;

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□ the costs of basic and additional wages of production workers with deductions for a single social tax.

The software developed by the authors guarantees manufacturers to form the production of an assortment of shoes that will be in full demand and provide enterprises with stable TEP

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