MANAGEMENTOFINDUSTRIALORGANIZATIONINHETEROGENEOUS POLIPOLYWITHUSAGEOFOPTIMIZATIONBUDGETMODEL

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Management system of industrial organization in heterogeneous polipoly with usage of optimization budget model was formed. Optimal characteristics required for budget planning of industrial organization was calculate with usage of mathematical model.

The research of SWOT-analyses of the regional industrial enterprises has revealed that they function in conditions of the changing market of heterogeneous polypoly. Therefore the development of the technique of optimization of selling and production of such enterprises in view of features of market managing is urgent. It is necessary to begin the development of this technique with the division of the system of acceptance of administrative decisions at the industrial enterprises into long-term and short-term parts.

In research on management there is a differentiation between strategy, policy and tactics of the organization, namely the strategy determines the tactics and the policy, the planning of the organization activity is carried out at the level of strategy and the realization of plans - at a level of tactics and policy[1].

A table of comparative characteristics of policy, strategy and tactics of the organization can be created on the basis of the analysis of the definitions used in the books on economy and management, namely the tables from "Management of the organization" by Y.A.Afonin and A.P.Zhabin[2].

Strategic decisions are usually realized in different spheres of business (marketing, manufacture, purchases, and finance). In case of insufficient coordination there is a danger of inconsistency of the decision-making by functional managers which can contradict the interests of the organization. Various kinds of company activities should be coordinated through the development of the unified plan of actions for the future. In books by foreign researchers such detailed plans are usually called estimates and in the domestic literature they are called budgets.

Table 1

Comparisonofpolicy,strategyandtacticsoftheorganization

Parameter	Policy	Strategy	Tactics
1. A level of hierarchy	Highest level management	The highest and average level of management	average and low level of management
2. Period	Long-term	Long-term and mediate term	Short-term
3. Type	Association of the enterprises, the enterprise	Association of the enterprises, the enterprise, plant	Plant, shop, site, workplace
4. Kind of object	System	System, the project	Operation
5. Uncertainty	High	High and middle	Low
6. Need of the information	External, macroenvironment	External, microenvironment	Internal
7. Alternatives	Limited by the external macroenvironment	The wide spectrum of alternatives limited by policy and external macroenvironment and microenvironment conditions	Alternatives are limited by policy, strategy, external macroenvironment and microenvironment conditions
8. Degree detailed elaborations	It is not detailed	Integrated study	Detailed study

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The place of budget-making within the framework of planning, decision-making and management is shown in fig. 1. The scheme consists of several stages[3].

For the formation of long-term plans (see the top part of fig. 1) the scheme of the strategy formation is offered as a system of the parameters describing possibilities of industrial enterprise development. Here we refer a variety of kinds and versions of the goods (in view of the consumer typology); level and frequency of updating of the assortment; level and ratio of the prices for the goods[4]. The plan of the strategy formation, considered in fig. 2, includes the following groups of stages: the analysis of the internal and external environment, the development of the alternative variants of the strategy, the comparison and the estimation of the strategy, and the strategy choice.

sold production is restricted by the demand of consumers dependent on the price set by the monopolist. In case of polypoly all manufacturers, changing the price, change the volume of demand. This case is rather complicated and is examined in the theory of games, the situation becomes even more complicated if the system is hierarchical and it is possible to form coalitions or change its structure. The given model should take into account that the market where the regional industrial enterprises cooperate is heterogeneous polypoly.

The seller behaves like in polypoly if they expect, that their selling depends on their price, and behavior of the buyers as well as on the prices of other sellers, while their competitors do not react to any of their actions. This behaviour is effective especially when:

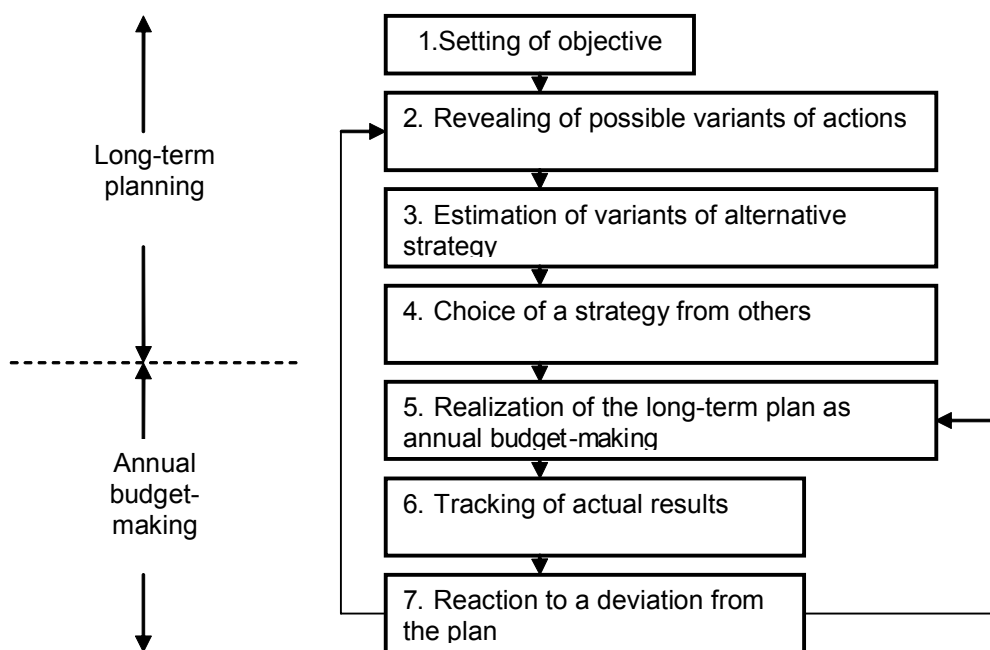♦ there is a great number of sellers, but each of them has a small productive capacity;

*Fig. 1.*The scheme of long-term and short-term planning and management of the industrial enterprise

Within the framework of short-term planning for the development of optimum budgets it is offered to generate an economic-mathematical model of decision-making by the industrial enterprise.

A number of approaches is used for the construction of models of industrial activity planning. Thus, it is considered that in case of ideal competition the price of the production is fixed and set by the market, and the enterprise is not capable to influence it. In case of monopoly the price is established by the manufacturer, but the volume of the

♦ each seller tries "to adhere" the buyer to themselves with the help of the service advertising;

♦ there is a great number of buyers.

A chain of specialized shops in city is a fine example of heterogeneous polypoly. To describe the possibilities of the price policy of the seller on the market in polypoly the function of selling by Guttenberg is used[5](see fig. 3).

If the seller raises the price within the monopoly segment and competitors keep to the
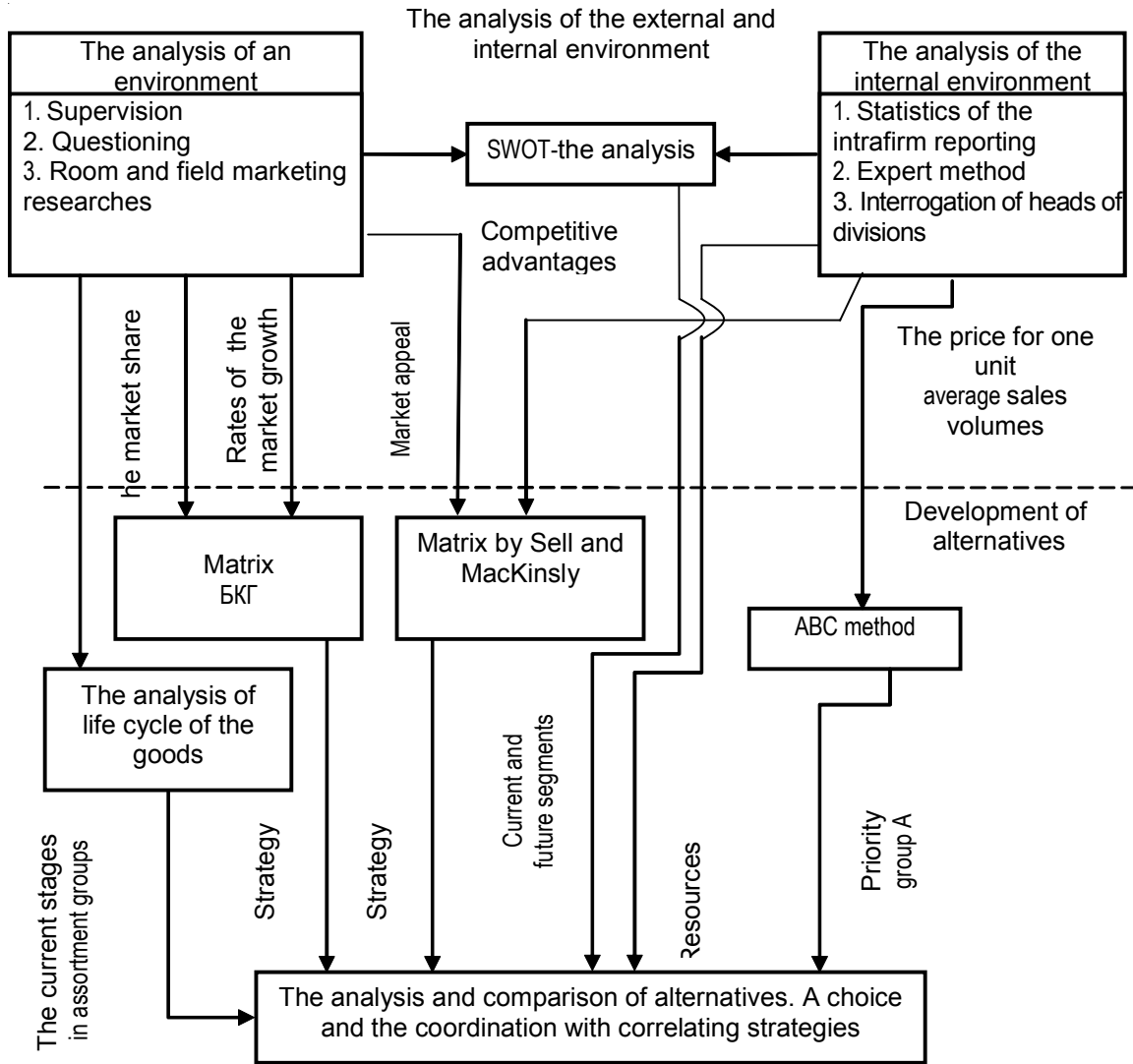
The analysis of the external and
internal environment

The analysis of an environment
1. Supervision
2. Questioning
3. Room and field marketing researches

SWOT-the analysis

The analysis of the internal environment
1. Statistics of the intrafirm reporting
2. Expert method
3. Interrogation of heads of divisions

Competitive advantages

The market share

Rates of the market growth

Market appeal

The price for one unit
average sales volumes

Development of alternatives

Matrix БКГ

Matrix by Sell and MacKinsly

ABC method

The analysis of life cycle of the goods

The current stages in assortment groups

Strategy

Strategy

Current and future segments

Resources

Priority group A

The analysis and comparison of alternatives. A choice and the coordination with correlating strategies

Fig. 2. **The scheme of formation of alternative strategy of the industrial enterprise**

Fig. 3. **Demand in heterogeneous polypoly**

The price of sale

Top polypoly segment

Monopoly segment

Bottom polypoly segment

Border of capacity

Volume of selling
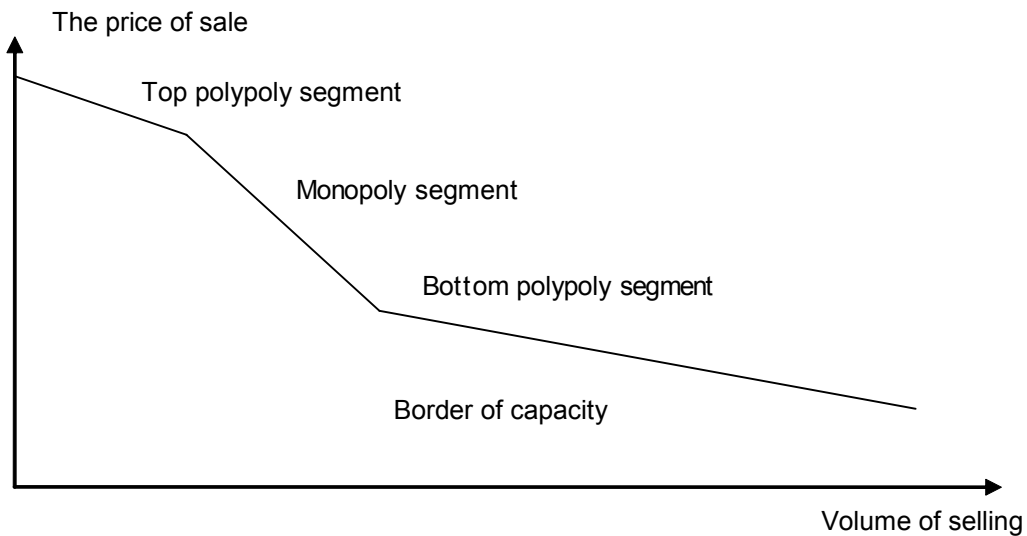
old prices, the seller does not lose buyers, however, they limit the consumption.

If the seller (and they alone) raises the price up to the top polypoly segment they are abandoned by a part of constant clients to buy from competitors as difference in the price is not counterbalanced any more. But for separate competitors the increase in a sales volume remains nevertheless imperceptible as constant clients who left the seller are distributed between numerous sellers.

If the seller reduces the price within the limits of a monopoly segment their constant clients expand their demand. In case of a further reduction of prices up to bottom polypoly segment the seller receives even the additional clients coming from competitors. However, the possibilities of expansion of a market share of the seller are limited to limits of their capacities. And in this the reduction of demand will remain imperceptible by their competitors, i.e. below "a threshold of sensitivity").

In case of heterogeneous polypoly the behaviour of each seller as monopolist is limited to a certain extent. Beyond the "monopoly segment" they should take into account a turnover of buyers possible in both directions. However, because of the insignificant amount of the turnover there will be no price reaction of

The maximum profitable combination of the price and quantity in polypoly is similar to a case of monopoly. The difference is that, as a rule, the function of a revolution has two maxima. Therefore the maximum profitable combination of the price and quantity according to position of functions of demand and expenses can be found in both monopoly and bottom polypoly segments.

For exact definition of the prices the following economic-mathematical model is offered:

$$\begin{cases} \Pi(p) = \sum_{n=1}^{N}\sum_{i=1}^{I} q_{in}(p_i) \cdot p_i - \\ -\sum_{j=1}^{J} [z_j (\sum_{i=1}^{I} \lambda_{ij} \cdot q_i(p_i)) \cdot \sum_{i=1}^{I} \lambda_{ij} \cdot q_i(p_i)] - \\ -C(q(p)) \xrightarrow[p]{} \max; \\ p \in P; \quad 0 \le q_i \le Q_i, (i = 1,...,I), \end{cases}$$

The first item is the income of the enterprise dependent on the established prices, the

second item $\sum_{j=1}^{J} [z_j (\sum_{i=1}^{I} \lambda_{ij} \cdot q_i(p_i)) \cdot \sum_{i=1}^{I} \lambda_{ij} \cdot q_i(p_i)]$

is expenses for purchase of components, the third item is all other expenses of the enterprise connected to sale and manufacture of end products. Tables 2 and 3 illustrate the budgets of the self-cost of the sold product and the budget of the profit from sales[6].

Thus, the author offers a technique which includes the following stages.

1. First, the demand for production is determined, i.e. how the volume of demand for every item in the assortment depends on the price. The market function of demand develops from the individual demand of each consumer, therefore it is necessary first of all to investigate the consumption interests of the largest buyers. It is suggested that a questioning of a network of representatives, dealers and agents for scoping the demand for every kind of sold products should be carried out.

2. The function of the offer of components by the suppliers which shows connection between the prices for components and the required amount should be studied. It is necessary to take into account that if the delivered volumes are exceeded by the suppliers discounts are granted.

3. Construction of a matrix with the technological factors reflecting the amount of the components of a particular kind, used to produce one unit of the end product of every position in the assortment should be constructed.

4. A system of budgets at the current initial data should be formed.

5. The economic-mathematical model which provides a maximum of the profit of the enterprise taking into account the set functions of demand for the end products, offers of components and total costs should be constructed.

6. The economic-mathematical model of determining the prices and volumes of sales to the dealers, the prices and volumes of purchases by the suppliers should be studied.

7. The budgets at optimum values of the parameters providing maximization of the profit should be recalculated and the received additional economic benefit should be determined.

8. The performance of the optimum system of the budgets with the use of methods of financial management should be controlled.

By way of conclusion it is necessary to pay attention to the features of the elaborated techniques and economic-mathematical model which take into account the specificity of functioning of the industrial enterprises:

1) The criterion of the given model is the profit which allows touse a nonlinear function of the de-

Table 2

Example of the budget of the self-cost of sold products, roubles

Parameters	According to budgets	Sum
The remains of the end product by the beginning of the period	2 717 750	2 717 750
The basic materials	22 643 620	27 353 838
wages (including Uniform Social Tax)	1 455 362	
Industrial charges	3 254 856	
The remains of the end product by the end of the period	3 508 680	3 508 680
self-cost of sold products		26 562 908

Table 3

Example of the budget of the profit from sale of products, roubles

The parameters forming financial result	According to budgets	Sum
Proceeds	34 345 760	34 345 760
self-cost of sold products	26 562 908	26 562 908
The gross revenue	7 782 852	7 782 852
Commercial charges	263 000	263 000
profit from sale of products		7 519 852
The tax to profit		1 804 764
Net profit after payment of the tax		**5 715 087**

mand for end products and function of the offer for the components;

2) The technique is intended for the use in the regional markets where the manufacturer works in conditions of the heterogeneous polypoly and independently establishes the prices for production. In the given technique the prices can change discretely or have several variants of the value, and they change in the limited price ranges beyond which the manufacturer starts to compete to the national enterprises or with the enterprises from the neighboring regions producing similar product. These conditions are characteristic of polypoly;

3) The model uses the matrix of technological factors displaying the technological connection between the outputs in every position of the assortment and the amount of the components necessary for their manufacturing. In case of the trade the matrix is not used and the amount of products purchased from the suppliers is equal to the amount delivered to the final customer;

4) The technique takes into account the demand of consumers which determines the planned volume of manufacturing. Depending on volumes of manufacturing and on the basis of a matrix of technological factors the amount of the components which are necessary for manufacturing by means of the used technologies is determined, however, it is done in view of the present stocks calculated under the necessary specifications. Thus, the situation when in case of the unforeseen demand for the certain kind of products the buyer should wait for a long time for the delivery of the necessary components and manufacturing of the required product which can lead to the situation when a client chooses the service of the competitor is avoided;

5) The technique is designed for a short-term prospect (for example, a quarter of a year) and is not intended for strategic planning on long-term prospect, namely, for decision-making on development of new kinds of product, removal from manufacture of the positions which were not claimed by buyers;

6) The optimal parameters necessary for the planning of budgets of the industrial enterprise can be calculated with the help of the model which together with the recommendations of its use including the control and updating of budgets, allows to raise the management efficiency.

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