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S.V. Vyshemyrska

AUTOMATION OF PRICE FORMING MANAGEMENT AT CHILD'S FOOD INDUSTRY ENTERPRISES

Abstract. The state management system baby food company are presented. The expediency of the use of modern information systems for various tasks in the enterprise are proved. The possibility of using game theory to operational pricing of products are presented.

Keywords: game theory, pricing, facility management, decision-making.

Introduction. Globalization of economy greatly influences the activity of modern enterprises. Relations with foreign partners became accessible, information and material production lines grew through the borders of states, transport expenses decrease, trade volumes grow, in particular with the countries in Central Europe. The development of adaptation strategy for international market needs becomes actual for many enterprises, that requires active decisions of pricing questions next to an increase of product competitiveness. This problem in proper extent concerns to the enterprises of food industry and especially child's food enterprises.

Correct technological development acquire special value in the conditions of food enterprise restructuring, necessity of production products of new types, mastering the specialized production capacities. Effective informative support is necessary for development of corresponding project decisions, which provides leaders, technologist, economists with necessary analytic information as to the perspective and possible variants of the aim achievement. Modern computer technologies substantially simplify the process of information accompaniment of technological and organizational decisions making, however existent information systems and technologies difficult in application are costly and often inaccessible to the wide circle of specialists.

Research actuality. The enterprise of child's food is marked with very hard control of products quality, which depends on quality of raw material, terms and terms of storage of raw material and products, correctly calculated compounding, that must take into account all necessities of child's organism on the certain age stage maximum exactly and not deviate from state standards [1, 2]. Expansion of descriptions of

food enterprises products predetermines the origin of wide range of prices. Reducing the price, enterprise will not get permanent advantage, but its increasing has, risks, as competitors have choice: to go back to previous prices or lose the consumers on a benefit of the competitors [5].

Task raising. Development of scientific bases of decision making at a management industrial enterprises is needed for perfection of existent methods of technological processes planning, increase of efficiency of functioning and development of the production-economic systems. The main problem of enterprise management is inconsistency functioning of different chains, which enterprise control system consists of. Creation of effective enterprise control system is predefined by the necessity of multicriterion design of support of acceptance of administrative decisions at planning of productive processes at an enterprise [6]. At the terms of risk and vagueness of design and analysis of situations in pricing for the study of flexible strategies maybe on the base of mathematical vehicle of game theory [7, 8].

It is important to examine the course of processes at an enterprise in dynamic market conditions taking into account that a decision at every next step depends on previous steps. The decision of such tasks will assist in increasing of operative management of technological and economic process at the enterprise of child's food. *The aim of this work* is the consideration of questions of information support in decision making at management pricing at the enterprise of child's food.

Results of researches. The theory of active system which was improved and oriented on the proposed tasks is chosen in this work as development methodology of the information system of decision making support. We divided tasks and corresponding mathematical models into two classes: economic and technological. It is suggested to use complex approach in active systems for task decisions which combines evristic-analytic and probabilistic methods and gives an opportunity to examine tasks from different sides. Possibility using buyers approach within the framework of active systems theory which allowed to get the necessary models of decision making support in particular task was considered next to evristic-analytic methods.

Information system consist of (fig. 1): 1) subsystems' chain which decides technological tasks such as calculation of food packing norm depending on humidity, information for a label, optimization of transportations for supplying with raw material and ready-made products; analysis of organolaptic and physical-chemical indexes of ready-made

products, automated planning of composite foodstuffs compositions; economic tasks (estimation of investment project risk, situational analysis of the financial state of enterprise, choice of competitive commodity by the method of unclear relation of advantages, active pricing) and others.

Let's consider the game "producer-consumer" for decision of active price forming task. Interests of both sides at the food industry market have antagonistic character. Every player pursues the goals of his price maximization at the expense of the opponents. Enterprises try to maximize their profit owing to higher prices on their products, and the consumer wants to minimize them. In this case the situation of decision making according to a game theory is described with the help of three active elements expressed by sets [11]:

$$\{X, \Theta, F\},$$

where is a set of management object decisions;

$\Theta = \{\theta_1, \theta_2, \dots, \theta_n\}$ is a set of economic environment status;

$F = f_{kj} = f(x_k, \theta_j)$ – matrix of the evaluation functional values.

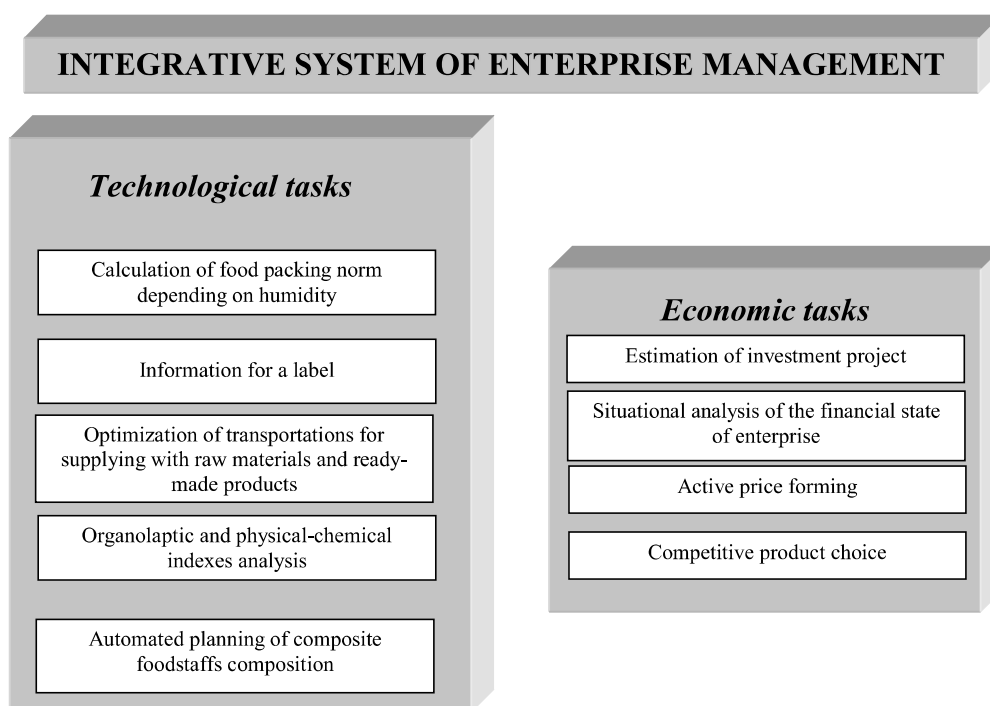


Figure 1 – Integrated control system by an enterprise

Enterprise management must do a correct choice in an antagonism situation. Winning of every pair, which characterizes the relative size of results of actions and depends on such elements, as situations of environment and variant of decision, corresponds to the evaluation func-

tional value to. Proceeding from this form a matrix of the evaluation functional. In detailed form such situation of decision making is set by a matrix the elements of which are f_{kj} are quantitative estimations made decision $x_k \in X$ on condition that an environment is in the state $\theta_j \in \Theta$ [11]. In such matrix a line player has m different strategies (lines), and column – n strategies (columns), thus every number f_{kj} is payment to the line player, if line player chose k strategy, and column j strategy.

The decision of game consists in finding of optimal strategies for every player, that means such strategy which at the permanent repetition of actions gives to the subject maximally possible middle winning. For this purpose use "minimax principle". As elements of matrix F are payments to the line player, then a line player is maximizing in the choice of the line, and column – minimizing in the choice of column. Therefore a line player at first finds a minimum element in every line [12]:

$$\alpha_k = \min_j f_{kj} ,$$

and then elects a line for realization, in which the biggest element from minimum is situated:

$$\alpha = \max_k f_{kj} ,$$

where α is a bottom cost of game.

Like the player of column at first in every column chooses a most value $\beta_j = \max_k f_{kj}$ and optimal strategy chooses after a formula:

$$\beta = \min_j \beta_j , \text{ where } \beta \text{ is an overhead cost of game.}$$

Obviously, that always $\alpha \leq \beta$. If $\alpha = \beta$, then a game is called a game with the point of "saddle". An element for which $f_{kj} = \alpha = \beta$ is named the element of "saddle". Not every game has a point of "saddle", however, if a point of "saddle" is, then strategy of players is determined simply.

Wald's, Gurviz's and Sevidges criteria suit well in the case characterized by antagonism interests of environment as decision making criteria in the conditions of uncertainty [11].

The synthesis of the above-mentioned methods allowed to build management pricing frame at the enterprise, basis of which is a sequence of the process stages and decision making moments (fig. 2).

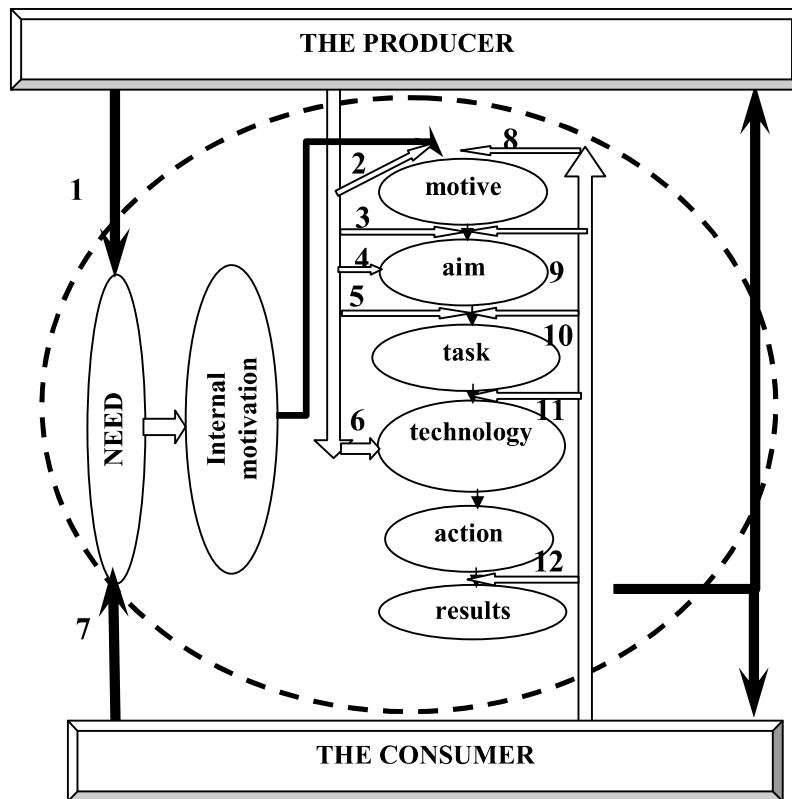


Figure 2 – Management element activity of the active pricing

The approach to be considered was used for the strategy of the active price forming for the "South cannery of child's food", Kherson.

Conclusions. The existent information systems do not answer the requirements of consumers, they are unjustified expensive, does not provide with active estimation of enterprise functioning efficiency, and preparation of recommendations in management decision making. The offered information system consists of separate subsystems, each of which decides the concrete task of enterprise management by economic and technological processes.

Decisions, made by enterprise management in the field of pricing, are the most difficult and responsible, in fact they can not simply worsen financial-economic activity, but also lead the enterprise to bankruptcy. For reasonable decisions making it is expedient to rely on a few variants of prices, calculated for the same products which allows to choose the optimal level of price in a present market situation. The considered mathematical model of the active price forming allows the management to do a right choice in an antagonism game "producer-

consumer" and to make reasonable decisions within the framework of the offered information system of making decision support at the child's food industry enterprise.

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