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**ASPECTS OF MULTIOBJECTIVE OPTIMIZATION IN PLANNING OF THE ENTERPRISE**

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*Сonsidered the aspects of multi-objective optimization planning company. Was shown advantages and disadvantages of the method. Proved methods of selection options for solutions.*

 **Singlecriterion optimization, multicriteria optimization, the method of principal components method concessions.**

As the market economy conditions increasing demands for scientific validity planning activity of company. Among the numerous methods of planning deserves special attention multi-objective optimization method, the possibility of which determine the relevance of the research.

**Analysis of the main research and publications.** Research on this topic conducted by such scholars as M. Cruz, R. Tulchin, S. Kirichenko, O. Kryvda, A. Kavtysh, M. Hreschak, A. Kotsyuba, S. Vojvodina, B. Serduk.

**The aim of article -**  justification applying the method of multi-objective optimization in the planning of company activity.

**The main material.** The work of enterprises in market conditions necessitates the implementation of a new approach to solving strategic forecast and current planning production and marketing of finished products.

Desired level of competitiveness and businesses sustained presence in the target market can be achieved by the simultaneous implementation at least four groups of objectives: economic, social, environmental and investment.

In most cases, optimization problems in the organization of companies settled as single-criteria. But single-criteria approach can be justified only if index is taken as a criterion, is totally dominant and inaccurate information sufficiently small.

It is not possible to determine the rate or criteria of any degree that would be reflected all aspects of the dynamics of the enterprise, so using single-criteria approach is not appropriate. The consequence of this simplification is to reduce the cost-effectiveness calculations derived from the implementation in practice of individual enterprises.

The approach reflects the use of multipurpose optimization to meet the challenges of planning, first found in the works of V. Novozhilov [2].

Revealing the economic aspects of production through the application of planning, prof. I. Nelidov said: "There can be any single indicator that even has the highest level of generality that would allow display versatility, multidimensionality, dynamic variety of economic phenomena such as the development and improvement of production ..." [4].

Using the method of singlecriteria leads to simplification, which results in reduced economic efficiency that can be obtained from the implementation of the results into the practice of enterprises [1].

If the solution of singlecriteria problems methodological problems do not occur, and only possible computational difficulties, the way of multi-objective decision. The question that should be considered the best alternative for the problem of multiple objective functions that are contradictory and achieve optimum at different points of the set of alternatives? Multicriteria goals can be to each other in the following ways: 1) according to neutral targets, and 2) the purpose of co-operating. (usually the system can be seen using one objective, while others are achieved at the same time), and 3) competing goals (one of the objectives can be achieved only through the loss for the rest).

You can offer a structure currently existing procedures for decision multicriteria problems of this kind (Fig. 1).

 Figure. 1. Structure solution procedures multicriteria problems

This structure helps to better understand the solutions to problems faced by the researcher.

The method consists in reducing the problem to singlecriterion optimization.

The method of principal components is that the quality criteria associated with one of the indicators, selected as the main. In the main characteristics imposed restrictions. In this case, the main indicator is implemented optimality criterion, on the other - admissibility.

The method is simple, vividly but the free choice of the main criteria can lead to tragic consequences or results in ineffective [6].

For problems in which the criteria are uneven, used method concessions. 1) place the criteria for their importance (most important is first); 2) Find the optimal value W1\* of the objective function W1; 3) Do the assignment on the first performance indicator, ie worsen W1\* size to a value of W1\*\* = k1W1\* ;4) introduce additional constraints in the problem W1 ≥ W1\*\* ; 5) to find the optimal value W2\*of the objective function W2; 6) Do the assignment for the second performance indicator, W2\*\* = k2W2\*;7) enter into additional task constraints W2 ≥ W2\*\* 8) a new task with two additions solved by the third measure of efficiency and so on; 9) the process of problem solving ends when the solution will be obtained on all counts. The final plan will be optimal [1].

Method of complex criteria. Is to create a total monoindicator. Thus, the basic idea of the method consists in building a single function arguments which are components of the vector benefits. Often this function is represented as a fraction where the numerator are all values ​​which increase desired, and the denominator - those who would like to reduce. [3]

Chance problem statement, which provides, built process many criteria one by introducing a priori weights λi for each criterion fi(x). Coefficients are selected based on the degree of importance of intuitive representation of different criteria: important criteria weight obtained with larger absolute values​​. After the weights multicriteria problem is reduced to a function of singlecriterion goal  [5].

Instead of a simple linear combination of the initial criteria can be used more sophisticated means of formation of these new criteria.

**Conclusions and recommendations for further research**. Based on the above, we can conclude of the case for the practical application of multi-objective optimization to address the economic, planning, financial and administrative tasks in the enterprise. Multiobjective optimization is one of the natural methods of solving conflicts that arise when solving economic problems because, in most cases, it is impractical strive to achieve only one goal (often local), should strive to develop quality plan, targeted to achieve key business objectives. Application of multi-objective optimization opens up new possibilities of use of technical, economic and financial indicators used to measure activity.

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