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AN APPROACH TO FORECASTING THE VALUES OF PERFOMANCE INDICATORS IN THE PUBLIC ADMINISTRATION SYSTEM

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The article gives the development of theoretical and methodological foundations and practical recommendations for constructing a comprehensive method for predicting the values of performance indicators in the system of state and regional government.

Keywords: forecasting, public administration, decision making, adaptability, simulation, expert.

Each type of social activity is accompanied by management. Moreover, the latter is an integral component of each type of activity and at the same time a special type of activity with a certain set of functions. Management functions are inherent in the management of all types of social activities. They directly

follow from the subject-object mapping of public administration processes. There are various lists of managerial functions, but in modern studies, according to the results of work, they refer to four main functions: planning, organization, motivation, control and two connecting processes: communication and decision making.

A very important property of any management is its focus. The essence of managerial activity is the achievement of goals, and the content - actions to achieve them. According to the formulation of P. Drucker, management is a special kind of activity that turns an unorganized crowd into an effective, focused and productive group. To paraphrase another of the most famous representatives of management science A. Fayol, we can say that to manage the state is to lead it to goals with the maximum possible use of all available resources. We also confirm this idea in the works of other famous scientists, for example, in, where it is indicated that the goals of any organization include the transformation of resources to achieve results,

On the way to achieving goals, many difficulties arise, to a certain extent they can be eliminated by an effective choice of management decision-making methods.

It is determined that the socio-economic situation in Ukraine is characterized by a rather high degree of complexity of relations, the uncertainty of information about the characteristics of economic objects, and the dynamics of processes taking place. The scale of socio-economic interaction is spreading, economic, social, informational, technical, organizational ties are becoming more complex and ramified, the pace of socio-political processes is rapidly accelerating. All of the above factors make high demands on the quality of managerial decisions, the speed of their adoption and implementation using a fairly wide range of scientific methods: from the dominance method and lexicographic ordering to mathematical programming methods and value theory methods in decision making under deterministic conditions, from methods discretization of uncertainty and stochastic dominance - to the method

of analysis of hierarchies and decomponization methods of the theory of expected utility when making decisions under conditions of risk and uncertainty.

The decision-making mechanism is based on intuition, judgment and rationality. So, the subject of management (for example, local bodies of state executive power), is guided by intuition, becomes a hostage to chance, and from the point of view of statistics, his chances of making the right choice are not high enough. Judgment-based decisions are based on knowledge and meaningful experience. Using and relying on common sense, adjusted for the current situation, one selects the option that brought the greatest success in a similar situation in the old days. Decisions based on methods of analysis, justification and optimization are made for strategic and tactical management and are rational.

It should be noted that the vast majority of situations require new management decisions, eliminating the use of the analog approach.

Considering the features of modern economic relations in Ukraine, as well as the specifics of the work of local bodies of state executive power, it can be considered that it is not enough to use only the intuition and experience of the leader to make optimal managerial decisions. In Ukraine, the practice of using an intuitive approach to decision making based solely on the subjective judgments of the leader is quite common. Unlike others, this approach does not provide for a strict sequence of actions, depriving the process of preparing decisions from formal procedures. The main objective of the scientific school of improving managerial decisions at the present stage is to minimize the impact of an intuitive approach on this process. However, the solution of such a problem does not remove from the agenda the problem of the human factor in decision making. Therefore, it is necessary to develop such a management decision-making scheme that provides a balanced distribution of reactive response, analogues of accumulated experience, scientific methods and models, intuition and mastery of a manager in managerial activities.

An analysis of the work on the theory of decision-making concerning various aspects of the socio-economic development of the state shows that without a systematic approach it is impossible to ensure the objectivity of the study, and, consequently, the theoretical solution and definition of tasks. It should be noted that a solid research base has been formed on this issue. Scientists such as V. Bakumenko, S. Bir, A. Degtyar, M. Meskon, G. Simon, R. Fathutdinov and others made a particularly significant contribution to decision theory.

The theory of decision making is based on the use of various methods and models of decision making, including the forecasting method.

Prediction refers to scientifically based prediction of the probabilistic paths of the development of phenomena and products for a more or less distant future. Prediction problems in management are very popular because they can be used, for example, to predict future values of various kinds of indicators.

Forecasting is based on storing the general tendency of the development of phenomena over time, therefore, in practice, the forecasting process is reduced to selecting, based on data from past periods, the analytical dependences of the parameter under study on factors influencing and extrapolating these dependencies for the future. The indicator forecast is obtained by substituting the required factor value into the obtained regression equation. Thus, the predicted value is a point estimate of the average value of the indicator at these levels of factors.

The simplest of forecasting methods is the extrapolation of the trend of the time series calculated over the past period. A trend expresses a trend in dynamics observed using linear or non-linear time functions obtained by the least squares method or otherwise.

One of the most common forecasting tools is the construction of trend lines using MS Excel based on a scatter chart based on actual data of past periods. These or other qualitative development properties express various equations of trends. MS Excel offers various types of approximating

dependencies: linear, logarithmic, polynomial, power, exponential, linear filtering. However, an attempt to implement the proposed models leads to significantly different numerical results, which, moreover, often have different directions of development. This leads us to the task of assessing the possibility of using one or another forecasting model.

This approach is certainly quite effective, but in our case there are several additional problems that can reduce this efficiency.

These problems include:

Firstly, this is a constantly high variability of both the values and the composition of influential environmental factors, which leads to frequent changes in the trends of indicator values.

Secondly, as a consequence of the previous problem, the impossibility of choosing a single standard type of approximating dependence is, first of all, the simplest, but very often very effective linear dependence.

Thirdly, the very high complexity and cost of choosing your type of approximating dependence for each indicator and for each region.

Thus, the method of complex solution of these problems should be based on the properties of adaptability to environmental changes and unification of the choice of the type of approximating dependence, as simple as possible.

As such a method, it is proposed to use the linear type of approximating dependence with the “forgetting” of earlier data.

If there is standard use of the least squares method (including using MS Excel) when choosing the linear type of approximating dependence, the earlier data will be multiplied by “forgetting” coefficients, the smaller the value, the earlier the data.

For example, when forecasting for the fifth year using data for four years, the “forgetting” coefficients may be 0.1; 0.2; 0.3; 0.4 for the first, second, third and fourth years, respectively.

Thus, the largest contributions to the criterion ratio are made by the recent periods, and the earliest are subsequently nullified.

We have that in the construction of the next approximating dependence linear is used, but at the expense of coefficients of "forgetting" it will be already different than in the previous period. As a consequence, we have a piecewise linear function on the global segment of time.

By definition, a piecewise linear function is a nonlinear function which, when presented geometrically, consists of transitional linear segments. An arbitrary function at a closed interval can be approximated with a precision by a piecewise linear function, which increases the quality of the approximation.

Thus, the proposed method is adaptive in terms of "forgetting" outdated data, unified in terms of choosing a single standard simple type of approximate dependence - linear, which in the above approach also improves the accuracy of the approximation and the forecast itself.

The introduction of weighting coefficients of "forgetting" allows, if necessary, to construct a simulation procedure to reproduce the possible variants of the forecast, changing the speed of "forgetting" of data in one way or another.

It is proposed to determine the basic composition of the “forgetting” coefficients based on the Delphi method.

This method is based on conducting and processing the results of a simple expert survey, while allowing to decompose a complex problem into several subtasks, which gives the opportunity to maximally agree the opinions of experts and to obtain a sound decision.

Note that the use of this method in the US has been quite successful in predicting "public policy in the field of scientific and technological progress."

In order to obtain expert assessments, it is necessary to create at the state level (region, industry, etc.) a group of experts, including leading scientists, government officials, analysts, etc., clarification and, perhaps, updating of the directions of scientific and technological progress. In this case, the group of experts should function as far as possible anonymously and, if necessary, within it should be rotated at the level of 10-15%.

This will allow, on the one hand, to increase the objectivity of the decisions taken, on the other - to ensure the effective continuity of such decisions and adaptation of the group of experts to the possible changes of the external environment by involving specialists in new knowledge for the group of knowledge.

Each expert is invited to form a set of values of “forgetting” coefficients that are optimal according to the expert.

The variant of this set is obtained as a result of the standard procedure of the Delphi method.

The algorithm for our case is given below.

Algorithm 1.

Step 1. Issue tasks to experts.

Step 2. Generate the required datasets.

Step 3. Checking the completion of the data generation process. If the process is complete, then go to step 4, otherwise - to step 5.

Step 4. Checking the availability of experts is drastically different from the group's opinion. If there are such experts, then go to step 5, otherwise - end.

Step 5. Formation of the list of experts for possible rotation.

Step 6. Transfer to each expert a summary opinion of their colleagues.

Step 7. Adjustment of individual opinions of experts.

In Step 1, experts are assigned tasks to form a set of values for the “forgetting” coefficients. In step 2, the initial formation of the composition of this set. In step 5, a list of experts is formed, whose opinion is not consistently in line with the opinion of the majority of the group, and who will be the main contenders for expulsion from this group. In step 6, each of the experts receives a summary result of their colleagues' proposals, and in step 7, adjusts their own position to reflect this view. Upon receipt of the final survey results, some values may be fixed by one group of experts and not be allocated to others, but in the general case, to summarize the results of the survey, a general set of values is formed as an arithmetic mean.

Thus, we obtain the final set of values of the coefficients of "forgetting".

In the approach proposed in the article we have a comprehensive use of standard decision-making methods: forecasting, Delphi method, simulation modeling.

And it is very important to have the proposed prediction mechanism with adaptive qualities.

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