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THE USING OF THE STATISTICAL METHODS AND MODELING IN MAKING MANAGERIAL DECISIONS: THEORETICAL ASPECT

Abstract. *It has been justified the importance and expediency of using statistical methods and modeling in making managerial decisions. It has been considered the application of statistical methods at each stage of statistical analysis. It has been given the description of the main models used in the process of analysis of economic activity and financial status of the enterprise and determined the directions of their using in making managerial decisions.*

Keywords: *statistics, statistical methods, statistical analysis, modeling, methods of modeling, making managerial decisions.*

Introduction. In market conditions and conditions of strict competition, the operational response of the enterprise to the change of economic situation due to the adoption of operational optimal managerial decisions becomes actual. In order for an administrative decision to be effective, it must be scientifically grounded, purposeful, quantitatively and qualitatively defined, lawful, optimal, timely, complex, flexible, fully completed and, most importantly, must be verified with reliable and exhaustive information. The statistic is the information base of any subject of entrepreneurial activity.

The statistical analysis with using statistical methods is an important tool in the process of making managerial decisions regarding the development of an object of activity. The application of statistical methods in the analysis of economic activity allows us to identify the regularities and trends of its development, causal relationships, get reliable characteristics for making informed decisions about choosing the best ways to solve specific problems or overcoming the negative consequences, predict the influence of factors and the possible development of events in the process of implementing managerial decisions.

The modeling creates an effective basis for improving the management process. The using of the models makes possible to make decisions, in the substantiation of which all factors and alternatives are taken into account that arise in the difficult conditions of production and economic activity.

Literature Survey. The using of the statistical methods and statistical analysis in making managerial decisions was considered by: R.O. Kulinich [1], R.M. Motorin [2], Ya.O. Ostapenko [3], Yu.S. Cal-Calko [4], O.G. Yankovy [5].

The socio-economic phenomena and processes with using economic-statistical analysis and modeling are researched by scientists: O.G. Osaulenko [6], Ya.O. Ostapenko [7], O.I. Chernyak, P.V. Zakharchenko [8], O.Ye. Chorna [9].

The problems of modeling the managerial processes were also researched by foreign scientists: P. Dickson [10], M.F. Gumerov [11], K.J. Arrow [12], J. Greedy [13], L. Walras [13].

Methods. The purpose of this article is the substantiation the importance of application and generalizing theoretical and methodical aspects regarding the using of the statistical methods and modeling in making managerial decisions. Such research methods were used to achieve the purpose: observation and comparison, theoretical generalization, analogy, induction and deduction.

Results. The results of any business activity are increasingly dependent on the quality and effectiveness of the management process. The managers at different levels should have full, operational and purposeful information about the processes and results of the enterprise or organization. In this case statistic serves as an information basis. Statistics have a powerful methodological arsenal, whose knowledge and practical using by economists of the enterprise will enable to significantly improve the efficiency of their work.

Operational statistical information will reflect processes at the enterprise, and the using of the statistical methods is an instrument of analytical research of the existing trend and forecasting of possible results of the activity of the subject of entrepreneurship and their changes in the future.

At the stage of preparing information the methods of statistical observation, summary and grouping are widely used for the analysis of the results of activities and the adoption of managerial decisions, as well as the simplest methods for processing of the information arrays: the definition of absolute, relative and averages values.

We can analyze economic and financial status of the enterprise or industry, determine the prospects for development with the help of statistical indicators (absolute, relative, average). The absolute values provide full information about indicators of the enterprise's performance in absolute terms, determine the reserves of improving their economic and financial status.

The application of the relative size of the comparison is important among the relative sizes. The comparison of indicators of enterprises`s performance with indicators of previous periods and planned indicators will allow to analyze the condition and prospects for development of economic activity, identify reserves of improving the economic and financial situation.

The comparison of indicators in the regional context with indicators of other enterprises contributes to determining the competitiveness and financial stability of the enterprise. The relative indicator of the structure will reflect the structure of the manufactured or sold products, the share of services rendered, the structure of incomes and expenditures of structural units and the enterprise as a whole, as well as structural changes and this will facilitate the making optimal management decisions.

The relative and absolute values of the dynamics of indicators enterprise`s performance will reflect the degree and tendency of its development over a certain period of time. The using of the statistical indicators as components of relative values is appropriate in the analysis of the enterprise`s performance, they will help to determine the factors that influence on the change of intensive and extensive indicators of activity. The averages values are the most commonly used indicators of aggregation of statistical information.

At the enterprise it is expedient to analyze the average salary of staff, average annual income and expenses by structural units and the enterprise as a whole, as well as average costs for the using of the energy resources, it will facilitate the

introduction of energy-saving technologies and economy of resources of the enterprise. The variation indicators, in particular, the standart deviation and the quadratic coefficient of variation of the expenses and the profit are appropriately used at the stage of direct analysis of the condition and activity of the enterprise. It is important to compare them with similar average indicators for the industry and for Ukraine.

The distribution of business by region, the concentration of both domestic enterprises or customers (for enterprises providing services) and foreign enterprises and clients will help to determine the indicators of concentration and localization.

In order to determine the reasons of the loss-making of an enterprise for eliminate it, or profitability of enterprise for spread it, it is necessary to determine the interrelation between the indicators of activity. The analysis of the interrelations between the indicators is carried out both with the help of parametric and nonparametric methods. Non-parametric methods determine the investment attractiveness of a business entity and its business, in particular, in a regional context. Parametric methods, such as correlation-regression or dispersion analysis, determine the interconnection and interdependence between quantitative indicators of activity.

On the basis of the above analysis it is possible to determine the influence of factors on the results of activity (the cost of the manufactured products and / or services rendered), to predict the economic and financial situation of the enterprise in the nearest periods of time. Also, the predicted performance indicators are obtained as a result of statistical analysis of the dynamics indicators.

With the advent and improvement of modern computer programs of data processing, statistical processing of data has risen to a new level. Now the analyst may not have mathematical training. The operating with statistical concepts and correctly choosing the methods of analysis is enough. The spreadsheets of Microsoft Excel (which included in the Microsoft Office suite, Qattro Pro, and others) foresee the computer realization of the basic statistical methods of data processing Specialized packages have greater capabilities of statistical processing, for example: SPSS (PSPP), SAS, STATGRAPHCS, STATISTICA, etc.

One of the useful features provided by modern automated information systems for managers is the possibility of modeling production and economic processes in order to most effective impact on them.

The basic methods of modeling:

- Theory of games: modeling the influence of the decision on the components of the external environment (competitors, partners, consumers, etc.)
- Queueing theory: designing the best system of promotion the goods, determination of the optimal number of distribution channels and the structure of the distribution network (optimal service model).
- Inventory management (logistics): determination of the time of placing of orders, their quantity, volume of inventory balances in warehouses, etc.
- Linear programming: providing an optimal way of distributing resources in the presence of different variant needs for their.
- Simulation modeling – it is a forecast for the development of the situation.
- Economic and statistical analysis: method of cost evaluation, cost structure, economic benefits; construction of the graphs of the dependence of three variables: the level of sales, the unit cost of production and the amount of profit.
- Payment matrix - a statistical method that allows choosing the most optimal variant from several proposed ones.
- Decision Trees: a schematic representation of the successive decisions of the manager reflecting the financial results, the probability of obtaining their positive value, the possibility of comparing alternatives.
- Extrapolation - it is a forecast of the acquired experience, existing trends, dynamics and alternative assumptions in order to anticipate the future.

All methods can be grouped into modeling groups in making managerial decisions:

- Informal (heuristic) decision-making methods. These methods are based on the analytical abilities of people who make managerial decisions and intuitions of the manager. Their advantage is that they are accepted promptly. Disadvantage:

informal methods do not guarantee the avoidance of false decisions, because intuition can fail a manager.

- Group decision-making. The main point in the process of collective work on the adoption and implementation of managerial decisions is to determine the circle of persons involved in this procedure.

The preparing and taking managerial decisions can be greatly accelerated and improved by the building financial models. The purpose of creating and using financial models is the help that such models can provide to enterprise management in the decision-making process.

Financial models provide enterprise management with useful analytical information that can be used as a basis for making informed decisions.. Information provided by financial models can be analyzed, depending on the purpose:

1. Achievement of goals. The analysis of the financial model will show if the results of the solution can help achieve the enterprise`s goals. Thus, using the model of cost planning, it will show if the company can maximize its profits based on estimates and assumptions included in the model at a certain point in time. The linear programming model is used for analysis of the optimal using of enterprise`s resources.It can quickly determine if the goals can be achieved by the enterprise basing on a particular solution that included in the model at various stages.The managers can use this information to review decisions, reassess goals, and rethink decision-making processes.ь.

2. Risk analysis. The risk analysis is an important part of the decision-making process. The ability to instantly analyze the situation with the help of financial models provides executives with a quick and easy method to conduct a broad analysis for making any decision. This is the main advantage of financial models.

Conclusion. The various techniques, methods and models of statistical analysis can be used in the analysis of economic activity and financial condition of any enterprise. Their number and scope of the application depend on specific goals and they are determined by enterprise`s tasks in each individual case. The active government`s using of the various levels of economic and statistical methods that

serve as a constructive and reliable tool for substantiating and adopting a decision-making solution will allow to relocate many of the functional problems into the field of precise quantitative analysis, which will allow to improve the financial conditions of individual enterprises and improve the efficiency of management of socio-economic development of regions and the country as a whole.

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