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Section - Economy

METHODS AND MODELS OF THE ANALYSIS OF THE ECONOMIC BEHAVIOR OF THE ENTERPRISE: THEORETICAL ASPECT

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The economic behavior of enterprises is a direct consequence of processes that are carried out not only within the enterprise, but also affect its activity from the outside, directly or indirectly. In view of this, the model of economic behavior of a modern enterprise is a model of an organization capable of adapting to permanent changes in the environment thanks to a more flexible organizational structure, deepening the division of labor, specialization, the application of modern methods of planning, management and innovative decision-making, advanced management technologies.

Economic behavior is characterized by dynamism, which requires analytical, mathematical and graphic research. Features of the development of economic behavior of economic entities in the conditions of nonlinearity, dynamism and stochasticity were studied by both domestic and foreign scientists. Therefore, we consider it expedient to analyze the existing methods and models of economic behavior analysis of enterprises depending on the ability, resource capabilities and readiness to respond actively, adaptively and effectively to changes in the external environment.

Research of conceptual approaches to the analysis of processes of modeling the economic behavior of the enterprise is devoted to the works of such scientists as Yarmak M., E. Mason, T.A. Horodnya, M.O. Danyliuk, O.K. Eliseeva, B.F. Zablotskyi, K. Granger, H. Hatanaka, E. Peters and others.

K. Granger, M. Hatanaka studied the use of spectral analysis methods, which are based on the Fourier theorem and allow to show the presence of cyclical elements of economic dynamics. Since seasonal and cyclical economic processes are characterized by periodic changes in indicators, they can be mathematically described by the Fourier series, which makes it possible to decompose a time series with cyclic components into several sine and cosine functions with different amplitudes, periods and frequencies. The Fourier series transformation is based on the following idea: almost any function represents the sum of individual harmonic components [6]. The resulting variables in this model are the values of the time series, and the sine functions of the possible frequencies are the independent variables. The coefficients of the Fourier series are coefficients of the regression model that show the degree of correlation of the original

data. If the calculated value of the coefficient has a relatively large value, then there is a strict periodicity in the output data.

M.O. Danyliuk believes that the method of spectral analysis is appropriate to use when modeling the economic behavior of an enterprise in the presence of constant interrelationships between objects. This leads to the conclusion that such methods are inexpedient, because the cyclical components of the economic system change from one fluctuation to another.

Quite often, in the study of complex systems, standard statistical analysis is used, the choice of which is justified by the fact that certain indicators are subject to the normal distribution law. Natural processes are characterized by local randomness and global determinism. Contrary to Newton's determinism, chaos theory proves that these two opposite states have a place to exist. For the analysis of such systems, Horst suggested using fractal R/S analysis, which allows you to build point and interval forecasts of future values with high accuracy [7].

The fractal dimension of the time series implies that the process can be between deterministic and random. Edgar Peters proved that R/S analysis allows not only to detect long-term memory in a time series, but also to estimate the length of periodic and non-periodic cycles, and is robust against noise. These features make Hiorst analysis suitable for the study of natural time series. It should be noted that there is a certain disadvantage of using R/S analysis - obtaining biased estimates if the studied series contains short-term memory, is non-stationary and heterogeneous - contains a heterogeneous sample [9].

Effective management of the economy and economic behavior of business entities should be based on modern technological and instrumental approaches and accurate mathematical calculations. Imperfect business processes require a detailed analysis of business structures in a difficult economic sphere. Hence, there is a need to apply continuous economic models that would correspond to the dynamics of economic processes with constantly changing factors.

The most promising methods among the modern new deterministic approaches of modeling, analysis, finding cycles, visualization and forecasting are considered to be partial-polynomial or spline approximation, which are power, periodic, exponential, logistic and other functions. The combination of accuracy, versatility, internal optimization properties, optimal "stitching" of fragments at the borders of the plots, automatic satisfaction of several conditions at the junction of the reporting period and the forecast horizon, which facilitates, clarifies and extends the forecast, allows you to recommend this device as the main one for the analysis and modeling of many types of behavior of economic objects. Since economic processes have the ability to change under the influence of uncontrollable factors, it is assumed that, there are stochastic fluctuations - oscillations that are constantly repeated in time and collectively form a single system - an oscillator. Hence, there is a need to study the mechanisms of "cyclism" and "repetition" of economic behavior. Cyclical behavior of economic processes with a stochastic residual and active components of dynamics is automatically realized based on the spline approach. The revealed new possibilities of analysis of multivalued functions, on phase and parametric portraits make it possible to analyze econometric dependencies.

Many scientists [1, 2, 4, 12, 13] consider it expedient to take into account the stage of the life cycle when forming the economic behavior of business entities, so we will consider methods and models for determining the stage of life development.

R. I. Sekirov developed an algorithm for determining the stage of the life cycle, which is based on the model of I. Adizes and includes three stages. At the first stage, when the direction of the company's development process is determined, its current state is analyzed according to certain criteria: expectations, funds, permission / ban, political power, management or system management, profit. The second stage involves determining the transitions the company has undergone on the basis of the questions, the answers to which are given by the manager. At the third stage, organizational characteristics are defined, which change from one stage to another. For this, a rating scale is used, which describes the confidence intervals of the company's belonging to one of the two stages. The quantitative method makes it possible to obtain the sum of the estimates and to conclude at which stage the enterprise is. Although this algorithm allows you to structure information about the current stage of the life cycle, it does not take into account all the features of the company and can only act as an auxiliary tool for organizational diagnostics [8].

Yarmak M.R. believes that when determining the stage of life development, an important stage is the selection of indicators that should be analyzed over time. He proposes to evaluate the stages of the life cycle of the enterprise according to the aggregated indicator of dynamics, which takes into account the growth rates of indicators according to the geometric mean formula. The author emphasizes the inclusion of only quantitative criteria in the system of indicators, since the evaluation of qualitative criteria requires significant time spent on collecting and processing information [11].

O. V. Milinchuk in his works proves the expediency of taking into account all aspects of economic activity, namely by such components as: personnel, clients, business processes, finances. The following conditions have been established for defining the system of indicators: the selected criteria must be adequate to the task of diagnostic research, be subject to dynamic and comparative analysis with the indicators of a representative group of other enterprises, not duplicate each other and cover all subsystems of the enterprise's economic activity. The analysis of the dynamics of the integral indicator is the basis of the assessment of the stage of the organization's life cycle. The presented approach to determining the stage of life development is based on the statistical method of determining the integral indicator and allows taking into account quantitative changes in the activity of the enterprise [5].

The method of determining the stage of the business entity's life cycle, developed by Yu. S. Shembel, allows for a mathematically justified assessment of the stage of development the enterprise is at. The author proposed a system of five indicators that are calculated or evaluated by an expert: rate of change in sales, acceleration of change in sales, volume of sales in relation to the break-even level, volume of sales in relation to the maximum level, rate of change in sales in relation to normative growth. Based on the first two indicators, the slope of the life cycle curve is determined; the third and fourth are necessary to estimate the actual volume of sales in accordance with the break-even and maximum levels; the fifth indicator allows you to determine the scale

of changes in sales volume. First, an analysis of the signs of the first two indicators is performed, and then the values of the next three indicators are taken into account. The author foresees various combinations of indicator values and defines 142 possible state situations, which differ in probability of occurrence, degree of criticality and a comment regarding the development of the enterprise in the future [10].

S. V. Koryagina used four groups of indicators to assess the stage of the enterprise's life cycle: profitability, business activity, liquidity, and financial stability. The limitation of the list of indicators is explained by the possibility of carrying out mathematical calculations on them. The most important indicators are determined by an individual survey of experts. At the next stage, an integral index is calculated based on selected indicators, the value of which will characterize a certain level of development of the economic behavior of the enterprise [3].

Thus, when forming the economic behavior of a business entity, it is important to take into account the concept of enterprise development, which determines the general course of action and prospective development of the enterprise in terms of achieving competitive advantages and success of operations; a plan or model of actions aimed at achieving the goal; a set of decision-making rules; use of "successful techniques" and positioning of the enterprise in the external environment. There is still no single approach to modeling the economic behavior of an enterprise, because methods and models have their advantages, but the task of modeling economic behavior is partially solved and does not fully take into account the capabilities of all subsystems of the business entity to determine its future actions. Therefore, there is a need for further research in the direction of modeling the economic behavior of business entities.

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