

Management and Control Model of Organizational Change in the Process of Monitoring of Financial Results



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Abstract: Organizational changes are considered as a necessary element of the organizational development process of the enterprise - the process of forming a new organizational system that ensures maximum efficiency and effectiveness in achieving organizational development goals.

The development of the organization is a system of measures in the field of strategic management aimed at the implementation of targeted organizational changes that ensure the effective implementation of the strategy and the achievement of the strategic goals of the enterprise. The article presents a three-circuit descriptive model of the enterprise development management process that describes the management processes: the interaction of the enterprise with the environment, the implementation of the economic development strategy of the enterprise and organizational changes in the enterprise. Based on the development management model, the role and place of the organizational change management process and the stochastic dynamic model of this process, taking into account the characteristics of the environment of the enterprise and the intensity of the implementation of organizational changes at the enterprise, are demonstrated.

Keywords : Control, Financial Results, Management, Model Monitoring, Organizational Change

I. INTRODUCTION

Sustainable organizational development, ensuring competitiveness in the domestic and international markets and increasing the economic efficiency of domestic enterprises in the face of macroeconomic instability and information uncertainty are the priority tasks of the economy.

In their decision, mastering by management of modern methods of managing organizational change is of utmost importance, which requires the use of relevant models and methods of analysis of various aspects of organizational structure and functioning [1-4].

Organizational changes are considered as a necessary element of the organizational development process of the enterprise - the process of forming a new organizational system that ensures maximum efficiency and effectiveness in achieving organizational development goals. An organizational system is an ordered set of interconnected elements and relationships between them, where elements are understood as parts of an organization (departments, job positions, employees), its functions (production, marketing, sales, personnel management, etc.) or specific phenomena (organizational culture, competencies employees, etc.), the most significant of which are the organizational structure and organizational culture of the enterprise [5]. One of the obstacles to building effective programs for the organizational (strategic) development of enterprises is the insufficient development of the mathematical and methodological apparatus for modeling this process, taking into account stochastic dynamic processes of organizational change [6].

At present, there is no single theoretical and methodological approach to substantiating the appearance of mathematical models of the dynamic processes of organizational changes that ensure the development of the organization, and the task of their adequate mathematical modeling has not been finally solved.

II. INFORMATION AND EMPIRICAL RESEARCH BASE

A. Analysis of the current state of the theory of organizational change

The study of organizational development problems has a long history.

In this study, organizational development is understood as the purposeful activity of management to improve the quality of means and methods to achieve new goals of the organization, the desire to choose the forms of existence of the organization that lead to qualitative changes, achieve the desired economic effect in the long term and accumulate critical success factors while ensuring in the short term self-preservation organization.

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It should be assumed that, in accordance with the law of self-preservation, organizational changes are a process of purposeful (controlled) disturbance of the dynamic equilibrium of an organization.

An analysis of the scientific sources and practical experience of modern enterprises allows us to conclude that today most enterprises operate in a rapidly changing external environment,

fierce competition, internationalization and globalization of supply and demand, information, technical and technological innovations. Lack of attention to the adaptation of the organizational and functional structure of the company to these phenomena gives rise to the problem of "structural and functional disorder." This problem, according to the researchers, is manifested in the breakdown of relations between the basic structure-forming elements of the company: goals, objectives, economic conditions, technical and technological basis, functional-behavioral structure, etc. Inconsistency in the fundamentals of the activities of any enterprise entails the problem of inefficient use of resources, the occurrence conflict situations in various functional areas of the organization, economic downturns and bankruptcy.

Based on the results of studying scientific papers on the problem of organizational development, we can conclude on the methodological connection of a number of concepts in the context of explaining this phenomenon, the central place among which is the concept of "organizational changes" (Fig.1.).

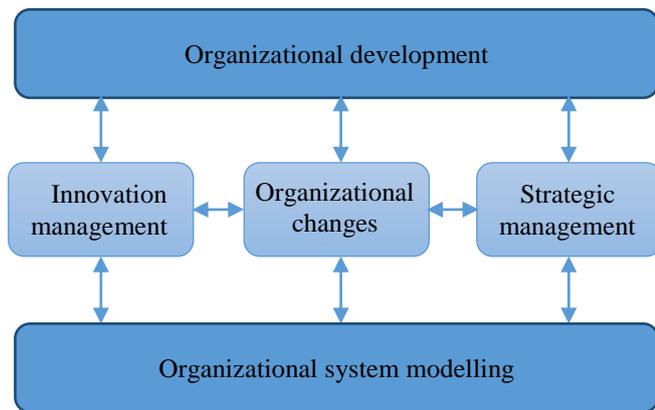


Fig. 1.Example of a figure caption.

The concept of "organizational change" has many different interpretations, which is characteristic of both the scientific community and socio-economic practice. According to the degree of intentionality, two types of changes can be distinguished:

1) planned changes - the process of a controlled transfer of the organizational system from the current state to a certain state (for example, in the interests of gaining a competitive advantage over other organizations);

2) unplanned (spontaneous) changes carried out without predetermined system-wide goals (for example, in the process of self-organization).

In addition to the degree of intentionality, the following are considered as main classification features of organizational changes (Table 1):

Table- I: Classification of organizational change models

	Evolutionary (gradual)	Revolutionary (spasmodic)
Reactive	Gradual actions aimed at eliminating operational deviations of the current state of the organization from current requirements due to operational changes in the state of the environment.	Emergency actions aimed at eliminating significant deviations in the state of the organization from current requirements. They can be caused either by significant (including sudden) changes in the state of the external environment, or by a cardinal change in the goals of the organization.
Proactive	Gradual actions aimed at promptly changing the state of the organization or its external environment based on assumptions about upcoming changes in the state of the external environment.	Emergency actions aimed at a significant change in the state of the organization in the future, due to the presence of assumptions about the upcoming cardinal (including sudden) changes in the state of the environment.

The most common types (directions) of planned organizational changes are changes in strategy, organizational structure, organizational culture, goods, services, technologies, etc.

B. Mathematical modeling as a method of researching organizational systems and processes

One of the most effective and promising methods for studying organizational systems and processes is their modeling - the process of constructing and analyzing an organization model.

Model (from lat. Modulus - measure, analogue, sample) - a copy or analogue of the studied process, object or phenomenon that displays the essential properties of the simulated object from the point of view of the study.

Ensuring the adequacy and correctness of the formal fixation of similarity relations when modeling complex organizational and economic systems is a rather difficult task, the solution of which, nevertheless, is a prerequisite for this type of research. The purpose of creating models of organizations is to develop common approaches to assessing the activities of various organizations.

Table- II: The main types of models of organizational systems

Types of models	Mathematical apparatus, theory and methodology
Decision models	Utility theory. Theory of Choice. Graph theory. Optimization methods. Cooperative and non-cooperative games. Hierarchical games. Limited rationality. Fuzzy sets. Models of collective behavior. Relationship preferences.
Incentive models in organizational systems	Institutional management. Participant behavior patterns. Project management. Development and optimization of organizational structures. Game theory. Theory of active systems. Network structures.
Models of hierarchical structures	Graph theory. Optimal trees. Piecewise homogeneous and additive cost functions. Hierarchies and command theory. Theory of Contracts. Hierarchies of knowledge. Theory of decision making.
Management hierarchy models	Management costs. The hierarchy of production (technological) line management.

Inventory management models	Decision theory. Optimization methods.
Resource allocation models	Stochastic methods. Utility theory. Matrices. Linear programming.
Models of financing innovative development of a company	Static and dynamic modeling. Uncertainties. Mechanisms: self-financing, distribution of investments, return on investment, mixed financing, distribution of costs and distribution of income.
Organizational project management models	Games with a variable composition. Management theory. Matrix management structures.
Personnel development management models	Hierarchy of needs. Management theory. Motivation.
Expert decision making technologies	Expert Forecasting. Theories of measurement and expert judgment. Mid-range methods. Mathematical methods for the analysis of expert assessments.
Decision making based on quality assurance models	Fundamentals of statistical quality control. Asymptotic theory of one-stage plans.

One of the most developed in our time classes of mathematical models of organizations that allow the use in the study of problems of organizational development, include models of the formation of organizational structures.

C. Assessment of financial results of the enterprise

The financial results of the enterprise is a systemic concept that reflects the joint result of the production and commercial activities of the enterprise in the form of revenue from sales, as well as the final result of financial activities in the form of profit and net profit.

The concept of "financial result" refers to various types of profit and loss. Below are the most common classification characteristics of the financial results (Fig. 2).

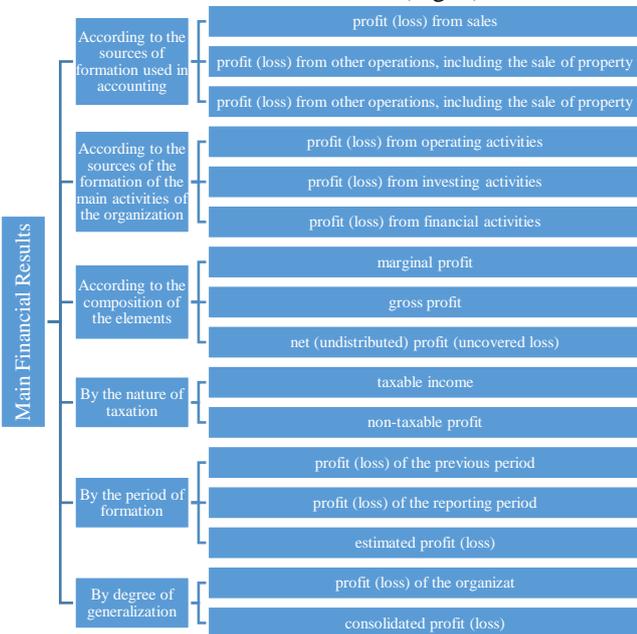


Fig. 2. The Main Financial Results

III. MATHEMATICAL MODELING OF PROCESSES OF MANAGEMENT OF ORGANIZATIONAL CHANGES AT THE ENTERPRISE

As noted above, the processes of organizational change management in modern enterprises should be attributed to processes that generate a high level of a priori inaccuracy of quantitative, and often qualitative, characteristics. To solve this problem, it seems possible to use the mathematical apparatus of the theory of fuzzy sets and the methodology of

mathematical modeling based on this theory [4].

Mathematically, the principle of distributed responsibility is demonstrated by the matrix $D_{m \times n}$ of the distribution of labor costs of organizational changes (in the following expressions, the time argument t is omitted to simplify the notation):

$$D_{m \times n} = \begin{pmatrix} d_{11} & \dots & d_{1n} \\ \dots & \dots & \dots \\ d_{m1} & \dots & d_{mn} \end{pmatrix} = d_{ji} \quad (1)$$

where: d_{ji} - distribution coefficient of labor costs - degree of compliance of competencies, functional orientation, organizational role, resource and methodological support of the j -th unit of the enterprise to the i -th problem of organizational changes;

n - the total number of organizational change tasks facing the enterprise;

m - the total number of units (main, functional and auxiliary) involved in the implementation of organizational changes.

Substantially, the coefficient d_{ji} determines the level of effort devoted to attention and time, cost of resources, etc. of the j -th unit, aimed at solving the i -th problem. For example, d_{11} is the rate of labor when solving the first unit of the first task (p_1) of organizational changes; d_{12} is the rate of labor when solving the first unit of the second task (p_2); d_{21} is the coefficient of labor when solving the second task (p_1) by the second division, etc.

The result of dynamic planning of organizational changes carried out in accordance with the principle of distributed responsibility will be a column vector $U_{m \times 1}(t) = F_U(\mathbf{P}; \mathbf{Z}_R)$ - a system of events that includes m tasks - according to the number of organizational units:

$$U_{m \times 1} = \begin{pmatrix} u_1 \\ \dots \\ u_m \end{pmatrix} = \begin{pmatrix} d_{11}p_1 & \dots & d_{1n}p_n \\ \dots & \dots & \dots \\ d_{m1}p_1 & \dots & d_{mn}p_n \end{pmatrix} \quad (2)$$

For example, the task system of the first unit $u_1 = d_{11}p_1 + \dots + d_{1j}p_j + \dots + d_{1n}p_n$ indicates that his organizational change program includes all n organizational change tasks, while the labor costs are $d_{11}, d_{12}, \dots, d_{1n}$ the solutions of each of them are different and are determined by the approved parameters of organizational changes \mathbf{P} taking into account feedbacks on the operational results of the transformations \mathbf{R}^o .

Suppose that the organization has the following strategic development goals $\mathbf{T}_{4 \times 1}$, providing a transition to a new strategic position:

- τ_1 - product diversification;
- τ_2 - implementation of the latest achievements of scientific and technological progress in production to reduce production costs;
- τ_3 - creating your own sales network; τ_4 - the formation of a corporate culture that promotes the effective implementation of innovations in production and management.



Let the section of the program of organizational changes \mathbf{P} , aimed at ensuring the implementation of goal τ_2 , include the following tasks (fragment):

- p_1 - reorganization of the department of research and experimental development (R&D);
- p_2 - creation of the position of an engineer for innovative technologies, selection of the applicant;
- p_3 - acquisition of new industrial equipment;
- p_4 - search for a supplier of new raw materials and conclusion of a supply contract;
- p_5 - organization of professional retraining of employees.

Let us outline the plans for organizational changes in the departments (functional areas) of the company:

- u_1 - production;
- u_2 - department of management of personnel;
- u_3 - sales department;
- u_4 - R&D department;
- u_5 - finance department; u_6 - marketing and advertising department.

Structurally, the matrix D in this case will have the form $(d_{ji})_{5 \times 6}$. Consider the plan for organizational changes in the production function of the company:

$$u_1 = d_{11}p_1 + d_{12}p_2 + d_{13}p_3 + d_{14}p_4 + d_{15}p_5 \quad (3)$$

The terms on the right side of the expression represent the five parts of the organizational change plan carried out by the production department of the company. As can be seen, in accordance with the principle of distributed responsibility for organizational changes in the production function, the following labor costs are characteristic:

- d_{11} - the participation of the unit in the reorganization of the R&D department;
- d_{12} - participation in the creation of the position of an engineer for innovative technologies and the selection of an applicant;
- d_{13} - participation in the acquisition of new industrial equipment;
- d_{14} - participation in the search for a supplier of new raw materials and the conclusion of a supply contract;
- d_{15} - participation in the organization of professional retraining of employees.

The first $d_{11}p_1$ and third $d_{13}p_3$ parts of plan u_1 can be called explicit (typical) tasks of this unit, while the rest, indicating

functions that are not characteristic of the production department, are implicit tasks. Parts of the organizational change programs of a particular unit that demonstrate non-specific functions for it can be called "non-core" or "auxiliary". However, the term "implicit", in our opinion, reflects one important feature of adaptive processes occurring in enterprises - the lack of the required coordination of the actions of departments in solving new and, above all, non-traditional tasks for departments. The concentration of the management of departments on their own (obvious) tasks often leads to serious disagreement in joint activities. Moreover, the implementation of organizational changes in most cases requires the formulation of precisely "implicit" tasks, as well as the search for new methods for their solution and coordination of activities.

For the remaining divisions (functional areas) of the company, the elements of the matrix $\mathbf{D} = (d_{ji})_{5 \times 6}$ will have the same meaning, but the corresponding labor costs will be different. Thus, the process of forming the vector $\mathbf{U}_{m \times 1}$ of managerial decisions involving the distribution of n tasks of the organizational change program between m organizational units can be represented as:

$$\mathbf{U}_{m \times 1} = F_U(\mathbf{P}; \mathbf{Z}_R) = \mathbf{D}_{m \times n} \mathbf{D}_{n \times 1} \quad (4)$$

Expression (4) demonstrates that each unit of the organization forms its own program of organizational changes, while each component of the plan is a combination of particular tasks, which ensures the decomposition of the general process of changes in a particular field of activity.

Such a formal interpretation of the task distribution process in the implementation of organizational changes takes into account the dynamism (cyclical nature) of the task distribution processes during the implementation of organizational changes.

Thus, the model requires the timely receipt of adequate information about the impact of the results of organizational changes on the economic efficiency of the enterprise and making changes to this process.

Imagine the structure of the organizational change management circuit K1 by the deviation management system scheme - with negative feedback on the results of the changes (Fig. 3).

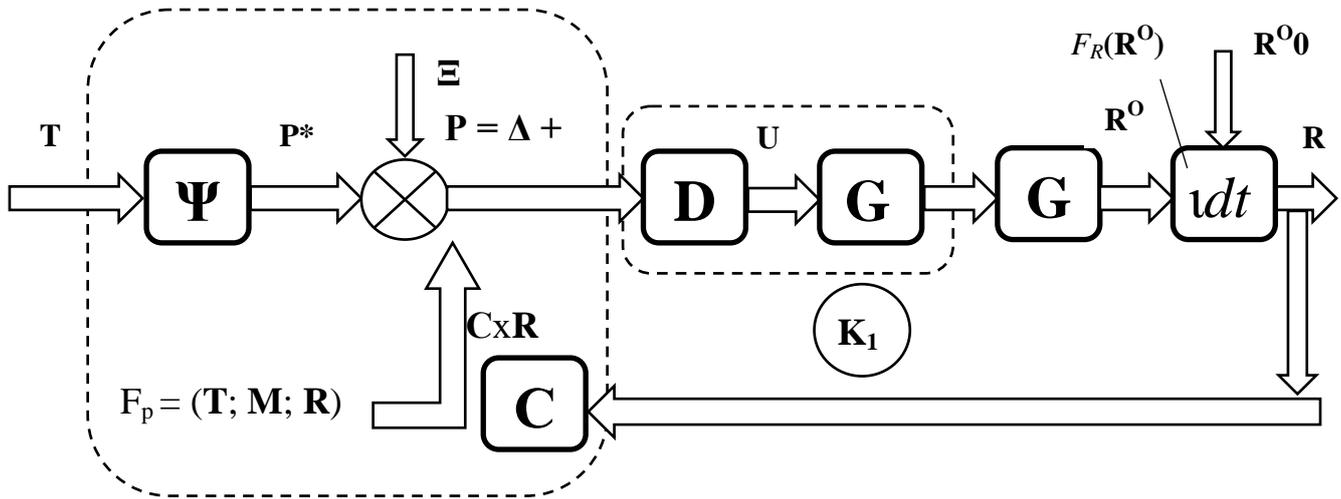


Fig. 3. Organizational Change Management Model Diagram

In turn, the function $P = F_p(T; M; R)$ of the formation of the organizational change program (2.3) can be represented by the expressions:

$$P_{n+1} = \Delta_{n+1} + \varepsilon_{n+1} \quad (5)$$

$$\Delta_{n+1} = P_{n+1}^* - C_{n+m} R_{m+1} \quad (6)$$

$$P_{n+1}^* = \Psi_{n \times L} T_{L \times 1} \quad (7)$$

If the vector demonstrates the directive nature of the distribution of operational tasks between departments based on the program of organizational changes, the vector reflects the fact that in the process of implementing organizational changes, the department's management is delegated the right to make independent decisions to adjust this process..

IV. RESULT AND DISCUSSION

The development of the organization is a system of measures in the field of strategic management aimed at the implementation of targeted organizational changes that ensure the effective implementation of the strategy and the achievement of the strategic goals of the enterprise. The article presents a three-circuit descriptive model of the enterprise development management process that describes the management processes: the interaction of the enterprise with the environment, the implementation of the economic development strategy of the enterprise and organizational changes in the enterprise. Based on the development management model, the role and place of the organizational change management process and the stochastic dynamic model of this process, taking into account the characteristics of the environment of the enterprise and the intensity of the implementation of organizational changes at the enterprise, are demonstrated.

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