

UDC 330.47:004.652.2

DEVELOPMENT OF PROCEDURE OF CREATION OF ORGANIZATIONAL STRUCTURES

E.S. Boldyrev, I.V. Burenina

Ufa State Petroleum Technological University, Ufa
e-mail: bes-1983@mail.ru,
iushkova@yandex.ru.

Abstract. *In article process of creation of organizational structures is considered. The maintenance of the main stages of algorithm is analysed: predesign preparation, analysis of organizational structure, creation of organizational structure, assessment of organizational effectiveness, registration of results. For an assessment of organizational effectiveness use of a method of the analysis of the hierarchies added with a scale of Harrington is offered.*

Keywords: *organizational design, control system, organizational structure, management functions, internal environment, environment, specification, management principles, organizational model, criteria of efficiency, engineering design, working draft, economic-mathematical methods, heuristic methods, expert systems.*

The most important factor of development of any organization is the rational organizational structure, which should be such to provide realization of its purposes. At formation of the organization it is supposed that at the initial stage of the purpose and structure are coordinated. Further under the influence of various factors the structure ceases to correspond to the purposes, without managing to react to changes, its efficiency decreases.

Proceeding from it, at any stage of development of the organization there can be a problem of design of new organizational structure which decides with application of a number of methods. For correct carrying out this process development of a scientific and reasonable approach to process of formation of organizational structure has great value.

The purpose of this article is streamlining of process of formation of organizational structure, and also its addition with modern methods of design.

For achievement of a stated purpose the solution of the following tasks is provided:

- drawing up of algorithm of formation of organizational structure;
- specification of process of collecting and interpretation of initial information for design;

- carrying out the analysis of degree of rationality of organizational structure of the operating enterprise from the point of view of construction principles;
- adjustment and specification of process of direct creation of organizational structure;
- addition of process of an assessment of organizational effectiveness with a method of the analysis of hierarchies (MAI) and Harrington's scale.

Organizational design is a streamlining of organizational and structural characteristics of the organization as systems for achievement of its efficiency, adaptability and productivity.

In the course of creation of organizational structures methods of a system approach and the requirement of laws of the theory of the organization are widely used.

Management of the organizations is carried out according to a system approach. It means that the organization is considered as the big open system which has been built in the outside world. The system represents set of the elements connected and cooperating with each other making complete education, having the new properties which are absent at elements.

Process of creation of organizational structure, proceeding from requirements of a system approach and the organization theory, it is necessary to begin with its design.

The problem of design of structure of production consists in choosing such division of powers and resources at which operating conditions of separate structural division of the organization and a condition of realization of the works peculiar to different divisions would be satisfied in common.

The content of process of formation of organizational structure is universal. It includes the formulation of the purposes and tasks, definition of structure and a place of divisions, their resource providing, development of the regulating documents fixing and regulating processes, carrying out in an organizational control system. This process by authors is offered to organize according to the following scheme (fig.1).

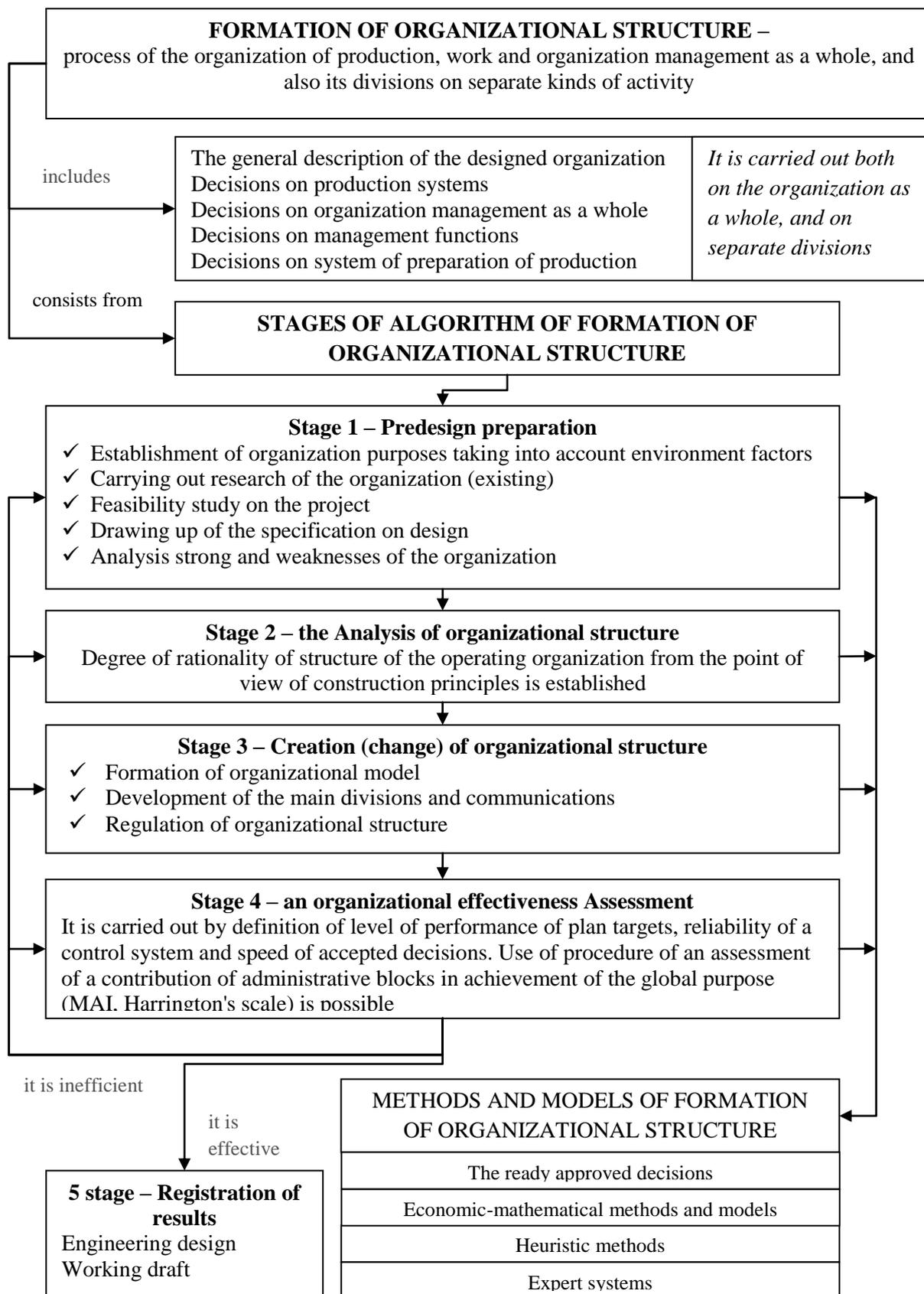


Fig. 1. Process of formation of organizational structure

Algorithm of formation of organizational structure described on fig.1 doesn't contradict the traditional scheme of its creation: the purposes – tasks – amount of works for performance of tasks – number of performers – their group – volume of administrative work – creation of links. Authors offer its certain modernization which is urged to increase its quality.

Design – process of creation of the project, a prototype, a prototype of expected or possible object, a condition. A subject and the purposes of organizational design are given on fig.2.

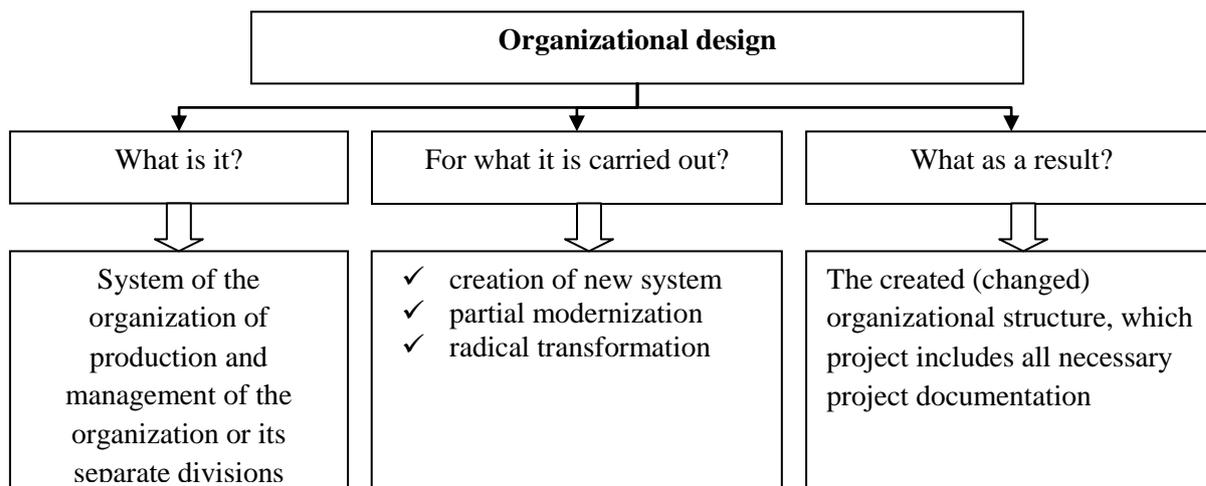


Fig. 2. Subject and purposes of organizational design

The organizational system represents set:

- 1) the mechanism of internal functioning, in, necessary for process of an administrative and production activity;
- 2) the mechanism of the relations with environment which contains the elements necessary for formation of a favorable business field.

The organizational project includes the following sections (tab. 1).

Table 1
Sections of the organizational project

Name	Contents
1. General description	General characteristic, structure, number
2. Decisions on production	Organization of production, form of the organization of work, automation level
3. Decisions on organization management	Structure, methods, technology, communications, number of the personnel, decision on functions
4. Decisions on management functions	Planning and forecasting, supply, marketing, organization, account, management
5. Decisions on system of preparation of production	Various aspects in the course of creation and introduction of innovations

Sections of the organizational project can be detailed on tasks and procedures according to design conditions.

The contents of the organizational project aren't obligatory. It changes depending on the purposes of design, operating conditions of system, complexity, novelty, branch accessory of objects.

In the course of design allocate a number of stages.

1. Predesign preparation.

The organization purposes taking into account an environment condition are defined.

Environment is divided into the environment of direct and indirect influence. To the environment of direct influence carry suppliers, consumers, competitors, laws and state authorities, public organizations, shareholders. To the environment of indirect influence – technology, economy, policy, socio-culture, local population and a geographical position.

The special place in environment has the international environment. To the international business refer export, licensing, joint ventures, direct capital investments, multinational corporations.

The choice of the purpose occurs on the basis of market researches, and also is defined proceeding from preferences of the persons, accepting decisions.

For organization creation the main goal is exposed to decomposition on sub-purposes for definition of ways of development of the functional directions and structural divisions.

Within predesign preparation organization research (in a case with operating organization) which includes a number of the directions is carried out.

The analysis of volume of production and realization of production are carried out for the solution of the following tasks: assessment of extent of implementation of the plan and dynamics of production and production realization; definition of influence of factors on changes of indicators; identification of intraeconomic reserves of increase in release and production realization; development of actions for development of reserves.

Carrying out research includes the prime cost analysis. The analysis of prime cost allows to find out tendencies of change of an indicator, implementation of the plan, influence of factors, reserves, and to give assesment of the work of the enterprise for use of possibilities of decrease in product cost.

For understanding of distribution of expenses the factorial analysis of change of expenses from volume, structures of let-out production and level of variables and constant expenses is carried out.

At research the labor input analysis is carried out also. In the course of the analysis study dynamics of labor input, implementation of the plan on its level, the reasons of its change and influence on a labor productivity level. Labor productivity indicators are applied to an assessment of intensity of use of the personnel.

In the conclusion the profit and profitability analysis which main objectives are is made: control over the implementation of plans of realization and receiving profit; definition of influence of objective and subjective factors on financial results; identification of reserves; job evaluation on use of possibilities of increase in profit and profitability; development of actions for use of reserves.

Feasibility study on the project of design of organizational structure.

The feasibility report document should contain the following sections:

- introduction;
- the characteristic of object and existing organizational structure (for the existing organization);
- purposes, criterion and restrictions of creation of new organizational structure;
- functions and tasks of created organizational structure;
- expected technical and economic results of creation of organizational structure;
- conclusions and offers.

Specification. In specifications specify: purpose of drawing up of the design document; data on researches earlier executed in the organization; planned amounts of works according to the analysis and design of structure; information sources for work; level of payment of works on structure design.

Analysis strong and weaknesses of the organization.

It is carried out within operated system and operating subsystems and concerns all aspects of activity of the organization. To research are subject strong and weaknesses of the organization, production and sale process, a financial condition, marketing services, the personnel, organizational culture.

Whether for the analysis strong and weaknesses the management should estimate there is at the organization a potential for use of possibilities (strengths), and also what shortcomings the enterprise (weaknesses) possesses. The analysis includes five functional fields of activity of the organization:

- Marketing.
- Finance;
- Production;
- Personnel;
- Organizational culture.

The specified directions of the analysis belong to factors of the internal environment of the organization. However, during the analysis environment factors for the purpose of a prediction of threats and possibilities are investigated also.

Analyzed factors of environment:

- economic factors (inflation, taxes, employment rate, solvency of the enterprises);
- political factors (legislative and regulations);
- market factors (competition);
- social factors;
- technology factors;

- competition factors;
- international factors.

As a result of carrying out researches offers on improvement of a control system by the organization should be formulated. For this purpose the stage of predesign preparation includes carrying out comprehensive investigations of the organization (in a case with operating structure). At design of new organizational structure it is offered to give special attention to feasibility study process.

2. Analysis of organizational structure. He is urged to establish, how organizational structure is rational from the point of view of estimated criteria (management principles).

1. Goal-setting.
2. A priority of functions over structure of links.
3. An object priority over the subject.
4. Adaptability.
5. Complete coordination.
6. Complexity minimum.
7. Autonomy limits.
8. Centralization and decentralization combination.
9. Vertical and horizontal interconsistency.
10. Unity of a rasporyaditelstvo.
11. Control range.
12. Equation of duties.
13. Coverage by control.

This stage is carried out by heads of the enterprises or divisions in whom change of organizational structure, with involvement of specialists of department (management) of strategic planning is supposed. As a result of the analysis shortcomings of existing structure come to light, the decision on need of its adjustment is made.

3. Creation of organizational structure.

3.1. Formation of organizational model.

The organizational model is principles of formation of divisions, delegations of powers and investment with responsibility.

Principles of formation of divisions:

- functional model: «one division = one function»;
- process model: «one division = one process»;
- matrix model: «one process or one project = group of employees of different functional divisions»;
- the model focused on the contractor: «one division = one contractor»;

3.2. Development of the main divisions and communications.

Implementation of organizational decisions not only on large linearly - to functional and program and target blocks is provided, but also up to base divisions of management personnel, distribution of tasks and creation of intra organizational communications. Base divisions are understood as independent structural units into

which are organizationally divided linearly - functional and program and target subsystems. Base divisions can have the internal structure.

Structuring the organization is widespread on divisions:

1) managements are the divisions formed on a branch and functional sign, and providing realization of separate activities and exercising administration of the organization.

2) offices are the branch or functional divisions uniting in the structure smaller functional divisions.

3) departments – represent the divisions structured on a branch and functional sign which provide realization of separate activities.

4) departments – the functional structural divisions which are responsible for concrete activity or for organizational and technical ensuring of realization of one or several directions;

5) services – groups of the structural units united on a functional sign having the related purposes, tasks and functions. Thus management or the management of this group is carried out centrally by one official.

6) the bureau – is created or as a part of larger division, or as independent division. As independent structural unit of bureau it is created for conducting executive activity and service of activity of structural divisions.

As independent structural divisions also production facilities (for example, shops) or units serving production (workshops, laboratories) are created.

Independent divisions, in turn, can be divided into smaller structural divisions:

a) sectors – are created as a result of temporary or continuous division of large division. Temporary structuring occurs for the solution of a specific objective or the project. Function of constant sector is realization of concrete activity of division;

б) sites – are strictly limited to responsibility "zones" – each site is responsible for the concrete direction of work;

в) groups – represent the structural units created by the same principles, as sectors, sites — they unite experts for performance of a specific objective or implementation of the specific project.

3.3. Regulation of organizational structure.

The regulation of organizational structure provides development of characteristics of management personnel and procedures of administrative activity. It includes: definition of structure of internal elements of base divisions; determination of design number; distribution of works; responsibility establishment; development of procedures of performance of administrative works; calculations of expenses for management and indicators of efficiency of management personnel in the conditions of the designed structure.

As a result of works at this stage the detailed project of new organizational structure, with the detailed description of all divisions of the organization (including their regular number), the mechanism of their interaction, and also expected economic indicators is formed.

4. Organizational effectiveness assessment.

The assessment of efficiency is an important element of development of the design decisions, allowing to define level of progressiveness of structure, and is carried out for the purpose of a choice of rational option of structure or a way of its improvement. Organizational effectiveness should be estimated at a design stage, in the analysis of structures of management of the operating organizations for development of actions for improvement.

The complex set of criteria of system effectiveness of management is formed with the account:

1) degrees of compliance of reached results to the established purposes of the production and economic organization;

2) degrees of compliance of process of functioning of system to objective requirements to its maintenance of the organization and results.

As criterion of efficiency at comparison of options of organizational structure possibility of the most complete and steady achievement of the purposes of a control system serves at smaller costs of its functioning.

Basic value for an assessment of system effectiveness of management has a choice of regulatory base for definition of level of efficiency.

One of approaches of differentiation is reduced to comparison with the indicators characterizing efficiency of structure of reference option of control systems. The reference option can be developed and designed with use of available methods of design of control systems. Its characteristics are accepted as the standard.

Often instead of methods the expert assessment of an organizational technological level by analyzed and designed system, and also separate subsystems, or the complex assessment of a control system based on use of a quantitative and qualitative approach, allowing to estimate management efficiency on set of factors is used.

The indicators applied at an assessment of efficiency of structure:

1. Group of the indicators characterizing system effectiveness of management, being expressed through the end results of activity of the organization, and costs of managements. At efficiency estimates on the basis of the indicators characterizing the end results of activity of the organization, as the effect caused by functioning or development of a control system, the volume, profit, prime cost, volume of capital investments, quality of production, terms of introduction of new equipment are considered.

2. Group of the indicators characterizing the contents and the organization of management process including direct results and expenses of administrative work. As costs of management are considered management personnel maintenance costs, operation of means, the maintenance of buildings, training.

At an assessment of management efficiency indicators which can be estimated both quantitatively are used, and is qualitative. To standard characteristics of

management personnel carry the following: productivity, profitability, adaptability, flexibility, efficiency, reliability.

3. The group of indicators characterizing rationality of organizational structure and its technical and organizational level. The control of units, level of centralization of functions of the management, accepted standards of controllability, distribution of the rights concerns them and responsibility.

Authors offer to add this stage with an organizational effectiveness assessment by means of MAI added with a scale of Harrington. Along with available methods this method by comparison of organizational structure before carrying out changes allows to estimate more qualitatively efficiency of the designed organizational structure and in addition to prove the decision on its introduction.

5. Registration of results.

Final stage of process of design of organizational structures. Results of design can be presented in two forms.

Engineering design (ED). The purposes of works are development of the main technical solutions on created system and final determination of budget cost. Works come to the end with development: all-system decisions necessary and sufficient for release of documentation on system as a whole or its separate divisions.

Working draft (WD). The purpose of works is release of working documentation on created system. Works come to the end with release of the working draft consisting of documentation, necessary for creation or change of organizational structure, installation and adjustment of a complex of means and documentation and program the providing necessary for adjustment and operation of system, and production of programs on machine carriers

At various design stages the following methods are applied:

1. Search of the ready approved decisions from bank of decisions of system.
2. Economic-mathematical methods and models (EMM and M) solutions of organizational and economic tasks.
3. Heuristic methods of synthesis of decisions.
4. Expert systems.

EMM is possible to present in the form of a set consisting of three groups of methods and models: economical and statistical models, methods and models of econometrician, methods of research of operations.

The greatest practical application from economical and statistical models find: structure models (groups, similarities, curve distributions); models of interrelations (equation of correlation and regression, model of multidimensional classification); dynamics models (trend, periodic fluctuations, growth curves, multiple-factor models).

Econometrician modeling – the direction of the economical and statistical modeling consisting in statistical estimation of parameters of mathematical expressions, characterizing the economic concept about interrelation and object development, and in their application for economic conclusions.

Research of operations – application of scientific principles, methods and means to the tasks connected with functioning of organizational systems. The modeling purpose – finding of optimum decisions. Methods are for this purpose used: mathematical programming, theory of counts, theory of games, theory of statistical decisions, theory of recognition of images.

Heuristic methods – the ways of the decision including a set of methods of cogitative activity and operations of work with information. Practical application was found by the following methods: analogies, inversions, empathy, idealization, brain storm, conference of ideas, garlands of associations and metaphors, synectics.

Expert systems – the systems of artificial intelligence functioning on the basis of heuristic rules and methods of mathematical logic. Heuristic rules represent reflection of knowledge of the expert, i.e. the system has data and the knowledge forming the knowledge base.

Original design is traditional and is characterized by that all types of works are focused on creation of individual projects. The project is developed for each concrete object, in the maximum degree considering features of this object. This method of design has high labor input and big terms.

Sample design – assumes division of system into components and creation for each design decision which with some modification is used at design of organizational system.

In organizational systems of the automated design process of development is considered from system positions and is based on computer use. At the heart of system of the automated design the modeling method which application assumes construction and maintenance in an adequate condition of global model of organizational system and the automated creation of the project corresponding to this model lies.

In the conclusion it is necessary to note that formation of organizational structures can't be carried out, using purely technical approach. A large number of various factors is involved in this process, each of which is necessary for considering separately. Play a role and the legislation, both branch, and a financial position of the enterprise, and a psychological portrait of his head. Additional difficulties create such phenomena, as instability and opacity of the organization.

As a whole the corrected process of formation of organizational structure allows to carry out with higher quality than work on its creation, than existing techniques. But for it still bigger improvement carrying out additional researches is necessary.

Literature

1. Ansof X-th., Brandenburg G. Metodika of design of organizational structures. In book: Intra firm planning in the USA. M, 1972. P.452
2. Bazilevich L. A. Optimization of production structure of the enterprise on composite economic-mathematical model. L, 1970. P.199
3. Kapustin S. N. Modern technologies of management for optimization of business of the companies. M: Dashkov and To, 2002. P.547
4. Laura A. Лайс. Design of structures of the production organizations. Modern management. Encyclopedic directory. Vol. 2. M: Izdattsentr, 1997. 576 p.
5. Hammer M., Champi of J. Corporation reengineering: The revolution manifesto in business: the lane with English SPb.: Page - the Petersburg university, 1997. – 332 p.