

SECTION 1. ARCHITECTURE AND CONSTRUCTION

1.1 Organizational and technical modeling of design and construction systems

The diversification and individualization of the social needs of building products requires a high degree of flexibility in the economic mechanism, its ability to respond quickly and without loss to a change in the direction of development of science and technology, to the structure of demand. This form of activity is based on the expansion of risky entrepreneurship and the systemic organization of modern production [1].

The system organization implies, first of all, the formation of a scientific and construction complex, the competitiveness of builders not only in the domestic, but also in the world markets. The concept of "organization" should be considered from two sides: static and dynamic. In the first case, the term "organization" can describe the state of internal order, consistency and interaction of parts of the whole. In this interpretation, the concept of "organization" is identical to the concept of "system".

And how the organization system has certain features somehow:

- ✓ consists of many elements interacting with each other, i.e. has the integrity property;
- ✓ has a clear organizational form, i.e. between its elements there are ordered connections;
- ✓ unites the elements included in it with a single goal;
- ✓ has the property of emergence, i.e. a qualitatively new property of the whole, which none of its elements, taken separately, has.

For the implementation of structuring, it is necessary to establish those signs, in accordance with which the organization how the system is divided into its component objects. Such signs are:

- ✓ homogeneity of functions performed by individual objects;
- ✓ Homogeneity of the goals of the activities of objects. Separate structural elements of the organization include objects engaged in the production of certain types

of products, works and services, serving a particular area of activity, having the same production processes, etc.;

✓ territorial community of objects. When implementing structuring, it is necessary to correctly determine the number of levels allocated as elements of the structure. The more complex the production, the more levels can be distinguished.

Scientific research on the formation and development of organizational and technological building systems based on new information technologies is very relevant and fruitful [2].

The elements of the technological system model, which activates control over any information flows, are presented in the table 1:

Table 1.

Elements of the technological system model

Elements	Content
1. Internal environment	
1.1 Production	Types of production, resources and technology for the design and construction of various types of buildings
1.2 Functional	The functions of engineering and technical workers and employees, ensuring the achievement of the ultimate goal - the creation of a high-quality and reliable facility.
1.3 Procedural	Technology, anticipation of the formation of documentation, its approval, expertise, technical and environmental information.
1.4 Technical	Formation of documentation: means of communication, software.

Continuation of Table 1.

Elements	Content
1.5 Environmental	Pricing for design and construction products, methods of stimulating quality, reliability of new construction products.
1.6 Personnel	Quantity, structure, qualification of personnel.
2. External environment	
2.1 Customers	Composition of executors, investors, main executors of work, allocation of land plots for construction.
2.2 State supervision	Coordination of design and estimate documentation, examination, registration of land plots, initial cost, design and survey work.
2.3 Manufacturers	Formation of applications for the execution of the necessary products, the conclusion of contracts, guaranteed product quality and delivery times.
2.4 Supply organizations	Applications for building materials, delivery schedules, transport.
2.5 Mounting hardware	The composition and qualifications of performers, the creation of new technologies and equipment, the cost of product quality.

The process of forming an organizational structure includes:

- ✓ formulation of goals and objectives;
- ✓ determination of the composition and location of construction units;
- ✓ number of employees and resource provision;
- ✓ development of regulatory procedures and documents;
- ✓ forms, methods, processes carried out in the management system.

The development of an organizational and technical enterprise management system includes the following stages:

- ✓ formation of a general structural diagram of the control apparatus;
- ✓ development of the composition of the main units and communication between them;
- ✓ regulation of the organizational structure.

The formation of a general structural scheme provides for:

- ✓ determination of goals and problems of production and economic activity;
- ✓ general specification of functional and program-target subsystems that ensure their achievement;
- ✓ the number of levels in the management system, the degree of centralization and decentralization of powers and responsibilities at different levels of management;
- ✓ the main forms of the relationship of the organization with the external environment and the requirements for the timing of information processing, staffing and economic mechanism.

The development of the composition of units and the relationship between them provides for the implementation of organizational decisions, includes both a set of large enterprises and divisions of individual enterprises.

Development of the composition of units and communication between them provides for:

- ✓ implementation of organizational decisions, including both a set of large enterprises and subdivisions of individual enterprises of the management apparatus of small and medium-sized industries.
- ✓ distribution of the main tasks and building intra-production relations, including departments, departments, bureaus, sectors, laboratories. The regulation of the organizational structure includes:
 - ✓ development of quantitative characteristics of the management apparatus and procedures for management activities;
 - ✓ determination of the composition of internal elements: bureaus, groups and positions;

- ✓ determination of the design number of the subdivision, the labor intensity of the main types of work and the qualification composition;
- ✓ distribution of tasks and works between specific performers and establishment of responsibility for their implementation;
- ✓ development of procedures in subdivisions of the order of their interaction in the performance of interrelated sets of works;
- ✓ calculation of management costs and performance indicators of the management apparatus in the conditions of the project organizational structure.

The main stages of creating new construction products are determined in accordance with the requirements of the current legislation. The issue of assessing the impact of changes in legislation on the model of the organizational and technological system has also become relevant. Two groups of methods for studying the system are accepted: a priori and experimental ones.

A priori methods include:

- ✓ examination of design, technological, management documentation;
- ✓ modeling of a possible redistribution of costs between design and construction organizations;
- ✓ modeling of technology for the formation of design and estimate documentation and construction.

The experimental ones are:

- ✓ assessment of possible ways of rational development of documentation for similar facilities in order to save labor costs for designers;
- ✓ control observations and obtaining objective data during construction and trial operation.

Based on the data obtained, reserves are identified to improve the efficiency, reliability and quality of new construction products.

An example of a study, as a rule, are objects of regional financing, industrial, public and residential type.

A model of a design and construction system focused on the creation of new construction products, modeling and analysis of the degree of influence of changes on

the design and operation of facilities, structuring the reserves for improving the efficiency, reliability and quality of new construction products.

The process of organizing production, which involves the design, construction, operation and improvement of production systems, includes a number of related types of work. At the same time, one should proceed from the fact that the organization of production can be aimed at creating or improving the existing production system. In the first case, the goal of the organization is to create a production system for a new enterprise or some new division in an existing enterprise, in the second - the organization is associated with the improvement of the existing system, i.e. with the reorganization of production or the entire enterprise, or one or more of its divisions.

In the work on the organization of production, it is necessary to determine the organizational goal, i.e. determine the result expected from a specific organizational work.

As organizational goals, such results of organizational activities as increasing the rhythm and efficiency of production, improving the quality of products, decrease in stocks of inventory items, etc. In some cases, several organizational goals are put forward at the same time, which requires their coordination.

The process of determining the organizational goal involves the joint work of the head of the enterprise and specialists in the field of production organization.

Establishing the types of activities and determining the circle of participants in the work. Once the goals of the organization have been defined, the activities needed to achieve them must be established.

The extreme complexity and importance of this stage of organizational work should be taken into account.

Since all levels of the structure are in relation to subordination, the problem of reasonable distribution, delegation of rights, duties and responsibilities, which establish the relationship between objects located at different levels of the structure, arises. It is about the relationship between centralization and decentralization.

Centralization solves the problem of coordinating the activities of objects located at lower levels of the structure. Centralization is possible and necessary when the

processes carried out in the organization are sustainable and stable. Decentralization is required where the properties of objects located at a lower level of the structure are in constant dynamics under the influence of diverse factors, the consequences of which can be very uncertain.

Both centralization and decentralization make it necessary to coordinate the activities of the objects that make up the structure of the organization. Coordination involves ensuring the joint functioning of objects located at different levels of the structure. It is a process aimed at ensuring the best development of the organization under the given conditions in which this organization operates. Coordination is carried out in two directions:

- ✓ establishing rules, regulations that govern the course of action that make up the organization;
- ✓ practical support for the implementation of these rules in the operation of each object that makes up the organization.

However, the concept of "organization" is somewhat broader than the concept of "system", since it is not only a state of order, but also ordering processes, which can be both natural (embodying the organizing principle of nature) and purposefully formed by people.

Most often, the term "organize" is used when it comes to the purposeful interaction of people with each other (establishing stable relationships, coordinating activities, etc.) or the expedient construction of people's actions with the work of machines and mechanisms. For example, actions to create an enterprise mean the grouping of living (workers) and materialized (machines, buildings, structures, raw materials and materials) labor for a specific purpose - the functioning of the future enterprise. That is, under the "organization" in this case, one should understand the totality of natural processes and actions of people leading to the formation and improvement of the relationship between parts of the whole.

Thus, "organization" is understood as a complex system (with a certain structure and type of connections), functioning within the boundaries of certain rules and One of

the signs of the organization is isolation, expressed in the isolation of internal processes and the presence of boundaries separating it from the external environment.

These boundaries can be material in the form of walls and fences or ideal (prohibitions, norms, rights, regulations, etc.). For example, the closeness of the circulation of funds of an entrepreneurial organization, which can only function normally when the costs of production are fully returned as a result of the sale of products procedures to realize the purpose of its existence. Still, a sign of an organization is consistency, the presence of links (economic, technological, administrative, informational, social, etc.) between its individual elements, with the help of which they interact and influence each other. Also, a sign is self-regulation, which allows the organization, within certain limits, to independently resolve many issues of internal life and, taking into account specific circumstances, carry out external commands.

Finally, as another sign of the organization, the presence of a specific culture, which is considered today as a first-order competitiveness factor, should be mentioned. Culture (including management) is a fusion of values, traditions, beliefs, norms, symbols, which largely determine the relationship in the team and the direction of people's behavior.

Organizations as systems are made up of interdependent components. Changes in one component of the system lead to changes in its other components. Similarly, organizations tend to strive for balance. Finally, to continue to exist, the organization as an open system must maintain favorable relationships with the external environment. The characterization of any organization is impossible without a clear reflection of the influence of environmental factors and the assessment of internal environmental factors on the development goals of the organization and the nature of its activities. At the same time, it is important to determine the nature of the environment and the nature of its influence on the management of the organization. The external environment of the organization, as a rule, is divided into a macro environment and a micro environment.

The macroenvironment characterizes all situations in the business environment of a city (country, region), its characteristic features affect the activities of all economic

entities, regardless of the form of ownership and the specifics of the products offered on the market (both for a private hairdresser, and for a large electrical equipment manufacturer, etc.). The macroenvironment includes broader social forces (factors) that affect the microenvironment: demographic; economic; natural; scientific and technical; political and legal.

Demographic factors are determined by the demographic environment, which is one of the most important, since this environment largely determines future demand. Demographic factors are the population size, its density; territorial location; age structure, fertility, mortality; the number of marriages and divorces; ethnic and religious structure of the population. The economic environment consists of factors that affect the purchasing power of the population and the nature of purchases. Economic factors are the economic situation of the country (region); purchasing power of citizens; dynamics and structure of consumption; financial, monetary, credit situation of the country. The natural environment is the resources of nature itself, necessary for the activities of the organization or influencing it.

Natural factors are the natural resources of the country (region), the prospects for their use; the degree of provision of national production with the main types of raw materials and fuel; the influence of state bodies on the intensity of resource consumption; the level of environmental pollution in general and in individual regions.

The technological environment is the most powerful force that affects all the technical capabilities of an organization. Scientific and technological factors are the pace and extent of scientific, technical and technological changes; intensity of innovation; innovative potential of the organization and its main competitors; safety requirements for innovations; personnel qualification.

The political and legal environment includes legislative factors that affect the activities of the organization. Political and legal factors are the political institutions in the country and their development; state of legislation regulating economic and economic activity; the consequences of the influence of foreign economic policy on competition and demand in the domestic market; the influence of the public on the nature of decisions taken by state bodies.

Cultural environment – includes institutions that influence the core values, preferences and behavioral norms of society. Sociocultural factors are the level of cultural development; forms of crops; features of cultural and moral values of consumer groups; the degree of susceptibility of public consciousness to the influence of external factors.

The microenvironment characterizes the parameters and situation of activity in a single market of particular interest to the organization (for example, the characteristics of the cotton fabric market or the hotel services market). The microenvironment refers to the forces operating in the area immediately adjacent to it, which can affect its ability to serve customers: the organization itself; suppliers; buyers; intermediaries; competitors; financial organizations; mass media; public [3].

The degree of success of an organization in the market depends on various factors that make up its market opportunities. This success is largely determined by the elements of the internal environment of the organization: the personnel potential of the organization; organizational and managerial capabilities of the organization; design and engineering potential of the organization; production capabilities of the organization; marketing potential of the organization; material and financial capabilities of the organization. In the analysis, environmental factors are divided into: controlled by the organization (managed and directed by it).

These include all factors of the internal (intracompany) environment, as well as factors of the microenvironment with which the organization directly interacts, since these factors (customers, suppliers, intermediaries, competitors, contact audiences), interacting with the organization, have a counter-effect (but not control); not controlled by the organization (beyond its authority).

These include macro-factors of the external environment, which have an almost one-sided nature of the impact on the organization, it only remains to actively adapt to them. When considering the factors of the internal (intra-company) environment controlled by the organization, it should be taken into account that some of the factors are controlled by the top management of the organization (field of activity, strategic

development goals, the role of marketing and other services of the organization, corporate (corporate organizational) culture).

The organization must have an effective feedback system that allows you to have a fairly complete picture of the relevant factors of the uncontrolled external environment. Based on this information, the organization must adapt its strategy to the environment, taking into account its competitive advantages and development goals. Long-term sustainable success implies the need to find new opportunities that match the goals, as well as timely respond to the threats of competitors, changing the organization's development strategy. Despite all the variety of possible definitions and interpretations of the concept of "organization", in the literature there are the most common features that can be grouped into six main classes, or types: the formalization criterion is the main characteristic of the organization that determines its goals, connections and relationships; type of ownership; attitude to profit; organizational and legal form; dimensions; participation in various sectors of production.

The changes taking place in the world and domestic economy predetermined the emergence of more and more competitive new organizational forms. The greatest prevalence and popularity in the economic environment of Ukraine had such forms of integration as: financial and industrial groups; business unions; clusters; virtual organizations. Financial and industrial groups are large organizations that combine industrial enterprises, trading firms, banks, investment funds and insurance companies.

Entrepreneurial unions are formed on the basis of voluntary cooperation agreements that unite companies of different sizes and forms of ownership. Clusters are business unions united in certain territories, the latter provide them with certain competitive advantages.

Virtual organizations – a network of independent companies united by modern information systems in order to mutually use resources, reduce costs and expand market opportunities.

Ukrainian management practice is characterized by close attention to the hard factors of business: structures, technologies, policies, clear functionality, control.

This allows you to ensure the functional manageability of the business, its security. The formation of new meanings that create a coherent, consistent vision of the company's new reality for the staff is, in most cases, not considered as a separate management task. As a result, the personnel of enterprises begins to independently form a picture of the world, which helps them explain the changes that are taking place – the process of meaning formation becomes spontaneous.

This process takes place against the backdrop of an unfavorable perception by the staff of their position in the company. Employees are not presented with the idea of the social purpose of the organization, therefore the primary meaning of the existence of any commercial organization – making a profit – appears before the employees in a naked form. The social value of their work is not present in the picture of the world being formed. The attention to hard factors broadcast by the management is perceived as discrediting the value of personnel, reducing its role to the level of a technological resource – a part of technology.