

## Раздел V. Новые информационные технологии в энергетике

УДК 65.0

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### **МОДЕЛЬ УПРАВЛЕНИЯ СИСТЕМОЙ НА ОСНОВЕ ПРОЕКТИРОВАНИЯ SWOT-МАТРИЦЫ И СИСТЕМЫ МЕНЕДЖМЕНТА КАЧЕСТВА НА ПРЕДПРИЯТИЯХ ЭНЕРГЕТИЧЕСКОГО КОМПЛЕКСА**

*В статье рассматривается категориальный аппарат информационно-управленческих систем для построения модельного сопряжения SWOT-матрицы и системы менеджмента качества, что особенно актуально для энергетической промышленности.*

*Цикл; многокритериальная система; абстрактная система; кибернетическая система; уровень иерархии; фактор времени; SWOT-матрица.*

**V.S. Novikov**

### **SYSTEM MANAGEMENT MODEL BASED ON THE DESIGN SWOT-MATRIX AND QUALITY MANAGEMENT SYSTEM FOR ENERGY COMPLEX ENTERPRISE**

*The article deals with categorical apparatus of information management systems to build a model pairing SWOT-matrix and the quality management system, which is especially important for the energy industry.*

*Cycle; multicriteria system; abstract system; cybernetic system; the level of the hierarchy; the time factor; SWOT-matrix.*

In modern practice, addressing management issues in enterprises energy complex of Russia used programming and modeling of organizational and production systems. With the uncertainty of Russia's economic and financial-credit system managers and economists base their decisions on the functioning of the energy enterprises, based on modeling promising areas of development organizations.

The problem in the multidimensional issues affecting economic cycles and institutional comparative. Economic cycle (wave) is characteristic of all areas of economic life and all the organizational and economic systems. Economic cycles shall be furnished to a periodic fluctuations of business activity in the business environment. The cycle represents the time interval in the formation of a market economy, within which there is a growth in output of goods and services, and then decline, recession, depression, recovery, and finally, again its growth. But the cycle is a complex notion of the interconnectedness of all economic objects and subjects of a single State or organization and economic grouping of countries. We can say that the cycle is characterized by a system of higher order.

System of a lower order systems are presented at the level of individual businesses or organizations in the energy sphere of the enterprise-agency complex. Research in these areas have identified the material, natural, artificial, abstract, financial and other systems.

For example, the material system (MS) are the objects of real time-no. Among the variety of material systems are natural and artificial systems. Artificial systems can be classified according to several features, chief among which is the role of humans in the system-me. On this basis we can distinguish two classes of systems: technical and organizatsionno-economic systems. The basis of operation of the economic-organizing systems are processes, committed human-machine systems.

Abstraction System (AS) are speculative representation of types and models of physical systems, which are subdivided into descriptor-WIDE / logical, and symbolic / mathematical. Consequently, the logical system as a consequence of the deductive or inductive judgments of material systems can be regarded as a set of ideas about the structure, the basic laws of states and the dynamics of economic systems. Cybernetic (KS), or control system - a system by which we study the processes of governance in the technical, biological and social systems. The central concept here is the information – means of influencing the behavior of the system. KS enables to simplify difficult to understand the process of governance in order to address the objectives of the study design.

English researcher cybernetician S. Bir structures all systems on the level of complexity into three groups - simple, complex and very complex. Russia mathematician GN Cooks divides the system depending on the number of elements included in them, into four groups: small system (10 -103 elements cent); complex systems (103 - 107 elements); ultraslozhnye system (107 -1030 elements); supersystem (1030 - 10200 elements). As examples of systems of the second group, he is a transportation system of the city, the third group - the social organization of the fourth group - the universe.

Researchers A. Hall and R. Feydzhin in their works on the basis of respect of their definition of the system gives the following classification systems. If the change in each part of the system causes a change in all other parts and the whole system, in this case the system is a holistic (integral) (IS). If you change every part of the system causes no change in other parts, then the system is called the total (skopeing) (SS).

Blauberg IV, VN Sadovsky and EG Yudin propose a classification system objects upon which you can reasonably identify the class of systems, which is specific for systems studies and distinguishes the latter from other directions of development of scientific knowledge. Apparently, the classification systems can hardly be regarded as independent task put forward without regard to the object and purpose of the study. Therefore, the different types of systems, these authors do not consider exhaustive, and the only possible ones. Note, flexible adaptability to meet for a control system based on the fact that elements of the subsystems are functioning in the absence of unambiguous advantage in the behavior of the elements of the subsystems.

Summarizing, we can say that MS has the following features:

- ◆ There are not only communication coordination (interaction elements), but also the context of subordination due to the origin of some elements from the other, the emergence of new connections, etc.
- ◆ There are special control mechanisms through which the whole structure affects the nature of the operation and development of parts (a system of norms in society, government, etc.).
- ◆ Basic properties of parts are determined by laws, the structure of the whole.
- ◆ During the development of an organic system is a qualitative transformation of the parts together with the whole. The primary components within the system of road transport has undergone a transformation which is determined by their modern form.
- ◆ A prerequisite for sustainable organic systems is in constantly updating their elements.
- ◆ Inside an organic whole are unique blocks (subsystems-we).

The external environment is also a complex system and has all its behavior system. All the factors of direct and indirect impacts should be subjected to careful study of the analysis of data on objects that control and treated in terms of their impact on the effectiveness of solutions. Consideration and study of systems in their indissoluble connection with the external environment it suggests a systematic analysis. The world economic system operating in the environment of direct and indirect effects are complex systems. It is believed that a complex system is one that is already discussed above, but has a certain set of properties:

1. The effectiveness of the system - the ability to achieve its targets for a specified period of time at the rate of a certain amount of resources and the possible presence of some specific restrictions.
2. Physical heterogeneity and the large number of elements.
3. Emergence - irreducibility properties of individual elements to behavior system in general.
4. Versatility – the ability of the larger system to implementation of some set of functions on a given structure, which is manifested in the properties of flexibility, adaptation and survivability. Flexibility - is the property of the system to change the purpose and operating parameters (functions and structure of the system) depending on the operating conditions (adaptation) or the state of the subsystems (vitality).
5. Reliability – is the property of the system to implement predetermined functions within a certain period of time with specified parameters of quality.
6. Safety – is the ability not to cause unacceptable impacts to the environment.
7. Resistance – is a property of the system to perform its functions with output parameters of the external conditions of the system for certain restrictions.

In the above classifications systems proposed by various authors, we propose to consider the economic system (ES) – as any enterprise and energy complex of Russia. The company has the properties of many types of systems, so it can be attributed to them, and on general as presented as follows:

$$ES = MS + AS + KS + IS + SS. \quad (1)$$

Having considered the essence of the concept of system, properties, characteristics, types and classification systems proposed by various authors, highlighting in this classification economic system, we determined the types of economic systems in the overall structure. Since the ES has the characteristics and properties of many types of systems, she found a place in different classifications, each of which may be useful in choosing methods of modeling ES. This will allow LOT to prove to us that the organization is an economic system, emerging in accordance with the intended purpose.

Based on the above will define the organization in terms of facility management. Organization – is structured with the intended target system oriented to the development of a separate part of the level of the hierarchy in the light of ES formation of other constituent elements of this system has been completed and the influence of the environment. For research organizations are suitable methods of investigation used for these classes of systems. Thus, using a systems approach as a way of thinking in relation to the organization and management, foster democratic governance, will give a schematic representation of the structural model of the organization as an open system in Fig. 1.

In a graphical representation of the organization n different inputs of which are described by the values of  $f_1, f_2, \dots, f_n$  – obtained from the external environment, information, capital, human resources, materials; m different outputs, characterized by the values  $d_1, d_2, \dots, d_m$  – products and (or) services;  $S(t)$  – function of the organization, which

depends on time;  $Z(t)$  – a situation the uncertainty of the external environment, with the presence of the time factor.

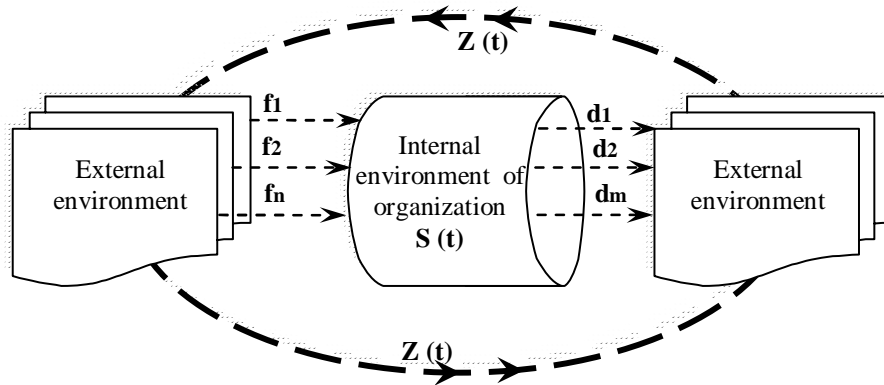


Fig. 1. Structural mapping models for organization

Strategic management system involves the use of available resources, the situation and market share in order to maximize the impact of the implications for the business. Strategic management tool, make it possible to effectively coordinate the work of the distributing company as a system is the SWOT-matrix and the quality management system. Two designated tool can support the viability of the system and effectively in business, science, marketing, financial performance, and the orderly interaction of these instruments is the ability of the system (company / organization) in a timely manner to identify meaningful changes in the environment, to anticipate new trends in growth of industry, latent dangers and opportunities and adequately, mobile, and effectively respond to unforeseen changes.

Performance SWOT-n matrix of the system (organization) in Fig. 2 can be represented by the following characteristics of stability under the selected type of markets and energy complex of Russia:

Strengths n system: reduction of total costs, the introduction of new products and services, the high scientific potential of the system innovation in ODL technology used for system management, to the full satisfaction of consumers of goods and services, the ability of the system for a flexible adaptation to environmental change, ability to reduce entry barriers to new levels of organization of the market.

Weaknesses n system: the political and economic dependence on public authorities, inefficient economic-organizing system, its cumbersome nature, dependence on volatile demographics, increased competition in the market.

The possibilities from the external environment for the development of n system: the growth occupied a market niche in providing quality goods and services, cooperation with other systems (organizations), an increase in enumeration related manufactured products and services, the possibility of optimizing revenue and expenditure, a gradual shift boundaries between for Public restrictions on the production of products and services.

Threats from the external environment for the development of n system: insufficient budgetary financing development of the industry, reducing the growth of the market (market share), market volatility, the rapid aging of innovative technologies, the growth of competitive pressures, an unstable political situation, changes in legal and regulatory framework business activity.

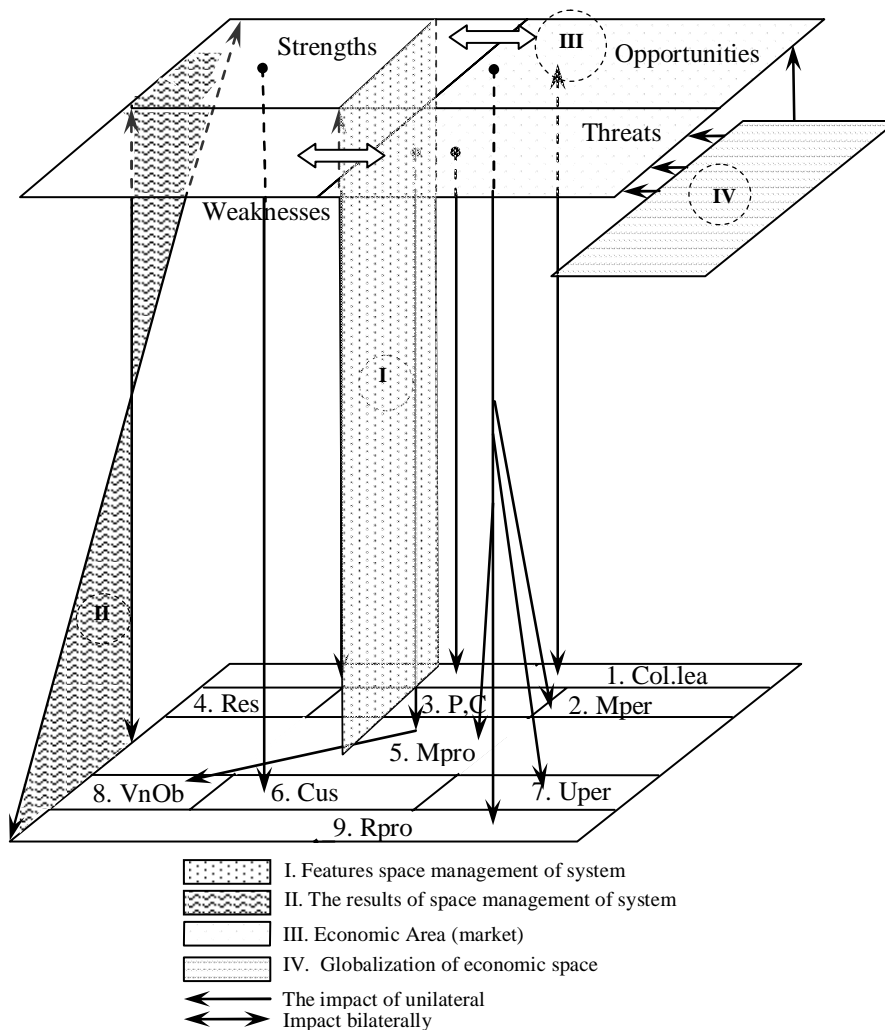


Fig. 2. Model management system based on design SWOT-matrix and the quality management system

Quality management system (lower part of the model) before sub-systems: 1. Col.lea – collective leadership; 2. Mper – management of personnel; 3. P, C – Policy and strategy; 4. Res – resources; 5. Mpro – management processes, 6. Cus – customer; 7. Uper – satisfaction of needs of staff; 8. VnOb – impact on society; 9. Rpro – results of the process (Fig. 2).

Thus, as the comparison base is taken SWOT-matrix, its part of market features reveal the following: the existence of favorable conditions likely including the collective leadership (Lea), management of personnel (Mper), management processes in the complex (M pro) satisfaction of needs of staff (Uper) and in general the results of the process (Rpro), business activity. Market-based threats are putting pressure on the leadership (hands) organization (system), determined leadership and responsibility for the entire process of business activities of the organization. Market threats influence the results of

all activities in the complex (P pro). Market threat / change requirements for products / services move the priorities of the administration in the organization (system).

Thus, we can conclude the model management system, based on my design SWOT-matrix and the quality management system rather sketchy and full, using all the units and elements of SWOT-matrix and the quality management system. The model provides all the information management systems and can be used in the construction and selection of the vectors of the strategic development of individual enterprises, appropriate interventions and energy complex of Russia.

#### БИБЛИОГРАФИЧЕСКИЙ СПИСОК

1. *Бир С.* Кибернетика и менеджмент. – М.: Изд-во "УРСС" (Editorial URSS). – 2006. – С. 280.
2. *Блауберг И.В., Юдин Э.Г.* Становление и сущность системного подхода. – М.: Изд-во Наука, 1973. – С. 270.
3. *Вяткин В.Н.* Организационное проектирование хозяйственных комплексов. – М.: Экономика, 2002. – С. 325.
4. *Новиков В.С.* Обеспечение системности гарантий качества образовательных услуг высшего профессионального образования. Перспективы социально-экономического развития Юга России. Работы молодых ученых Южного института менеджмента. – Краснодар: Изд-во ЮИМ, 2007. – С. 106-110.
5. Организационные структуры управления производством / Под. общ. ред. Б.З. Мильнера. – М.: Экономика, 2001.
6. *Поваров Г.Н.* О матричном анализе связей в частично ориентированных графах. – 1956.
7. *Садовский В.Н.* Методологические проблемы исследования объектов, представляющих собой системы. Социология в СССР. Т.1. – М.: Наука, 1965.
8. *Холл А.Д., Фейджин Р.Е.* Определение понятия системы. Исследования по общей теории систем. – М., 1969.

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#### **ИССЛЕДОВАНИЕ ОПТИЧЕСКИХ СВЧ-МОДУЛЯТОРОВ КАК ЭЛЕМЕНТОВ РАДИОПЕРЕДАЮЩИХ УСТРОЙСТВ ТЕЛЕКОММУНИКАЦИОННЫХ СИСТЕМ В ЭНЕРГЕТИКЕ**

*Обсуждаются схема и результаты экспериментального исследования статических модуляционных характеристик микрополоскового макета оптического СВЧ-модулятора, разработанного на основе бескорпусного инжекционного полупроводникового лазера (ИПЛ).*

*Радиопередающее устройство; энергетика.*