МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ДНІПРОВСЬКА ПОЛІТЕХНІКА»

78-а студентська науково-технічна конференція
«ТИЖДЕНЬ СТУДЕНТСЬКОЇ НАУКИ»

24 – 28 квітня

# ЗБІРНИК ПРАЦЬ

Дніпро
2023

# STUDY OF CONTROL PROCESSES THROUGH SYSTEM ANALYSIS

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System analysis is a scientific and methodological discipline that studies the principles, methods and means of studying complex objects by representing them as systems and analyzing these systems [7]. Thus, in system analysis any object is considered with regard to its systemic nature, that is, not as a whole, but as a complex of interrelated constituent elements, their properties and processes.

The most widespread use of system analysis is in management theory and practice - in developing, making and justifying decisions related to the design, creation and management of complex, multi-level and multi-component artificial systems.

The importance and perspective of applying system analysis in the field of management are analyzed in the works of the researchers in the field of system analysis von L. Bertalanffy, Y. Chernyak, and J. Sterman. They define the main goal of system analysis in an organization as the development and implementation of such a management system, which is chosen as a standard that meets all the requirements of optimality [1-3]. Clearly formulated goals for the development of an enterprise are the basis of a system analysis and research development program.

The elements of science and practice are closely intertwined in systems analysis. Therefore, judgements based on personal experience and intuition are allowed. An important feature of system analysis is the unity of formalized and non-formalized research tools and methods used in it.

System analysis is particularly useful in the design of control systems for complex, large-scale systems such as power plants, transportation networks, and manufacturing plants. These systems often involve multiple subsystems that interact with each other, making their analysis and design a challenging task. System analysis techniques can be used to develop models of these complex systems and to evaluate different control strategies to optimize their performance [5].

System analysis is a subset of the study of control processes. It involves the use of such techniques as modeling, simulation, and optimization to analyze and understand complex control systems. By doing so, researchers can identify ways to improve the performance of these systems, that can have wide-ranging benefits in fields such as engineering, economics, and environmental science.

The system analysis identifies the following characteristics:

- the role and place in the industry;
- the state of production and economic activities;
- production structure;
- management system and organizational structure;
- interaction with suppliers, customers and parent organizations;
- innovations needs;
- forms and methods of stimulating employees.

The most optimal approach in studying the control system is the system approach that helps to comprehensively assess any production activity at the level of specific characteristics. This will help to analyze any situation within a particular system and identify the nature of the input, processing and output problems.

A system approach based on market research first examines the "output" parameters, i.e. goods or services, namely what to produce, what quality indicators, in terms of any costs to be determined, in what time frame to sell and at what price. The answers to these questions should be clear and timely. The "output" at the end has to be defined by a competitive product or service. In turn, "input" parameters are defined as information, raw materials, technology, capital, and human resources. We also need to define the "process" parameters: transformation, operations, management, and employees work. (Fig. 1).

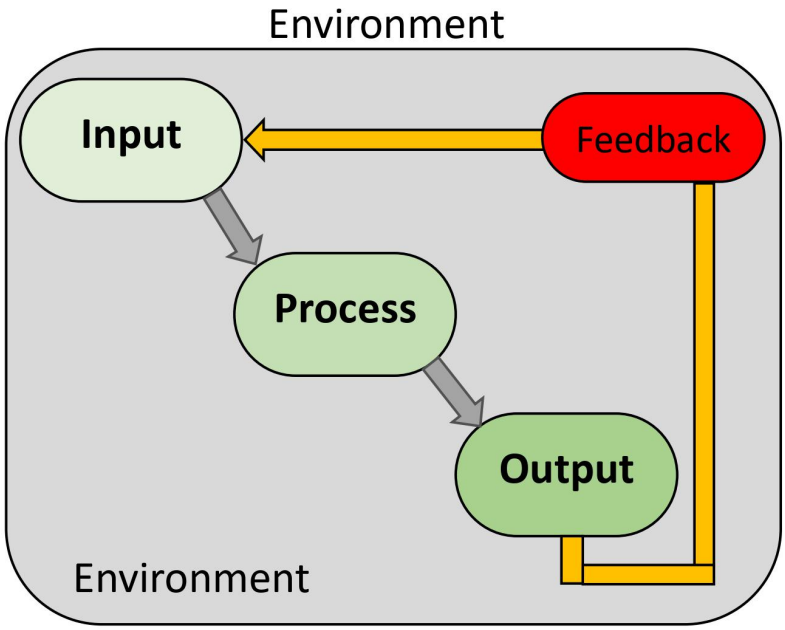


Figure 1 - Model of System Theory for Organization Management (adapted from [6])

This approach is considered in the analysis of both the internal and external environment of the organization. This means that we must consider not only internal but also external factors - economic, geopolitical, social, demographic, environmental and other factors that are important aspects when analyzing organizations [8].

Thus, it can be concluded that the need to turn to a system approach in enterprise management is caused by complication of the internal structure of management objects, expansion and branching of relations, rapid and continuous growth of the volume of information, environmental instability, and increased competition.

Holism, interdependence, hierarchy, and multiple perspectives are the main principles of the system approach. This approach has five main objects of analysis, such as management structure, management methods, management style, development strategy of the organization, and technological features of the production process. Therefore, this approach recognizes that the behavior and performance of a system

depend on the interactions among its components rather than on the individual properties of each component.

To sum up, system analysis is a critical direction in the study of control processes, and it has broad applications in many fields, including engineering, economics, and environmental science. The insights and techniques developed through system analysis research can help improve the efficiency, reliability, and safety of control systems in a wide range of applications.

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