

SYSTEMS APPROACH IN SOCIAL AND ECONOMIC CYBERNETICS

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Abstract. Unsuccessful attempts to apply technical cybernetics to the modeling and control of social and economic systems are due to the fact that we need different views of the systems approach, we need different cybernetics. It is proposed to use post-non-classical scientific rationality as a philosophical and methodological basis for the formation of adequate representations of social and economic cybernetics. The systems approach in post-non-classical scientific rationality turns out to be associated with the research and organization of «self-developing human-dimensional systems.» Taking into account the specifics of the problematics of social systems control, we have proposed considering this class of systems as self-developing poly-subject (reflexive-active) environments in which the ontological bases for the convergence of hybrid reality (subject, digital and physical) are provided. Subjectness becomes the main system-forming factor, the main factor of systems approach. At the same time, the evolution of cybernetics is associated with the development of scientific rationality, with the ascent from classical cybernetics of the first order, to second-order cybernetics and post-non-classical cybernetics of the third order. A variant of the model of a self-developing reflexive-active environment, which is presented as a multi-level structure of the ideological, conceptual, technological level and level of implementation, is proposed. The proposed foundations for building social and economic cybernetics have attracted the attention of the international community of scientists focused on the creation of these areas of scientific knowledge.

Keywords: systems approach, social cybernetics, economic cybernetics, post-non-classical scientific rationality, third order cybernetics, self-developing reflective-active environments.

INTRODUCTION

Cybernetics has a wealth of successful experience in organizing the control of technical systems, which has allowed developing tools that are adequate to the specifics of control objects, largely based on mathematical methods and computer technologies.

When trying to use this experience for organizing the control of social and economic systems, various problems arose that convincingly demonstrated the inadequacy of technical cybernetics tools for this class of systems [1].

In technical cybernetics, the idea of consistency was adequate to its tasks. However, it turned out to be inadequate for social and economic cybernetics.

The development of second-order cybernetics ideas and approaches (Von Foerster) is associated with the expansion

of ideas about systemic nature, with the inclusion of active and reflexive control objects in consideration. However, second-order cybernetics could not fundamentally overcome the causes of the crisis. What is connected, in our opinion, with methodological limitations in modeling the integrity of social systems.

We propose the consideration of a new approach to the presentation of a system based on modern ideas of the philosophy of science, based on post-non-classical scientific rationality [2].

THE BASIS OF SYSTEM FOR THE DEVELOPMENT OF SOCIAL AND ECONOMIC CYBERNETICS

The philosophical and methodological foundations could be the ideas of post-non-classical scientific rationality [2]. This

rationality sets the four most important foundations of a systemic approach, focused on the harmony of the subjects of development.

The first subject is a methodologically sound joint presentation of subjects, means and objects in the processes of cognition and activity. The second one is the inclusion in the processes of cognition of social values and goals, along with intrascientific values, the establishment of harmony of the internal and external mechanisms of development. The third subject is an introduction to science of ethical regulators and fundamentally important links with culture. The fourth subject is an understanding of post-non-classical rationality not only as a specific type of scientific rationality, but also as a framework methodological construct that organically incorporates classical and non-classical rationality.

Systems approach in post-non-classical scientific rationality by V.S. Stepin is associated with the study and organization of "self-developing man-sized systems" [2]. Taking into account the specifics of the problematics of social system control, we proposed considering this class of systems as self-developing polysubject (reflexive-active) environments [3], which provide for the ontological basis for the convergence of hybrid reality (subject, digital and physical). The evolution of cybernetics is associated with the development of scientific rationality [4]. This gives grounds to consider the systems approach in social and economic cybernetics in the context of post-non-classical scientific rationality.

The problem of the crisis of the dominant type of civilizational development is connected with the post-non-classical understanding of the systematic and the system approach. In recent years, more and more attention on interdisciplinary scientific events has been paid to the challenges and threats generated by the specifics of technological civilization, the need to find a transition to a new type of civilizational development. The focus of attention is the problem of searching for ideas about the systematic and the systems approach adequate to the civilizational transition. In our opinion, the post-non-classical interpretation of a systems approach is

adequate for searching and developing an image of a post-technogenic civilization, which may be a socio-humanitarian civilization.

It is fundamentally important to note that the concept of a systems approach in the search for new forms of civilizational development is associated with the basic values of human development. These are the values of conservation and development: of a person; humanity; biosphere; technosphere, in which the increasing role is played by digital reality.

It is these values that are organically interrelated and require a systematic approach for organizing the processes of goal-setting and the implementation of strategies developed on the basis of the basic values of human development.

In the technogenic civilization, the initiator and creator of which was the West, these values are practically ignored, as evidenced by reports of the UN and the Club of Rome, prepared in 2017 and 2018. In the technological civilization, the economic basis of which is capitalism, the values associated with the principle of profit maximization flourish. It is the futility of capitalism for the future of mankind that is justified in the aforementioned reports of the UN and the Club of Rome.

Technogenic model of climbing uncontrolled by mankind according to technological structures fits in well with the technogenic civilization. For Russia, which, due to a number of circumstances and prevailing realities, turned out to be hopelessly backward from the leaders of the transition to the VI technological order (NBICS), a promising potential option "to overtake without catching up" with the leaders of the technological race opens up. This is the transition to the VII socio-humanitarian technological order, becoming the leader of the socio-humanitarian civilization. This transition will also mobilize society for the intensive development of high technologies, coordinated with regard to the basic values of human development.

The planned transition to a socio-humanitarian civilization will be associated with the formation of the subjectness of human development. At the same time subjectness becomes the main system-forming factor.

THE BASIC MODEL OF THE SELF-DEVELOPING POLY-SUBJECT (REFLEXIVE-ACTIVE) ENVIRONMENT IS THE BASIS OF THE SYSTEMS APPROACH IN SOCIAL AND ECONOMIC CYBERNETICS

It is fundamentally important that the self-developing poly-subject (reflexive-active) environment is considered as a self-developing system and as a meta-subject. As a consequence, the third-order cybernetics paradigm can be represented as a "subject - meta-subject" [3].

The idea of self-developing reflexive-active environments was proposed under the influence of some interdisciplinary ideas and concepts. Philosophy gave the basic ideas of post-non-classical scientific rationality, on the basis of which the opportunity arose to integrate ideas and concepts of the humanities: ideas of the noosphere (V.I. Vernadsky), the concept of society as a social system (Niclas Luman), activity and subject-activity approaches (A.N. Leontyev, L.S. Vygotsky, S.L. Rubinstein, and others), research by Russian methodologists (G.P. Schedrovitsky, etc.), interdisciplinary ideas for the formation of social cybernetics (Stuart Umpleby), socio-humanitarian analysis of computer-aided design experience country control systems (V.E. Lepskiy) and others.

The model of a self-developing reflexive-active environment is presented by us through the multi-level structure of the worldview, conceptual, technological level and level of implementation [3].

Worldview level:

- values and meanings of harmony of the subjects of development;
- ethical norms and principles of organization of interaction of subjects;

- models of correlation and convergence of world outlook bases of various social communities.

Conceptual and methodical level:

- the subject-activity level (positioning of subjects, ontology of their activity and interaction);

- criterion level;

- the level of principles (the structure of the principles of organization of activities and interaction of subjects);

- methodical level.

Technological level:

- conceptual and technological;

- instrumental and technological.

Realization level (practical experience).

It is fundamentally important that the technological level is a link between the conceptual representations of the subject-oriented approach and the ideas in scientific support and practice of the established approaches (including the first and second order cybernetics tools).

Self-developing reflexive-active environment is a meta-subject that has invariant properties for various types of subjects: purposefulness (activity), reflexivity, communication, sociality, ability to develop.

Such an environment is fundamentally different from networks. This is the interaction of active elements that can be formed on the basis of natural intelligence (personality, group, etc.), artificial intelligence (agents) and the integration of natural and artificial intelligence.

The organization of the interaction of active elements with each other and with the environment is determined by a system of values, principles, ontologies, criteria, and specialized subject-oriented information platforms [3].

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