ления социальными системами. Приведены сведения о направлениях апробации концепции кибернетики третьего порядка для совершенствования управления страной на основе системы распределенных ситуационных центров и результаты успешной апробации на международных научных конференциях.

Ключевые слова: постнеклассическая научная рациональность, кибернетика третьего порядка, саморазвивающиеся рефлексивно-активные среды, субъектно-ориентированный подход, рефлексия, управление, философия науки, этика.

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Цитирование: *Лепский В.Е.* (2018) Философско-методологические основания становления кибернетики третьего порядка // Философские науки. 2018. № 10. С. 7–36.
DOI: 10.30727/0235-1188-2018-10-7-36

Philosophical-Methodological Basis for the Formation of Third-Order Cybernetics

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DOI: 10.30727/0235-1188-2018-10-7-36
Original research paper

Summary
In the paper, a philosophical and methodological analysis of the evolution of cybernetics in the context of the development of scientific rationality is carried out. The evolution of cybernetics is represented as a movement from the methodology of "observable systems" (N. Wiener) and to the methodology of "observing systems" (von Foerster) and to the methodology of self-developing reflexive-active environments. Special attention is paid to the formation of a new promising direction for post-non-classical cybernetics of self-developing poly-subject (reflexive-active) environments, which, given the correlation with previous stages of cybernetics development (with classical and non-classical scientific rationality), we define as third-order cybernetics. The analysis of the basics of the formation of third-order cybernetics was carried out with consideration of interrelated aspects: philosophical, methodological, theoretical, and methodical. We also provide model of self-developing poly-subject (reflexive-active) environments as well as a system of ontologies, defining the mechanisms of functioning of such self-organizing poly-subject environments and active elements that organize the communication space (natural, artificial intelligence,

and combined formations). The ontology system also makes it possible to integrate cybernetics of the first, second, and third order. Some socio-humanitarian trends in the development of cybernetics are considered: from an external observer to a distributed observer; from monodisciplinary to transdisciplinary approaches; from activity approach to subject-activity one, and further to subject-oriented approach; from information to active knowledge; from ethics of goals to ethics of strategic subjects. Potential opportunities for using third-order cybernetics are described, in order to improve the quality of solving a number of important scientific and practical problems of controlling social systems. Information is provided on the directions of approbation of a third-order cybernetics concept for improving state administration, based on a system of distributed situational centers, and there is its approbation at international scientific conferences.

Keywords: post-non-classical scientific rationality, third-order cybernetics, self-developing reflexive-active environments, subject-oriented approach, reflexion, control, philosophy of science, ethics.

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Citation: Lepskiy V. (2018) Philosophical-Methodological Basis for the Formation of Third-Order Cybernetics. *Russian Journal of Philosophical Sciences = Filosofskie nauki*. 2018. No. 10, pp. 7–36.
DOI: 10.30727/0235-1188-2018-10-7-36

Введение

Проблемы управления со времен Античности были в фокусе внимания философов [Диев 2010, 35], а в начале XXI века интерес все более возрастает в связи с ярко выраженным кризисом этой проблематики [Espejo 2015, Novikov 2016].

В настоящее время в философии науки в значительной степени благодаря идеям В.С. Степина накоплен богатейший задел в представлениях о типах научной рациональности. Фактически разработана система парадигм, в которой каждая последующая в развитии включает в себя предыдущие как частные парадигмы. Эти представления опирались прежде всего на отечественные разработки в философских, методологических и психологических исследованиях в конвергенции с естественнонаучными подходами. Были выделены три типа научной рациональности (классическая, неклассическая, постнеклассическая) [Степин 2003, 619–636], которые позволили систематизировать на макроуровне эволюцию проблематики управления и кибернетики как области научного знания. Более того это позволило постановить проблему создания кибернетических комбинированных «человекоразмерных»

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Philosophical-Methodological Basis for the Formation of Third-Order Cybernetics

Introduction

The development of control and cybernetics theory is associated with involvement of new natural-science and humanitarian fields of knowledge in it, with the increasing role of interdisciplinary and transdisciplinary approaches. This is due to the broad interpretation of the concept of control as it was formulated at the dawn of cybernetics, which was presented as a science of general laws of the processes of control and transmission of information in machines, living organisms, and in society [Wiener 1948].

An interdisciplinary analysis of the evolution of cybernetics in general, and especially in controlling social systems, should be based on a philosophical and methodological interpretation of its trends. Since ancient times, problems of control have been in the focus of philosophers, and in the early 21st century interest in these has been increasing in connection with the manifest crisis of this problem [Diev 2010, 35].

By now, the philosophy of science, largely due to V.S. Stepin's ideas, has accumulated a wealth of background knowledge of the types of scientific rationality. A system of paradigms has been developed, in which each subsequent development retains previously dominant ones as private paradigms. These ideas were based primarily on developments in Russian philosophical, methodological and psychological research, integrated with natural-science approaches. Three types of scientific rationality (classical, non-classical, and post-non-classical) were proposed [Stepin 2005], which allowed systematizing problems of control and cybernetics at the macrolevel. Moreover, this enabled us to pose the task of developing cybernetic combined "human-oriented" models, where it would be possible to use concepts, methods, models and technologies accumulated at different stages of the formation of cybernetics [Lepskiy 2015].

The article presents results of a philosophical and methodological analysis of the evolution of cybernetics, in the context of improving its scientific rationality; special attention is given to formation of a new promising direction for post-non-classical cybernetics of self-developing poly-subject (reflexive-active) environments, which, taking into account the correlation of the previous stages of cybernetics development with classical and non-classical scientific rationality, we defined as third-order cybernetics [Lepskiy 2018].

Aspects of philosophical and methodological analysis are selected with consideration of established views of scientific analysis:

– philosophical level (philosophy of science – basic types of scientific rationality, basic philosophical directions);

– methodological level (basic paradigms and objects of control, methodology of the scientific approach);

– theoretical level (basic knowledge that support control means in an area of knowledge);

– methodical level (basic types and models, mechanisms and technologies of control).

As our basic stand of analysis in this study, we take the types of scientific rationality (classics, non-classics, post-non-classics) [Stepin 2003] and view the evolution of cybernetics in their context of which. At the same time, we use the results obtained earlier from philosophical and methodological analysis of the problems of control [Lepskiy 2015].

Classical scientific rationality: first-order cybernetics

Philosophical aspects. While focusing on the object of research, classical scientific rationality leaves behind the impact of research tools and the subjects of cognition. This simplification is justified by the orientation toward obtaining objective knowledge of the world. Scientific research is considered as knowledge of the laws of Nature that exist outside man [Stepin 2005].

This type of scientific rationality determined the specificity of the scientific approach at the initial stage of cybernetics, when major influences were exerted by positivist philosophy. And during building models of persons, the focus was on behaviorism, which also had also stemmed from the ideas of positivism.

Methodological aspects. The traditional idea of control was limited to the "subject-object" paradigm, which was reflected in numerous works [Lectorsky 2001]. The dominant integrated approach is an activity approach, in which freedom of the subject is largely limited by the goals and regulations of the activity.

First-order cybernetics corresponds to the philosophical and methodological provisions of classical scientific rationality [Lepskiy 2018]. This is the "cybernetics of observable systems." This branch was founded by Norbert Wiener [Wiener 1948]. The basic concepts of classical cybernetics are the system and the object of its control. The functional analogy largely determined the approach to the modeling of control objects. As a consequence, representation of the control object in the form of a "black box" became widely spread. The control system generates control actions for keeping the object on its given trajectory, correcting its state through feedback.

The "subject-object" paradigm influenced the choice of adequate approaches for modeling control processes: functional, functional-structural, axiomatic, informational, operations research, classical game theory, etc. Domination of the natural-science approach allows us to generalize this stage of cybernetics as monodisciplinary. Nevertheless, there appeared fields of knowledge that had a pronounced interdisciplinary character, such as:

– engineering psychology (psychology – physiology – cybernetics);

– bionics (biology – cybernetics);

– neuro-linguistic programming (NLP) (psychology – linguistics – cybernetics).

In first-order cybernetics, the informational approach dominated in knowledge organization. The focus was on information flows and problems related to their organization. The founder of the informational approach, Claude Shannon, wisely warned against the technical limitations of the information approach, but this approach has become widely used in management of social systems. Limitations of the informational approach in management were clearly explained by Russell Ackoff (as appearance of managerial misinformation systems).

In the context of ethical considerations in first-order cybernetics, the basic targets are goals, and its dominant ethic can be represented as the "ethic of goals." One of the radical expressions of such ethics where the goal is dominant is the rule that "the end justifies the means" [Lepskiy 2016].

Classical cybernetics of the first order is adequate to the basic provisions of classical scientific rationality. It is based on the ideas of positivist philosophy and the paradigm of "subject-object." Attempts to apply ideas

and models of first-order cybernetics to management of social systems have faced many constraints that were then overcome within the framework of non-classical and post-non-classical rationality and, accordingly, new types of cybernetics.

Non-classical scientific rationality: second-order cybernetics

Philosophical aspects. Non-classical scientific rationality takes into account the interaction between knowledge about the object and the nature of the means of activity and corresponding operations. However, the interrelations between scientific and social values and research goals remain outside the bounds of scientific reflexion. In accordance with this logic, there occurred a transition from dominant positivism to philosophical constructivism, which became a leading trend in non-classical rationality.

Methodological aspects. A significant contribution to the development of methodological foundations of non-classical science was made by the Russian school of methodologists, in which the thesis was clearly formulated as "the means set their object" [Lefebvre, Shchedrovitsky, Yudin 1965, 141–149]. This served as the basis for the transition to consideration and modeling of active objects, and for transition from "subject-object" to the "subject-subject" paradigm. In the context of non-classical scientific rationality, the researcher becomes one of the participants in the system of reflexive relations, where the active object is also included.

Increasing the role of the subject led to the need to review the dominance of the activity approach. Adequate specificity of non-classical scientific rationality is achieved in the subject-activity approach [Rubinshtein 1997, 438]. As a consequence, along with activity in cybernetics, communicative and reflexive activities have to be considered.

The leading role of the "subject-subject" paradigm contributed to intensive development of interdisciplinary research: philosophy, psychology, sociology, political science, biology, etc.

Second-order cybernetics was proposed by Von Foerster as "the cybernetics of observing systems" [Foerster 1974], as cybernetics of active objects that are capable of observing and modeling their researcher (or observer). Second-order cybernetics meets the main requirements of non-classical scientific rationality. The philosophical foundations of second-order cybernetics were formed mainly within the framework of philosophical constructivism. It is important to note the change in the "observer" concept. In first-order cybernetics, the monopoly rested with an external observer, whereas in second-order cybernetics, along with an external observer, considerable attention is paid to the observer who is embedded into the object.

In accordance with the "subject-subject" paradigm in second-order cybernetics, the communicative activity became the leading form. At the same time, the role of reflexive communicative activity sharply increased [Lefebvre 1973; Umpleby 2014].

Fundamental cultural specifics of approaches to second-order cybernetics in the West and in the USSR were described by V.E. Lefebvre in 1986. Both in the West and in the USSR, the concept of second-order cybernetics was based on reflection (the "observing object"); yet in the West the behavioral approach dominated, and studies were conducted largely within the framework of biology. In the USSR, the structural approach dominated, so here studies were conducted primarily within the framework of psychology.

The transition from the "subject-object" paradigm to the "subject-subject" paradigm also brought about new types of control: reflexive control, informational control, control of active systems, etc. In second-order cybernetics, operations research and game theory were substantially developed. There are numerous examples of their practical application in economy and in the military sphere. In particular, the ideas of second-order cybernetics were reflected in the studies of Nobel Prize laureates in economics Thomas Schelling and Robert Aumann [Lepskiy 2015].

The view of the world in non-classical science cannot be adequately represented by knowledge if it is detached from the subjects, without taking into account subjective realities. This approach was presented both in the works of professionals in cybernetics (V. Turchin) and in works of philosophers who revealed the crucial importance of personal (hidden) knowledge (M. Polanyi), which found its reflexion in second-order cybernetics.

The dominant ethic in second-order cybernetics is communicative ethics [Lepskiy 2015].

Second-order cybernetics is adequate to the basic provisions of non-classical scientific rationality. It is based on the ideas of philosophical constructivism and on the paradigm of "subject-subject," subject-activity, and network approaches. Second-order cybernetics helped to overcome a number of limitations of first-order cybernetics in the control of social systems.

Post-non-classical scientific rationality: third-order cybernetics

Philosophical aspects. In the post-non-classical type of scientific rationality, the interpretation of knowledge obtained about an object is correlated not only with the specifics of the means and operations of activity but also with the value-target structures of the cognizing subjects, or agents. Also, the connection between the internal and external mechanisms of scientific research, the connection of intra-scientific goals with extra-scientific ones, social values and goals becomes fundamentally important. In the center of attention, they also hold correlation of the obtained knowledge with the value orientations of the subjects of scientific activity [Stepin 2003].

In the context of post-non-classical scientific rationality, a whole transformation takes place. Philosophical constructivism also retains its importance in post-non-classical scientific rationality, but its radicalism is fundamentally "softened." In the organization of communicative processes,

greater attention is paid to preventing restrictions on the freedom of subjects, on establishing equal partnership with other people and with natural processes [Lectorsky 2001, 46–47].

Methodological aspects. The focus of post-non-classical scientific rationality is on self-developing systems [Stepin 2003]. As a consequence of this basic paradigm, the subject is a "self-developing poly-subject environment" [Lepskiy 2010]. This paradigm is based on the subject-oriented approach, which developed from the subject-activity approach [Lepskiy 1998]. In the subject-oriented approach, there is increasing attention to the subjects and their environment, and attention to the activity component is reduced due to a sharp decrease in the influence of regulatory components on the actions of subjects in modern reality. Originally, the basis of the subject-oriented approach was developed for designing automated control systems for the state [Lepskiy 1998].

It is important to note that the subject-oriented approach allows solving two major problems that non-classical scientific rationality had difficulty with. Firstly, the possibility of creating a new approach to solving the observer's problem for self-developing "human-oriented systems," through organization of a mechanism of distributed self-observation. Secondly, the possibilities of creating fundamentally new mechanisms for controlling complexity, based on special organization of reflexive processes and on integration of elements active in the environment.

The high methodological complexity of the organization of the diversity of approaches allows us to state that it is very difficult to achieve significant results within the framework of the traditional ideas about interdisciplinary communication. In post-non-classical rationality, a transdisciplinary approach should be principal in the field of control and management, which is a logical methodological development of the interdisciplinary approach [Lepsky 2018].

Third-order cybernetics is formed on the basis of post-non-classical scientific rationality. The logic of the formation of third-order cybernetics is based on the transition from first-order cybernetics – "observable systems," to second-order – "observing systems," to third-order cybernetics – "self-developing poly-subject (reflexive-active) environments." And also on the ascent from the paradigm "subject – object" to the paradigm "subject – subject" and then, in third-order cybernetics, to the paradigm of "subject – metasubject (self-developing poly-subject environment)." Third-order cybernetics has its own specifics and also defines a paradigm (framework construction) that includes first and second order cybernetic paradigms, similar to post-non-classical scientific rationality.

It is essential that the self-developing poly-subject (reflexive-active) environment proposed here should also be regarded as a self-developing system and as a metasubject. As a consequence, the third-order cybernetics paradigm can be represented as "subject-metasubject."

The idea of a self-developing reflexive-active environment was proposed under the influence of a number of interdisciplinary ideas and concepts of philosophy, it generated the fundamental ideas of post-non-classical scientific rationality, on the basis of which it became possible to integrate ideas and concepts of humanitarian studies: ideas about the noosphere (V.I. Vernadsky), the concept of society as a social system (Niklas Luhman), activity and subject-activity approaches (A.N. Leontiev, L.S. Vygotsky, S.L. Rubinshtein, et al.), contributions of Russian methodologists (G.P. Shchedrovitsky, et al.), interdisciplinary ideas of the formation of social cybernetics (Stuart Umpleby), sociohumanitarian analysis of the experience of developing automated systems (V.E. Lepskiy), and others.

We propose a model of the self-developing reflexive-active environment as a multilevel structure of the worldview, conceptual, technological levels, and at the level of its implementation [Lepskiy 1998; Lepskiy 2010].

Worldview level:

– values and meanings of harmony of development subjects;

– ethical norms and organizing principles of interaction between subjects;

– model of correlation and convergence of world outlooks of various social formations.

Conceptual-methodical level:

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

– criteria level;

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

– methodical level.

Technological level:

– conceptual-technological;

– instrumental-technological.

Implementation level (practical experience).

It is of fundamental importance that the technological level should provide a link between conceptual representations of the subject-oriented approach and representations in the scientific provisions and practice of the established approaches.

A self-developing reflexive-active environment is a metasubject that has invariant properties for various types of subjects: purposefulness (activity), reflexivity, communicativeness, sociality, ability to develop. This environment is fundamentally different from networks. It is interaction of active elements, which can be formed on the basis of natural intelligence (persons, groups, etc.), artificial intelligence (agents), and combination of natural and artificial intelligence.

The organization of interaction among active elements as well as with their environment is determined by a system of values, principles, ontologies,

criteria, and specialized subject-oriented informational platforms [Lepskiy 2010; Lepskiy 2015]. The mechanisms of communication of active elements are most strongly determined by a system of ontologies of self-developing reflexive-active environment.

The subject-oriented approach is a basis for creating a system of ontologies of self-developing reflexive-active environments. Below, we single out the most significant initial propositions for developing an ontology system:

– integration of individual, collective (corporate), and social experience;

– complex organization of various activities for control and development of social systems: support for established activities;

– resolution of problem situations, overcoming points of disruption of activities and communications;

– setting strategic goals and developing strategies; transfer of external experience to improve control and development mechanisms; ensuring implementation of innovative projects, etc. (taking into account the principles of synergetics, in accordance with which the stable and unstable states of systems are fundamentally important, the scalable time scale of processes of changes in systems – for example, micro and macro scales, etc.);

– joint organization of work on the above types of activities of representatives of administration, business, public organizations, and citizens (convergence of representative and direct democracy);

– creation of social elevators (means of mobility) for citizens who make significant contributions to the development of a reflexive-active environment (the formation of an elite of development);

– monitoring and public support of the administrative system, neutralizing risks of corruption and increasing the creative potential of the control system;

– creation of a basis for development of subject-oriented models of the environment (information platform for ensuring the reflection of all subjects in the environment, criteria for assessing the state and future of all actors, communication mechanisms for all actors to participate in various types of joint activities, etc.).

In accordance with these initial provisions, the following basic types of positions of subjects in a self-developing environment can be distinguished, both individual or group-oriented:

– established types of activities (communications) and reproduction of their subjects (S1);

– overcoming points of disruption in established types of activity (communications) and reproduction of their subjects (S2);

– development of established types of activity (communications) and of their subjects (S3);

– designing new types of activities (communications) and new actors (S4);

– implementation of innovative types of activities (communications) and new actors (S5).

In accordance with the positioning of subjects, an appropriate system of ontologies is proposed:

– support of the established types of activities (communications) and their subjects (ontology of "maintenance");

– support of subjects at the points of disruption of established types of activity (communications) and the reproduction of their subjects ("support");

– development of established types of activity (communications) and their subjects ("development");

– designing new types of activities (communications) and new actors ("construction");

– implementation of innovative projects of new types of activities (communications) and new actors ("innovation").

These ontologies are not alternative; moreover, they complement each other and together define the ontology system of a self-developing reflexive-active environment. The description of these ontologies applied to automated systems of organizational control is presented in the monograph [Lepskiy 1998].

Consider the features of the two most technologically complex ontologies: "development" and "support."

The ontology of "development" is connected with the subject's reflection over his activity. The result of such reflection can be carried out either by the controlling subjects themselves, or in cooperation with development professionals, for example, through organizational and activity games. The ontology of development is related to strategic goal-setting and design of development strategies.

The ontology of "support" has a pronounced orientation to the subject, as it is designed to provide support in difficulties that arise for a person or group who happen to find themselves in "individual points of disruption." We regard such a point of activity disruption as a situation when a specific subject of activity lacks "ready" algorithms (mechanisms) for conducting some activities. Analyzing the main causes of such an occurrence, there are two types of "individual points of disruption":

– activity (lack or inconsistency of activity standards in a specific situation: functions, rights or responsibilities of subjects, funds, resources, etc.);

– subjective (emergence of needs and ideas for transformation of established types of activity or of its subjects, inadequacy of subjective perceptions of surrounding social environment, behavioral norms, etc., inconsistency of professionally important qualities of subjects with new requirements of activity, emergence of problems with individual identity and self-determination, inconsistency of the actors' functional state with the conditions, etc.).

The ontology of "support" is focused on helping the subjects in such situations. In fact, it is about assisting in the active development or procedural knowledge on the basis of experience gained through

reflection over performed established activity. The main tasks of the ontology of "support" include: forecasting, systematization, identification of "individual points of disruption of established types of activity (communications)," identification of means to overcome them (searching for analogies, developing scenarios for active development or formation of subjectivized norms of activity, etc.), translating unsolved problems to the ontology of "development."

Unlike the ontology of "development," focused on strategic issues of reorganizing activities and the environment as a whole and taking into account a long-term prospects, the ontology of "support" is intended for tactical (operational) support of its subjects, intended to solve specific problems. It is significant that in this ontology, the activity of subjects should be greater than in the ontology of "development," since in solving a specific problem, all responsibility falls on the subjects included in it.

In the ontology of "support," due to high requirements of speedy problem solving, new opportunities for using artificial intelligence systems open up. Important aspects of helping such users are not only informing them about the subject matter of the problem but also support in the organizational plan for determining behavior in a problem situation, for assessing their capabilities and ways to improve performance.

In the context of current philosophical concepts, the proposed ontology system corresponds to the original ideas of post-non-classical scientific rationality with regard to self-developing systems and sets the framework for organization of interdisciplinary and transdisciplinary research.

Knowledge in third-order cybernetics. In post-non-classical science, the new view of the world cannot be represented by knowledge that abstracted from the cognizing and acting subjects and from their subjective realities, without which an adequate interpretation of the knowledge they have received is impossible. The combination of individual subjects' world views forms a common post-non-classical view of the world. Post-non-classical science is interdisciplinary knowledge in which various scientific theories (understood as models and subject realities) form an interconnected network. This provides a synergistic effect of applying the methodological principles of subjectivity to tasks of subject-oriented design of self-developing poly-subject environments.

Third-order cybernetics is adequate to the basic assumptions of post-non-classical scientific rationality. It is based on humanistic interpretation of philosophical constructivism and the paradigm of "subject-metasubject (self-developing poly-subject environment)" as well as on subject-oriented and environment approaches. Third-order cybernetics avoids a number of limitations of first and second-order cybernetics in management of social systems.

Generalized results of philosophical and methodological analysis formation of third-order cybernetics

Generalized results of the analysis of the foundations of the formation of third-order cybernetics are given in Tables 1 and 2.

Table 1

Philosophical and methodological levels of the analysis of formation of third-order cybernetics (generalized results)

Philosophical level		**Methodological level**			**Cybernetics**
Type of scientific rationality	**Basic philosophical approaches**	**Basic paradigms and types of subjects**	**Basic objects of control. The dominating types of activity**	**Basic scientific approaches**	
Classical	Positivism	"Subject – Object" Utilitarian subject	Complex system Activity in activity	Activity approach Monodisciplinary approach	**First-order cybernetics**
Non-classical	Philosophical constructivism	"Subject – Subject" Communicative subject	Active systems Communicative activity	Subject-activity approach Interdisciplinary approach	**Second-order cybernetics**
Post-non-classical	Humanistic interpretation of philosophical constructivism	"Subject – meta-subject" Strategic subject	"Self-developing environments" Reflexive-activity	Subject-focused approach Transdisciplinary approach	**Third-order cybernetics (post-non-classical cybernetics of self-developing reflexive-active environments)**

More detailed information for the selected aspects of analysis, is given in the following publications:

– types of scientific rationality [Stepin 2003];

– humanistic interpretation of philosophical constructivism [Lectorsky 2001];

– basic paradigms and objects of control [Lepskiy 2015];

– formation of the subject-oriented approach [Lepskiy 1998];

– methodological foundations of self-developing reflexive-active environments [Lepskiy 1998, Lepskiy 2010];

– transdisciplinary approach in the field of control [Lepskiy 2015];

– philosophical and methodological analysis of the evolution of cybernetics [Lepskiy 2018].

Table 2

Methodical level of the analysis of formation of third-order cybernetics (generalized results)

Cybernetics	Methodical level				
	Basic types of control	**Basic models**	**Basic mechanisms and technologies**	**Basic types of reflexive activity**	**The dominating ethical regulators**
First-order cybernetics	Classical control	Analytical (mathematical)	Feedback Hierarchical structures	Personal reflection, over situational reflection	Ethics of domination of target orientation
Second-order cybernetics	Reflexive control, manipulations, etc.	Imitating models, business games, etc.	Communication relations Network structures	Communicative reflection	Communicative ethics
Third-order cybernetics	Environmental control	Models of self-developing reflexive-active environment	Control through self-developing environments, through culture, values, technologies of assembly and destruction of subjects of development Self-developing environment	Meta-reflection, reflection of strategic subject	Ethics of strategic subjects

The results of these studies should be considered as the initial steps towards the development of third-order cybernetics. To be ready for practical implementation, a great work of the interdisciplinary international community of scientists and practitioners has to be done. The success of this work is inextricably linked with the change of the planetary outlook, with the overcoming of market egoism on the basis of creating conditions for harmony of the subjects of development.

Conclusion

The article analyzes the philosophical and methodological foundations and substantiates the expediency of the development of third-order cybernetics, cybernetics of self-developing poly-subject (reflexive-active) environments.

The formation and development of cybernetics of the third order will improve the quality of solving a number of important scientific and practical problems of control social systems, in particular:

– stimulate and support the processes of society's identification;

– improve the processes of assembling the subjects of development and consolidation of state, business and society, stimulating and supporting the development of civil society;

– improve the mechanisms of democracy based on convergence of direct and representative democracy;

– overcome market selfishness through harmonization of subjects of development;

– create opportunities for all actors in performance of their social activities in the interests of development and the creation of social elevators;

– to stimulate and support processes of formation of development elite, and create conditions for its inclusion in the mechanisms of strategic control;

– contribute to solving problems of complexity in the control of social systems (Ashby principle);

– create conditions for the emergence of new socially-oriented economic development mechanisms;

– create effective mechanisms for innovative development;

– reduce social tensions in society, increase security from technologies of controlled chaos and "orange revolutions" and other types of destructive influences;

– initiate transitional processes from the technogenic to a socio-humanitarian civilization, etc.

In Russian experience of management in recent years, attempts have been made to use the conceptual developments of third-order cybernetics to improve the System of Distributed Situational Centers in the country, and their transformation into the System of Distributed Strategic Development Centers [Avdeeva et al. 2017].

In the international community, the discussion of philosophical and methodological foundations for the development of third-order cybernetics was first held at the World Congress WOSC2017 in Rome in January 2017, and further at the 11th International Symposium "Reflexive Processes and Control" in Moscow in October 2017 [Lepskiy et al. 2018], and in 2018 at several international conferences. In the international scientific community in general, our ideas of third-order cybernetics have been accepted, and ways of further cooperation are already outlined. It was decided to hold the next congress on system research and cybernetics WOSC2020 in Moscow on September 16–18, 2020.

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