

Importance of Reliability of Social Systems

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Abstract

Reliability is a fundamental philosophical category that covers different levels of structural organization of matter and the society. It reflects the essential properties of the real artificial and natural systems, and is the subject of the study of different sciences like technical, natural-mathematical, socio-economic, social, etc. This research examines the nature and important characteristics of reliability of social organizations (systems) from the system approach's point of view and the morality of modern society.

Keywords: *philosophy of reliability, complex systems, society, system approach, probabilistic approach, morality.*

1. Introduction

The reliability aspects of the management problems in the 90s of the 20th century are studied primarily in techno-economic sciences (cybernetics, bionics, theory of information, theory of machines, neurophysiology, engineering psychology, etc.) [2]. In fact, the reliability practice covers many levels of organization of matter, including the organization of living nature and society. This fact is indicative of the fact that the phenomenon of "reliability" is an up-to-date, both for technical systems, and organic (natural) and socio-economic systems, for inclusiveness in the beginning of the 21st century the reliability is seen as interdisciplinary and with general scientific value.

Reliability can be perceived as a fundamental philosophical category, since it owns the property "generality", i.e. its contents extends in various fields (natural, technical, economic, public, etc.). Another sign confirming the affiliation of reliability to the philosophical categories is the presence of the second category, inflected with the first, through dialectical law [5]. This second category is the failure of the system. While reliability characterizes the effectiveness, reliability and stability of a system, then the unreliability caused by aging, internal and external to the system factors suggests the occurrence of faults, failures, injuries, errors, etc. These failures have a place in all spheres of reality. The inevitability of the failure occurrences lies in the very nature of matter. Reliability is dialectical relating to failure. These concepts

reflect two opposing parties in the process of functioning of a system.

2. Reliability of social systems

From the above statements follows the basic equation of the reliability of the systems [1,8], which posits that the sum of the probability of normal system functioning (reliability) and the system failure (unreliability) in the certain interval of time (observation period) is equal to:

$$P(\Delta t) + Q(\Delta t) = 1 \quad (1)$$

where:

$P(\Delta t)$ - reliability function;

$Q(\Delta t)$ - failure probability.

Social organizations represent the most widespread form of social group that is formed and functioning purposefully in order to satisfy certain social needs of its members and the society as a whole. In studying the social organizations, one can apply various approaches: mechanistic, bureaucratic, social, structural-functional, situational, systemic [3,6].

Using the system approach, social organizations can be defined as a set of components and the connections between them, operating in a single whole [Katz, D., Kahn, I., 1966], or as a set of separate (distinguishable within the confines of reality) elements, connected to each other by certain relationships that define the structure of the relationship system [6].

In these definitions are included starting concepts in the system approach – item (subsystem), structure (organization) and integrity (generalization). They express the statistical aspect of the systems analysis. A central concept of the listed, which has a fundamental importance and characterize the specificity of the system approach and its peculiarity is the concept of structure (organization) [7,16].

Structurally the social system is made up of certain subsystems, which, in turn, also have a complex character: subsystems of the objectives, technical, structural,

psychosocial subsystems, management subsystems [Kreitner, R., Kinicki, A., 1995].

G. V. Suhodolskiy distinguishes subsystems in social organizations according to their nature: physical, mechanical (technological), biological, psychological, social and symbolic [6].

Regardless of the differences in the number and composition of subsystems in social organizations proposed by the various authors, they (subsystems) are not considered as independent subsets, but as interacting and functioning in the single whole of total social system. Relationships between individual elements can be immediate and indirect, unilateral or bilateral, simple and complex, which defines the principle of their interaction (mechanistic, linear, matrix, organic).

Due to its functional and structural complexity, social organizations cannot be classified as deterministic systems. Deterministic systems are assumed to be passive, that is, with no active origin in themselves [Снурмов, А., Петров, Н., Аманасов, Н., 2012]. The study of such systems is associated with dynamic pattern representing the form of causal relationship in which any previous condition determines uniquely all subsequent conditions, which supports the prediction of the future development of the system. The determinism rejects the objective nature of randomness and probability [7,10].

In complex systems the deterministic approach is not applicable, since their operation is subject to statistical regularities. The consideration of social organizations, as consisting of multiple interrelated functional elements is seen as a fundament that they to be perceived as cybernetic systems and therefore in their learning and control to be implemented the Cyber-approach.

From a cyber-philosophical point of system reliability can be defined as "property, manifested in the ability for normal operation under certain conditions of interaction with the external environment, a quantitative parameter which is the probability of reliable operation for a defined period of time [9]. Reliability as a concept is defined as "the property of a system, manifested in their ability for effective functioning" [11,17] or as "probability to keep the system of certain quality specifications over the relevant interval of time and under specified conditions" [2].

In particular reliability of social systems can be defined as the ability to perform the same functions for a period of time. Reliability is a key feature of social systems. It covers aspects of interaction in the system "human-machine", information relationships and personal characteristics of the individual, as part of the social system [9,12,13].

Reliability in social systems (as well as in all systems) has certain characteristics – relativity, dialecticism, uncertainty, probability.

Reliability in social systems has relative character, since it is not possible, the existence of an "absolute reliability" of the forms of matter. The theorem of the relativity of the expectation and the reliability is postulated that "without unreliability (failure) we have no idea about the existence in the nature of the reliability phenomenon." [11].

Another aspect of the relative nature of reliability is commented in the philosophical writings of Prof. DSc Evgeniy Gindev, academician of Technological Academy of Russia: "in the technology practice is possible from relatively little reliable elements to construct a relatively reliable systems, able to possess greater reliability of all items" [2]. This is also seen in social systems. The reliability of the entire social system is significantly higher than the reliability of structural elements is due to the fact that its constituent elements are not strictly deterministic, and at the base of their functioning is the principle of the parallel action [11,15,16].

The reliability of the operation of a given system, as a result of the impact of internal or external factors, always includes in itself the failure as a necessary moment of inner contradiction. This circumstance determines the dialectic nature of reliability in social organizations. The trend for existence of reliable state is impossible without a trend for the failure occurrence. These two states of reality are in constant intransigence and "fight", confirming the law of unity and struggle of opposites.

The state of reliable functioning of social organization is relatively stable, while the failure state is relatively unstable, because it is not connected with the essence of the functioning of the system. The status of the reliable functioning of the systems do not preclude the possibility of the failure occurrence, and the existence of a failure state does not exclude the possibility of moving to a reliably functioning after carrying out the relevant preventive or corrective measures and actions [11,14].

Taking into account the complexity of social systems when performing analyses of the reliability of functioning, it is not possible to reach concrete and precise calculations. Due to this fact the reliability in social systems are characterized by the uncertainty, i.e. the actual value of reliability could not be established. In practice, with repeated assessments can be obtained a set, in the range of what is the real value of reliability, without the opportunity to be defined itself.

In this sense, the reliability of the social organizations appears to be a random variable, which determines its probability character. The reliability of social systems is considered to be a probability category, and due

to the fact that the processes that take place in them (production, marketing, management, distribution, etc.) are considered as random, since their results are a function of time and are conditioned by multiple random variables. Taking into account the conditionality on the occurrence of the events influencing the functioning of the system, they may be treated as random events [4,7,8].

Taking into account the peculiarities of functioning of social organizations, then it is needed during their studying to apply a probability approach [4,10,18]. Originated as a section of mathematics, the probability approach is widely used today, not only in technical sciences, but also in natural and social sciences.

The methods of investigation, based on probability theory, ensure the progress of scientific knowledge during the second half of the twentieth century. The idea of probability presents, complements and embody the conceptual revolutions in knowledge of human society and there is a cosmological value to society [7,8].

3. Conclusions

The reliability of social organizations is multi-parametric socio-economic phenomenon and is the basis for the viability of numerous organizations (administrative buildings, industrial enterprises, educational institutions, commercial companies, etc.) that occupy dominant positions in society.

In this connection, its study is of special importance for ensuring the effective functioning of modern society. Application of probability approach in this study allows to look from high-tech point on this phenomenon and suggests the evolution of cognitive problems of the inner world and the inner dynamics of social systems.

Acknowledgments

The author would like to thank to professor Evgeniy Gindev and professor Nikolay Petrov for their support during the analysis.

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