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# Notes on the Reliability in social organizations

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*Abstract— Reliability is a major 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: technical, mathematical, natural, socio-economic and social. This work considers the essence and characteristics of the reliability of functioning of social organizations of postures-the overall approach and the morality of modern society.*

*Index Terms— philosophy of reliability, complex systems, society, system approach, probabilistic approach.*

## I. INTRODUCTION

Reliability aspects of the problems of control till the 90-ies of the twentieth century are studied basically in technical-economic sciences (cybernetics, bionics, theory of information, theory of automation, neurophysiology, engineering psychology, etc.). Reliability in practice covers many levels of organization of matter, including organization of living nature and society. This fact is indicative of the fact that the "reliability" is a topical as well as for the technical systems also for the natural and socio-economic systems, for inclusiveness in the beginning of the 21st century the reliability adopts an interdisciplinary and general scientific character.

## II. RELIABILITY AS A PHILOSOPHICAL CATEGORY

Reliability could be perceived as a fundamental philosophical category, as has the property "**generality**", i.e. its content extends in various fields (natural, technical, economic, public, etc.).

Another sign confirming the reliability affiliation to the philosophical categories is the presence of the **second category**, inflected with the first, through dialectical law [1]. This second category is the infringement (the refusal) of the system. While reliability characterizes efficiency, failsafe and stability of a given system, then the violation caused by aging, internal and external to the system factors suggests the occurrence of faults, failures, injuries, errors, etc. These disorders have a place in all spheres of reality. The occurrence of violations inevitability is set in the very nature of matter. Reliability (good condition) is dialectically related to the **violation** (refusal). These concepts reflect both opposite sides in the process of the functioning of a system.

It follows from the above drawing the main equation [2]-[4] of the reliability of the systems, which postulate that the sum of the probability of reliable (fail safe) job and the likelihood of a violation (refusal) at a fixed interval of observation is equal to the unit:

$$P_{BP}(\Delta t) + Q(\Delta t) = 1, \quad (1)$$

Where  $P_{BP}(\Delta t)$  is probability of fail safe operation,  $Q(\Delta t)$  - probability of a violation (refusal).

## III. RELIABILITY IN SOCIAL ORGANIZATIONS

Social organizations represent the most widespread form of social group that is formed and functions targeted in order to satisfy certain social needs of its members and the society as a whole. In studying social organizations apply different approaches: mechanistic, bureaucratic, social, structural-operational, situational, systematic [5]. Using the system approach, social organizations can be defined as a set of components and the connections between them, operating in a coherent whole [6], or as combination of the individual (distinguished in the limits of the reality) elements, connected to each other by certain relationships that define the structure of the system [7]. In these definitions are included starting concepts of the systematic approach-component (subsystem), structure (organization) and integrity (summarization). They express the statistical aspect of the analysis of systems. A basic concept of the enumerated aspects, which has a fundamental importance and characterize the specific of the system approach and its peculiarity, is the concept of structure (organization) [8], [9].



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Structurally the social system is composed by the certain subsystems, which, in turn, also have a complex character: subsystems of the objectives, technical, structural, psycho-social subsystems, control subsystems [10]. G. Suhodolskij differs subsystems in social organizations according to their nature as physical, mechanical (technological), biological, psychological, social and symbolic [7]. Regardless of the differences in the number and composition of subsystems in social organizations proposed by the various authors, they (the subsystems) are not considered as independent subsets, but **as interacting and operating in the coherent whole** of the total social system. The connections between the individual elements can be immediate and mediated, unilateral or bilateral, simple and complex, which defines the principle of their interaction (mechanistic, linear, matrix, organic). Due to their structural and functional complexity, social organizations cannot be classified as deterministic systems. Deterministic systems are assumed to be passive, that is, do not possess active beginnings in itself [11]. The study of such systems is associated with dynamic regularity 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 [8], [12].

In the complex systems, deterministic approach is unworkable, since their functioning is not a subject to dynamic patterns but to statistical ones. The examination of social organizations, composed likely by the multiple interrelated functional elements, gives a basis they be perceived as cybernetic systems relevant in their learning and control to be applied the **cybernetic approach**.

By cyber-philosophical perspective system reliability can be defined as "a property appearing in abilities for normal operation under certain conditions of the mutual-action with the external environment, a quantitative parameter of which is probability for the actual functioning of the relevant period of time [13]. Reliability as a general scientific concept is defined more as "a property of systems, manifested in their ability for effective functioning" [14] or as "a probability to save the system from certain quality characteristics during the relevant time period and under the relevant conditions of functioning" [15].

In particular, reliability of social systems can be defined as the ability to perform their intended functions in a given period of time. Reliability is the main characterization of the social systems. It covers the aspects of interaction in the system "man-machine", information relationships and personal characteristics of the individuals as part of the social system [13].

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

Reliability in the social systems has **relative character**, since it is not possible the existence of "absolute reliability" of the forms of matter. In the Theorem of the relativity of the hope and the reliability is postulated that "no violation (reliability), we had no idea about the existence in the nature of the phenomenon reliability." [14].

Another aspect of the relative nature of reliability is rated in the philosophical writings of Prof. DrSc E. Gindev, academician of the Technological Academy of Russia: "in the technology practice is possible from relatively small number of reliable elements to construct relatively reliable systems, capable to show greater reliability than their constituent elements" [15]. This is also seen in social systems. The possibility of the reliability of the entire social system to be significantly higher than the reliability of its structural elements is due to the fact that its constituent elements are not strictly deterministic, and in the basis of their functioning is the principle of the parallel action [14].

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

The status of the reliable functioning of social organization is relatively stable, while the state of disorder is a relatively unsustainable, because it is not connected with the essence of the functioning of the system. It shows the reliable functioning of the systems do not preclude the possibility of the occurrence of the violation, and the existence of a breach (denial) does not exclude the possibility of moving to a reliable functioning after carrying out relevant preventive measures [14].

Taking into account the complexity of social systems in analyses of their 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**, or the actual value of reliability could not be established. In practice, repeated evaluation might get fixed defined multitude, in the range of what is the real value of reliability, without having a chance to define itself.

In this sense, the credibility of the social organizations appears to be a random variable, which determines its **probability**. Reliable poverty-social systems are considered to be probability category, and due to the fact that the



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processes that take place in them (production, real marginalization, management, distribution, etc.) are considered as incidental, since their results are a function of time and are conditioned by multiple variables. Account the conditionality on the occurrence of the events influencing the functioning of the system; they may be treated as random events [8], [9], [16].

Taking into account the peculiarities in the operation of the social organizations have when they are learning to apply **probability approach** [17], [18]. Originated as a section of mathematics, probability approach is widely used today, not only in the technical, but also in natural and social sciences.

The methods of investigation based on probability theory, shall ensure that the progress of scientific knowledge during the second half of the twentieth century. The idea of probability presents complements and embodies the concept-ptualnite revolutions in knowledge of human society and have a Cosmo-logical value to society [8], [9].

#### IV. CONCLUSION

The reliability of social organizations is multi-parametrical socio-economic phenomenon and is the basis for the viability of numerous organizations (administrative offices, industrial enterprises, educational institutions, commercial companies, etc.) that occupy dominant positions in society. In this connection, its study is of particular importance for the effective functioning of modern society. The probability approach implementation in this study allows to look at this phenomenon from a high technological point and to suggest an evolution of the cognitive problems of the inner world and the inner dynamics of social systems.

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