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THE ROLE OF SOFT MEASUREMENTS IN CREATING THE TECHNOLOGICAL BASIS OF THE DIGITAL ECONOMY

PROKOPCHINA SVETLANA (ORCID 0000-0001-5500-2781)[1]

[1]Financial University under the Government of the Russian Federation

Abstract. The paper proposes the concept of soft measurements as one of the promising directions of creating a methodological framework and technological base of the digital economy. Within the framework of this concept, soft measurements are implemented on the basis of the regularizing Bayesian approach (RBA) and Bayesian intelligent technologies (BIT). The basic principles and properties of soft measurements important for solving practical problems of the digital economy are formulated. The proposed concept of professional intelligent networks based on intelligent jobs specialists. The examples of the developed applied systems of soft measurements focused on the functioning in the conditions of information uncertainty are given.

Keywords: soft measurements, regulatory Bayesian approach, digital economy.

Artificial intelligence is one of the five basic directions that make up the technological basis of the digital economy [1]. Its methods and means are designed to provide full-scale solutions to new economic problems that arise in the formation of the information society. As noted in [2]," the formation of the digital economy is the result of technological development, and its theory is the fruit of the theory of information society and information economy "(knowledge economy). The so-called "super-intelligent" or "society 5.0" (in the terminology proposed by Japanese scientists) is formed on the wave of the fourth industrial revolution, which is based on digital technologies. Post-industrial society (in the terminology of American sociologists D. Riesman and D. bell), part of which is the digital economy, is characterized primarily by the fact that it is the main driving force of development are knowledge-intensive.

The generation of knowledge, as the main resource of the digital economy and society as a whole, is determined by the efficiency of intellectual methods and means used to obtain them. Advanced 5G telecommunications technologies, as noted in various articles of mobile companies, will provide a significant number of benefits for the economic development of society. But at the same time, the main issue is not so much the question of how fast to transmit information, as the question of the content of such programs, which determines the essence and effectiveness of the socio-economic tasks, the question of "compression" of data to the level of useful knowledge. This knowledge can be transferred over the network many times faster than the data, which will reduce the transmission speed requirements.

For the digital economy, as for any economy, it is important not only and not so much transactions as the generation of effective evaluation and management decisions. It is the problem that solves the methods and means of artificial intelligence, which include methods and means of Bayesian intelligent technologies and soft measurements.

Conceptually, [3] soft measurements are fuzzy, multivariate, conditional (the measurement result is reliable within the framework of certain experimental conditions) measurements with soft logic of forming a solution to the measurement problem and a complete metrological justification of the measurement results .If the criterion for the choice of measurement solutions is the Bayesian criterion for the minimum average risk of solutions, such measurements are called soft Bayesian

measurements (MBI). They are based on RBA and BIT. Soft measurements are designed to measure the properties , states, dynamics, trends, characteristics of complex objects, processes and systems in terms of their continuous development and active interaction with the environment [3], Almost all real modern economic systems can be attributed to complex objects operating under conditions of uncertainty under the powerful influence of environmental factors. So the concept of soft measurement is adequate to the nature of economic systems.

The use of methods and means of soft measurements proved to be effective in solving many basic problems of the modern economy, some of them will be given below, others are covered in the works of the author and his scientific school, as the results of completed projects in Russia and abroad. In fact, these works are convincing examples of solving the problems of the main directions of the digital economy. Currently, the creation of data collection and transmission systems, the solution of economic problems based on the ideas and means of the digital economy, its "digitalization" is gradually beginning in almost all regions of the Russian Federation. First of all, these are the tasks of organizing public services, large-scale industry, energy and transport.

According to information from various sources, in particular, [1,2], the most advanced in these matters are Moscow and Moscow region, St. Petersburg and Leningrad region, Kazan and Innopolis in Tatarstan and other regions.

In fact, the "digitalization" of the regional economy began not with the introduction of this term, but much earlier and not only in these types of economic activities. So at the end of 80-ies of the last century was put into operation intelligent system of accounting and evaluation of the state of wild animals in Russia, which was designed not only to collect information on the number of animals of different populations, but above all to make optimal management decisions to ensure the safety of species. In those difficult economic years, the decisions of the system largely contributed to the adoption of urgent measures to restore the number of wild animals, such as elk and wild boar populations, for which hunting licenses were banned for several years in some regions. In 1991, in the North-Western region of the Russian Federation (Sevzaprybvod), a fisheries management system was put into operation for 9 regions of the Russian Federation, which collected and analytically processed information on fish resources and transmitted it through the network to the center for management decisions and for scientific purposes.

In the period from 1997 to 2002, Lentransgaz established a network of environmental audits of oil and gas industry enterprises for 9 regions of the Russian Federation on the basis of international and Russian standards.

On the basis of the RBA methodology, intelligent utilities networks have been created, which are designed to monitor the state of all infrastructure components of housing and communal services in real time, as well as to generate management decisions. Figure 1 presents a cognitive scheme for assessing the state of the water supply system in an urban area. All these systems were essentially systems of the digital economy, as they solved the problem of digitalization of economic entities. Methodological and technological bases for these systems were the technology and tools and a BIT that have been implemented on platforms of "environmental analyst" and "Infoanalyst" in the form of Intelligence working stations (IWS) with a variety of professional functions [3].

Currently, 28 different types of IWS (licensed and patented software systems) have been created, the configuration of which in accordance with the purpose of the task can be organized almost any professional management network.

The concept of such networks is developed on the basis of the methodology of cognitive Bayesian intelligent networks (KBIS) within the methodology and technologies of RBA and BIT, including soft measurements. A detailed description of the methodology and examples of KBIS implementation is

given in a number of works of the author, for example in [3]. The essence of this concept is that the subject, the specialist is included in the contour of the measuring and analytical network as a source and receiver of information, as well as a device of intellectual information processing.

The use of Workstations IWS allows specialists to achieve several objectives. The main goal is to organize professional activities and related processes on the basis of intellectual processing of information from various industrial and external sources. To do this, a network of IWS, focused on this field of activity.

The second goal is the qualification of professional knowledge of specialists included in the circuit of such a network. Each IWS is capable to certify the decision of the expert at any time that provides an opportunity of metrological justification of knowledge of experts on certain criteria and requirements, and also creation of a hypercube of qualimetric scales of experts as a whole for all network.

The third goal, which is achieved by using the IWS network, is continuous self-education and training of specialists.

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Based on the methodology of RBA with the use of the system "Infoanalyst", which was developed for the project of the Accounts Chamber of the Russian Federation.

Figure 1 shows the author's classification of measurements.

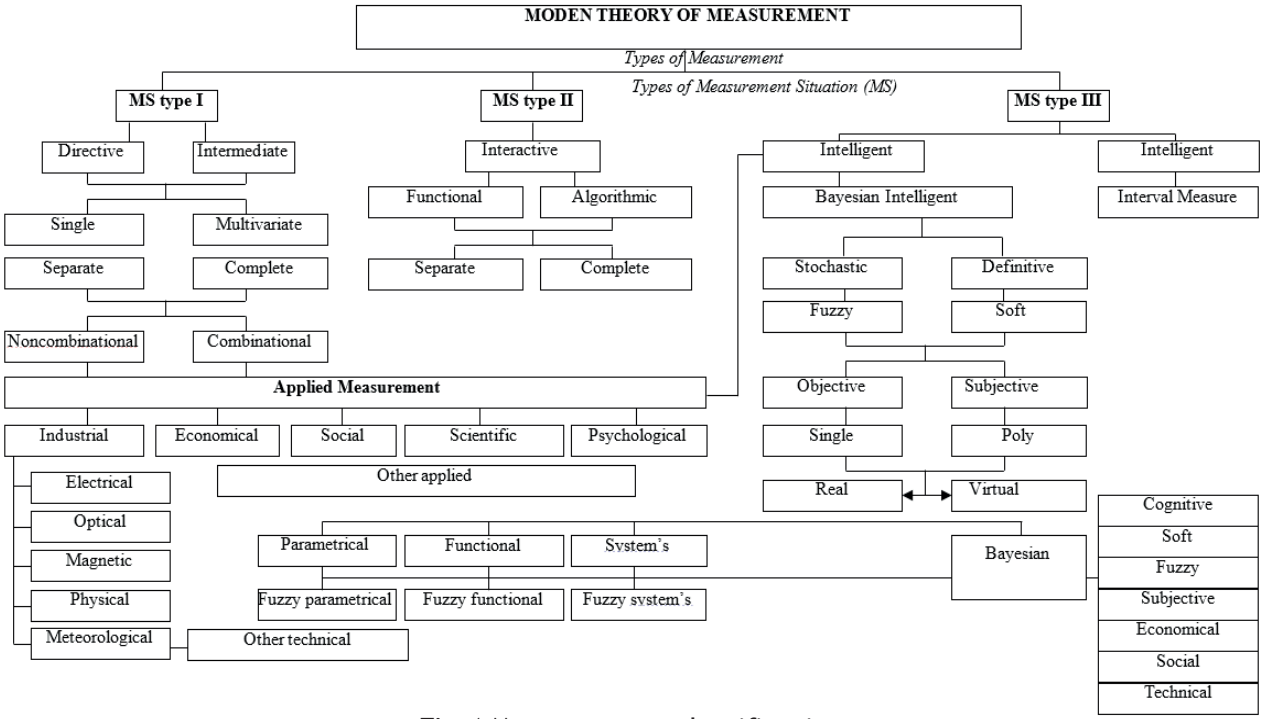

Fig.1 Measurement classification

REFERENCES

1.Digital future. Business Guide. Appendix to the newspaper "Kommersant", may, 2018.

2. The foundations of the digital economy. Under the editorship of M. I. Stolbov, E. A. Brendalewis. - M.: Ed. Home "RESEARCH LIBRARY", 2018. - 238 p.

3. *Prokopchina S. V.* Methodological foundations of the theory of soft measurements. In the book. "Soft computing and measurement", volume 1, M.: Izd. Home "RESEARCH LIBRARY", 2017. - 395 p.