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THEORETICAL INNOVATICS AND THEORY OF SYSTEMS AND SYSTEM ANALYSIS

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Abstract. Article of science on a joint of the theory of measurements, theories of informatics, the theory of management of technical systems, theories of management of social and economic systems are devoted to classification characteristics of theoretical innovatics. The integration role of the theory of systems and the system analysis when developing methods and models of management of cyber physical systems is presented.

Keywords: digital society, theoretical innovatics, cyber physical systems.

The 00th surely can be called an era of society digitalization..The "digitalization" term often understood as an introduction of the new information innovative technologies serving for the organization of infrastructures for business, enterprise and society management. Innovative infrastructure is represented as the interconnected set of "layers" of transformation of measuring information on subject domain of a research. The subject domain of a research in theoretical innovatics is connected with social and economic systems. An object of research of theoretical innovatics is social and economic system. The process principle of engineering of resources allows the simultaneous monitoring of all business processes indicators with such difficult dynamic systems as social and economic systems. The theoretical innovatics as a science counts as many centuries as long exists a scientific thought, innovative transformations of the society management, production, business.

Change of technological ways is characterized by a concise type of innovation: transformative, gradual, process, marketing, organizational, explosive, etc. The technological breakthrough is impossible without accumulation of knowledge, investigations, technologies, purposes, market researches, the prepared shots and infrastructure to be shown at a given time.

Historical prerequisites of emergence, formation and development of theoretical innovatics are connected with the works of such scientists as N.D. Kondratyev, Y.A. Shum-peter, B. Tviss, Kosygin A.N., Liberman E.G., Glushkov V.M., Fedorenko N.P., Primakov E.N., Obraztsov I.V., Volkova V.N., Tukkel I.L., Yakovets Yu.V., Gelbreyt D.K. and many others. There are works [1 - 3] on structuring and formalization of the concept "innovation", "innovative process", "funnel of innovations", econophysical models of distribution of innovations, etc.

The terminology database of theoretical innovatics is presented in [4]. As early as in the 90th of the last century the "innovatics of all countries and nations" gathered in the city of Oslo and formulated the main objective of the business analytics of innovative activity: the acquisition of primary measuring information on innovative processes. It is important to define sources of data on innovative processes effectively to operate innovative activity. Such primary measuring information is: bibliometric data, know-how knowledge, inventions, technologies.

In [5] it is emphasized that "the essence of an innovation is made of changes, and the main function of innovative activity is its change function". It is obvious that such interpretation of innovations is concordant with digital transformation of domestic economy. Only the possibility of management of changes, adaptability of control of parameters, indicators, KPI of social and economic system allow to customize the system according to strategic objectives.

This is even more significant in term of the fact that nowadays the social and economy system (the digital enterprise) is suggested to be considered as the cyber physical system, equally represented by technical and socioeconomic patterns. Thus in works [6,7] it is offered to consider the primary measuring information on the digital enterprise in the context of electric, and economics measurements.

[5] also addresses the issue of the place and the role of innovatics theory in conjunction with theoretical, scientific-methodological basis of different theories: the theory of system and system analysis, the change system, the organization system, management system (technical and socioeconomic systems), marketing and management systems (information, marketing, social, logistics, etc), theoretical economics, informatics, etc. The used principle of "an automation pyramid" of management of business processes of the digital enterprise allows to draw a conclusion on a binding role of the theory of systems and the system analysis. Transformation of primary measuring information in output administrative information are offered to be realized on the basis of such CALS technologies as technologies CAD/CAE, PLM, ERP, BPM, CLOUD, SMART, GRID.

Application of the theory of management of CPS-systems allows to apply technologies of the "Internet of things" to management of the digital enterprise, the "Internet of people", the "Internet of services" in terms of the processes of formation of administrative decisions on efficiency of activity of the enterprise. The special role in processes of improvement of administrative decisions at technological transformations of production is given to the description of life cycle of technological innovations. Understand processes of introduction of new technology solutions of management as technological innovations business - processes. Transition from business - processes "as is" to business - to processes "as it is necessary" - one of the purposes of introduction of technological innovations. In a particular, technologies of informatization and automation of business processes, technologies of processing of multidimensional information, cognitive visualization of information, technology of data mining, technology of introduction of IT services for management of various levels of transformation of information, technology of modeling business - processes, technology of extraction of knowledge, technology of interpretation of data, technology of introduction of corporate information systems, etc. belong to such technological innovations. The main directions of researches at the modern level of development of theoretical innovatics are connected with development of mathematical models of management of innovative processes. So, the environment of introduction and distribution of innovations is considered as multidimensional properties space which is characterized by some "density" and speed of distribution of innovations. Mathematical models of management of processes of distribution of innovations are represented with use, for example, of scenario approach, ecophysical approach at which innovative process is described with application of the corpuscular and wave theory [8]. The theory of systems and the system analysis allows to organize interrelation of methods and models of theoretical innovatics with methods and models of the theory of measurements, theories of management, the theory of informatics, etc.

Use in the theory of systems and the system analysis of cyber-physical approach has significantly enriched processes of formation of administrative content. Administrative content for the digital enterprise as difficult dynamic system contains knowledge of process.

Thus, it is offered to represent theoretical innovatics as the system of knowledge which sources is knowledge of various theories of transformation of primary measuring information on subject domain of a research. The system analysis allows "to sew" necessary structure of knowledge accompanying decision-making process about the effectiveness of the introduced innovations into the uniform operating content.

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