International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

http://ijpsat.ijsht-journals.org
Vol. 24 No. 1 December 2020, pp. 11-14

The Importance of a Synergistic Approach in Management

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Abstract – This article analyzes the importance of the Synergetic Approach in Management from a scientific point of view.

Keywords – Management, synergistic approach, marketing, innovative development, bifurcation.

I. INTRODUCTION

The modern concept of the synergetic approach is based on the study, analysis and modeling of the processes taking place inside it, as well as their properties and conditions. After all, an attempt to manage complex transitional innovation processes and updated systems, not knowing their properties and not understanding the state they are in, is unlikely to make effective managerial decisions and get the desired results.The complex processes that occur during the development and application of innovative technologies, types of products, services and business models are clearly non-linear and are accompanied by irreversible changes.

II. MAIN PART

Scientifically based management, forecasting and planning of innovative processes should primarily be based on modern mathematical models and methods of nonlinear dynamics and synergetics. A number of researchers have previously used similar models and methods to analyze innovative processes. In this work, the analysis of the properties of innovative processes was performed from the standpoint of synergetics and was based on the use of information and multifractal approaches. The study, analysis and modeling of the properties of innovations on the basis of information and multifractal analysis allow us to better understand the nature of dynamics, including the cyclical nature, of the technical and economic development of open innovation systems based on the universal laws of self-organization and self-similarity.

Consider the innovation process of developing an updated system, which, in accordance with the concept of "open innovation", we accept an open system. Such systems in the process of their updating develop as open dissipative stably nonequilibrium systems capable of self-organization. The presence of material, energy and information flows, which are flows of investments, patent information, personnel, equipment, etc. from external sources to the system and their dissipation are prerequisites for the activity of the updated system. So, the system under consideration is a dissipative stably nonequilibrium system capable of self-organization.

The self-organizing system under consideration includes professional communities, and from a psychological point of view, it is advisable to add a stream of “motivational energy”, the extinction of which leads to a decrease in the rate of growth of scientific knowledge, the depletion of the stream of innovations and the gradual destruction of the intellectual structure, which emphasizes the dissipative nature of innovative systems. The homeostatic properties of the professional community are determined by such factors as scientific schools and historical traditions, the educational system and textbooks that ensure the continuity and sustainable development of science, engineering and technology.

A distinctive feature of innovative processes in this concept is that they are accompanied by irreversible changes. All real processes to one degree or another are irreversible and nonequilibrium. They allow on a unified basis to describe the life cycle of an updated system, including the passage through this system of a sequence of developmental leaps and evolutionary stages of development at each hierarchical level. The transition to a new level of development proceeds from disorder to order, through instability phenomena, where the system being updated opens up the possibility of moving to one of several options for future development. The result of the action of self-organization processes in the updated system is the formation of a sequence of events of various sizes, forming a stream of innovation, in the time domain. If innovation is associated with the processes of self-organization in an open system, this stream of diverse innovation events has the property of large-scale innovation.

To analyze the flow of innovative events, a model of large-scale innovation of the point process, which can be represented in two ways, is usually used. On the one hand, as a realization in the form of many idealized impulses located on the time axis at points corresponding to innovations, on the other hand, as a random accumulation process or cumulative function, a step broken line that undergoes a jump at the moment of the next innovation and retains its value until next jump. The scale of innovation is taken into account by the height of the momentum or the magnitude of the jump. Thus, it is possible to visualize the sequence of different-scale innovative events in time, and it is also advisable to consider them as an innovative trajectory of a system updated from time to time.

Thus, the study, analysis and modeling of the properties and states of innovative processes on the basis of information and multifractal analysis made it possible to better understand the nature of the innovative development of open updatable systems based on the universal laws of self-organization and self-similarity.

On this basis, the modern concept of a synergistic approach and the management of innovative processes and projects is built by monitoring and regulating the parameters of input flows (material, energy and information), which are flows of investments, patent information, personnel, equipment, etc. from external sources to the updated system. Monitoring and analyzing the variability of input flows, taking into account their distribution laws, makes it possible in each case to predict the confidence interval of time during which critical points of the updated system are expected to pass. Due to the ability to control external influences at the input of the system, it becomes possible to influence the transit time of the critical points by the updated system. The ability to predict the time spent by the updated system in this extremely uncertain state characterized by high risks allows us to take the necessary measures to facilitate the rapid passage of the system through a critical point and the successful adaptation of the updated system to a new state. In the future, it seems appropriate and possible, with rather weak external influences on the input flows, to direct the updated system along the desired development path.

Thus, the use of the modern concept of the synergetic approach is an effective tool for the development of innovation management systems and allows us to identify the nature of the innovation process as a sequence of innovative events.

One of the leading directions of the modern theory of innovative development is the concept of technological structures, the authors of which are Russian scientists, in particular, S. Glazyev and D. Lvov. The concept is based on the work of J. Kitchin, N.D. Kondratiev, J. Schumpeter, G. Mensch, A. Kleinknecht, P. Drucker, T. Hegerstrand, F. Peru, etc. Studies of the laws of long-term economic development have been generalized to the theory of technological structures, by which are understood the integral complexes of technologically conjugated industries and the corresponding technical and economic paradigms, the periodically occurring process of successive replacement of which determines the “long-wave” rhythm of modern economic growth.

In the course of every structural crisis and every depression that accompanies the process of replacing one technological structure with another, new opportunities for economic success open up. In the phase of depression, there is a mismatch between the emerging new technical and economic paradigm and the existing institutional structure, and overcoming it involves a general change in social behavior and institutions in accordance with the conditions of the technological changes that have occurred. Along with technological changes, the transition to each new technical and economic paradigm, respectively, the way out of depression to a new stage of economic growth, includes the formation of new forms of organization of production, new skills and abilities, a new structure of the aggregate product, a new investment structure, and finally, new types of infrastructure, providing appropriate production conditions.

Each transition to the next technological structure is accompanied by a technological crisis of greater or lesser depth, however, a change in the dominant technological patterns leads to significant changes in the organization of production and, as a consequence, in the international division of labor. Technological structure - a set of technologies characteristic of a certain level of development

of production; in connection with scientific and technological progress, there is a transition from lower structures to higher, more progressive ones. The technological structure encompasses a closed reproductive cycle from the extraction of natural resources and professional training to non-productive consumption. In the framework of the technological structure, a closed macro-production cycle is carried out, including the extraction and obtaining of primary resources, all stages of their processing and the production of a set of final products satisfying the corresponding type of public consumption.

According to this concept of technological structure, we are now at the turn of the birth of a new, sixth technological structure. The reason for the existence of the previous five TU, he calls the features inherent in the productive forces in different eras of capitalism. The leading industries and types of activities, thanks to which capital has the maximum growth, constitute the core of technical specifications, and technological innovations that have created the core are called key factors. Each structure has its own peculiarities of the social life of society, the role of the state in production management, the dominant countries, their policies, promising research areas and the degree of their importance in production. The future technological structure arises in the bowels of the current, and comes into force when the latter exhausts its ability and loses effectiveness in increasing the rate of profit.

Glazyev gives such a periodization of technological structures:

First technological way. Period: 1770-1830. Core: Textile industry, textile machinery, iron smelting, iron processing, channel construction, water engine. Key Factor: Textile Machines;

The second technological way. Period: 1830-1880. Core: Steam engine, railway construction, transport, machine and shipbuilding, coal, machine tool industry, ferrous metallurgy. Key factor: steam engine, machine tools;

The third technological mode. Period: 1880-1930. Core: Electrical, heavy engineering, steel production and rolling, power lines, inorganic chemistry. Key factor: electric motor, steel;

Fourth technological mode. Period: 1930-1970. Core: Automotive, tractor manufacturing, non-ferrous metallurgy, production of durable goods, synthetic materials, organic chemistry, oil production and processing. Key factor: Internal combustion engine, petrochemicals;

The fifth technological mode. Period: 1970-2010. Core: Electronic industry, computing, fiber-optic technology, software, telecommunications, robotics, gas production and processing, information services. Key factor: Microelectronic components.

According to the reduction of cycles, the terms of technological orders are also reduced. As you can see, this concept is only the allegory of Schumpeter's innovative theory, partially supplemented by the concept of productive forces.

Thus, the economic dynamics considered in the framework of the concept of technological structures is interpreted as an uneven process of consistent development and replacement. At the present stage of development, science really should help the economy, but not in the manner described above - becoming a commodity, but rather, help to get rid of the commodity form of production as soon as possible. It should be such material production that in the best way ensures the production of the main productive force - man. No supernova economic ideas, if they do not solve the main contradiction of the existing economy, can claim to be progressive. Real progressive ideas are only those ideas that will help to consciously build an economy, saving us from the development chaos inherent in capitalism in the form of time cycles, innovative waves or technological patterns.

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