

Using the synergistic principles for economic development management

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Abstract – Methodological problems of development of the synergy as a science were researched. The synergistic approach to social-economic system research and its peculiarities were analyzed. The principles of synergistic development of an economy were substantiated. The role of chaos in appearance of dissipative structures on the way to self-organization was researched.

Keywords – synergy, economic system, synergistic approach, chaos, dialectics, nonlinear systems, dissipative structure, economic development, self-organization.

I. Introduction

Necessity of deep modernization and transition to a new innovative trajectory of state economy development in modern conditions of globalization challenges causes topicality of the chosen topic. The Ukrainian economy functioning is characterized by a set of fundamental contradictions, which complicate solving of the mentioned problems of globalization. Fundamental contradictions consist of insufficiently effective state management, protection of ownership rights, conditions for intensive entrepreneurship development, a high level of corruption. In the context of the modern economic theory, peculiarities of society social-economic development and impossibility to completely explain a nature of many economic and noneconomic factors, which influence evolution of social-economic gradation systems cause necessity of extension of methodological and theoretical instruments used for scientific researches of this area. Analysis of these problems requires consideration of synergistic effects in modern conditions. The consideration enables to increase substantiation and effectiveness of an economic policy.

II. Main Material

Nowadays, the world economics departs from precisely determined views. Economists become considerably open not for a mechanic approach, but for an organic one. According to this approach, an economy is considered as a complicated emerging system [1], the environment is considered as an ecosystem [2], and a problem of development is defined using terms of co-evolution [3, 4] with the environment.

The synergy as a science of self-organization, self-development in unequalized, irreversible, and nonlinear processes appeared as a reaction to such events, as a laser, high-powerness, superhardness, superconductivity etc. G. Hacken, the Stuttgart University professor, an expert of solid-state lasers, an author of the book “The synergy”,

published in Germany and translated to Russian in 1980, is a founder of the synergy [5, 6].

Scientific premises in the self-organization theory of I.R. Prigozhin and the synergy theory of G. Hacken are the same: the unequalized thermodynamics, irreversibility in chemical and thermodynamic reactions, the probability theory and a freedom of choice, the equalized and the unequalized kinetics. Because of this, I.R. Prigozhin and G. Hacken are simultaneously referred to the fathers of the synergy [7, 8].

In the context of the synergistic theory, a process of system management is a negative process. A process of system management determines rules and functions that are not a system nature a priori, in other words, these rules and functions do not express a system sense. Such management causes an imbalance of a system development process and, in some cases, completely destroys it.

The modern economy as a complicated system develops unevenly. It is characterized by both regimes of stable functioning and regimes of chaotic dynamic. Although the scientific approach “synergistic economics” (which is based on considerable nonlinearity of economic processes and which researches time and changes in the nonlinear economic theory) rapidly develops nowadays, linear models are used for simplification in certain cases of economic systems researches.

Nonlinearity and complicity of social-economic systems, and existence of a considerable amount of reverse relationships inside systems form a synergistic nature of many economic events and cause numerous synergistic effects that change quality of national economy functioning. Absence of necessary attention to such effects in a process of economic system research results in insufficient and incorrect understanding of objective regularities that are typical for a system and insufficiently effective management in a practice.

To research economic events the synergy uses an approach that is based not on determinate meaning of an event, but on its essential description. Description is made on a basis of belonging to a particular level of a system, a form of a level, and ability to potential evolutionary development.

A sense of self-organization is an ability to change own structure at a level of own functioning and correlation of own internal elements content without external influence. A cardinal difference of self-organization from cybernetic organization consists of detecting of own ability to evolutionary transformation provided by a system on a basis of its internal sense, but not due to change of its structure on a basis of external organization. Dependently on a system type and its sense, each system can express different self-organizational features. A synergistic process is formed according to these features.

Consequently, research of social-economic processes and problems of their development requires using new methodical approaches. The economic synergy is one of the most significant methodical approaches. In the context of the synergy, modern economic development has a binary aim:

1. A social-economic system direction of self-development and self-organization, which provides extended economic reproduction.

2. An accordance of state economic development aims with general tendencies of the world economy and sufficiency of their relationships.

It is important to notice that an essential condition of system self-organization is its openness, in other words, a process of dissipation in a system should be compensated by energy inflow in different forms. Self-organization is only possible, if entropy in a system is compensated by energy inflow from external environment and if this compensation is positive, in other words, exceeds an environment entropy increase level. As a result of the process, a complicated metastable system occurs. An economy should develop in such a way that to best use present resource potential and to achieve established aims in the best way. It is a sense of the self-organization principle. This opinion concerns with efficiency thresholds of economic activity in terms of a particular economic system and economic independence achievement. But an economy refers to dynamic systems, it tends to self-development. Significant changes of production relationships, connected to a real turn of the economy to needs of population, economic independence of enterprises, new forms of organization at local levels impel to revise priorities in a system of elements of a national and a regional economy.

The classical economic theories only provide a study of a negative reverse relation, but the economic synergy studies a phenomenon of a positive reverse relation, which create an impulse of system development. The economic synergy studies a methodology of a system element transfer from characteristics of quantity to characteristics of quality using the concept of "synergistic effects".

A key question of the synergy as a science is a role of chaos in an evolution process of world complicated nonlinear systems. Development of system matter is influenced by many eventualities that have a direct influence on its dynamic and sense. The synergy studies an influence of a chaos extent as a demonstration of fluctuations that changes a system evolution dynamic. Dissipative structures occur on a threshold of chaos. It is a paradox event. Dissipative structure generation is a phenomenon of localization in terms of system functioning in an exacerbation condition. These regular formations occur on the basis of sampling intensification of system composite elements that are connected to each other, unlike linear system elements. Chaos, in the context of the synergy, is not a destructive power completely. It plays a role of an organizer of a process, during which elements needed for element system development are selected. At a final phase chaos vectors a system in direction of an attractor.

Each open system functions and develops using resources. The synergy effect concentrates resource of a phase area, at which a system operates, involving new resources. At the same moment, previous resources

should be completely spent till a marginal level. According to this, in the context of the synergy, an amount of resource needed for system development may be quite small.

In conclusion, chaos is a factor, which vectors a trajectory of system development in direction of an attractor due to a dissipation increase. Since chaos synchronizes fluctuations of future microelements of a system and causes their combining, and, in a result, creates a system, more complicated than one before chaos's influence, chaos is an organizer of a complicated system occurrence. An important role of chaos in a process of system evolution results in possibility of an evolution regime change, corresponding adaptation of its development possibilities to a real process. A chaos influence is characterized by fluctuations, in other words, a change of its influence intensity in time. It initiates possibilities of creation and destruction of systems.

Conclusion

Therefore, the synergistic approach makes own conclusions on such basis: an economy is an emerging system and it should be created taking into consideration the developmental systems theory. Unstable and chaotic stages may occur in this system due to nonlinear reverse relationships. This process may result in appearance of different final states of a balanced market. A problem of choice may not be solved passingly. It should be solved by a country taking into consideration its peculiarities and national interests.

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