

ANTI-CRISIS CORPORATE MANAGEMENT IN TERMS OF A NEW PARADIGM: CONCEPTUAL APPROACH**Kushchik A.P.***Zaporizhzhia National University
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The article notes that the functioning of corporations in modern conditions is carried out under the influence of a number of deep-seated contradictions inherent in the current entropic industrial-market model of the economy, in which the instability and disorganization have recently sharply increased. In the context of the transition to an information society with a knowledge economy, the role of a creative person, the importance of scientific management and foresight based on using new methodological approaches and tools of economic science of an innovative-synergy type, are growing. As stated above it is logical to use such concepts as “deterministic chaos,” “entropic economy,” “synergetics”. It is noted that in chaotic systems, in due course, the so-called attractors, that is attracting sets, are observed, to which the system, making its development predictable. Thus, some chaotic systems can pass after a certain time into the regulated state. This opens great prospects for anti-crisis corporate management: through the identification of attractors, the impact of fluctuations, bifurcations and the transition to a new self-organization. The bifurcation process is the objectification of choice and the transition from uncertainty to a specific system of equilibrium of the limiting state, chaos. Therefore, it is necessary to take into account that it is not only the type of attractor and the features of its behaviour, but also the force, the influence of attraction of the attractor (attraction) in the spatio-temporal coordinates of development. According to the theory of self-organization, the order in systems with interconnections between elements occurs round the attractors, which form an information field round themselves, and ensure the creation and maintenance of stability within the system. In the process of synergetic control, the problem of forming the necessary attractors to establish a balance of order and chaos in the system is one of the most urgent. The synergetic paradigm suggests that management should be based on the creation of a strategy as a structure-attractor of development and the formation of a socio-economic system which, leads it out on the given meaningful strategic directions of innovative development without external influence.

АНТИКРИЗОВЕ КОРПОРАТИВНЕ УПРАВЛІННЯ В УМОВАХ НОВОЇ ПАРАДИГМИ: КОНЦЕПТУАЛЬНИЙ ПІДХІД**Кущик А. П.***Запорізький національний університет
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детермінований хаос, ентропійна економіка, економічна синергетика, аттрактор, біфуркація, флуктуація.

Відмічається, що функціонування корпорацій в сучасних умовах здійснюється під впливом комплексу глибоких протиріч, властивих нині діючій ентропійній індустріально-ринковій моделі економіки, нестійкість і дезорганізованість якої останнім часом різко зростає. В умовах переходу до інформаційного суспільства з економікою знань зростає роль творчої особистості, значущість наукового управління і передбачення на основі використання нових методологічних підходів та інструментарію економічної науки інноваційно-синергійного типу. З урахуванням усього сказаного логічно використовувати такі поняття, як «детермінований хаос», «ентропійна економіка», «синергетика». Відзначено, що в хаотичних системах з часом спостерігаються так звані притягаючі множини - аттрактори, до яких прагне система, роблячи свій розвиток передбачуваним. Таким чином, деякі хаотичні системи можуть через певний час перейти в упорядкований стан. Це відкриває великі перспективи перед антикризовим корпоративним управлінням: через визначення аттракторів, вплив флуктуацій, біфуркацій і перехід до нової самоорганізації. Процес біфуркації є об'єктивізацією вибору і переходом від невизначеності до конкретної системи рівноваги граничного стану, хаосу. Тому необхідно враховувати не тільки тип аттрактора і особливості його поведінки, а й силу, вплив тяжіння аттрактора (аттракції) в просторово-часових координатах розвитку.

Відповідно до теорії самоорганізації, порядок в системах з взаємними зв'язками між елементами виникає навколо атракторів, які формують навколо себе інформаційне поле, забезпечує створення і підтримання стійкості всередині системи. В процесі синергетичного управління проблема формування необхідних атракторів для встановлення балансу порядку і хаосу в системі є однією з найактуальніших. Синергетична парадигма передбачає, що управління має ґрунтуватися на створенні стратегії як структури-атрактора розвитку і формування соціально-економічної системи, яка без зовнішнього впливу виводить її на задані осмислені стратегічні напрямки інноваційного розвитку.

Statement of problem

The linearly-deterministic and narrowly disciplinary approaches in the framework of modern classical theory based in fact on a Newtonian worldview are not able to explain and foresee the main problematic areas of socio-economic development of a society caused by non-linear patterns of an entropic economy. Today, most classical management methods have become ineffective in solving the problems of managing global economy, state, region, subjects of management, and people.

In the early 90s of the XX century, a new direction of research in economic science was founded that was economic synergetics. The object of economic synergetics is the study of the economy as a complex, self-organizing, human-centered system in the context of the evolution of integration and universal systems, and the subject is laws, conformity to natural laws, mechanisms and forms of economic self-organization and interaction.

The methodological basis for the formation of a new worldview base for economic science is a synergistic concept based on chaos theory. The category of chaos has established itself in the natural sciences and is being introduced into the socio-economic ones, performing the role of a general scientific category. Most scientists determine that chaos is the entropy. Entropy (chaotic state) is an integral property of all social systems.

From the standpoint of modern achievements in synergetics, chaos can be represented as a disorganization of the system. Chaos is not so much a state as a process. The evolution of any self-organizing system, including the economic one, combines the processes of randomization and ordering. Synergetics postulates a cardinal conclusion that chaos has its own structure and therefore is a complex and unpredictable form of order.

In this regard, it is relevant and promising to consider the laws governing the transformation of the functioning of socio-economic systems and, in particular, corporations on the basis of a synergetic paradigm.

Analysis of recent studies and publications

Scientists who have studied the aspects of synergetics in various fields of knowledge are C. Sherrington, S. Ulanov, V. Arnold, I. Zabusky, R. Fuller, D. Chernavsky I. Prigozhkin [1], S. Kurdyumov [2]. The author of the synergetic direction and the term "synergetics" is

Professor G. Haken, who first used this term in 1973 [3]. Yu.F. Stavenko, F.I. Gromov devoted their article to the consideration of the entropy approach to modelling business processes [4]. The entropy method for monitoring the implementation of economic strategies was proposed to be used by A.V. Kryanev, V.V. Matokhin, V.V. Kharitonov [5]. The foundations of theoretical and methodological approaches to the study of entropy and synergy economics are developed in the framework of the substantial information paradigm and are presented in a number of works by S. Dyatlov [6, 7].

General aspects of the synergistic approach in economic research were considered by the Ukrainian scientist S. Mocherny. But he did not pay attention to questions of the dependence of the size of the socio-economic synergetic effect on the characteristics of socio-economic systems, he did not consider factors that positively and negatively affect its size during the exploitation of property. D. Bell, J. Stiglitz, M. Bücher, V. Savchuk, V. Kushlina, L.T. Geiger, G. Martin, Yu. Zaitsev and others are involved in the theory of the systemic transformation of society, but they do not use a synergistic approach to analyse socio-economic development, do not consider the trends, the consequences of the distribution of benefits in the national economy. The justification of the synergy of socio-economic systems, taking into account the state of transformational reforms, is especially relevant today in the analysis and planning of Ukrainian corporate development.

Objectives of the article

The purpose of the article is the study and systematization of modern approaches to the formation of crisis management in complex economic systems (corporations), based on the theory of chaos and the synergistic concept.

The main material of the research

Each leader in a situation of uncertainty and ambiguity primarily seeks to achieve an understanding, if not the essence, then at least the specifics of what is happening. Therefore, the idea of the stable interaction of a limited number of key factors in a causal relationship allows you to gain confidence and make managerial decisions. In a situation of stable functioning of the organization, this leads to success and allows you to solve the main problems. But the toughening of the competition, the globalization of the world economy, the complexity of

political processes and their impact on economic life leads to the need for a paradigm shift in strategic thinking at the corporate level.

We must recognize that the surrounding social reality is non-linear and, moreover, interactive. This greatly complicates the analysis and management as a whole, since, according to S. Mann, “non-linearity means that the act of the game leads to changes in rules” [8].

Chaos theory allows us to consider the internal and external environment of an organization not as a concentration of a set of stable factors of neighbouring and distant environment that affect the existence of an organization, but as a nonlinear dynamic changing space in which any insignificant element can acquire a system-forming value.

In accordance with the synergy-entropy approach, socio-economic systems should be classified in accordance with two main types: entropic and synergistic [6].

Synergistic systems are complex, open, self-organizing systems that are capable of responding to external influences with targeted orderliness, higher self-organization, and efficiency of structures. In these systems, development is due to the emergence of qualitatively new subsystems and synergistic effects. In the synergistic system, coherence, i.e. coordinated ordered behaviour of its structural dynamic elements increases and improves the order increases and entropy decreases.

Along with the first type, there is a second type of social systems - open socio-economic systems of the entropy type, in which, through the negative activities of managing entities, the entropy increases and the order decreases. These systems can exist and maintain their existence only by absorbing the resources of other open systems (the external environment) and their gradual destruction.

For synergetics, chaos is the same natural stage of development as ordered. Synergetics considers the development process as a multiple alternation of chaos and order (the so-called deterministic chaos).

The inaccuracy of information and the constant interference of chance lead to the fact that the management of the corporation in reality is faced with a completely different state of things than expected; this cannot but reflect on his plan, or at least on those ideas about the situation that formed the basis of this plan. If the influence of new data is so strong that it decisively cancels all accepted assumptions, then others should take the place of the latter, but usually there aren't enough data, because in the flow of activity the events overtake the decision and do not allow time to think maturely about the new position.

The activity of corporations in a market environment consists of the stages of gaining and losing their competitive advantages. The development of society

leads to intensification of competition, the search for factors providing a competitive advantage, and in this process, the intellectual richness of managerial decisions, the creation and application of increasingly complex methodological techniques plays a paramount role.

First of all, consider the economic system at the enterprise level. It is important for an economic entity to maintain the level of entropy at the required level, so the entrepreneur will also perceive the deterioration of affairs in his business as personal entropy. Accordingly, he will also take care of maintaining the necessary level of entropy in subordinated to him economic system (at the enterprise). And the entropy of an economic unit without managerial influences tends to increase, both under the influence of internal contradictions and under the influence of external factors. Of course, large corporations acting as complex self-organizing systems are able to overcome entropy by dividing into manageable and managing subsystems, but even such organizations have a limited life cycle. At the same time, current management activities only allow maintaining the level of entropy at an acceptable level for a certain time, but in any case there may come a point (bifurcation point) when drastic measures will be required to reduce entropy at the enterprise, that is, innovations will be required, both technological and managerial.

The criterion for assessing the level of entropy in the enterprise system can serve as a drop-in profit (profitability) or business activity. Accordingly, a critical level of entrepreneurial entropy corresponds to such a level of profitability that does not even ensure simple reproduction. The change in profitability under the influence of innovation will serve as an indicator of changes in the level of entropy, and ultimately the effectiveness of innovation in the economic system [10].

We believe that the choice is ultimately determined by the expected entropy gain from the implementation of innovative projects, which is largely consistent with economic indicators. At the same time, the innovative behaviour of economic entities is determined by other, non-economic factors. Don't forget one more important conclusion from the theory of chaos – although in the open system the degree of order increases, but each open system increases entropy outside its limits. Or in other words: with the development of the system, the disorder around it increases. This means that the inevitable condition for the existence of every open system is that it sends entropy to the environment. An increase in order within the system is accompanied by an increase in disorder outside it.

To ensure the sustainability and development of a holistic open socio-economic system, the nature of chaos does not exclude the opportunity to control. The set of system parameters is such that its behaviour is in the zone between the spheres of stability and chaos. In reality, the instability of the trajectories of chaotic systems makes them extremely sensitive to manage.

Even in the absence of external shocks, an integral integrated system includes factors that push the system beyond stability, into turbulence and reformatting [8].

A decrease in entropy (chaos) and an increase in the synergy (order) of the system should be ensured by effective management decisions made on an analysis of not only past states parameters of a system, but also on a comparative analysis of potentially achievable options for informational models of the future state of a given system. In our opinion, the main task of synergy-informational effective management is the ability to program the future in the present, to shape purposefully the future, the optimal mode of functioning and development of the system, to make the target function of the development of this system, subordinating to it all the resources and behaviour of the implementing entities.

The economic, technical and technological indicators used in the analysis reflect individual aspects of the life of the elements, but do not give an idea of their internal organization, potentiality, relationship with each other and the external environment, and their focus on the implementation of target settings.

One should not overestimate the possibilities of information-entropy analysis, if only because of the weakness and limitations of theoretical studies in this direction. It should be considered as a necessary addition to economic and social analysis (economic and social modelling) of the activities of the corporation as a whole and its individual enterprises in particular. The scope of such an analysis from the standpoint of entropy is generally limited to the following tasks:

- identifying the degree of stability of the system and its links and the effectiveness of its structuring and the degree of permissible freedom of its elements;
- assessing the dynamics of the market environment as a set of non-probable events and situations and evaluating the corresponding set of behavioural strategies that, to one degree or another, satisfy a specific manifestation of market dynamics.

An important role in information analysis belongs to the entropy measure of information. In our case, entropy, according to the theory of information, reflects a measure of the disorder of the system and its elements and the uncertainty of the strategies of its (their) behaviour within the framework of the functioning environment. In the framework of a single socio-industrial organism, acting to achieve certain goals, entropy, as a measure of uncertainty, is reduced and much less than that of many elements of the same type, but disparate, separately functioning. The more ordered the set, the more systematic it is, the more efficiently it functions as a whole and the less its entropy.

One of the directions of modelling the determination of the level of entropy in a corporation can be the technique

proposed by A. Dulesov and V.I. Khrustalev [12] In the activities of the enterprise for a certain period of time, information on the predicted and actual results of the work is deterministic. However, deviations of actual from forecast values for fixed time instants carry the probabilistic nature of fluctuations. The differences of these values (outcomes) are the set $X = \{x_1, x_2, \dots, x_i, \dots, x_M\}$, consisting of M elements. On this set, the probability distribution $p(x)$, etc. should be given. Thus, we come to the well-known formula of C. Shannon for the definition of entropy. If we connect the distance between the values of the events i and j to the target parameters, then the entropy will be called "geometric entropy" or "B-entropy." From a scientific point of view, B-entropy is attractive because it represents a promising direction of the entropy approach in the problem of estimating data uncertainty. Further study and development of the B-entropy approach will allow us to calculate the uncertainty of information with greater accuracy in any applied problem. This will allow in practice to use rationally the resources, time and other components. With the development of theoretical research, it is possible to develop new models based on the B-entropy approach, which will help in developing effective solutions for managing business processes of the corporation.

Conclusions

Chaos theory and all derived from its concepts, approaches, programs for describing socio-economic processes testify to its conceptual productivity, including macro- and microeconomics positions. Based on the results of the study, we can conclude that the natural-scientific developments of chaos theory and the theory of dynamical systems by I. Prigogine and the adapted theory of "controlled chaos" by S. Mann provide great methodological and conceptual potential for research in the socio-political and economic spheres. The projection of the methods of studying chaos in the financial and economic spheres allows us to formulate conceptually synergistic methods of managing the corporation.

The entropy-synergistic approach to the study of open socio-economic systems makes it possible to identify the causes, type, nature of spreading systemic economic crisis, determine a measure of increasing or decreasing order in an open socio-economic system, formulate the principles and patterns of overcoming its entropy disbalance or degradation.

For optimal synergistic management of a corporation which uses the energy of chaos and the potential for reserves of self-organization of complex systems, it is advisable to form a highly intelligent managerial entity capable to project the efficient, current, promising goals of a managed entity, and coordinate self-organizational processes.

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