MIXOLOGY AS BASIS OF FOOD SECURITY

Tatiana Yegorova-Gudkova[1]

[1]*Candidate of Science (Economics), Docent of Economic-Law Department, Odessa Mechnikov's National University, Odessa, Ukraine, e-mail: tatiana1yeg@gmail.com; ORCID: https://orcid.org/0000-0002-6542-9639*

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Abstract. *The article proposes to analyze the theme of Mixology as one of the basic aspects of food security and self-organization of system of food security and examining the issues of food security accordance to the point of view to the theory of system and self-organizational approaches. The food security of the state is characterized not only by the physical and economic availability of food, but also by its usefulness, which refers to the qualitative characteristics that determine the consumer value of a particular product. The usefulness and quality of finished products depend not only on the quality of raw materials, production technology, quality of technological equipment, production culture, but also on the recipe according to which the product is produced. Tries to consider the mechanism of self-organizational development for ensuring food security, To investigate the mixology approach as third root of food security. The evolution of the control system involves the study, design, diagnosis and prediction of development of complex systems based on self-organized invariants -- generalized golden sections is an unique method, not comparable to any other. Investigation of food securities aspects should be based on transdisciplinary approach and use Nature's like models. Also, it should be methods of theory of system and theory of synergetic considered on the mechanism of self-organizational. Diagnostics of the level of self-organization implies entropy testing of systems and calculation as an integral indicator of the relative informational entropy. Entropy depends on temperature, pressure and distribution of structural inclusions making up the system. With the constancy of the first two, being calculated in relative form, the structural components of the system appear in the form of weights, frequencies or probabilities. Diagnostics of the level of self-organization implies entropy testing of systems and calculation as an integral indicator of the relative informational entropy. Entropy depends on temperature, pressure and distribution of structural inclusions making up the system. With constancy of the first two, being calculated in relative form, the structural components of the system appear in the form of weights, frequencies or probabilities.*

Keywords: *interdisciplinary synthesis; self-organization; food security; mixology approach; golden section; nature-like management.*

JEL Classification: B41, C18, Q18

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Introduction. Process of development of economy of modern society differs today from past times. It depends of whole geopolitical situation in the world by the scale of economy. Extensive expansion of territories and resources for development and retreat in case of failures has been exhausted. Hence, high degree of responsibility of the global subject and a high payment for the errors committed in the actions committed by Mankind, which may turn out to be incommensurable with its further stay on Earth.

Today, with the beginning of the era of interdisciplinary synthesis, integrative fields of knowledge have appeared, combining the previously unreducible fields of science, this is their mission to form a single science about nature and man is still unrepresented. the queue of synergy and the general theory of systems) reveal the effect of a single method on qualitatively different objects.

To give the information society to fully manifest its original (informational) essence – such is the super task that determines progress. Actually, progress here is expressed in development of new means and ways to master space in the macro and

micro scales, each of it represents a self-contained area of objects. The most important factor is the amount of information, understood as a limited variety and, in particular, harmonized diversity, inherent in all normal structures of World.

Problems of system quality of management today remain perhaps the most important area where the interests of large groups of people intersect. Quality today is in demand as the main imperative of life and the engine of social development, which was confirmed by the Congress held by the European Organization for Quality.

Literature review. Since of end of the 20th century system and transdisciplinary methods have received a new development that provide a solution to problems of complexity, systemic quality of various systems, their dynamics, structural harmony, changes in states and processes of their self-organization. This is the time of comprehension of the laws of harmony, knowledge of the systemic quality of things and the quality of complex systems, methodological and theoretical support of systems synthesis technologies. By analogy, the provision of this task is intended to provide information tectology, the concept of which was introduced by .A. Bogdanov [1]. They focus on the harmonization of information bound in real structures as a limited variety.

General theory of harmony of systems Soroko E.M. [2] and synergetics give specific methods of how and to what extent "little things" should be introduced into the system or removed from the system in order to enhance the "effect of cooperative action" with their help, harmonize the whole, start the process of enzymatic action of these "little things", make chaos work as efficiently as possible to achieve the optimal functional mode of the system.

For example, for the food industry, harmonization provides for the development of methodological approaches from the search and study of options for the influence of "small factors", as starting elements in the structure of both technological and managerial processes.

Mixology as an innovative direction in ensuring the quality of finished products as a result of harmonization in accordance with the mathematical algorithm of recipes and mixtures on the basis of artificial design of structures provides for the application of the basic provisions of the general theory of harmony of systems "with a metric component, based on the nodal line of measures in its canonical form," which makes it possible to find the corresponding invariants, without which no theory, in principle, will have applied value.

Such invariants are the so-called generalized golden sections in the range of values of the integral characteristics of systems, on a single quality scale, which play the role of gravitational points, attractors that lie on the nodal line of measures. Nodes of interference (nodes of measures) within binary oppositions of the "quality-quantity" type, play the role of invariants, attractors "[1, 2, 3, 4].

To describe the state of the system used in the theory of systems, the works of the following scientists were used: Formula of information entropy - a formula for calculating the amount of information, was developed by K. Shannon [5, 6].. Prigogine's principle: outside the equilibrium, the production of entropy reaches a minimum [7]. It is contradicted by the Ziegler principle: "... in open self-organizing

systems, the production of entropy outside the equilibrium is maximum" [8]. These principles are consistent within the framework of the theory of generalized golden sections - invariants of self-organization and evolution of systems. There is an obvious alternation of “measure zones” with k-nodes as attractors (Prigogine's principle), and “zones of dimensionlessness” with “anti-nodes” as repellers (Ziegler's principle) [9].

I. Prigogine, to designate the state of partial order, arising far beyond equilibrium with its entropy maximum, introduced the concept of dissipative structure. Such structures provide “a striking example of the ability of disequilibrium to serve as a source of order [9, c.13]. The solution to the problem turned out to be at the nodes of the measure, in the generalized golden sections

Information as a limited variety is intended to provide strategies for structural synthesis in the design of complex systems, the harmony of composition and system quality of multicomponent objects, including formulations and mixtures. Generalized golden sections serve as attractors for the integral measure of the states of these systems, in particular, for the relative informational entropy. [1, 2, 14].

Aims. The purpose of the work is to explore the processes of self-organization in management and show their strategic perspective to achieve the innovative quality of modern management of system of food security.

Tasks of article: to consider theoretical and methodological essence of the phenomenon of self-organization; consider the metric evaluation of the self-organization system; consider the hypothesis of testing control of systems of food security for stability; propose an algorithm for designing self-organizing food systems as mixture.

The evolution of the control system involves the study, design, diagnosis and prediction of development of complex systems based on self-organized invariants - generalized golden sections is an unique method, not comparable to any other. The aspect “integral measurer of phase states of systems -- the nodal line of measure” [1] is also a kind of generalized “methodological comparator” because it is applicable in designing and analyzing systems of different origin, both economic and social, technical and technological also.

Methods. Synergetic in management is at the same time a new science, a new paradigm of knowledge, and a new world view - the world view of the development of integrity.

This is one of the productive generalizing lines of obtaining knowledge about the real processes of the objective world, in particular - knowledge about ordering and self-ordering, about management and self-organization. In the center of her attention: self-organization processes; cooperative phenomena; phase changes of quality of complex systems; invariants of evolution; patterns of evolutionary maturity; open systems; development of harmony and measure; processes and patterns of the formation of new qualities.

The use of a mixological approach will allow solving the problem of optimizing redundancy. Redundancy occurs in all processes and systems. Optimizing redundancy is a complex task, which allows you to bring the costs of production and

storage to more profitable ones while maintaining quality and improving it. from the point of view of the efficiency of the level of production, rational use of resources, the release of additional volumes of products. On a national scale, this will have a positive effect on the state of food security, provided that the conditions of usefulness for human consumption are met, which has a large-scale both social and economic effect.

A corresponding definition is associated with the concept of generalized golden sections: the concept of a recurrent series of golden crossings, which have such numerical values: 0.500 ...; 0.618 ...; 0.682 ...; 0.725., 0.825., 0.99 [1: 2; 3].

Each of the values is an invariant or attractor of the system, which ensures its stability and self-organization. In the dairy industry, we can observe this entire series (except for 0.500) as an indicator of the fat content of butter and ghee, which can be stored for a sufficiently long period of time without deteriorating consumer qualities. That is, there is a manifestation of the property of stability.

Results. Diagnostics of the level of self-organization implies entropy testing of systems and calculation as an integral indicator of the relative informational entropy. Entropy depends on temperature, pressure and distribution of structural inclusions making up the system. With the constancy of the first two, being calculated in relative form, the structural components of the system appear in the form of weights, frequencies or probabilities. Accordingly, entropy becomes the expression of the amount of information related to the distribution of system components. Normalized to one, i.e. being related to its maximum value, it in this case takes the form:

$$\overline{H} = -\frac{1}{\log n}\sum_{i=1}^{n} p_i \log p_i \quad , \qquad (1)$$

where n – number of system components. Being a measure of chaos, structural diversity, the maximum of which is reached at $\overline{H}$ = 1 – в equilibrium system(i.e. if the weights p_i are equal to its structural components), it is additional to the measure of organization, order, uniformity of R and satisfies with it the conservation law:

$$\overline{H} + R = 1 \qquad (2)$$

According to the Theorem of I. Prigogin, outside the equilibrium of a system, entropies capable of reaching a minimum of production (increment), and its opposite of R is a maximum:

$$\frac{d}{dt}\left(\frac{1}{\overline{H}}\frac{d\overline{H}}{dt}\right) = 0 \quad , \qquad (3)$$

and correspondingly

$$\frac{d}{dt}\left(\frac{1}{R}\frac{dR}{dt}\right) = 0 \qquad (4)$$

According to the condition of multiplicity of relative measures,

$$\frac{1}{R}\frac{dR}{dt} = k\frac{1}{\overline{H}}\frac{d\overline{H}}{dt} \quad , \qquad (5)$$

where $R = \overline{H}^{k}$*, which, in combination to conservation law, gives the node generator a measure* $\overline{H}$*:* $\overline{H}^{k} + \overline{H} - 1 = 0$*. This is the same equation as above, but for the integral measure* $\overline{H}$ *as an*

average over statistical sum of probabilities capable of expressing both the level of infrastructural diversity and the "degree" of intrasystem chaos.

According to the Ziegler principle, outside the equilibrium of the system, the entropy production in it is maximized. Attractors and repellers of no equilibrium states of a system are nodes and anti-nodes - taps of states acquired by any of systems regardless of its scale and real specificity in the process of self-organization or evolution [1, p. 87,89], and transition between such states is quantized and fixed by measure nodes $\overline{H}$.

Modernization of a control system based on research, design, diagnostics of conditions and forecast of development of complex systems based on self-organizing invariants - generalized golden sections is a unique method, not comparable with any other. When conducting such a study requires strict control in the collection of statistical material.

Aspect "integral meter of phase states of systems --the nodal line of measure" is also a kind of generalized "methodological comparator" since it is applicable in the design and analysis of systems of different origin, both economic and social, technical and technological, also. As example will investigate third aspect of food security – quality of food.

Discussion. Food security of the state is characterized not only by the physical and economic availability of food, but also by its usefulness, which refers to the qualitative characteristics that determine the consumer value of a particular product.

The usefulness and quality of the finished product depends not only on the quality of the feedstock, production technology, quality of process equipment, production culture, but also on the formulation according to which the product is produced. A recipe is a kind of system. From the point of view of systems theory, a system has a "conservative" part — a structure and a "dynamic" part — a state. In the structure of the system, two main structural elements can be distinguished: invariants and variations. The invariant is invariable in the structure of the system.

"An invariant is a structural relation, a generalized quantitative or qualitative indicator that persists during certain transformations, transformations, changes in the system that it characterizes. Variations are changing elements of the system "[2; 3].

"The stability of the system is determined by the relations of the values of the measure of order or disorder for the corresponding parameters by the Fibonacci method or the golden ratio" [2]. "Perhaps in nature there is a simple principle: the greater the number of proportions of the golden section, the higher the level of development and the higher the possibility of expansion, and the growth of entropy reflects this process as a quantitative measure." [2].

An invariant aspect of any system is its structure, which always has a certain level of diversity. Through its harmonization, the system receives a nonequilibrium state, necessary for its effective life. Thus, it acquires an optimal mode of existence, characterized by functional quality. ... Generalized golden sections are invariants, on the basis of and through which, in the process of self-organization, natural systems

acquire a harmonious structure, a stationary mode of existence, structural-functional ... stability ”[2, p.132].

The concept of generalized golden sections is connected, in fact, its synonym - the concept of a recurrent series of golden sections, which have the following digital values: 0,500 ...; 0.618 ...; 0.682 ...; 0.725 .., 0.825 .., 0.99.

Each of above figures is an invariant or attractor of the system, which determines its stability.

For example, in the dairy industry, we can observe all of this series (except 0.500) as an indicator of the fat content of butter and ghee, which can be stored for a sufficiently long period of time without compromising consumer qualities. . So, for example, the minimum fat content of butter is 62% and in some parameters its use is limited: butter with such a fat content cannot be heat treated and even has the appropriate name "Sandwich", the production of such butter requires higher operating costs for technological equipment. The most popular varieties are those with a fat content in the range of 72 - 73% and 82 - 83%, as well as ghee, the fat content of which is 98 - 99%.

And quality of the stability property takes place. Is it a coincidence? Is it possible to develop formulations of healthy and “sustainable” (long-lasting) foods? How can we use the effect of micro doses, also calculated on the basis of the principles of proportional division, called the Law of Measure?

Conclusions. Is it possible to develop formulations of healthy and stable food products that can be stored for a long period of time? Is it possible to use the effect of microdoses or "little things" based on the principles of proportional distribution, or the Law of Measure? The proportions of the law Measures are found in all material objects and can be classified as universal integral mathematical constants of nature-like technologies and control [2; 4]. The proportions of the Law Measures are found in all material objects and can be classified as mathematical constants of nature-like control.

Based on the foregoing, a scientific hypothesis is initiated on the possibility of substantiating a new methodological approach to the development of useful stable compositions (formulations, mixtures, etc.) that are commensurate or correspond to nature-like constants. The design of recipes and mixtures in the food industry based on the mathematical constants of the Measure law is the implementation of an innovative approach to product quality management. By harmonizing the formulation of finished products or mixtures for their constituents, changing their structure, introducing such an integral criterion as a measure, we approach the mathematical constants of nature-like technologies and processes with their dynamic shaping properties [12].

Some stages of the methodology for designing balanced formulations (stable systems):

1. Assessment of the status of the system, for example - the formulation of a particular product.

2. Assessment of the structural and functional state of the system.

3. Assessment of the share of value added in the product of the system;

4. Comparison of structural state assessment results with attractors representing a recurrent series of golden sections: 0.500 ...; 0.618 ...; 0.682 ...; 0.725 .., 0.825 .., 0.99 and other derivatives of the golden section.

5. Monitoring the reliability, viability and redundancy of the system (estimate the proportion of deviations) and entropy testing of the system (calculation of information entropy).

6. Formulation of the project of redesigning the system (compounding) and implementation of the project for the development of a new compounding.

7. Assessment of the designed system for structural and functional compliance with the law of the Measure [13].

Confirmation of this hypothesis requires additional research, for example, the existing widespread high-quality and sought-after products for compliance with the proportional division constants. But utility is the key characteristic of food security of a modern developed state.

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