Cyclicity of stability in economy

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CYCLICITY OF STABILITY IN ECONOMY [1]

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The article considers the science problem of identification of a life cycle of an economic agent in particular and of organizational-economic system in general. As an alternative solution of this problem the author proposes to use an universal index – stability index, which is directly linked with measure of uncertainty (entropy) and certainty (negentropy). Differentiated life cycle of stability allows us to approach the question of deliberate adaptation to ongoing changes, when control and resource management are done efficiently, in more adequate and, in some cases, more effective and rational way. The research gives some basic theoretical-methodological assumptions considering the stability dynamics, performs the typification of life cycle of stability based on its type, shows the significance of stability over a time horizon.

Key words: life cycle; fixed stability; uncertainty; comparative stability; synchronous development; stability areas.

JEL Classification D91, D81

1. Introduction

Growing instability of complexity and diversity of social-economic relation processes creates an urgent challenge of deliberate adaptation to ongoing changes both inside and outside an economic entity. Risks and threats of the modern world, more and more seriously every next time, test stability of an organization mechanism, its strength and resistance that in many cases depend on how and in what way the adaptation to ongoing changes is performed. Of course, the changes, in general, can bring positive as well as negative elements to the future development of the whole community. Evolutional grow leaps go together with objective rises of uncertainty, mainly vartiational (vartatsion). It is exactly vartiational uncertainty as well as certainty which are the factors that change the existing «rules of the game», on one hand improving the organizational structure by providing it with better adaptation, but on the other hand starting the deployment of other uncertainty types (in particular the uncertainty of environment, of decision making and the consequences of the given decisions), because of a specific protectivity feature of the mechanism.

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The rationality of control efforts, done at various points of a life cycle, is a separate question, which does not get the proper attention in the science community. The science literature review shows it clearly enough, changing the focus of the researches from a sufficient control influence to the control in its very general meaning.

Correlation of uncertainty and the life cycle of an economic entity is supported by cause-effect and logic-structural determinants. Life cycle, in its general understanding, is a cumulative feature of, contradictory at first glance, trends of performing the inside and outside processes and happenings, which actually show their self-organization capability during a continuous balancing of various processes' conditions. In another case, organization-economic system together with the economic entities would be doomed to fading and self-distraction under the pressure of progressing disbalances of imperfect economic mechanism.

In this particular context it is worth to use the instability parameter which allows us to properly explain the link between different uncertainty appearances and their influence on functioning of an economic agent, and hence on the system in general. The choice of stability index is necessary due to the lack of theoretic-methodological positions able to explain the exact correlation of development stage and life cycle; even though they have been studied a lot, still, there is no proper or any scientifically relevant answer to this question. As a result, this forms a scientific problem, the solution to which is partly presented in this research. The complex review of the author's ideas, assumptions and hypotheses, their argumentation and proving in the context of solution of the given problem are supported by many scientific challenges, in particular the differentiation of life cycles of stability by its types, the presentation of trajectory shape of such cycles according to their linearity and nonlinearity, based on the significance of stability over a time horizon.

It is obvious, that a study of stability and its dynamic life cycle initially needs a deeper and specific analysis of uncertainty as a direct source of quality, location and influence of a stability type at the same time. Very important issue here is the understanding of process of formation the location and the role, that uncertainty plays in the process.

2. Science literature review

The idea of cyclicity of different processes and happenings are used in a big range of researches, from biologic analogies in living systems to the usage of this conception in organization theory, science theories, dynamic characteristics of other aspects of ontological appearances that repeat over time.

Because of a big diversity of life cycle models researches, there is still no single approach to the number of its stages and the points where they change each other. It is natural that the cause of this problem is the difference between the object

of the researches which are unique and have a lot of specific features. As an example, we can provide the life cycle models, used for a branch (*Porter 1983; Moore 1991*), products producing (*Levitt 1965*), organization or economic agents (*Gupta and Chin 1993*), organization's population (*Hannan and Freeman 1977, 1978*), information and knowledge (*Sugumaran and Tanniru 2002*), dynamics (*Helfat and Peteraf 2003*) and others. But, even for the models studying the same object, it is very impossible to find similar preconditions to the calculation of the number of stages and especially their features. But in the same time such a challenge can be presented by finding of universal indicative parameters such as strength, stability and the uncertainty influence significance.

Which is also important, there is a spread conviction, that the concept of life cycle has got a general framework only at the beginning of the XX-th century. This is supported by the research of Shyrokova G., Klemina T. and Kozyreva T. (*Shyrokova etc. 2007, 4*). But the author's research brought him to a different conclusion. The knowledge of microcycles has appeared long ago enough, but the cycles in their business meaning without any links to natural factors had appeared long before the modern ideas. In the encyclopedic dictionary of 1803, the edition of Andreyevskiy I., Petrushevskiy F. , Sheviakov V. and Arseniev K., gives one of the first mentions of «the beginning of management terms» (*Andreyevskiy etc. 1803, 35*) of agriculture, which depend on the local conditions.

It is significantly worth to note the encyclopedia article of Barrow J.H. about Williams W., dated 1839. At the very beginning it links uncertainty and life cycle as consequences for «permanent cost changes of … property … in situation of uncertainty and continuous disturbance» (*Barrow 1839, 3738*). So, Barrow J.H. thinking about prosperity and fade of «working class, farmers, vendors, manufacturers, traders, [in general – fn author] all [who – fn author] were prospering and active; in a couple of months after … difficult conditions … [fade – fn author]», and makes a lot of important observations. The most important issue Barrow J.H. comes to, is the «feature of various types of depreciation», and «after the success and fade, when it comes to the end, prosperity stars again».

The main conclusion of Barrow J.H. is that «prosperity and problems in their intermediate status move forward in an infinite cycle». It is likely that exactly these words are the first mention of business cycles in economics and of sequences of different stages and their changes.

Only after more than 125 years [3] one of the first life cycle models appeared. As one of the first modern researches of synectic definition of life cycle concept can be

[3] Here the author avoids giving the exact date of modern models on purpose, because detailed study of science literature allows to find more and more early publications, as, for example, the work of Barrow J.H, which was considered not actual for a long time.

considered the work of Haire M. (*Haire 1959*), where a try to explain organization structure in terms of biological behavior was taken. Further, this research was supported by other scientists in argumentation of different life cycle models.

Considering, that the life cycle conception is initially used to explain organizational plans, different models were oriented on the prognostic potential of defining of possible development direction. Thus, Lippitt G.L. and Schmidt W.H. (*Lippitt and Schmidt 1967*) used their life cycle model in management skills formation, knowledge and relations; Smith K.G., Mitchell T.R. and Summer C.E. (*Smith etc. 1985*) used it to define the activity priorities; Lyden F.J. (*Lyden 1975*) to create effective ways of solving problems; Scott M., Bruce R. (*Scott and Bruce 1987*), Churchill N.C., Lewis V.L. (*Churchill and Lewis 1983*), Quinn R.E., Cameron K. (*Quinn and Cameron 1983*) to define the factors of expansion and recession. But this is not the limit of the researches.

Analyzing the theoretic points of life cycle models, we can come to a conclusion that descriptively they touch three articular research areas: complication of organization's administrative tasks, increase of organization's structure complexity and formation of organization's competencies (*Roche 2009, 45*). About the last, it can be said, that economic agents, using the advantages of relatively favourable conditions during their life cycle, can form a stability reserve by creation of new organizational elements (*Miller and Friesen 1984, 1164*).

Basing on the life cycle explaining through complication approach, and also on the fact that organization changes directly depend on the environment conditions effectiveness for a particular economic agent, a direct relation between uncertainty dynamics and life cycle can be found. It is worth to mention such a characteristic as «management flexibility». According to Raysberg B., Lozovskiy L. and Starodubtseva Y. this organization feature parameter appears as a capability of rapid structure reformation, adaptation to new conditions (*Raysberg etc. 2006*).

Then, we can assume that the flexibility feature is a part of manageability index and the cause-effect relationship should be pointing at the initial significance of management and other characteristics of and economic subject. If the manageability is low, then the flexibility as a result of an management action does not show its full power.

This, in the total result, brings us to the assumption that stability, which consists also of the features of flexibility, adaptability and manageability, can serve as the reference point able to define the life cycle stages, in its general understanding, and the mobility of internal self-organization capabilities. The appearing «fatigue» moments of organization structure bring in the necessity of conscious management, including the preventive management under uncertainty, because it is exactly these factors , which are the main parts of evolutional expand and development leap.

3. Specific features of life cycle of stability

3.1. Uncertainty in life cycle

It obvious, that life cycle of stability concept implies both the loss of stability and its recovery, which change each other in a strict sequence, except of some specific appearances. Such appearences are the presence of microcycles in the stability stages (statuses) sequence. As a result, we come to a very irrefutable logical fact that the range of microcyclic oscillations and their frequency show how imperfect the system functioning mechanism is. *As the number of these cycles of change from stable to unstable position of economic subjects approaches the critical point, the vartiational uncertainty aggravates, which then starts the cycle of depreciation and recovery of the system structure stability*, and, in general, means the formation of new and more effective economic mechanism.

The loss of mechanism stability during growth of vartiational system uncertainty works as a catalyst to an organization structure change, which (the change) becomes inevitable. *As a result, the loss of the system mechanism stability brings to the further loss of fixed stability of the system.* In fine, the vartiational uncertainty allows to draw a two-segment spiral-shaped graph of organization-economic system life cycle from the point of view of stability types.

As the author considers it, the sequence of loss and recovery of the particular stability status, supported by a life cycle system-uncertainty and certainty model, allows not only to clarify the nature and the essence of a life cycle, but also to define the evolutional shifts, that can explain contradictory trends of simultaneous complication and improvement of new concept of economic relation. The only difficult point in the process of stability status defining is the evaluation of necessary entropy or negentropy level in a situation when there is a fixed vartiational stability. However, the development and presentation of theoretical-methodological approaches to the evaluation of such an uncertainty or certainty level and its argumentation is a separate scientific task, the solution of which is not a part of the given research.

As it was mentioned before, stability life cycle of organization-economic system has a direct influence at the development of an economic subject. The author's idea about microcyclic stability oscillations is sypported by words of Mihalev O., which makes the assumption about «the life cycle of organization stability, depending on the life cycle of the organization and changes of the environment it is in» (*Mihalev 2010, 21*). This, curiously enough, is partly incorrect. According to the conclusions made above, which point at the relation between life cycle and uncertainty dynamics, the author makes an assumption, that *stability life cycle as a stage (status) is discrete.* Life cycle of an economic subject in total can be presented as a wavy curve, which cannot be observed in conditions, when stability is

fixed. Furthermore, the appearing negative premises, which actually bring to the wave-shaped motion, may have no reflection on the change sequence of fixed stability status. This is because the threshold level of uncertainty is fixed, if all the other aspects are unchanged, and the threshold level defines the status of the stability.

The dynamic constancy of entropy level causes the fact that the fixed stability criteria does not change. As a result, a fail of a whole life cycle due to the increasing uncertainty, does not mean that the stability status will be lost. There appear some untypical life cycles in which the relatively smooth (depends on the sensitivity level) motion on one hand contrasts with a zigzag curve of fixed stability on the other.

The creation of nonlinear stability life cycle is possible, if and only if the stability is conducted of comparative evaluations. Exactly for this stability form the entropy dynamics, or rather, changes of internal uncertainty in comparison with the environment uncertainty [4], shows the periods of favorable economic trends. However, the author is deeply convinced that this assumption does not mean, that life cycle of stability conjunctively depends on the life cycle or environment changes, as Mihalev O. stated.

According to on the author's formalization of comparative stability [5], and also on the fact that environment changes have a reflection on a general microcycle, *becomes possible the situation, when parallel and codirectional* [6] *motion of life cycle of a separate economic subject and life cycle of the environment creates specific conditions – conditions, when comparative stability does not change.* But, it is believed, that the stability life cycle of the object of research will remain actual even when the organizational cyclic oscillations are synchronic.

Specific definition of the fundamental precondition when the comparative stability is fixed allows us to make a conclusion that there are limits to define not only what the stability life cycle depends on, but also what are the preconditions if it. Firstly, a factor's influence may be or eliminative or, secondly, not coordinated. The refusal to complete the first factor may cause the situation, in which both determinants of dependency will keep changing and can possibly come to similar oscillations; but the refusal to complete the second may cause the direct resonance effect, when the cyclic oscillations will be very alike, which, as a result, will fix the stability status. The limitations, in general, have one condition – keep the ongoing changes synchronic and proportional to each other. It all reflects the dynamic balance, where stability is, in a natural way, a constant value.

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[4] It is also worth to note, that here the author mentions the environment uncertainty not as the uncertainty of a specific environment, but as a composite value, as the uncertainty of a whole as a space-time surface, where the object is function and which is a part (element) of a system or a subsystem.

[5] See other researches of the author.

[6] Another important factor is the proportionality of changes, for which internal and environmental uncertainties remain, in a sense, fixed.

The conclusion, made by the author, that there are no cyclic oscillations of stability in case of some preconditions, actually is not paradoxical in any way. Opposite, it reflects the regularities of development of equilibrium structures. However, the study of nonequilibrity may bring us to not less significant conclusions about life cycle of stability of an economic subject and system in general. Premises to this can be found in the research of Prigozhin I., who notices, that «discovery of nonequilibrium structures, as we know, was followed by the revolution in the trajectory study» (*Prigozhin 1991, 46*). On one hand, area of the research includes question of short-term and long-term stability;on the other hand – the questions of ongoing changes during the life cycle and feedback by the self-regulated regulators.

3.2. Time horizon of stability perception

As we know, trajectory of a life cycle with very high sensitivity has a shape of a curve with leaps, where the jumps of expand are changed with similar waves of depreciation. This, in total, results into redefining of stability status in short-term and long-term prospective. Dynamic development of economic subject or organization-economic system points at the fact, that «trajectories of many nonequilibrium systems are unstable, and hence we can make reliable predictions only for short-term periods» (*Prigozhin 1991, 46*).

There is a spread conviction that stability in its general economic understanding has different perceptions at different time horizons. And the instability now, in this particular moment, may become stability in the future. The position of the author is very similar to this point of view, but differs at some conceptual points. One of them is the subjectivity and lack of a specification of a stability type, which has an influence on the argumentation and reliability of the statements, that short-term stability changes its sign over a long-term period.

Considering the fact that assessment of stability may evaluated in a comparative or a fixed way, there appears a contradictory point, regarding for which type of stability is this statement true. According to the author, the fact that an assessment of a fixed stability is performed in a particular moment, eliminates its usage in a subjective perception of stability status over different time periods. This is because the fact, that the stability status is evaluated due to the uncertainty limits, which, then, changes over time. And this is why the basic precondition is not completed – the equality of «all the other aspects» in development dynamics.

There is another type of difficulties for comparative stability, where life cycle exists in its classic meaning. As the quantitative value of comparative stability has the optimum of correlation between its own uncertainty and the uncertainty of environment, then all the oscillations are focused around it. The built cyclic oscillations of the comparative stability value, with usage of various time periods to

control the trajectory sensitivity, in fact replace the life cycle of changes, which do not show the stability status as achieved yet.

This makes *obvious the fact, that stability is momentary by its nature.* Consideration of short-term and long-term time horizons does not give the expected effect of change of perception of the stability status for an economic subject or system in general. According to the author, the difference of time period does not have a fundamental influence on the process of stability identification and it is, at least, incompetent to state that short-term instability will or may become stability over a long-term period. *Stability is objective, its status depends on current regularities and trends.*

Typical example of replace of cause and effect is the assumption of Mihalev O. that was not supported. According to him «"current" instability which causes uncertainty of its next status, becomes stability in long-term aspect, as it, in fact, changes, adapts a system, approaching it to attractor – the status of the highest stability to challenges most possible in the future» (*Mihalev 2010, 27*). Defining the intermediate parameters, which define its lack or presence, for both short-term and long-term periods, does not provide any reliable assessments of stability, but opposite – in a very significant way falsifies the real status of the object of research, brings inaccuracy and subjectivity to the evaluation process.

The way to the attractor [7] always lays through the instability position, when chaos and disorder of processes and appearances, arising and fading alternatives with uncertain probability of consequences, approaching their critical point find regularities and order in the coordinated reality. In fact, the attractor is not only a goal, but it is the result of self-organization and adaptation. The entropy and negentropy limit creates at the same time the manageability and self-organization limit; this is why the stability attractor is not a limit-defined at a particular point of dynamic system phase space, when life cycle trajectory of an economic subject or system approaches such a fixed status with strictly defined characteristics. Dynamics assumes mobility, changeability of all the processes and operations, links among various system elements and dependent or mutually dependent relations between them, which then result into the fact that stability attractor characteristics are also mobile.

Even though it is paradoxical, but it is exactly dynamic mobility of the stability attractor characteristics what creates specific periodic areas and not the strict or trajectory focuses of attraction or rejection. Increasing uncertainty during this, allows us to make a conclusion that stability status, area and point of its maximum value are not attraction focuses in a life cycle. As a result, we cannot claim that attractor has fixed position [as, for example, in works of Mihalev O. and

[7] The term is used according to the treatment and understanding from the side of Mihalev O.

Myasnikov A. (*Myasnikov 2010, 56*)], because exactly such position becomes more a repeller, than an attractor by its essence. Symmetrically opposite area to repeller [8] in relation to attractor, namely actual stability position, is the source of disbalance of the defined motion trajectory, its fade under the power of attraction and approach to recession and self-destruction. The way of distraction from some factual status to the position of stability is complete due to specific efforts, which decrease the consequences of ongoing changes. Subject, in order to increase its life time, seeks to them, using its all efforts and resources, but in fact its ambitions are the result of objective attraction to uncertainty, and hence to self-destruction.

The increase of difficulties of the ongoing changes creates moments of bifurcation, when a system or an economic subject can solve this problem, if they have enough capabilities of adaptation and self-organization, or they, conversely, cannot solve it. Bifurcation, obviously, only supports the fact that increasing changes make the life cycle trajectories more different. Partial proof of this can be found in the research of Budanov V., who defined the significance of bifurcation points in a life cycle: «only at these points it is possible to have an influence on system's behavior, its destiny without using force, using information or in any level low and weak actions» (*Budanov 2006, 166*).

The existence of ideal motion trajectory or vector which are proper to the given goals and tasks, burdens the self-organization mechanism and pushes to the instability when various alternative paths arise because of changes. It becomes very difficult or even impossible to define the best, necessary trajectory among them. As a result, the system or economic subject passes the instability stage after choice one of many motion vectors and begins to recover. By excluding wrong reactions and solutions the stability of the system increases, which allows, in some cases, to say that stability is achieved again. The life cycle ends and by this a new era of development starts.

4. Conclusion

The periodic areas of stability, which appear as a result of life motion of a system or an economic subject (organization) bring us to an assumption that subjectivity of definition of stability status cannot be eliminated, no matter how hard it is standardized. The most significant element of subjectivity remains – goal-setting of the system or the economic subject. In the author's approach to stability and its relation to life cycle, the author tries to formalize and justify from a scientific point of view the ways to define stages and the specifics of their change sequence.

Entropy and negentropy, if they are considered as universal parameters of awareness, allow categorizing the quality of the position of an object, but also its

[8] Reppeller is a point, the trajectory and rejection area of which are, by its nature and essence, opposite to attraction.

quantitative features, estimating its actual life cycle motion trajectory in comparison to the trajectory of rational, optimal and in some cases effective activity life. The existence of two segments of stability, in division into comparative and fixed, allows to extend the general theoretical-methodological assumptions about actual specific features of stability in economy, its dependency on the ongoing changes in environment as well as in the life cycle of the economic subject. All this brings us to the need of creation of more complete management under uncertainty, when stability is an indicative signal of sufficient prevention actions.

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