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Uncertainty Cyclicity and Projectionness

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Abstract- The paper's research focus is a methodological issue of a relationship between the uncertainty and risks, their co-evolutionary influence on each other. To discuss this, we in details describe the "projectionness" as an available specific property of the economic mechanism. It manifests itself in variability of the uncertainty apperception force that presents a power of its transformation into the risk. In the author's model of the cycle, we have presented the uncertainty dynamics, where a multi-level vector of the spiral motion complements a traditional linear sequence in a turnover of various types of the uncertainty. An aprioristic connection between the entropy and risks allows us to make a reasonable conclusion in the paper that the preventive management task is selective regarding both the risks themselves, and the uncertainty.

Keywords: Uncertainty, Sustainability, Projectionness, Cyclicity, Uncertainty vector, Risk tetraplet, Vartational uncertainty.

Introduction

A risk as an a priori result of the available uncertainty is an inherent attribute of an activity. The exponentially more and more complicated social and economic interaction has caused a steady increase in significance of risks and the uncertainty, emphasizing a specific role of processes and mechanisms to control them. It may seem that continuous management efforts protect a business system or an economic agent, making them relatively much stable, secure and sustainable in their operation. Nevertheless, we strongly believe that it is not the case.

Control efforts are only necessary when an influence itself may bring a result, when resources spent on management are able to support or maintain the sustainability. But a sustainable condition has a certain factor of durability and therefore will survive even in case of fragmented control over the uncertainty. The selective control over such uncertainties optimizes a balance of sustainable development, when a respond to all the dangers and threats may cause the death of an economic agent, its self-destruction, but not due to the high uncertainty and a risky activity, but because of a resource deficit. Thus, a search for an optimum of the tolerated influence of risks and a managerial response (that vary within their life cycle) becomes one of the most pressing academic challenges to support the sustainable development. For such a challenge, there has been no definite or cross-functional solution so far.

Literature review

Essence of the uncertainty and risk

The risk tolerance, changes to a level of their acceptability over time, as well as managerial decision-making based on risk utility assessments have been a focus of many scientists and specialists, mainly abroad. Arrow [1, 2] and Pratt [3] with their desktop studies in the second half of the 20th century actually specified a direction for the later academic ideas. The direction intended to solve a fundamental challenge of a choice between significant risks and an identified certain level of their impact, at which further measures in the same direction would be fraught with a loss of the certainty tranquillity.

Empiric papers based on findings and statements by Arrow and Pratt on the risk tolerance owing to their utility, including papers by Friend & Blume [4], Cohn, Lewellen, Lease & Schlarbaum [5], Siegel & Hoban Jr. [6, 7], Riley Jr. & Chow [8] and many others, have shown that various factors influence a value of the risk utility and tolerance. Schooley and Worden [9] made a similar conclusion in their paper. They emphasized a specific role of the capital, as "the wealth particularly influences the risk intolerance, while influence factors are of a mixed nature". Therefrom, there are ambiguous interpretations of the risk tolerance and heterogenic methods for not only a qualitative, but also a quantitative measurement of the risk tolerance level.

The risk tolerance measurement has had an inherent association with understanding and perception of events and phenomena that we may one way or another refer to as risky. At the same time, the academic and methodological perception of the risk as a fundamental economic category has been a sufficiently explored issue. A multidimensional nature of the risk, similar to the uncertainty, has led to interdisciplinary studies on causes, forms and types of its manifestation in socio-economic processes and a response to the risk, subject to values of an economic agent. Among scientists engaged in research on the risk apperception, there are Marshall [10], Sandman [11], Renn [12, 13], Walker, Simmons, Wynne & Irwin [14], Pidgeon [15], Slovic [16] et al.

A primary review of academic literature has shown that "the risk perception involves many factors including beliefs, experiences, feelings and attitudes" [17] of a decision maker, as well as that the risk perception "presents a wider range of cultural and social dispositions regarding valued threats".

According to Sandman, the risk in its alternative form of expression is a combination of an objective danger and disturbance. This circumstance says that such subjective-objective forms of risk manifestations exist. It is the disturbance, where there is a subjective component hidden inside, which “ranges from indifference to active opposition [17] against the risk. Causes and factors that make changes to the disturbance are quite various, but they all seem to be associated with qualitative attributes of trust, knowledge of the risk by experience, of an evaluation of hidden sides of an event or a phenomenon. However, Sandman’s point of view on the risk only says of its non-object implementation. In other words, the risk includes a certain level of a damage and benefits from those events and phenomena, which are probable, and this makes its objective side. The disturbance does not arise concerning the risk itself, but the risk under specific conditions. To our mind, it would be more correct to correlate the disturbance with an economic agent or an enterprise, where they create conditions that make changes to the risk perception and tolerance. If we consider a hypothetical case, where the “fixed” risk arises in distinct agents, then an objective danger in general would remain unchanged. At the same time, the risk- caused disturbance has been changing. It seems that *it would be impractical to include the arising disturbance into the risk content; it would be more reasonable to consider it separately as manifested quintessence of risk perception factors* on the side of an economic agent. It is important that “a tendency to risk-oriented behaviour and a risk preference are attributed to very distinct factors” [18]. At the same time, the generalized disturbance is obvious in the most cases saying of a strength of influencing factors, which are not clear and obvious at the first glance.

Taking the above-mentioned into account, an opinion of some scholars has become amazing. They say that the uncertainty immediately influences the risk tolerance. This assumption would be only valid if the system projectionness (which we describe later) is stable within a considered time interval. Thus, Reuvid [19] argues that “the risk tolerance or appetite [towards it – *author’s note*] presents a degree of the uncertainty, which a company or an individual are ready to take for the risks to achieve their financial goals”. This presents a dual nature in the basic perception of the sustainability and the safety in the context of decomposed cause-effect preconditions for their genesis. It is obvious that “in terms of the uncertainty ... the risk *aversion* is important in decision-making” [20]. A compromise between the risk and the return is presented with a “constant called the risk aversion coefficient” [21].

The uncertainty concept is hard to be associated with those terms, an interpretation of which is unambiguous. Despite multiple general and specific definitions, the uncertainty has had more and more signs, characteristics and properties that have become integral predicates of ambiguity, shadow and inaccuracy. Despite a persistent basis in the uncertainty perception, movements within the economic theory have included into this concept their own content, sometimes dramatically different from the others. In his paper, Kramer [22] mentions multifacedness of the uncertainty. His generalization resulted in a conclusion that, “definitions as a rule tend to focus on the missing information

related to an inability to predict the future behavior”. However, this is only one provision concerning the uncertainty. The lack of the information is ambiguous and can refer to both the information of the external environment, and the data of their own condition, or, in other words, own understanding of ongoing processes, phenomena, mechanisms and reaction regularities [23]. In many respects, this issue is associated with a structure of the information, hence, a differentiation of this type of the uncertainty by signs of the data ownership [24].

In contrast to the thesis that the uncertainty excludes an opportunity of a significant prediction, the conclusion becomes allowed and scientifically valid. It says that, the uncertainty exists with a degree, to which the environment is unpredictable [25]. In other words, to the same extent, which makes difficult to judge on the likelihood of various actions [26]. Nevertheless, it would be an exaggeration to say that, “the information is a concept directly opposite to the uncertainty” [27]. Our speculations have shown that the information completeness is a factor able to reduce the uncertainty. As we can see, interpretations of the uncertainty vary depending on causes and factors of its appearance, which does not allow talking about any universal category (!), perhaps contrary to a common and shared understanding of a categorization nature. However, this dilemma has been still waiting for its solution.

Information Management vs Preventive Uncertainty Management

In an analysis of the uncertainty from the economic system’s “awareness” point of view, an impression may appear that the uncertainty management should be related to the information management. However, the author’s view on this issue is opposed to a common belief, that these approaches are similar to each other. We come from the statement that the uncertainty is incompleteness and inaccuracy of the information. A clear expression for an idea of a fundamental difference between the information management and the uncertainty management may be a review of known interpretations given for these concepts.

Atherley [28] considers the information management as a set of processes to analyze information needs, identify, obtain, and provide the information to users. In the earlier definitions for the concept of the information management, one can find a clear indication that this process relates to information flows. The closest concept to the concept of “the uncertainty management” is the “knowledge management”. It operates with the available data, but differences between them lie in the conventional truthness of knowledge, which convey different meanings. Nevertheless, there is the uncertain fact that judgments are true in a long term. Marinicheva [29] gives her own definition for the “knowledge management” term, claiming that it means making organizational, technological and communication conditions, under which knowledge and the

information will contribute into solving strategic and tactical objectives at an organization.

Thompson's paper [30] among the first ones includes a formal approach, applied to the research on the uncertainty management in business organizational structures. However, as an integral scientific movement, the uncertainty management was established somewhat later and more often had an interdisciplinary nature. Today's ideas about the uncertainty management are presented by Motro & Smets [31] and Grote [32]. However, also in those papers when referring to management the matter is only minimizing the uncertainty as the only possible option of action. The fact that Grote pays attention to a number of tools, including planning, competence use and development, multilateral cooperation and maximum operational task completion is not without its significance. All the referred management tools are presented with general principles in the uncertainty management in a context of the explored dynamics of parameters of organizational sustainability and flexibility [32].

In an aspect of a literature review, it is worth mentioning that some scientists do not differ concepts of the uncertainty management and the risk management. As an example of such a definition error, we can refer to Ioda, Ioda, Meshkova & Bolotina [33]. They say that the process... should base on an individually developed and own system of measurement for risks of different types. Besides, some researchers simply reject a conceptual opportunity of the uncertainty management tools practically applied at enterprises.

Methodology

Uncertainty as an attributive source of the risk

A connections between the uncertainty and risks is a subject of many papers, which state that the certainty is a direct source of risks. Studies on an interrelation between the uncertainty and risks have involved many scientists. Among them, there are Tepman [34], Bedford & Cooke [35], Vishnjakov & Radaev [36], Ermasova [37], Hristianovsky & Shcherbina [38] et al.

With a consideration of papers by the above-mentioned researchers, we offer quite similar statements to demonstrate that the risk is a consequence of the available uncertainty. A provision, saying that the risk is not only a consequence, but it can be also described with the uncertainty, we only apply in the context of a priori dependence (Note 1). As its base, this assumption has fundamental differences that are in place. Ermasova says that the "uncertainty is an ontological characteristic, while the risk is a manifestation form of the uncertainty". Tepman gives an extended interpretation for this relationship linking these processes to the systematicity theory, "the risks are considered as a property inherent to any kind of purposeful activity. It presents as the probabilistic uncertainty to implement target-oriented functions, for which their nature, contents, direction and achieving conditions have not been entirely clear to an actor". Herewith, [34] describes the risk with its constituents and considers them as the specifics of the risk.

The specifics of the risk includes the uncertainty, surprise, indecision, and assumption that a success will come.

According to Kulagin [39], "the uncertainty serves as a risk cause in decision-making", while the risk is identified with a possibility of an adverse outcome in terms of the uncertainty. Bedford & Cooke [35] have a similar point of view. They describe the risk in two aspects: as a danger (or a source of the danger) and as the uncertainty (a quantitative estimation of the probability).

In contrast to definitions for a correlation between the risks and the uncertainty, given by [37], [34], [35], [36] paper is much more profound. They immediately point out that there are several points of view on a relation between the uncertainty and the risk. In the first group, [36] include an opinion that the risk depends on the uncertainty. In this case, the uncertainty refers to an incomplete and inaccurate idea of values for various parameters in the future, generated by completeness and (or) inaccuracy of the information. Ideas from the second group say that the risk is a kind of the uncertainty, when an onset of events is probable and there is an objective opportunity to assess their likelihood. In this regard, believe that "a difference between the risk and the uncertainty refers to a method, using which we set the information, and depends on available (in case of the risk) or non-available (in case of the uncertainty) probabilistic characteristics of uncontrolled variables" [36]. Herewith, they believe that the "risk is the uncertainty regarding potential losses on a way to a goal".

Our viewpoint is close, but not identical to [36] on a ratio between the risks. As far as the first and the second group of opinions bind the risk and the uncertainty, one can find a confirmation and a scientific rationale for the author's approach to the a posteriori dependence between the uncertainty and the risk in provisions of the limit uncertainty theorem. It emphasizes an available "quantum-control influence" [40] upon the uncertainty, in which case a development route of a business system begins to experience changes.

Thus, there is the conditional dependence between the risk and the uncertainty. Hristianovsky & Shcherbina [38] indirectly confirm this, saying that "the uncertainty of many business situations generates a need in the risk in decision-making, a need to anticipate consequences of decisions made and a need in a systematic approach in whatever way of management".

Smirnov [41] gives an illustrative example of a traditional linear sequence for replaced uncertainties and risks, where the beginning of a cycle is associated with the uncertainty that also generates the risks. Cyclicity lies on the fact that the risks of the first step lead to an emergence of the new uncertainty, which in its turn causes an emergence of new risks. Smirnov refers to this process as "the transformation of the risks into the uncertainty", although the contrary would be much more correct, as the risk is a consequence of the uncertainty.

Ideas of cyclicity have led us to development of a model that extends a classical idea of a consistent turnover of the

uncertainty and the risks. Schematically, we may present the model as follows (Figure 1).

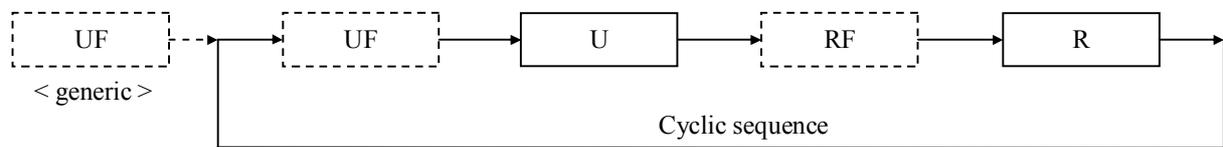


Fig.1. Cyclic sequence of uncertainty-risk transformation (risk tetraplet):
 UF – uncertainty factors; U – uncertainty; RF – risk factors (factors of risks); R – risks

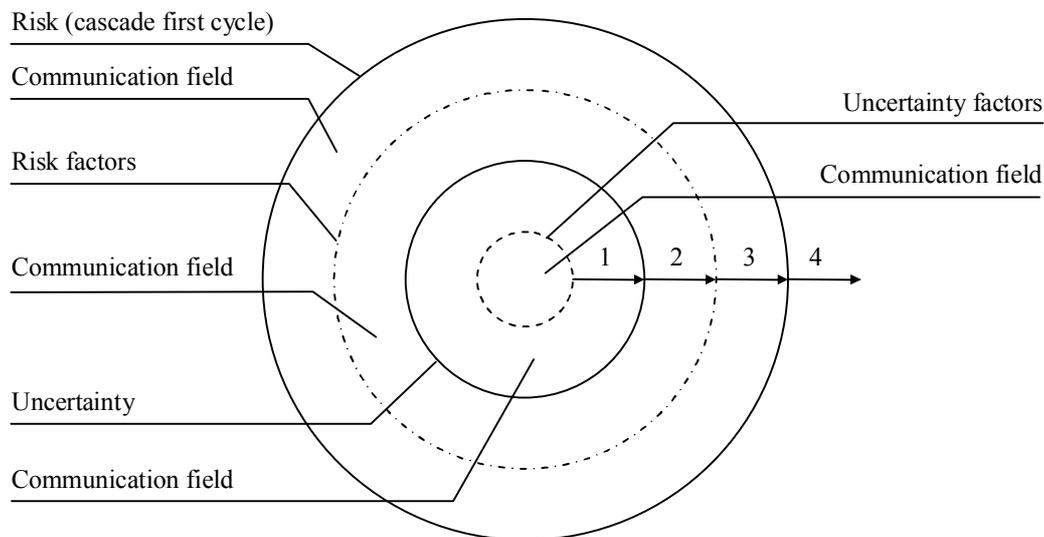


Fig.2. Waved image of uncertainty-risks transformation cascading,
 as exemplified with a cycle (risk tetraplet)

To the transformation cyclic sequence, “cascading” of the uncertainty and the risks is very close. Cascading implies an effect of an avalanche genesis of the risks and uncertainties in pairs, as well as the uncertainty and risk factors. Pergler & Lamarre [42] pointed out that this phenomenon only existed regarding the risk effects. They called the phenomenon the “cascade risk”. This refers to combined effects of different order, which may further affect results of activities implemented by a business agent. They also point out that cascading is important in terms of the uncertainty. The statement that “the idea of the cascade risk is particularly important in time of instability”, clearly indicates a need in further research on this relationship.

Kunin [43] also contributed into an issue of avalanche risk genesis and risk cogeneration modelling. His focus is a study in an impact of the risks and risk management measures upon entrepreneurship performance, taking into account new dangers and threats that appear when we take such measures. Kunin bases himself on making graphs of a basic structure and possible combinations of the risks using final and intermediate conditions of the risks system (for the more simplified form of

the oriented graph of the risks see Tikhomirov & Tikhomirova [44]). At the same, [43] does not take into account the uncertainty. He assumes that the risks generate themselves and that is, to our mind, erroneous. Stages in transformation or conversion of the uncertainty and risks involve that the initial uncertainty, and eventually the risk, would cause the new risk, but with a different impact potential. A review of academic literature has suggests that the authors have neglected cascading. A number of papers, mentioning avalanching or cascading of the risks in their connection with the uncertainty is quite limited.

Unlike [42] and [43], we do not only justify cascading and cyclicity of the uncertainty and the risks with intermediate sections in a form of factors, but also a wave nature of these phenomena. Given that a change to potentials of each element follows the transformation, as far as a number of cycles grows, an amount of the “pure” risks and the uncertainty would exponentially increase. We can consider a concept-base form of the wave theory idea on transformation of the uncertainty and the risks from a schematic representation of this process (Figure 2).

Paying attention to the basic primary component, the uncertainty factors, that affect a value of the uncertainty itself and subsequently an extent of the risks, it is worth specifying, which impel determinants may cause cascading progress within a process or serve as a motion catalyser for the whole cycle. Kulagin [39] gives a brief classification of the uncertainty factors based on two classification criteria: a source of the uncertainty (the environment uncertainty factors, factors of the personal uncertainty) and a nature of the uncertainty (random and non-random factors). It is obvious that these signs can not be considered a basis for a comprehensive development of the factor dependence model, with which the uncertainty itself is a resulting parameter. Petrakov, Rotar & Ayzvazyan [45] divide the uncertainty factors into groups with much contents and hence with fewer errors. According to them, we may group genesis factors for the accident and the uncertainty within a business system using two indicators: social-economic and technical and economic ones. Such typology allows making the factor model that consists of four successively dependent components. Thus, the factor model may contribute into determination of a size of potentials at each stage of the uncertainty-risk conversion cycle, based on their differences and similarities.

Risks and uncertainty influence on business sustainability and safety

It is obvious that the dynamics in the economic agent evolution leads to the fact that the risk tolerance level and its perception changes as far as the life cycle progresses. We start from the point that “the high performance ... directly depends on how...we assess and take into account the life cycle of an enterprise and its every stage” [46]. So, we may state that a value of a gap between the tolerance and an actual condition directly points out to an economic agent’s ability to follow a conventionally ideal (optimal) development route. *The risk tolerance makes a certain master value image of a standard condition to some degree*, with which the sustainability occurs as a result of two determinants combined. There are the reverse cause-effect a priori connection between the uncertainty and the risks, as well as goals and objectives of existence, embodied at the risk tolerance level at different stages of the life cycle. In addition to the indicative function that points out to the specific condition of an economic agent or entity, the tolerance plays a role of a control knob. According to the above-mentioned, an essence of the tolerated risk level is that a response to dangers and threats should not be continuous. Fraser & Simkins [47] support this feature in their conclusion, “efficient management task at an enterprise level and at an operational level is decision making and taking measures in an appropriate way to maintain a balance between the growth in the potential and a lack of effects. This balance of the risks presents the risk appetite and tolerance on the part of an enterprise”. Herewith, the resulting sustainability proves that actual development has only had a balance with set goals and objectives, and for their

implementation and achievement, we at the same time solve a challenge of an efficient use of the resource potential. It becomes obvious that the more rational the use of available resources us, the longer an economic agent will operate and the longer the life cycle will be, as “an access to resources is necessary for a survival of an entity” [48].

Generalization of risk tolerance ontological imperatives leads to research in the safety category. The “economic safety” concept is traditionally associated with such categories, as “independence”, “sovereignty”, “sustainability” and “stability”. The academic community has not actually developed a uniform definition for the “sustainability term” Mikhalev [49] had pointed out to a dual nature of this concept in the specifics of certain objects and phenomena research. And it has faced numerous responses and confirmations in academic papers. On the one hand, the sustainability is a property of the business system and each of its elements. It, “as an intrinsic property... depends on both the internal and external conditions”. On the other hand, one may state that the sustainability is a condition, in which the system can either be or experience the instability as a manifestation of an excessive exposure by the uncertainties and the risks, changes accompanying them and a speed of such changes. As a result, the “sustainability is not just a property or a system condition, but the property, which manifests itself in a condition that depends on its relationship with the external environment” [49].

There is a large number of papers, where interpreting the economic safety their authors involve the very terms of the sustainability and stability. We believe that as a common definition for the economic safety in the most general sense we can consider the definition by Abalkin [50]. He was one among the first people in contemporary Russia to have turned to this issue. According to Abalkin, the “economic safety is a set of conditions and factors that ensure the independence of the national economy, its stability and sustainability, its ability to have constant updates and improve itself”. Without being in an opposition to this definition, let us emphasize that the categories of “independence”, “stability” and “sustainability” act as parameters, on dynamics of which the achievement of the very safety condition will depend. Within this framework, an important point is identifying critical levels that present a genesis of these conditions. If with regard to the parameter of the stability and sustainability it is possible to apply a methodology for the entropy (uncertainty) and negentropy (certainty) assessment, then an option of the independence is revealed with the logic of the “economic justice” (Note 2).

A traditional understanding for the safety suggests that there are no threats to functioning of an economic agent, but the risk tolerance parameter makes us rethink the safety condition. On the one hand, the sustainability has been already a sign that a system is in the safe condition. On the other hand, the sustainability affects the uncertainty relationship and prevents us from saying in an unambiguous way that an enterprise is safe. Firstly, the category of risks is not the same as the category of safety, but a priori relationship between them indicates a correlation and determinacy of risks due to the

entropy. Secondly, a threshold of the fixed sustainability may not correspond with a boundary limit of the tolerated (acceptable) risk impact, defined independently.

We can find similar conclusions saying that the tolerance leads to the safety in Kosterev [51]. He reasonably points out that “the safety is a stay of the system in terms of the tolerated risk”, while the safety condition is a condition of the threat tolerance. Heldman [52] submitted similar ideas. He emphasizes that the risk tolerance is a balance between the “risk conveniences” for the stakeholders, when the threshold is a point of a bend of benefits of active or passive perception of risks, “as the impact cost would be too high, considering a number of benefits we can get”. The risk tolerance in this case becomes an “arc of area the comfort” for an economic agent. Thus, a business system or an economic agent, being sustainable, may find themselves unsafe.

Projectionness in uncertainty transformation into objective risk

If we agree that the safety is an area of the tolerated risk, which “an enterprise is ready to take to achieve its business goals, expressing the tolerance” [53], then it is necessary to consider an issue of *a connection between the sustainability and safety*. Any business system or economic agent instantaneously bear a certain amount of the risks (Note 3) and the cumulative entropy. We know that the dependence of the uncertainty and the risks is a priori in their cascade transformation. A lack of preventive control over the uncertainty is *ceteris paribus*, indicating the direct dependence of the risk value on the entropy. *However, in the development dynamics, the relationship between the value of the aggregate risk and the cumulative uncertainty gains an ambiguous role, describing a special property of the inner and outer part of the economic mechanism by the uncertainty apperception*. Denoting quantification of the uncertainty transformation into the risk describes an existing order in terms of *interpretations for the projectionness*, which experiences changes under an influence of “a few variables, one can even say that the behaviour of certain parts of the system just depends on these few factors” [40], called control “parameters of the order subordinating the system” [54].

This process is certainly not closed, the system has constantly developed and updated. As far as it does so, there are also updates to apperception of the uncertainty. However, this update is not unidirectional: periods of positive self-organisation are followed by moments of its negative effect, when saturation of the system with the risks and the density of their distribution indicates that an arbitrarily small increase in the uncertainty would lead to a considerable increase in the overall risk, and vice versa. As a result, the order parameters, initially affecting the behaviour of the parts of the system, later experience their influence. A circular flow of interdependence between the behaviour of parts and the order parameters of the system implies the available cyclic spiral development model, confirming numerous assumptions of the evolution route within

the business systems. The very existence of a particular cycle in the dependence of its behaviour and a condition of parameters indicate that control parameters of the system order have boundary determination values, going beyond which initiates movement in a flywheel of the system variability, the uncertainty of its behaviour at time of changes to threshold values of the order. And the surprising and inexplicable behaviour of the system is a consequence of these parameters' transformation.

Few factors are hidden that determine the behaviour of the whole system and its constituents. In all this, the quantitative relationship proposed by us between the aggregate risk and the cumulative uncertainty in a research object at any given time enables us thinking that *the high or low projectionness describes the order within the system or a mechanism to maintain it in a functioning mode*. In other words, the development dynamics shows that in some conditions the ratio between the risks towards the entropy is relatively poor (i.e. per unit of the inherent uncertainty, there is a comparatively less damage, with the risk expressed in monetary terms). Nevertheless, in other conditions, the ratio is opposite, showing the relatively high volume of a potential damage per unit of the cumulative or the private uncertainty.

There is an arising opportunity to discuss values to have an analytical examination of a mechanism of the system, develop a strategy and tactics for the direct or indirect control over both the system as a whole, and its constituents. The matter is that *the high projectionness says that the most rationale is to influence the uncertainty*. Owing to this, the risk (in a priori connection with the entropy) will decline more significant *than with the direct control over the risks and threats*. However, the feasibility of preventive control over the uncertainty with the relatively high projectionness faces limitations from changes to the entropy, as there is an objective limit for self-organization and manageability.

The question of the fixed sustainability and the safety condition has also remained open. If we assume that the hypothesis is correct that the safety condition is impossible without the available sustainability, it would be rationale to say that *the risk tolerance depends on a value of the uncertainty tolerance*. However, we think that the found projectionness in the mechanism suggests that the value of the overall risk due to the available uncertainty is produced at any given time with a different degree of determination.

Connections and mechanism of cyclic motion of uncertainty

Uncertainty cycle model

In typing of the uncertainty our basis is a classification proposed by [40], who identify the uncertainty of the 1st kind, which refers to the (external) environment. There is the uncertainty of the 2nd kind, that refers to a choice between managerial decisions in decision-making. There is the uncertainty of the 3rd kind, which refers to the future

implementation of management decisions. As pointed out by [40] in a quite reasonable way, the uncertainty of the 2nd and 3rd kind are indicators of the system self-organizing. However, to our opinion, such a classification requires some clarifications; the matter is that the mentioned researchers only consider a process of making or generating the uncertainty linear.

Held research have allowed assuming the cyclicity of the process, resulting in an objective need to designate a liaison, closing a chain. A new type of the uncertainty that appears at the end of the first cycle is the uncertainty of the 4th kind, called *variationsal*. We introduce the “*variationsal uncertainty*” concept into scientific use to present the uncertainty in a change to

parameters and conditions of a business system. Etymology of the concept is associated with Latin expression for variability - *vertibilis* and *variabilis*. It became the basis for our definition. We assume that *variationsal uncertainty* makes changes to a condition of the environment, producing new quasi-conditions that are a result from variative implementation of made managerial decisions. Each new cycle begins with the environment uncertainty that acquires characteristics that differ it from its condition in the previous cycle due to the contributing uncertainty of the internal and external factors (Figure 3).

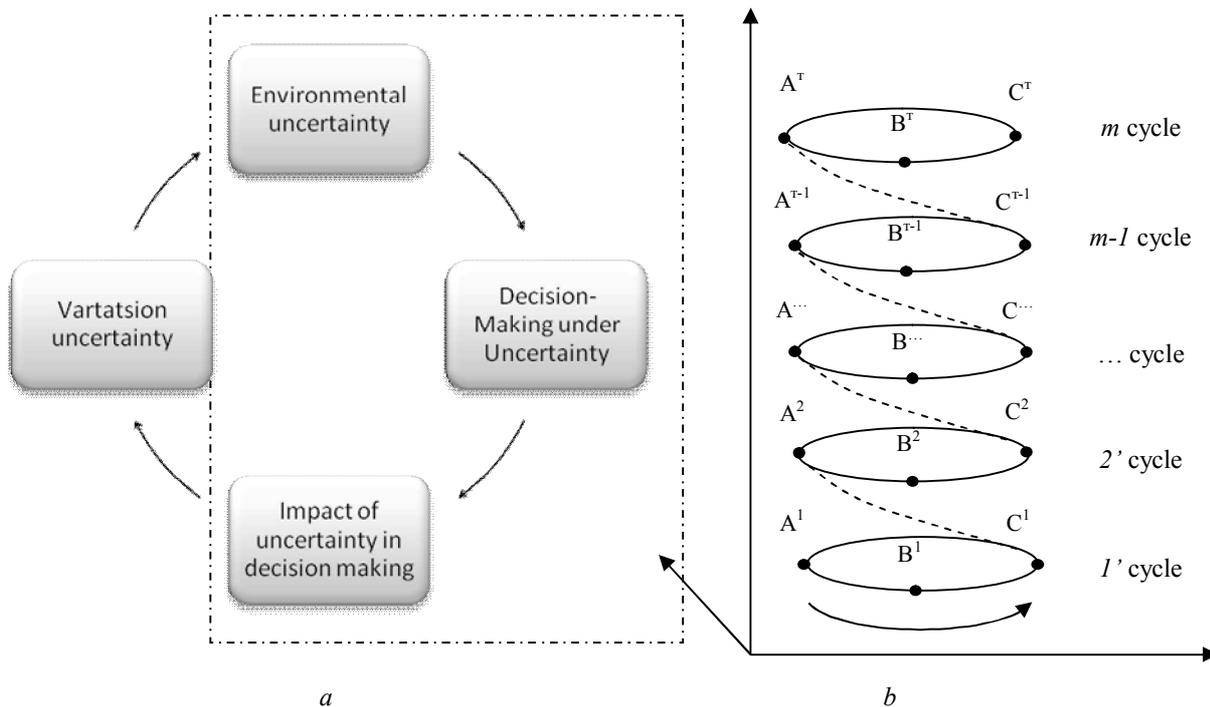


Fig.3. Uncertainty cycle model (*a* – for one cycle, *b* – in dynamics for many cycles):

□ – system uncertainties for one cycle; A – the environment’s uncertainty (1st kind); B – decision making uncertainty (2nd kind); C – uncertainty of future decisions' consequences and their future implementation (3rd kind); - - - variationsal uncertainty (4th kind)

The uncertainty cycle model submitted by us for an academic discussion, visualizes a dynamic process of the uncertainty transformation, where an initial change begins with the environmental uncertainty and ends with the variationsal one. As a result, the system goes into another condition. A graphical representation of the model does not cover all directions in activities of the subject and therefore has quite a simplistic view. Methodological ideas, expressed in the uncertainty cycle model, match in full the provisions of the ECLET theory (Emergent Cyclical Levels of Existence Theory, i.e. the theory of natural cyclical levels of existence). Graves [55] is its founder. The ECLET theory was derived from theoretical ideas and empirical studies by Graves on the spiral development of the society. Beck & Cowan [56] used the concept of “spiral dynamics”. They were Graves's successors,

who later recorded the provisions of the ECLET-theory. With regard to business systems, the ECLET-theory implies, according to Van Marrewijk [57], that “... all organizational forms, ultimately, must respond to the context of the environment of an activity at risk of neglect or even extinction”.

Combi-recertative and intro-recertative connections

Turning to the theory of the uncertainty cyclical transformation, we can identify the manifestation of unusual patterns. We think these points need a detailed explanation. The research has led us to a conclusion that the uncertainty in managerial decision making to some extent determines the uncertainty of the consequences from such decision. Thus, a change to the

uncertainty is not only a consistent, but also a multi-level process. The multilevel nature of the uncertainty cycle (to the same extent, of the certainty in mirrored events) implies that the uncertainties of the 1st and the 2nd, as well as the uncertainties of the 2nd and the 3rd levels, make a pairwise connection. Such a pairwise combination of the uncertainties has been called combirecertative. In other words, the uncertainty of the first step within a cycle, i.e. the uncertainty of the 1st, 2nd and the 3rd kind can form two combirecertative connections. A determining connection may be presented as a diagram, where the spiral cyclic model of the uncertainty is represented as a vector.

The second step of the cycle, i.e. a transition to the uncertainty of the 4th kind (vartational) makes a final pair of connections, when consistently and earlier implemented uncertainties of the 1st, 2nd and 3rd type lead to the final uncertainty within a cycle. This connection is the third combirecertative pair within a cycle. However, considering the case of several cycles of the uncertainty implemented, we have noticed another available pairwise connection that unites the final uncertainty within one cycle and the initial uncertainty of the subsequent cycle, and we have designated it as introrecertative.

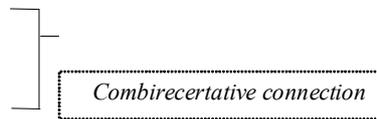


Fig.4. Vector of sequential change to uncertainties in cyclical motion

Figure 4 clearly shows a turnover of factors that cause a genesis of the uncertainty of the next kind (uncertainty trans-factors) and make a system of combirecertative connection between the uncertainties making three cis-elements within a cycle: A_i-B_i , B_i-C_i and C_i-D_i .

Returning to the “tetraplet risk” model (see Figure 1), one can pay attention to obvious conceptual similarities between the given representation of a successive change to the uncertainties in their cyclic motion and components of the mentioned model. In the both cases, there are intermediate elements, which are reduced to factors initiating and contributing into the development of the conversion process.

Within the vector of the sequential change to the uncertainties in a cyclical motion, each cis-element is a combination of two uncertainties, for which it is specific to show the combirecertative connection. A prerequisite for

formation of the cis-element along with the interdependence is an order of their turnover, as defined by the natural logical precedence in formation of the uncertainties.

In an annotation to the model, it is worth mentioning that the combirecertative connection between the uncertainties is nothing else but a result from the manifestation of a number of factors that initiate the system “motion”, transforming the consequences from the existence of one uncertainty into the new uncertainty. A set of trans-factors of the uncertainty for each cis-element is unique, as a nature of the uncertainties of each type is quite specific. The commonality within the proposed method allows perceiving all elements as an integrated system and, accordingly, providing preventive management, paying attention not only to individual components, i.e. individual values for the uncertainties of each type, but also to their overall cumulative impact.

A special place within the vector of a sequential change to the uncertainties belongs to the introrecertative connection that occurs because of new quasi-conditions (transfactors of a change to cycles). This undoubtedly affects characteristics and a value of the initial uncertainty of the next cycle. In fact, the introrecertative connection does not so much gather the uncertainties, as the cycles. This fundamental difference has allowed us differentiating the connections between the elements: the combirecertative connection describes subordination between the uncertainties within a cycle, while the introrecertative connection describes external processes of interdependence between cycles that form a spiral branch of the business development.

Conclusion

To summarize, a methodological supplement to the typology of the uncertainties has enabled us presenting a scientifically valid version for the uncertainties cycle model that develops following the spiral law. Object extrapolation of the ECLET theory to the cycle model has confirmed the assumption. The uncertainty vector that unfolds the spiral into a linear sequence provides an opportunity to identify and describe connections between the uncertainties. To do this, within the “vector”, we propose to make an analytical decomposition of components, but not from the objects’ viewpoint. Instead, we propose to make it from the viewpoint of the processes that take place in the cycle of the uncertainties. Our finding is a number of new abstractive descriptors used and introduced into scientific use. They might later get their clear methodological framework. Firstly, the “cis-element” concept, that presents the pairwise dependence and logical interdependence between the uncertainties. Secondly, the “combierecertative connection”. We introduce this concept to differentiate connections between both the uncertainties and the cycles. Third, the “introrecertative connection”. It appears between the variational uncertainty and the environment one of the subsequent cycle that actually allows identifying the connection between the cycles and ensure the continuity in institutional conditions to implement a business mechanism within the system.

Conclusions of the impact of the uncertainty and the risks on the economic sustainability and safety have led to a reasoned statement that even in cases where the uncertainty is constant, *ceteris paribus*, *the dynamics in order parameters of the business system embodies every time a unique amount of the risks that match the given uncertainty. Therein a theoretical and methodological sense of the projectionness seemingly lies, which allows, among other things, stating that the sustainability condition and the safety condition are not complementary. However, assuming that there may be a probably known mechanism projectionness multiplier, which in a certain interval of evolution remains unchanged, the risk tolerance is possible to be evaluated applying the product of the multiplier and the entropy threshold level that matches the achievement of the time-independent sustainability.*

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Notes

Note 1. We tend to think that the aprioristic risk really and directly depends on the uncertainty; i. e. with an increase in the uncertainty, the risk grows too. The incremental value may be changed and depend on elasticity of risks in relation to the uncertainty. Posterior development, which assumes certain control measures applied to the uncertainty, may destroy the direct dependence.

Note 2. The logic of the “economic justice” here refers to a condition, described with an achieved balance of the parties’ interests (potentials of economic powers of interacting actors in the economics).

Note 3. The totality of risks here refers to the total cost of the potential damage from the manifestation of events and phenomena of the uncertainty nature in all of its forms.

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