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Kuzmin, Evgeny A.

Ural State University of Economics

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## Fundamentals in Systematics of Uncertainty Management Theory

**Evgeny A. Kuzmin**

*Research Fellow (Econ.), Ural State University of Economics, Russian Federation*

*Email: KuzminEA@gmail.com*

### **Abstract**

*It is believed that a spontaneous nature of the uncertainty and its conceptual ambiguity reject a conceptual opportunity of management. Such a disposition, that has become a prevailing stereotype for the perceived uncertainty, leads us away from a productive solution to a number of pressing challenges to maintain economic safety and sustainable development. In opposition to this, in the paper, there is a thesis of administrative acceptability submitted for an academic discussion, methodological implementation of which is in line with a number of fundamental paradigms. It is a disclosure and systematization of uncertainty management principles that is a focus of the paper. The paper pays a special attention to an issue of perceived approaches to management, which have become traditional so far. There are also refined structural characteristics of the uncertainty functions and specifics of the management process.*

**Keywords:** *uncertainty, risk, uncertainty functions, sustainability, uncertainty management principles.*

### **1. Introduction**

Research on the uncertainty with good reason has not only taken a central place in economic science, but also in other fields of knowledge. The profit, according to F. Knight, generated from the uncertainty of conditions and environmental circumstances, is a clear evidence of a prevailing role of the uncertainty as an element of a structure within an economic mechanism. A focus of stimuli of a growth and a productive development is mostly on how the system is able to balance between the rigid determinism and the uncertainty of its own future. Being at a turn of extreme positions, the system is destined for its gradual wilting under a weight of complete predictability, or will be exposed to risks of an evolutionary gap. It is obvious that a search for conditions of a harmonious existence of the economic system cannot do without a research in the uncertainty management. It is a direction of the theory scientific systematics, under which this research was drafted, aimed at grounding the uncertainty functions, elaborate principles and refine specifics of a target influence upon the uncertainty.

We can state with confidence that the uncertainty management has a paradoxical nature. In as much as the very possibility of an influence on events and phenomena, a nature and essence of which have not been entirely known, the variability of their uncertainty level is questioned. However, we proceed from several assumptions that show the opposite thing. Firstly, goals for a complex economic system can be ambivalent. On the one hand, the system can be committed to the uncertainty. On the other hand, functioning goals may imply a decrease in the uncertainty (hence, being non-committed to the uncertainty). Secondly, given that the economic system seeks to continue in its own existence (keep its homeostasis), an idea of its creation involves maintaining a certain degree of sustainability and manageability. Considering the entropy, this level should be below a limit, overcoming which will result in the system destruction. Thirdly, taking into account the previous assumption, we conclude that a symmetric condition of the

system will be its existence above a certain level of the negative entropy, overcoming which will evidence emerging self-organization.

A rationale of a target influence upon the uncertainty is undoubtedly achieved by meeting reasonable management principles. Terms deriving from principles, establish a framework of acceptability and tolerance related to both the uncertainty, and possible risks. They, in turn, make objective limitations to a choice of a subject for a target influence, where a result from applying measures, tools and management mechanisms will be justified in terms of extraordinary efficiency – in measures to maintain economic sustainability and security. The eccentricly perceived uncertainty and conditions of risk tolerance, characteristics of the security and sustainability themselves lead to a need in development of those principles for the target influence upon the uncertainty, which would correspond with the conventionally established principles of general management.

## **2. Review of Literature: Uncertainty Meaning**

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. However, this is only a small share of ideas. Conceptual pluralism shows all the multifacetedness of the uncertainty phenomenon and at the same time an absent conventional agreement. It is this sphere of knowledge, to which Mooslechner, Schuberth and Schürz pay attention, supporting an idea that, “the uncertainty includes features that achieve disciplinary limits” (Mooslechner et al., 2004).

It would not be an exaggeration to say that *any evolutionary motion is a development that overcomes the uncertainty*. A hypothetical rejection from the uncertainty makes routine determinacy of the future, a movement towards which does not only lose an interest, but also its vital necessity. The uncertainty serves as an “objective property of economic processes” (Katchalov, 2002) and, inherent to all the phenomena, naturally “appears on a surface ... on the one hand, as a technical and economic category, while on the other hand, a social and economic one” (Gromeka, Maslennikov, Fedorovich et al., 1974).

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 mentions multifacetedness 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” (Kramer, 2004). 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 (Berger & Calabrese, 1975). 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 (Babrow, Kasch & Ford 1998). With the information considered as a probabilistic characteristic, it is a structural concentration of the reliable information (case frequency), on which the total uncertainty depends. It at the same time may be set against (but not refuted) an argument about a dependence of the uncertainty value on freedom in a choice from an ensemble of alternatives (Shannon & Weaver, 1949). Having become dogmatic, the

paradigm that a number of freedom degrees directly influences a level of the uncertainty is only valid when probabilities of outcomes are equivalent.

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 (Berger & Bradac, 1982). In other words, to the same extent, which makes difficult to judge on the likelihood of various actions (Ford, Babrow & Stohl, 1996). As a result, the uncertainty depends on an inability to predict or explain the economic reality on the ground (Salem & Williams, 1984). At the same time, the uncertainty relates to various aspects of the information, their perception regarding internal or external sides (Brashers, 2001), the absent or distorted information, its quality and its structure; its potential for interpretations and associations (Babrow, 2001); a subjective and objective information value, which produces the uncertainty in a choice of an alternative with other criteria besides probabilistic ones (Brashers, 2001). Despite all the consistency of these aspects in the ambiguity appearance, a search for a logical meaning in a web of the logic information units reduces a degree of the uncertainty after each case when cause-and-effect regularities have been found (Mokros & Aakhus, 2002).

Nevertheless, it would be an exaggeration to say that, “the information is a concept directly opposite to the uncertainty” (Katchalov, 2002). Our speculations have shown that the information completeness is a factor able to reduce the uncertainty. It is important to understand that this will be only fair for the information that is true and correct. Otherwise, a volume of information flows will contribute into a disorder and chaos growth. 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.

### **3. Methods: Uncertainty Functions**

#### *3.1. Related Functions of Risk and Uncertainty*

Significance of the uncertainty as an economic category, like for any other, is disclosed in those functions, which it performs. A review of scientific literature allows concluding that there have been almost no papers with enough attention to the issue. A discussion is mostly limited to a definition of risk functions (Karlik, 2009; Katchalov, 2002; Zhivetin, 2008) and their assignment to the uncertainty category, which is not true. Only several publications abroad mention functions that the uncertainty bears in economics. In the interests of the research, we consider practicable to describe in details some of the main among them.

Traditionally, functions of economic categories (e.g., the risk and the uncertainty) are considered through a prism of their analytical, innovative, regulative and protective roles, as indicated by many scientists. Thus, summarizing risk functions, Katchalov tends to an idea that all the abovementioned functions are applicable to commercial activities. Referring to Algin (1989; 1991), Golubeva (1993), Lapusta and Sharshukova (1996), as well as to other researchers, Katchalov concludes that such functions appear in terms of the uncertainty, as the risk in all respects acts as an indicator saying that the environment is unstable in terms of ongoing changes. A priori inseparability between the risk and the uncertainty suggests the idea of mutual reception for methods to describe a general economic value per category. *As a result, the uncertainty is between two functional areas.* There, on the one hand, there is the information, objectively

integrated into the concept of the uncertainty, while, on the other hand, there are risks manifested owing to the same uncertainty.

### 3.2. Display Function

The considered functions of the information suggest that the uncertainty as an economic category is indicative from its origin. Moreover, the uncertainty evidences at least of several aspects that directly describe the tranquility in the business system, including:

- Information sufficiency;
- Available sustainable relations that encourage decision-makers to choose between available alternatives either consciously (goal-oriented) or unconsciously (self-organizational);
- Simultaneous accountability of the uncertainty for the sake of the system's safety in economic risks and its stability for the sake of tolerance and a ratio of different types of the uncertainty.

Being a fundamental issue, the uncertainty is “an essence of administration” (Thompson, 1967) in overcoming a force of gravity towards it. A departure from organizational consistency increases the uncertainty; however, maintaining an order and its harmonious structure require management resources. It seems that if we abstract away from objectives and a purpose of existence, it would be easier to surrender, abstain from the management, but a result of this can be a collapse and self-destruction within the system. Herein we see already known scientific issue of a search for an optimum in knowledge and obscurity, “a search for the golden mean between two extremes” (Grote, 2009). Either the certainty or uncertainty are, ultimately, able to destroy the familiar world. The first one with a slow decay, while the second one in an outburst of sudden aggravation of casualty, where an outcome is a decay and a death, equally accidental.

### 3.3. Inspiration Function

Referring to a nature of an income origin, as well as the fact that it is the uncertainty that supports the evolutionary development, preventing it, on the one hand, from submerging into a routine of the certainty, and, on the other hand, protecting from a self-destruction disaster, an inspiring role of the uncertainty becomes clear. The inspiration function is born in a need and even a demand to “struggle with the uncertainty” (Dunn, 2011) according to Galbraith's economic doctrine (Galbraith, 1958). A forced resistance and a search for a balance between the order and the chaos produce an influence of “the uncertainty on a level of the economic activity” (Bibow, 2009), which barely confirms the author's conclusion. Such influence is presented at least in two directions: theoretical and practical. The theoretical level explains the importance of maintaining the growth momentum, while the practical comes down to maximizing the effect, or rather, the profit or the economic benefits with risk minimization.

*The inspiration function of the uncertainty does not only touch aspects of the economic activity, but also serves as a condition for an emergence of self-organization.* As far as at the turn of the sustainability and safety within the system an ability to self-adjust the inherent regulation intensifies, as well as an ability to debug internal processes, eliminate errors in their separate course and the coherent substitution. One may assume that it is the time, when the updated institutional order scheme appears, including an institutional superstructure. To our mind, the uncertainty intensification and an increase in its importance point out to the

arrangement vulnerability in the valid economic system. It seems that only in time of the highest confusion and chaos with a prevailing share of organizational errors and clearly visible sectors within the economic system, which have not survived under an onslaught of diversity and complexity, elimination of outdated rules and regulations and introduction of new institutions in the public life has the greater success probability.

### *3.4. Design Function*

A non-trivial approach to the uncertainty reveals another available function, the design function. Several provisions here call attention. They combine an understanding of the uncertainty as a choice between affordable scenarios. Another matter calls attention too, that the uncertainty means ambiguous outcomes from events and phenomena. From our point of view, it quite clearly suggests that the uncertainty, being in an opposition to the future determinism, makes it possible and admittable to select an own line of development for the business system or the economic entity, solving the valid conflict. There, on the one hand, there is an ensemble of alternatives, a choice between which is one of many facets of the overall design of the future. On the other hand, there is freedom of each alternative implementation, which is owing to probability has been only brought nearer to a desired, but not ensured outcome.

As a result, *any designing of the future based on the uncertainty is the oriented designing, different from an idealized model*. It is worth saying that the uncertainty function, expressed in drawing up a mosaic of the economic reality, is partly a known understanding of the forecasting function, but with a difference that the forecasting design for the uncertainty itself is an independent scientific matter. Its solution is likely in found trends and a usage of that important feature in the uncertainty behavior, which involves “pushing away” from absolute and insurmountable limits in dynamics. We believe that it is the uncertainty that allows with some certainty forecasting the future going of socio-economic processes.

Thus, knowledge of outcomes from alternatives in the inevitability of action results will contribute into their rejection, hence, the rejection from their own development: the future will find itself doomed to extinction in the routine. Thus, the design function and a role of the uncertainty come down to maintaining the viability of the society with all the social, cultural, political, economic and other attributes of its life. At the same time, we can associate preservation of homeostasis within the business with self-organization, which seeks to keep on the move the entire functioning complex in a tireless desire to continue the life unchanged.

## **4. Solutions: Principles of Preventive Uncertainty Management**

The uncertainty phenomenon is one of many others, which fully presents its uniqueness. A nature of the uncertainty distribution in the economic environment, specifics of its origin and extinction, a mechanism and processes of self-organization and its typological conditioning allow saying that the uncertainty management, to an equal extent with that of the certainty management, is subject to unique and to the same extent distinctive principles that produce in the end a kind of an institutional order. This conclusion is largely imposed with the ambiguity of the conventional doctrine related to the universality of general management principles, emphasized, for example, by Woodward (1970) and Dale (1969). Thus, there is a need in completing a methodological framework in the uncertainty management theory with a need expressed in this case in establishment of a system of principles. They are they in the specifics complement the

basis of principles of the general (common) management, making a kind of the superstructure. Grote concluded the same, *“it is quite clear that there are very diversive requirements to an entity in terms of the uncertainty, they face requests to turn the uncertainty into business opportunities”* (Grote, 2009).

#### 4.1. Tolerance Principle

It is known that there is a prevailing position among scholars and practitioners that means that there is a focus in the risk management system implementation on minimization of risks. This is by the way also shown in the uncertainty management (at least in those publications that indirectly say that such management is conceptually admitted). But the management itself should not be limited with one direction of its influence. Here, on the one hand, Kramer calls attention to the *“principle of the uncertainty decrease, used for the research ... of a connection in organizational contexts ...”* (Kramer, 2004). In addition, undoubtedly, a decrease in the uncertainty increases the organizational consistency and sustainability within the system. However, to the author's mind, *management actions are determined by commitment (tolerance) to different degrees to risks and the uncertainty, with both negative and positive value.*

From here, we can conclude a decrease in the entropy level and hazards from potential risks is only one possible exposure. A tolerance level detects reserves concerning changes to a degree of the risk and the uncertainty distribution in the environment of the subject, up to their increase when and only when it would be rational (acceptable) in terms of targets. Morden confirms this concluding that *“with a high level of the uncertainty avoidance [tolerance – Author's remark], an enterprise believes that control strengthening may reduce the uncertainty and unpredictability associated with events”* (Morden, 2004). Yoe also considers the tolerance a principle of the risk management [Note 1] (*“acceptable and tolerable levels of risk”* (Yoe, 2011)). It seems that in the uncertainty management, the tolerance principle should have one of central positions. *It is this commitment principle, which defines boundaries for the active and passive management, which finally defines the vector of management activities to increase or decrease the uncertainty and risks from the point of view of moment and dynamic performance.*

#### 4.2. Projectionness Principle

In an interdependence of the risks and the uncertainty, herewith manifested multiple effects are another essential point. An impact on the uncertainty (or the risk) in a logical and natural way tells on a degree of implementation of a remaining share [considering the structural connection *“uncertainty – risk”* or *“risk – uncertainty”*], even when regulation tools have not been applied to the latter. Emphasized in these trends, the indirect management is a subject for a detailed research. We are sure that such a manifestation of the management symbiosis has been entitled a features and a principle of projectionness. *The projectionness seemingly imposes a scientific objective of “the management synthesis that does not only stabilize the system regarding a reference point origin of the environment of conditions, but regarding the certain invariant set”* (Efimov, 2005), *where the shared or integrated management of the uncertainty, risks and a response to manifested threats will achieve the highest level of favour.*

It is important to explain a nature of the projectionness in the management system construction. We think that *the projectionness within the economic system presents its inner abilities to perceive (appercept) the uncertainty, an extent, to which an inherent level of the*

*uncertainty will contribute into risk appearance. With almost continuous and instant changes, the projectionness bears the uniqueness of a space-time point. Each time, the same uncertainty will produce a range of potential risks unique in strength and diversity.*

Discussing the projectionness as a principle, more exactly, as a principle to account such feature of the economic system, and more often its mechanism, it is worth saying that it has a dual manifestation. On the one hand, there is an a priori connection between the uncertainty and the risks. Here, *the projectionness points out to a primary ability of the economic mechanism to absorb the uncertainty, to dissipate it in processes of self-organization, a conscious or unconscious target influence. The risk in this case is a product of the residual uncertainty.* On the other hand, the hypothetically known numerical value of the projectionness multiplier allows estimating a tolerable or acceptable level of the uncertainty based on a similar level of the risk tolerance, like, by the way, vice versa. Such a solution in this way is very productive to measure the complex tolerance.

To add to the abovementioned points, one should pay attention to administrative aspects for the projectionness. Assuming that there is the *projectionness multiplier*, it is clear that the efficient management is able to bypass a direct response to disturbance in an indirect impact caused by a preconditioning mechanism. Thus, *a low or high multiplier value points out to the advisability of management regarding either the uncertainty, or the risks.* Moreover, which is not excluded, points out to the possible shared management of the risks and the entropy to a certain ration (following ideas (Wittich, 2000) on the management quality).

At the same time, there is another and poorly explored side of the projectionness. People think that the risks arise from transformations to the uncertainty. A priori sequence of the transformation has a clear linear nature. However, this vector among other things is connected with a feedback bridge. However, the most amazing here is an opportunity to manage the mechanism projectionness itself. *By a feedback, a target influence on the risks in the new cycle of the uncertainty consequent conversion establishes another level of incoming dangers and threats. The uncertainty is getting settled down in an attenuating cascade of risk development.* Thus, there are changes to the projectionness itself that with a new spiral cycle reduces a degree of the uncertainty and unpredictability apperception for an economic mechanism. Another hypothesis is getting logic and scientifically sounded. It says that the *uncertainty management makes changes to the valid projectionness, while the risk management makes changes to its future power.*

By the way, the system uncertainty does not only have the external projectionness, but also the internal one. The external projectionness relates to formation of subjective and objective risks in the environment condition, decision-making and so on. The internal projectionness reveals the content of the vector of a consistent change to the uncertainty. Either in case of the risks, when a cycle is closed and a changed condition affects the entropy in the new stage of a wave motion development, or in terms of the uncertainty, an increase or a decrease in a degree of manifestation for one type provokes a corresponding change to the other. The effect of the projectionness of various types of the uncertainty is to the author's mind explained with available pair connections, i.e. combirecertative and introcertative (Kuzmin, 2012).

An accounting principle for a property of the economic mechanism by apperception of the uncertainty inherently divides the management into two units, i.e. regarding the system and non-system uncertainty. In the both cases, management tasks are subordinated to an objective to maintain and preserve the sustainability and safety conditions. Moreover, the dualism in the principle itemizes the process of the management itself. As far as the system's uncertainty is not



homogenous and is a cumulative value, the management must finally come from the circumstances that an impact on the given type of the uncertainty does not only influence the risks that match it, but also other types of the entropy, and consequently other risks related to them. Thus, *the overall economic sustainability and safety are a result of the selective management of the uncertainties, where a choice of the entropy [Note 2] plays a significant role*. It is important to understand that the soundness and rationality in the uncertainty management are a result of the compared projectionness power. This, apparently, includes an essence of the principle that optimizes the integrated management, giving a reasonable basis. This is where the risk management intersects with the uncertainty management, challenging appropriateness of each of them. A rejection from this principle or its ignoring destructs the coherence in management results and is able to lead to destabilization of the environment (to the “aggravation mode”).

#### *4.3. Uncertainty Boundedness Principle*

The economic system seemingly has a certain threshold of the insurmountable uncertainty contained in a difference between the absolute and dynamic limits. Target impact on an order within the system with the found uncertainty above that threshold makes it impossible to maximize the effect and use resources in a perfect way. The emphasized finiteness of the uncertainty was determined with a limited range of information characteristics for complex systems, which implicitly make a kind of law (Gurevich, 2007). In summary, the provisions of such law are presented through finiteness of the information, where the truth remains relatively unchanged while a system or an object retains their original form. Each new evolutionary stage of development contributes previously unknown parameters into the pattern, thereby increasing a limit of the true information and the absolute limit for the uncertainty.

In the light of the uncertainty management principles formation, the information preservation law identifies a condition of the constant balance between the true knowledge. This, coupled with their real constraints allows referring to a key principle – *the uncertainty boundedness principle*. Justification for the principle lies in boundary abilities of self-organization. The principle, in fact, establishes barriers in vibrational changes, in which the subject or the system wander across the expanses of the system set with these limitations to the multidimensional economic environment. They seemingly repel from established borders formed for the ultimate uncertainty and certainty, giving a kind of forward-looking idea to such a movement. Identification of trends in the dynamic development can rightly be considered the “main management mode, i.e., forecasting management” (Grote, 2009). In the uncertainty aspect, we can assume that the opportunity to predict it was excluded in advance (by the vast majority of academic papers). This, as we believe, is an essential omission.

#### *4.4. Interoperability and Compatibility Principle*

A change to the uncertainty in a management process may be implemented making or destructing organizational prerequisites. Tools of a target influence are based on an assumption that the uncertainty and certainty phenomena are structurally dependent on each other. Convincing arguments in favor of the mentioned feature are in Beugré’s paper, who concludes, “the uncertainty in the management theory uses two principles, interchangeability and effect primacy that explain a cause of caring of justice ...” (Beugré, 2007). Based on this, the zero tolerance is clear as well as the conceptual inability to co-manage unidirectionally both the

uncertainty and the certainty. Otherwise, in a corpus of true knowledge a gap appears that does not fall into any of the known categories. All this allows making *a dual principle of interoperability and incompatibility for the multi-directed entropy (uncertainty) and negentropy (certainty) management*.

Another matter has remained relevant, that of simultaneousness or a progression of actions included in the multidirected management. A solution is within the resource adequacy, assuming that management is limited from below with a volume of resources required for this, while from the top with a value of an expected effect. When there is no limit from below, and the management effect meets the development requirements, the question of simultaneousness of the multidirected impact is solved by itself.

#### *4.5. Flexible Adjustment Principle*

The integrated management means that the influence on the uncertainty can be replaced with methods that are more efficient to maintain sustainability and safety. A choice has its focus on management purposes, involving at least two basic scenarios: the uncertainty increase or decrease. The business system in terms of a reject from the uncertainty repression balances at an edge of viability, which to some extent is a prerequisite for self-organization. Kadomtsev had a similar position thinking, “for self-organization to start within the system, it must reach a boundary of sustainability” (Kadomtsev, 1999).

In a typical case, the system is constantly maneuvering between its “degradation on its way to a chaotic motion ... and self-organization with the structures getting more complex...” (Ibidem). However, maneuvering follows a path to establish some parity in parameters of the autonomy and control (Grote, 1997; Grote, 2000; Grote, 2004), sustainability and flexibility (Thompson, 1967; Orton & Weick, 1990; Parsons, 1960), diversification and integration (Lawrence & Lorsch, 1967; LaPorte & Consolini, 1991) and many others diametrically opposite in manifestations of the management process characteristics. This allows speaking of an invariance for an image of the stable organizational structure, where effects of a change to a management parameter are compensated with counter effects from the other, such as flexibility and diversification [Note 3]. Their pairwise combination points out to heterogeneity in final generation of the complexity and the uncertainty.

With its basis exactly on a criterion of sustainability, the flexible adjustment principle presents a not simple mechanism of moving balancing in a challenge to repress the uncertainty. The identical continuity in the level of the uncertainty in this case can be achieved each time with a unique combination of management parameters. By the way, the uniqueness of a configuration is based on irreversibility of ongoing events and processes, which “is a universal nature of the world ... and it would not be an exaggeration to say that we have immersed in the irreversible progressive evolutionary world” (Kadomtsev, 1999), as Kadomtsev reasonably points out.

#### *4.6. Simplicity and Inertia Principles*

Ingenuity of the flexible adjustment logically faces a condition of simplicity, with which the uncertainty is destroyed with the everyday reality. Gurevich gives to a sufficient comprehensive definition for the importance and a role of simplicity (Gurevich, 2007), quoting from Wheeler. Wheeler’s remark is an undeniable statement that among all the principles, which can be identified, it is hard to imagine the more attractive one, than the principle of simplicity. And

among all kinds of the motion simplicity none is as perfect as the alternative “yes – no” or “true – false” (Wheeler, 1962; Wheeler, 1988; Wheeler, 1998). The simplicity principle in management, and specifically in the uncertainty management, is getting a necessary key to eliminate consequences of the management itself, when a target influence, being complicated in its implementation, makes the new uncertainty and only aggravates the process. Obviously, the uncertainty management should be simple and clear. This is the truth in management confirmed with practice.

At the same time, the development irreversibility and its progressive and evolutionary nature leads to a non-stop increase in complication of forms of business interaction and institutional arrangement of the system, a growth in communication channels and, ultimately, the information flows. Juxtapositioned simplicity and complexity make inevitable if not the destruction, then at least the crucial transformation of the business system under the weight of its own uncertainty. The management in this case is focused on maintaining the long-term sustainability. A path of such management goes through strong feedbacks, where a reaction and a result of a target impact have a low-value time lag. This reduces a delayed effect from both the administration and the uncertainty inertia.

Thus, *another principle of the uncertainty management appears that considers inertia specifics*. It is this principle, based upon which the target influence in its value should exceed the conventional level of the uncertainty, though modestly, to which it is applied. Causes of inertianess, on the one hand, are focus on boundedness of a feedback velocity. Even an expression perfect fullness of management and a response does not exclude and cannot exclude a time lag. On the other hand, the uncertainty function is nonlinear (logarithmic), where the absolute limit is set with a number of alternatives. An obvious consequence from this is a conclusion that with an increase of possible outcomes, an increase in uncertainty limit happens with a decay. At the same time, a movement in an opposite direction results, by contrast, in an increase in the specific value of the limit entropy. From hence, the inertia effect appears accompanying both a growth and a decrease in the uncertainty.

#### *4.7. Principles of Management by Points of Uncertainty Concentration*

To continue research on an effect of a feedback to the uncertainty management, we should refer to Thompson's ideas, who emphasizes the heterogeneity of its distribution within a single organizational structure. According to him, “complex entities as open systems [permanently, but at the same time “indefinitely” – *Author's remark*] face the uncertainty ... and therefore require [opposite] the confidence and certainty” (Thompson, 1967). However, the most amazing is that Thompson concludes that there is a kind of *entropy density*, as different parts of an organization face the quantitatively various uncertainty. This does not only refer to a diversifying ability of its perception (in a light of a special feature of the projectionness), but also management opportunities.

Thompson's viewpoint has found its representation in Gurevich's paper. He makes a rule of an information ban and makes the following conclusion: the law of the uncertainty conservation prohibits a change to it within a subsystem of an isolated (closed) system with the unchanged uncertainty in other parts (Gurevich, 2007). The uncertainty is actually not heterogenous, but its “correction” does not mean a need in a compensating correction. Suppression of the uncertainty through feedbacks generates a momentum to smooth it in other parts. On the one hand, owing to the projectionness, on the other hand, owing to the hierarchical

harmony at an enterprise. Herewith, the internal uncertainty of the economic system is flexible, its preservation, and even consolidation, seems to be unproductive [Note 4]. As a result, the management efficiency depends, among other things, on a requirement to take into account density and heterogeneity. Formed in it the *management principle by points of concentration* emphasizes relevance of a selective influence on the uncertainty. Of particular importance is identification of its areas with an increased density (saturation).

#### 4.8. Principle of Management Asynergia

An object-subject side of the uncertainty nature refers us to the already indisputable fact that the intensity of a side effect of the uncertainty with its different relative and absolute levels differs by its volatility. *A power of wave propagation of the uncertainty with an initially high or low pulse push remaining in an area of the entity comfort is seemingly have almost identical results in an organic and almost simultaneous decay of the uncertainty influenced by a weight and a force of self-organization.* The emphasized feature in the uncertainty development has at least two points that deserve attention to support the author's position. Firstly, the management faces a barrier in bringing a level of the uncertainty to an acceptable limit, after which an inner capacity for self-organization will be able to eliminate the chaos of free roaming ensuring stable and sustainable economic development. Secondly, it is important that the uncertainty, being nonlinear, has an uneven distribution, hence, quantitative values and their qualitative interpretations are subject to a particular form of gradation (scaling).

An obvious and quite natural consequence from this will be formation of a principle, which assumes a certain commitment in a volume of the uncertainty management to achieve the tolerance for its values. The principle itself should be defined in a slight different way, displacing a focus on a changing power of the management. It seems that in this we achieve traits of the selective action rigorism. Then such available patterns and effects can be reasonably summarized in a single paradigm called the principle of conditional asynergia in the uncertainty management with the canonically known force threshold for the regulating reaction.

### 5. Conclusion

Summarizing, we can conclude as follows. The uncertainty is not only quite a complex phenomenon in the economic, but also in any other aspect of the social life. Having analyzed the sources for the uncertainty and the functions it performs, we can state that the uncertainty is a special economic category. Explanations for such phenomena as the risk, stability, safety and sustainability fall to the share of the uncertainty. It is clear that in other papers, there is no detailed and clear concept for the uncertainty management process and there is practically no descriptions for productive interventions. In order to substantiate, it will be useful to give a working definition that will allow discovering a nature of the process and presenting the author's view on how to solve the issue. Thus, the *uncertainty management within the business system* is a process of conversion and administration of the available information, including producing (generating) new knowledge, aimed at keeping, minimizing or maximizing the uncertainty of internal events and phenomena, as well as the system as a whole.

The uncertainty management features are undoubtedly diverse. Further development of this range of problems requires an in-depth study of a number of scientific challenges that are beyond the scope of this paper. However, in the discussion above, we have referred to the most

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relevant aspects that are presented in the totality of elementary principles. Following these directives will not only help to build a perfect system for the uncertainty preventive management, but also the integrated management, where the main scientific problem is a “need to consider in an integrated way a large quantity of risks of a different nature with poorly structured and not always well-understood relationships” (Kudriavtsev, 2010). It may seem strange, but in this aspect, it is the uncertainty instead of the risk that looks more structured. From here, there is the distinctiveness in principles of the uncertainty management, such distinctiveness lies in their causal focus on changes to the order parameters.

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## Notes

Note 1. In addition to the presened tolerance principle according to Yoe's methodological approach (Yoe, 2011), one may say that the principle of precaution or "reasonable

avoidance” in a rejected actions in circumstances “when the consequences ... have not been well understood” (Yoe, 2011); the principle of an adequate level of protection and safety (Ibidem); the principle of minimum practically acceptable risk (ALARA Principle) (Ibidem) and others. They all reinforce a leading role of commitment and tolerance in taking certain risks.

Note 2. A choice in terms of uncertainty types, to which management influence tools are applied (uncertainty of the environmental, decision-making, decision consequences and the varational uncertainty).

Note 3. In this context, there is the indicative paper by Dean, Yoon & Susman (1992). It indirectly evidences the author's hypothesis about maintaining a level of the uncertainty and organizational sustainability in terms of variable changes to management characteristics. With this example of scientific formalization, we confirm that structuring can be the basis for secure decentralization.

Note 4. With the discrete information persistence, the uncertainty limit is only kept, though conditional, only reasonable for the given set of alternatives. Changes to a number of alternatives would certainly lead to a change to the absolute uncertainty limit, and likely result in a change to the uncertainty dynamic yield. At the same time the actual uncertainty, like the certainty, is influenced by an extremely large number of factors. This does not allow assertively stating of the maintained or constant uncertainty.