Crisis Management Modeling

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Abstract: - The goal of this paper is to present the elements of the issues of crisis management modeling. Knowledge of these elements is essential for the creating models of crisis management. At the beginning it is paid the attention to the ideas of theory of chaos that have been applied to crisis management. It also points to the need for the concept of the organization as a system. Furthermore, it dealt with the presentation and comparison of different concepts of crisis. There is emphasized the multiply approach to the crisis. The entities of the crisis are presented. The following barriers and limits in creating generally applicable (fits-all) models of crisis management mean a challenge not only for researchers but at the same time they make the creation of crisis management system in practice more difficult.

Key-Words: - Crisis, limit, management, model, system

1 Introduction

There are many challenges in each area of scientific study. In the area of the crisis management the challenges are more significant, possibly due to the complex nature of crises and due to the interdisciplinary character of their studies. To facilitate further progress of research and the systematic collection of knowledge it is necessary to integrate the relations between research programs currently in progress. One way how to achieve this is to integrate crisis studies into a global concept that would provide a unification of efforts in their research areas. The core of the orientation concept is based on the relations between various research topics on which the research can be built on. According to Shrivastava it is the notion of "permanently sustainable development" [27].

The notion of crisis can be elevated to the level of the wide and complex macro-term including a whole set of notions. It is a fact that it is necessary to include notions like uncertainty, contingency or ambiguity in the term crisis; it is possible due to the progress of complex knowledge and complex theory [31]. The idea of forming a "crisisology" is possible and its implementation would be beneficial. The crisis discloses and moves in the same time. The crisis discloses what was hidden, latent or potential in the society (organization or individual): basic antagonisms, deep seismic disorders and the hidden development of new realities. Crisis, at the same time facilitates the theoretical study of deeply rooted elements of a society or organization, their abilities to endure or transform. In this sense a crisis is also something like a mover. It moves everything that can bring change or transformation even if it is just in a temporary or preliminary form.

In recent decades the topic of crisis management has been significantly developed in scientific research. In the theoretical area, crisis management can be successfully developed only as an interdisciplinary science integrating economic, sociological, psychological, political and other scientific disciplines. However, the system approach to the research of this complex and integrated phenomena is a priority. In the opposite case we can reach only one-sided views. The research of crises is interdisciplinary and very varied. There is no unified concept guiding the process. Research results are dispersed and applied ad hoc. All these aspects of crisis deserve much more research attention than before. Economics, management, organization or the general standing after the crisis will never be the same as before it. Organizations need a better description of all types of crises. They need analyses of the reasons and consequences of crisis; they need instructions how to face them and how to manage them.

The preliminarily defined areas of the research are mutually overlapping:

The systemic approach to a crisis, which means understanding the organization as a system, a detailed review of the organization (system) research levels, with inherent crisis preconditions, a

review of different meanings of the term "crisis", explanation of the elements and factors related to the term "crisis".

To understand crisis as a term, it is necessary to understand an organization as a system that can go through crises. The author has focused on the system approach in an organization, as a system of complicated mutual relations, energy and physical changes (e.g. raw material transformation), feedback, complex mutual impacts of this feedback, the occurrence of disorders and risks that means conditions for the crisis initiation and development. The word "crisis" is often used in common speech and in the social sciences. A definition of the current crisis of an organization is constantly changing as well as techniques for its structuring.

2 Problem Formulation

This paper is focused to the presentation of the elements of crisis management modeling. Knowledge of these elements is essential for the creation of crisis management models. The paper will gradually focus on these individual elements. It is beginning with the application of the theory of chaos in crisis management and the presentation of the concept of the organization as a system follows. These are two default views for the multiply approach to the crisis (chaos vs. system). After next presentation of different approaches to the crisis the paper focuses on the elements that have been defined in these approaches. These elements are the basis for models creating. Presented barriers and limits round out of the elements, knowledge of which is necessary for crisis management modeling.

2.1 Theory of Chaos

From the view of the theory of chaos[1] the economy is a system operating in the conditions with a limited number of sources). That is why spontaneously recurring processes are characteristic for it - a periodic behavior or a limiting cycle where two poles set limits for the cycles of changes as every social, ecological, and economic equilibrium are temporary only. Theories of chaos as well as a systematic approach bring a statement on the economy and its probable cyclic or chaotic behavior. A systematic approach leads to the notion of economy as a living system consisting of people and social organizations in a constant mutual interaction. The theory of chaos emphasizing lack of predictability is based on the idea that very small changes or events within the systems may cause a very complex behavior or results.

Recognition of this interaction inspired Murphy [44] and later Seeger [46] to use the theory of chaos in crisis management. This approach, however, had not been further developed. Seeger [46] himself came to the conclusion that he had primarily focused on short-term goals - to solve the crisis out as quickly as possible with the least harming the image instead of focusing on long-term impacts and wider measures needed for the full grasping the theory of chaos. Also the idea that the events causing a crisis situation are not predictable is unfounded as scientists and practitioners say that all systems are prone to errors. Managers' ignorance of the situation before the crisis is not any longer understood as managers' defense after the crisis event. As soon as a presumption that all organizations will face crises in some period of their existence is accepted then the main questions are as follows: how to handle crises when they appear and mainly what steps can be taken to prevent them from occurring.

These questions are still a subject of debates in professional literature. At the beginning those debates were aimed at strategy development, how to manage crisis situations, and at improving organization's harmed image as a consequence of the crisis. The problem how to prevent crises from their breaking out had not been completely ignored but it was pushed aside because it raised fundamental questions about the style of management accuracy.

2.2 Complexity of a Crisis

To understand the concept of a crisis in the right way, it is necessary to see the organization as a system that can go through crises. According to Morin [15] the organization - system is viewed from three levels: a systemic, cybernetic and negative entrophic level. Each level creates good conditions for the crisis. It is the content of the first part. The

[1] In mathematics and physics the theory of chaos deals with the behavior of non-linear dynamic systems that (under certain conditions) show a phenomenon known as a chaos most significantly characterized by sensitivity to the initial conditions. Behavior of physical systems showing a chaos appears as random which is a consequence of that sensitivity even though a model of the system is deterministic in the sense that it is well defined and does not content any random parameters.
Systems showing a mathematical chaos are in a certain respect sophistically arranged. Thus the meaning of a word in mathematics and physics is in disaccord with usual understanding the word 'chaos' as a total disorder.

concept of crisis is diverse. The second part is focused on the different characteristics of a crisis.

As every system conception, the concept of crisis is based on the system of interdependent elements. These dialectic elements occur in a majority of definitions even though they are called differently. For a further theoretical search but also for practical utilization, it is necessary to understand these elements. The third part of this paper stresses that the concept of crisis is ambiguous. It also identifies and explaines the elements that are generally found in most crises (disruption, precondition, triggers etc.).

2.3 Organization as a System and the Levels of its Exploration

The author based the explanation of this concept on the theory of society. Marx's theory of society combines sociological, economic, anthropological, historical, futurological, and ecological perspectives. Marx sees society as an internally contradictory and dynamic whole in which the basic societal institutions get into conflict with an individual´s life process. This approach can be figuratively applied in view of the crisis and its elements.

If the concept of crisis had been limited to only the economic sector then it would be possible to describe it by some quantification characteristics as e.g. a decrease in production, a decline in consumption, or growth in unemployment. Once the concept spreads to all areas of societal life and to every theory then its explanation is difficult. Application of that term makes it possible to only express that something is wrong. The fact that the crisis penetrates into all areas of societal life offers approaching the crisis from the position of the theory of society that, as such is systematic, cybernetic and negative enthrophic, which is the basic principle of the 'theory of crisis' [15].

Morin in accordance with Marx's societal theory suggests investigating the system that can go through crises from three perspectives - systemic, cybernetic, and non-genthrophic levels [15]. The following outline of the three levels is based on Morin's article [15]:

2.3.1 System Level

A systemic approach assumes that everything belongs to some type of system. A system as a set of elements in a mutual interaction [35] inevitably has to induce antagonisms. Every mutual relation requires and puts into life the principle of complementarity (completing each other) as well of antagonism (contradiction). To the antagonism of forces the existence of which is assumed to exist in every interrelation, further antagonisms (hidden or revealed, potential or real) produced by the organization will be joined. By performing the integration of parts into the whole by means of complementarities, the system introduces certain limitations, barriers and repressions. These limitations suppress as well as release forces antagonistic to the other parts or to the system.

Hidden antagonism among parts and among parts and the whole is another feature of the system. Complementarity among parts of the system is inseparably connected with antagonisms. These antagonisms remain hidden or they are controlled to a certain extent. They begin to appear when a crisis is coming and if they accumulate they will cause it to break out.

The danger of potential crises: Already in the first level, which is a systemic level, a complexity occurs. Here, this expression does not mean only a complexity of interactions and interrelations. Such complexity can be found in every organization. It means every system, whose internal relationships among parts of the whole and between the whole and parts, are at the same time complementary, competitive (implicitly or apparently) and antagonistic. This is the first level where the crisis can find a breeding ground.

2.3.2 Cybernetic Level

A feedback that regulates a machine's working or maintains a smooth and stable system's operation is activated by the dissimilarity of a certain part of the whole and it tries to remove that dissimilarity. Such regulation is induced by the antagonistic effect of one or several parts, to one or to several other parts whose dissimilarity has exceeded a certain limit and it acts as a threat to the stability i.e. to the status quo and to the integrity of the system. Feedback restores complementarity among parts. Regulation maintains complementarity by means of partial and local anti-antagonistic measures.

The danger of the potential crises: The cybernetic level is formed by heterogeneous elements, mutual regulative influences (feedbacks) and by the utilization of antagonisms themselves. In organizations (systems) some feedbacks (e.g. economic growth) become a phenomenon that will shape social development. Other feedbacks, however, at many various levels create sources of crises. The cybernetic level means feedbacks that on

the basis of an error signal reduce deviations from a normative, correct value and, at the same time, it represents a complex interaction among feedbacks, which creates another ground for the crisis

2.3.3 Negative Enthrophic Level

Growth of entropy (the rate of disorder, uncertainty and chaos) means the weakening of interrelational energy and messing up the organization, which makes the mobilizing of antagonisms possible and leads to the disintegration and splitting up. Any system even the most static, the strongest and the closest one cannot avoid that disintegration.

The danger of the potential crises: On the third - non-enthropic level, permanent reorganization appears to be a central problem. Permanent reorganization is interrelated with permanent disorganization and it both feeds and mortifies disorders in non-enthropic zones to the same extent. Systems can outlast and develop themselves only if the exchange with the surrounding world is put into effect.

3 Problem Solution

The aforementioned facts can be summarized by the conclusion that the existence of systems implies antagonisms which contain the potential for their dissolution [15]. On the other hand, it can also be said: Anti-organizational forces are antagonistic towards the organization however they are necessary for it. Antagonism and complementarity are two poles of one complex reality. After breaking a certain limit the antagonism becomes a disorganization element, but even after that it can represent a precondition necessary for the reorganization that brings changes.

The bigger the complexity of systems is the more movable and unreliable the relationship between antagonism and complementarity becomes and thus the more it induces 'crisis phenomena' (Fig. 1).

A crisis arises from internal and external risks and disorders. In this form the third level appears entailing the complexity that is not only a breeding ground for the crisis itself but it also allows the crisis to gain real dimensions.

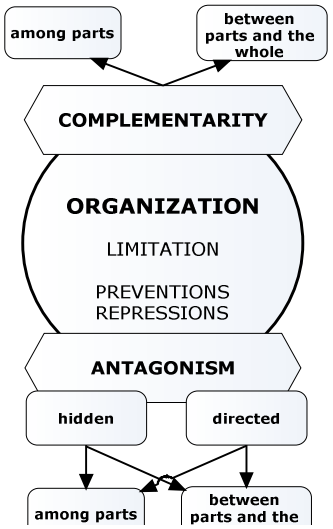

Fig. 1 Organization as the antagonistic complementary system

3.1 Multiple Approach to the Concept of 'Crisis' - Selected Approaches

The word 'crisis' is very often used not only in social science and in the common language. It indicates a serious problem or a situation in which damage arises. This too free and easy usage is a source of inaccuracy.

Firstly, it is necessary to explain this term. The expression 'crisis' originates from the Greek word 'krise' [27]. In Greek tragedies were moments of crisis in which it was necessary to accept a decision. Crises represented historical turning points where a human choice might have brought about the essential change for the future. A modern conception of crises according to O´Connor appeared in medical literature [17]. It described a serious health condition with the threat of death in which the organism itself was not able to recover without any external intervention and basic reconstruction, and where the self-healing abilities of the organism were insufficient to get it out of the crisis.

Definition of an organizations' current crisis is constantly changing with the change of the technique how to cope with it. Selbst [3] used a definition of crisis as 'any action or failure in the way of acting that significantly impede the organization in normal functions, in acceptable objectives, viability, survival or it has harmful personal effects on employees, clients or voters. That definition concentrated on the action and its failure.

Shrivastava describes the crisis as a destructive situation characterized by the need for immediate decisions, by large unfavorable impacts and by the reconstruction of the system [27]. According to his opinion, crises are induced by causing events, which are in effect for a long time, which have a wide range of consequences and which cause various kinds of damage. They result in a reconstruction of the affected organizations and social systems. Witte also takes time pressure into consideration [36]. He defines the crisis as a decision-making situation as a consequence of accidents and disasters where the existence of the system is in danger and at the same time, the time for making decisions is limited. Similarly, Seymour and Moor compare crisis situation to the cobra which attacks its prey suddenly with a surprise using a very powerful poison [24].

Pearson and Clair describe the crisis as an 'unlikely event with a large impact that endangers an organization's viability and it is characterized as the ambiguity of events and effectiveness, and it means a decision as well as a conviction that the decision must be made quickly' [18]. Their definition contains the finding that the crisis situation potentially escalates and adversely affects an organization's credibility. It puts a strong emphasis on reversing the crisis and bringing the organization back to the original condition and/or on a minimization of damage.

Snyder et al. understand the crisis as an unusual situation that is disturbing and harms the existing state of operation and the whole organization [29]. An organizational crisis, as long as it is ignored or wrongly managed, will endanger the competitiveness and sustainability of the involved organization. It may influence not only the organization involved, but also its stakeholders.

To be able to judge what the crisis may mean for those who are involved it is necessary to accept the ambiguity typical for the crisis. For example, Quarantelli [20] differentiates crises which are considered intentional (war, civil riots), and events which will appear incidentally (industrial accidents).

Shrivastava developed an approach, which claims that crises were 'disasters of an organization which had caused damage and social cracks including stakeholders and acting through technological, organizational and social processes' [26]. Arrangement of individual crisis events can therefore be seen as functions of interacting minor events that will then form the main event causing the crisis.

Accidents and disasters caused by both public organizations and entrepreneurial sphere were usually considered as industrial crises. Severe accidents at the workplace harming the environment or injuring employees or the public can be ranked among them. Also damage caused to consumers by poorly designed or dangerous products belong here [25].

According to Miller crises can be defined more generally - as serious financial obstacles, psychological suffering and harm to the environment that may occur as a result of an organization's activities [13]. Unifying the definitions was also confirmed by Gregory who saw 'high severity, a low probability of origin, risks and uncertainty as characteristics of the crisis [8]. A crisis arises under time pressure, it devastates a normal operation and it is potentially fatal for the reputation of the organization´.

Billing et al. suggest perceiving the situation as a crisis in dependency on a) a perceived range of possible loss when a difference between the current and required state is being created, b) a perceived probability of loss, and c) a perceived time pressure on the acceptance of a corrective remedy [2].

Meyers and Holusha classified the crisis within four factors: dimension, control, time, and alternatives of decision-making [11]. The first task is to identify the dimensions of the crisis, and the ability and opportunity of controlling it. Dimension meant the degree in which the organization was exposed to the crisis. In case of large exposure (risk) and small control the organization will have to make much effort to cope with the crisis. In a similar way they researched the relations between the factors of time and actions. The most serious crises fell into the critical zone based on both of these factors. Meyers and Holusha felt that such an approach could help managers recognize the areas of a potential crisis [11]. To do so, it is necessary to perform a crisis audit. It consists of two parts. It means first to examine the sensitivity or to assess the vulnerability of the organization if an unexpected change occurs. Management should make out a list of vulnerability and decide on priorities. In the following audit of suitability it is necessary to find answers to three questions: Can the organization detect the impending crisis in its early phase? How well is the organization able to manage the crisis if it has already occurred? Could the crisis bring some benefits?

Dyson considers the crisis 'clearly a matter of perception [4]. An industrial crisis has various shapes in the sense that a partial crisis probably consists of a set of interwoven crises...' Gottschalk assigns an important role to media when he considers the crisis as a significant interruption of an

organization's activity attracting media attention [7]. The resulting attention of the public influences a normal operation of the organization which is also under the influence of political, legal, financial and governmental impact. Also Berge emphasizes the role of media and provides organizations with instructions on how they should improve their communication for the period of the crisis and after the crisis [1].

Bell does not see the crisis as absolutely negative [21]. He says that the nature of a crisis in the given relationship is that the conflicts inside the relationship will grow to such an extent that there is a threat of the change in the relationship itself. This definition narrows the vision of the crisis only to the conditions of relationships.

Mitrofft and Pauchant offer a wider view [14]. They define the crisis as a disturbance physically influencing the system as a whole and threatening its basic preconditions, subjective sense and the existential core. This definition, however, ignores individuals, groups and their perception of the crisis. What might be recognized as a crisis by the organization's management cannot be considered a crisis in the definition by Pauchant and Mitroff.

A much more realistic definition is 'a situation which is faced by the individual, group or organization and which they are not able to solve by applying ordinary procedures and in which a stress arises due to a sudden change' [3]. This definition does not suppose any negative approach. Managers often perceive stress as a positive force.

Zuzák narrows the concept of crisis to the organization and he understands it as a situation of various time length in which it is decided whether the organization will return to the situation in which it was before the crisis because the achievement of business goals or its further existence is prospectively threatened [37]. He then modifies his definition of the crisis as an imbalance between the organization and its surroundings or a dysfunction among internal systems of the organization threatening the achievement of business goals or even further existence of the organization. Imbalance and dysfunction are a consequence of the appearance of risk events.

Also Frýbert [6] in his conception of the crisis focused only on the economic crisis understands the crisis as a result of internal and external risk factor interactions on one hand, and incorrect or inadequate reactions of an organization's leadership and its owners on the other hand. Umlaufová and Pfeifer also narrowly focused their investigation exclusively on the business crisis that they saw as a situation in which on one hand a balance between an organization's business characteristics was significantly disturbed (by the mission, philosophy, values, goals and style) and by the attitude of the business environment to the organization (claims, possibilities) on the other one [34]. The further prosperity of the organization then calls for essential action in order to regain a balance.

The author agrees with Fink's definition [5] which she expands from business entities to organizations in general: she defines the crisis as a large deviation from the normal state which disrupts the upward line of not only business activities (in a business entity) but also activities of the organization in general (in non-business entities), challenging the nature of the organization, threatened by a further escalation, attracting the attention of the public and media, and creating a negative image of the organization.

3.2 The Entities of the Term of Crisis

Similarly as all system conceptions, the concept of a crisis is based on the system of mutually dependent elements. These entities in spite of being named appear differently in most previous definitions of the crisis.

3.2.1 System

The author draws on the work of Norbert Wiener who sees the system as a set of elements in mutual interaction [35].

It is cybernetics that deals with the general principles of management and transmission of information in machines, living organisms, and communities. The most important principles of cybernetics applied in the study of crises are as follows:

Feedback: The principle of feedback was known already as a regulating technique and was used in the design of a feedback amplifier for the purpose of communication engineering. The founders of cybernetics, however, recognized that a very general principle was in question. Thanks to cybernetics that principle became known in general and it allowed explaining a number of events taking place in various dynamic systems.

Information: The exact theory gradually came into existence as a scion of the theory of probability. Information completed a physical picture of the world in the sense that it is an equally important entity such as mass or energy.

Model: The systematic study of various systems led to the knowledge that systems of a various physical nature might have very similar behavior

and that the behavior of one system could be searched through another one easier implemented system in a completely different time or spatial scales. In this publication a simplified description of the system is considered as a model of the system which accumulates important properties of the system. It is desirable that the model also allows a prediction of system behavior in yet unverified conditions.

3.2.2 Preconditions for a Crisis

Preconditions for a crisis can be developed by the accumulation of the sequence of events whose early identification relates to acceptable assumptions of risk and standards in order to avoid it. Reason, called such events 'hidden pathogens' connected with 'asymptomatic' (latent) failure' that can emerge in organizations [22]. Interesting failures are intellectual (rational) ones built on a management's assumptions which can contribute to the development of preconditions for the crisis (e.g. 'our employees are so devoted to us that we can absolutely trust them'). Turner and Pidgeon mark the evolution of events in the course of the emergence of a crisis situation as an 'incubation period' [33].

Turner and Pidgeon identified factors that would initiate the evolution of preconditions for the crisis [33]:

- Rigidity in thinking and conviction of the top management (the conviction of the organization); this failure of management may influence also the theory of group thinking.
- A problem is perceived, the organization is dealing with it, but separately without looking for connections with other problems that may possibly cause other further disasters.
- The organization does not recognize 'voices from outside' that warn it about potential crisis danger. People from outside may have to deal with rejection or with arrogant responses. Simply because the organization automatically believes they 'know better' the problem than people outside the organization.
- Another ordinary factor is the problem with the transmission of information. In risk situations the nature of information flows is changing. Communication does not work if there are not any sources or if the crisis situation is so serious that necessary information cannot be processed in the existing information network [30].

Inexperienced and ill-informed people finding themselves in potentially risk situations are also a factor contributing to many crises [10]. In some cases the existing regulations (crisis plans and the like) are not satisfactory, which further contributes to the probability of a crisis arising. The inability or unwillingness to see the imminent risk or to assess the size of sudden danger is a common factor [22]. Possible risks are usually underestimated [20]. Turner calls those factors 'crisis of neglect' [33].

Shrivastava divides the preconditions for the crisis: emerged in the nominal state and later latent - a hidden failure arisen during the incubation period as the internal failure of the organization in connection with the external limitations (regulators), by the infrastructural failure and by failure in the period of preparation for the crisis [27]. Smith characterized the preconditions as the 'crisis of management' [28]. Smith's argument is that the crisis has its roots in the management style that overstates the effect of relatively less important hidden flaws allowing them to combine and thus to trigger the crisis.

3.2.3 Disruption

This element has two sides. On one hand, it points to a certain event, external disruption that provokes a crisis (floods, a military conflict, poor crops, etc.). On the other hand, there are special disruptions that do not cause crises but they emerge at the surface from apparently undisrupted processes. Those processes will often appear in the form of being too big or fast growth of a certain value or the variable in relation to other variables (e.g. an excessive increase in supply in relation to demand) [32].

If those processes are considered on the systemic level, it is apparent that quantitative growth creates an overload phenomenon; the system loses its ability to solve problems with which it has dealt before exceeding certain limits. The system should be able to transform itself but it is not able to [15]. More generally speaking, the emergency breakdown can be thought as a consequence of overloading; the system is confronted with the problem which it is not able to solve within its rules and standards of operation and within the limits of its normal existence. A crisis therefore appears as the absence of solution (the effect of deregulation and disorganization) that can encourage the solution (a new regulation, evolutionary transformation) [15].

According to the author more important for the concept of crisis might be internal disruption caused by the processes that seem not to be divisive. This internal disruption caused by the overload shows itself as a failure of regulation or as deregulation. There is a crisis at the level of the organizational rules of the system; it means not only at the level of external events into which the system

is firmly settled but also in the organization itself, in its creative and recovering function. Deregulation of the organization will bring malfunction where there was functionality, a turning point where there was the continuity and a conflict where there was consensus.

3.2.4 Triggers

This tendency (predisposition) Turner and Pidgeon call a 'precipitating event' [33]. Shrivastava uses the term a 'triggering event' [26], and it represents a hidden (latent) failure originating in the 'incubation period'. Triggering events can be identified by the place, time, and the source of their occurrence.

3.2.5 Growth of Disorders and Uncertainties

Every system of living organisms and mainly every social system entail a disorder. Systems operate despite the disorder which means that the disorder is partly stopped, corrected, transformed and integrated.

A crisis, however, always means a decrease of stability in the system. That is why the crisis always means a growth of disorder, instability and risk. This leads to the growth of uncertainties and to the decline of predictability. Of course, a new, more general prognosis is possible under certain circumstances.

3.2.6 Immobilization and Release

The influx of disorders is connected with a paralysis which created flexibility of the system, and its mechanisms of reaction. On one hand, there is a collapse i.e. a disorder of the basic structural elements and on the other one there is stiffness i.e. a return to mechanistic forms. The aspect of stiffness reflects in the immobilization of that what really ensured the permanent reorganization of the system by blocking the mechanisms of feedback that removed deviations and faults.

Immobilization of mechanisms of permanent reorganization facilitates potential forces release [16]. Immobilization of the organization actually means a removal of all restrictions applicable to the parts of system and processes taking place there.

The central characteristic of the crisis is then not only the onset of disorders and uncertainty but above all the immobilization affecting the process of organization and reorganization, which is expansion and deregulation. 'Release' of the crisis is reflected in various aspects which are mutually inseparable [15]:

- Development of feedbacks

Crisis disruptions set forces into motion. They increase the existing fluctuations instead of moderating them. Deviations are becoming continuously more pronounced and they are growing instead of being removed. Creation of this feedback reflects in the excessive or inadequate growth or in the decline of a certain element [9]. From that point of view the time of a crisis is the time of the accelerating, increasing, spreading of infection and morphogenesis (the creation and development of new forms having their origin in deviations).

- Conversion of complementarity into antagonism

Hidden (latent) antagonisms in those processes have a tendency to appear while the manifested complementary elements have a tendency to be transformed into a potential form.

- Formation and growth of conflicts

Hidden antagonistic features anchored in every organization clearly appear on the surface. The conflict character has a tendency to fully grow at the moment at which it becomes dominant. Conflicts are multiplied not only on the level of individuals or groups but also within control and regulatory mechanisms on one hand and the processes of deviation and the creation of new tendencies on the other. It is obvious that the term of crisis cannot be limited to the term of internal conflict within the system but that it implies the possibility of inducing, multiplying and deepening a conflict.

3.2.7 Measures

Crisis puts disruptive processes into motion, and are usually very spontaneous. In those conditions the measures based on prognoses and on the deterministic approach seem to be muted. On the other hand it is important to state that the stimulation of measures takes place.

A crisis creates new conditions for negotiations and measures. Due to its uncertain and random nature, due to the mobility of forces and forms entailed and due to the multiplicity of alternatives the crisis situation creates a favorable situation for making bold innovative strategies. It provides room for decision-making among various ways of behavior and strategies. This element is developed wider in the part of this work dealing with crisis management training.

3.2.8 Change: progressive and regressive solutions

A crisis offers the possibility of return to the original state (by absorbing a disruption), the possibility of system disintegration (division), and the possibility of total disintegration (e.g. genocide of nation, liquidation of the organization), but it mainly means variants of development and changes.

The uncertain nature of the crisis causes that also its solution is uncertain. As a crisis brings sudden and fast spread of disintegration and integration forces (forces of extinction and recovery) it puts into effect certain 'sound processes' (research, strategy creation, innovations) and also pathological processes (myths, magic, rituals), and it can have both regressive and progressive solutions [15].

Here, the double face of the crisis can be seen more clearly: danger and the opportunity; the danger of regressive development and an opportunity towards progressive development. A crisis activates disorganization and reorganization (while one inevitably causes the other), and every increased disorganization entails factual danger of extinction but it also brings the opportunity to set up a new organization in order to overcome the old and create something new.

3.2.9 Recovery, reconstruction

After the immediate shock, the organization tries to manage the impact of a crisis, so that the damage is limited. This is the first step towards recovery. Turner and Pidgeon [12] label it as 'the first stage of settlement'; the immediate after-collapse situation is identified, ad hoc actions are taken and the rescue is started. Smith speaks about the end of the operational crisis in connection with the creation of a 'supportive environment', but according to his opinion the prospects of recovery are not optimistic [28].

Smith considers as the crisis of credibility and legitimacy the situation in which organizations look for scapegoats and blame them to justify their behavior and the management style before the crisis [12]. Their behavior is often justified by the effort to restore external confidence in the organization.

Victims may be offered compensation and they may again join an organization's social system. There is a chance to normalize relationships with employees and other stakeholders. An organization and its processes can be reorganized, demands for compensation can be met, new products can be introduced as well as a new production program, markets can be changed, and new financial management can be introduced, etc.

What Shrivastava [25] and especially Smith [28] point out to is 'a simple cycle of learning'. Errors are corrected but are not the essential policy.

3.2.10 Knowledge (learning)

By the investigation of the crisis itself or some other form of the crisis, an organization's attitude to the surroundings changes and it brings a shift from presumptions to the standards of prevention. This is called Kolb's cycle of learning based on experience. A crisis represents the actual experience from which organizations can draw comments and responses to an organization's behavior and its performance by searching and evaluation [38]. The investigation provides a prerequisite that the future behavior will be based on the new concepts (standards of prevention).

This is also a concept supported by Pearson and Mitroff with their contribution of an 'appropriate reaction' and 'critical examination' based on the experience from the crisis [19]. What both authors suggest is the need of inducing a power of learning 'double cycle' which includes questions and changing assumptions, standards and behavior. Such learning also depends on unlearning, which can be a struggle for managers who do not want to admit that they have to change.

3.3 Barriers in Crisis Management

According to Handy [39] there are three groups of barriers in the organization leading to problems connected with the working of crisis management.

The first group of barriers concerns individuals' problems. It can be classified as a set of psycho-social problems associated with perception, presumptions, beliefs and a number of psychological processes shaping behavior [41]. Moreover, difficulties which people have with perceiving the nature of problems they encounter may severely restrict their ability to assess the situation and in that way they increase the risk of errors [42].

The second set of barriers appears at the cultural and group level of the organization. It reflects a complex of problems concerning behavior of groups in the organization and the role played by the style of leadership and management in shaping cultural norms and behavior [43].

The last set of barriers exists at the level of systems and it includes a number of structural and environmental pressures and barriers influencing the organization. Barriers at the level of systems also include problems concerning complexity and its

impact on management and technologies. The mentioned problems may form barriers for the early detection of crisis potential in the organization but they may show points in which it is necessary to start solving the crisis with its strategic consequences.

Barriers mentioned here underline how demanding a task of crisis management modeling is. A 'Model' should have built in it a stage of predictable validity and it should also provide a general guidance for managers how to work with the future threats in certain time points.

3.4 Limits in Crisis Management Models

Most research in the field of crisis management was done by the evaluation of elapsed crises. Many searched events were such that they gave rise to a considerable attention of the public. Crises resulting in the public investigation provided a great number of public information for the analysis. Examples of such crises include the disaster of Challenger and Columbia spaceships, tsunami, problems connected with the BSE, the Bhopal, Cernobyl or Fukushima disasters or the terrorist attacks on 11th September 2001 or Breivik attack in Utoya in July 2011. Unfortunately, it means that many theoretical findings are based on investigations concerning several cases and extreme events rather than on 'normal' forms of unfavorable events causing crises in organizations.

This leads to the second restriction. Due to the fact that great part of research work is based on extreme events, the question is what validity of predictability its conclusions may have.

Especially important are the processes by means of which those cases and incidents will intensify. The problem was described by Handy [39] as a 'turning point' (point of bending, a breakpoint, the inflection point, or the overturn point). Handy points out the 'track' of development the organization experiences and the way in which this 'track' may turn into a crisis event. He says that the management's decision to intervene often comes too late, after the expiration of optimum time for a successful intervention. The space around that turning point can be considered problematic. A challenge for the management is to be able to work in that problematic space around various turning points so that they could be able to prevent the problem from escalation. Those various turning points can be considered as a creator of 'vulnerable path' in the organization [40].

3.5 Crisis is …

From the institutional point of view the crisis is everything that threatens the stability of an organization. However, all crises have several common characteristics (Fig. 2):

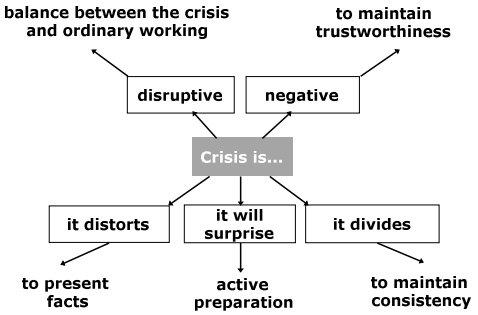

Fig. 2 Crisis is …

A crisis is almost always disruptive. As long as it is not solved it blocks an organization's activity.

The important role of crisis management is to find out how much negative the impact of the crisis on the organization might be, so that it could be possible to ensure a balance between managing the crisis and maintaining the normal operation of the organization.

Crises are almost always negative. They detract attention from important everyday tasks and undermine concentration on work and its objectives, and they create a tense atmosphere between ordinary employees and executives. They cast a shadow of doubt on an organization's credibility in the public image.

A crisis divides the organization. Both employees and executives choose a side which they will join on the basis of facts or their interests and/or organization's interests. Management should recognize the signs of polarization in time and take action to maintain an organization's consistency.

A crisis can cause distorted or inaccurate perceptions. It can show only one side of the whole situation and encourage negative public feelings against an organization. Impression can be very often taken as a fact. Therefore, management has to be ready to deal forcefully with misguided opinions.

With the exception of situations in which the organization anticipated certain risks, the crisis is usually a surprise. Even a prudent manager does not always have to be able to predict the crisis but he/she has to be familiar with the elements that

create it, and to plan how to deal with it when it occurs.

4 Conclusion

Research work dealing with of organizations' behavior under the attack of crises is intensifying. Organizational behavior may change during the crisis. This can be a result of changing demands on the tasks fulfillment but also a consequence of being guilty feelings that may make people conceal their behavior that could escalate into a crisis.

Due to the difficult identification of organizations for research purposes and gaining the access to information before the outbreak of crisis, much theoretical knowledge is based on retrospective analyses. Much important researches have been done within sociology, psychology, and other scientific fields. Because of different qualities of that research it is important to say that some theoretical frameworks, constructions or models based on it cannot include wider findings which are available across various disciplines. There are also problems within the validity of findings and generalization in the situational context including various territorial and time conditions of research or conditions in business or public sector. Even so they provide a considerable potential for learning opportunities.

When creating a model of crisis management it should be taken into account the application of chaos theory to the crisis management simultaneously with the concept of enterprise as a system.

In the previous text some entities of the crisis are presented. Knowledge of these elements is a prerequisite for the creation of models of crisis management It is obvious that the crisis is not only a summary of those entities but it is created by their interaction, their combinations, and interrelations of entities and phenomena that are at the same time complementary, antagonistic and operate dialectically. A crisis is both incapacitating and releasing power. It is a system of feedbacks, antagonisms and compliance, practical and magic seeking and finding solutions at the real and mythic level.

The concept of crisis is thus very extensive, more comprehensive than the concepts of failure, problem and disorder. A crisis entails failures, disorders, problems, deviations and antagonisms. This concept encompasses the origin of forces and destruction which is more evident here than anywhere else [15]. In the course of a crisis, quasi-neurotic processes (magic, ritual, mythological) as well as inventive and creative processes are simultaneously encouraged. All those processes entangle, enmesh and fight with each other. Development as a result of the crisis is circumstantial not only because of the spreading disorder but also because all those forces, processes and extraordinary powerful phenomena influence and destroy each other within that disorder. The interdisciplinary nature of crisis management and the lack of objective quantifiable information make crisis management modeling more complicated.

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