Towards a New Typology of Crises

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Introduction

'All our ignorance brings us nearer to death' sings the chorus in T.S. Eliot's opus 'The Rock'. It seems to be an elusive quest to judge if this statement is true in general, but without doubt ignorance concerning crisis management brings people affected by disasters or crises not only near to death but potentially kills them. So dealing with crises today is one of the high priority topics of policymakers, civil servants and executive staff. Also, scientific support is extensive and crisis researchers agree upon the point that still more has to be done to be prepared for future challenges in crisis management (e.g. Quarantelli, 1996; Boin and Lagadec, 2000). In this context, the continuous absence of a sufficient typology of crises and disasters is exceptionally painful (Quarantelli, 2001). If one wants to know how different types of crises develop, what kinds of problems surround them and, most important, how they can be handled, such a classification would surely be helpful by identifying common traits of different crises. Beside the obvious adaptability for practical use, such a typology could furthermore assist crisis researchers by coping with the future defiance caused by the simultaneous appearance of classic crises and the so called post-industrial, post-national crises ('t Hart, Heyse and Boin, 2001) by facilitating a more integrative approach to different crises. But classifying crises means shooting at a moving target as future events may differ from the incidents known today. Hence typologies which are appropriate at present may be only of limited use tomorrow, a difficulty making almost any classification approach to a transient procedure. Keeping these problems in mind, the article will deal with the following questions:

1. Why do we need a typology of crises? What attributes characterise a crisis typology that is of use both today and in the future?
2. What are the typologies used now and why are they not sufficient?
3. What consequences arise from a new typology launched in this paper for crisis management?

Therefore, the paper proceeds as follows. First, the general usefulness of a sufficient typology of crises is discussed, followed by the characteristics of a useful typology. After that, previous typologies are portrayed and discussed using the characteristics established before. The most important matter of concern is nevertheless the suggestion of a new typology, defining four different types of crises based on two classification criteria, namely the predictability of a crisis and the influence possibilities before or while it occurs. Thus, both the criteria will be introduced and debated and, in a further step, a matrix with four quadrants (for the four crisis classes) is launched. After the specific crisis types are discussed in detail, the entire concept is analysed censoriously.

Why and how classifying crises?

Anyone dealing with crises will be confronted with a crisis typology sooner or later. Some classifications appear to be almost natural, for example the distinction between man-made and natural causations; others are results of the latest research. Evidently, practitioners and scientists search for an efficient classification of crises as the references cited above and the discussion of the previous typologies in the forthcoming section demonstrate. Therefore, it can be stated intuitively that such a typology must be of great value. Going behind intuition, reasons for the suspected usefulness can be given. Dealing with crises means dealing with nightmares and nightmares become less of a threat if someone turns on the light. So classifying crises is the first step to keep them under control since they can be named and analysed. In this regard, analysing does not only mean carrying out theoretical research but it also includes progress in practically relevant measures, hopefully made possible by a typology serving as sufficient analysis framework. The benefit of a typology can hence be seen in its capacity to facilitate the deduction of consolidated findings about crises and auxiliary countermeasures. But, as mentioned several times, the sought-after typology has to be sufficient, a property seeming to be seldom fulfilled. Thus, in a further step, it is necessary to reflect what exactly determines a sufficient typology.

Suppose there are possible crises c_k with $k = 1 \ldots m$. Now, we are looking for possible subsets of crises T_i with $i = 1 \ldots n$ which represent the

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different classes of crises. The subsets should be a finite set for any time if one wants to speak of a time-invariant typology. All subsets together are T, the total sum of the available subsets or the entire typology. For example, if one separates all crises c_k into natural and man-made crises, T_1 represents all natural crises, T_2 represents all man-made crises and the typology can be described as $T = \{T_1, T_2\}$. If a typology is supposed to be of use, the following four conditions must be fulfilled.

First, the classes used in a typology should be mutually exclusive; an almost compelling necessity if one wants to mark off different types of crises. Therefore the condition $T_i \cap T_j = \{\emptyset\}$ must hold for all subsets. In other words, the clear allocation to only one selected class of crises should be possible as the need for interpretation often holds researchers or decision makers back from using a typology. So the condition $c_k \in T_i \Rightarrow c_k \notin T_j$ must be fulfilled for all $i \neq j$ and for all k.

Second, the typology has to be exhaustive, thus all possible crises should be covered, so $c_k \in T_i$ for all k. This is one of the most important attributes since new crises can occur. Therefore, only an elastic typology, allowing users to allocate an infinite set of crises to a finite set of classes T_i can be of use both today and in the future.

Third, any typology should be relevant as it generates utility. This condition is connected with the practical applicability and therefore the measures of prevention $P(c_k)$ and the measures of reaction $R(c_k)$ to counteract crises. A typology is relevant or useful if these measures are alike in the specified classes, thus if $c_a \in T_i \wedge c_b \in T_i \Rightarrow P(c_a) \approx P(c_b)$ and $c_a \in T_i \wedge c_b \in T_i \Rightarrow R(c_a) \approx R(c_b)$ hold for all $c_a, c_b \in c_k$. The usefulness therefore is a direct result from the possibility to allocate specific measures to the crisis after it is classified.

Finally, any typology should be pragmatic, thus the number of subsets should be manageable and heterogeneity between the subsets should be ample to avoid classifications only of scientific use.

To summarize, a crisis typology should allow for the clear allocation of all actual and forthcoming crises to only one of mutually exclusive classes and should furthermore facilitate the handling of crises. With the methodical framework launched above at our disposal, previous typologies can now be discussed.

Discussion of previous typologies

There exist several basic typologies of different crises in the relevant literature, supporting our suspicion that there is a need for such a concept and that this need is still not covered. Beside the general requirement, latest developments reinforce the impression of the typologies available at present not being suitable for the different and complex crises occurring today and presumably in the future.

The presumably oldest and most common typology distinguishes between man-made (technological) and natural causation (e.g. Rosenthal and Kouzmin, 1993); similar extensions of that typology even differentiate between man-made, natural and social crises (e.g. Rike, 2003). Though this distinction has some merits, mainly the chance to identify fundamental influence possibilities, it is now controversial. Today, the argument of its critics is that it is almost impossible to separate multiple, often linked but geographically widespread causations of crises based on the fact that modern crises come as an ongoing process (Rosenthal and Kouzmin, 1993). Global warming, with the population being both victim and offender, is without doubt a natural catastrophe but no act of God as, for example, a Tsunami. To sum up these two events under the heading ''natural disasters'' therefore does not seem to be an appropriate procedure. Using the characteristics established above, the typology is exhaustive as all crises can be traced back to either social, natural or man-made origin, but the subsets are surely not mutually exclusive. There are more examples than the one named above that prove that a crisis may have two or even three of the distinguished origins. Therefore, the allocation to only one class is often impossible. To judge if the typology is useful thus is hard, but apart from the problems in assigning various man-made disasters differ in the countermeasures that have to be applied to prevent or fight them. Hence, one has to be at least sceptical about its actual usefulness.

One possible solution could be a more detailed distinction. Rosenthal and Kouzmin propose a wide range of possible subsets: mine disasters, oil spills, air disasters, crowd disasters, nuclear crises, terrorism or chemical explosions (Rosenthal and Kouzmin, 1993). On the one hand, this makes distinctions more efficient because it is almost guaranteed that the crises discussed have common characteristics. On the other hand, on a more abstract level, it is hard to work out what could be the trait that a lot of crises have in common, one of the most important questions for a decision maker faced with a great amount of possible crises but a limited number of instruments to avoid or counteract them. So the usefulness of such a classification has to be discussed again, nevertheless keeping in mind that the deployment of countermeasures is facilitated. But the number of classes needed to deal with all crises might go beyond a reasonable degree if one wants to launch an exhaustive typology. Finally, it may be subject to some dispute if the classes are really mutually exclusive since a terrorist bomb attack on a chemical plant is both an act of terrorism and a

chemical explosion. Nevertheless, based on the fact that other efficient typologies are not available at present, distinguishing between main causations or main traits of a crisis is by now the most frequently used concept in the literature.

Beside the typology described above some other distinctions are also made. They usually characterise crises by only one attribute which can be either fulfilled or not. Examples are the differentiation between national or international crises, episodic or continuous crisis management and corporate or public crises (Rosenthal and Kouzmin, 1993; 't Hart, Heyse and Boin, 2001). Such typologies allow in the majority of cases for a clear allocation but they must be quite general and therefore of only dubious utility for a decision maker who wants to prevent or counteract crises. Furthermore, many of them are surely not exhaustive. A combination of different attributes to characterise a crisis will be more detailed but also more complex due to the large quantity of possible combinations.

In the context of the terror attacks of 9/11 and the world becoming a more and more insecure place thereafter, new typologies were launched. These typologies are often based on the conclusion that the classifications mentioned above are finally out-dated. At this point the distinction between ''normal'' and ''abnormal'' crises presented by Mitroff and Alpaslan should be dealt with since it stands exemplary for those modern typologies and furthermore refers to the approach undertaken by Charles Perrow.

Mitroff and Alpaslan demarcate intentional or abnormal accidents, for example bombings or kidnappings, from normal accidents that result from system-overload in technological systems and from natural disasters (Mitroff and Alpaslan, 2003). The common traits of those abnormal accidents are that they result from deliberate evil action by human beings while normal accidents are, as described by sociologist Charles Perrow in his famous, equally named book (Perrow, 1984), results of ill-structured technological systems. Almost any organization using hazardous technology, if it is complexly interactive and tightly coupled, is according to Perrow in permanent danger of *Normal Accidents* as the potential for breakdown is built into the technological systems used. Going back to Mitroff and Alpaslan, their typology seems to be a slightly adapted version of the distinction between man-made, natural and social crises. Man-made and social crises are reduced to normal accidents and abnormal crises while natural crises were left unchanged. Therefore, the classification is not exact as the authors themselves realize and the characteristics, especially the usefulness, can be assessed as done above. Other more recent typologies are as well for the most part adjustments of classifications already known since they use similar classification criteria as the typologies described above.

The review of the typologies used today has proved that it is very difficult to allocate all types of possible crises to a manageable number of mutually exclusive classes with the analysis framework available at present. Furthermore, the usefulness of the typologies discussed nowadays has to be assessed cautiously. The main problem seems to be the use of quite narrow classification criteria which are often expected to reduce the need for interpretation but make typologies static, impending time-invariant application when new events arise. Therefore, since progress in the occurrence of crises and in crisis management is unstoppable, a new typology should be based on different classification criteria. In the next section two possible new classification criteria, namely the predictability of a crisis and the influence possibilities before or while it occurs, will be introduced and discussed to establish such a new typology consisting of four subsets.

Classification criteria

The main focus of the typology discussed now is to identify crises which share common features, especially common features concerning the proactive or reactive measures that have to be carried out to avoid or combat crises. That property of a typology would generate the usefulness required. Therefore, two criteria helpful in this regard will be introduced now. Almost inevitably, the question of a crisis being predictable or not seems to be one of the most important traits, allowing for proactive planning if necessary, and therefore will be discussed first. The influence possibilities as criterion will be analysed thereafter.

Predictability

Almost every time a dramatic crisis occurs, debates about its predictability take place in public. More than one political or economic career was finished by the media establishing that the relevant decision maker was not aware of a crisis in his or her sphere of influence.

Barry Turner introduced the concept of predictability for the first time to the scientific arena. His book *Man-Made Disasters* leads crises back to sloppy management and omissions in the incubation period, implying that disasters or at least the major accidents discussed were predictable in a more than abstract fashion (Turner, 1978). Such a concept of predictability, judging the information management in a particular case, not surprisingly is subject of some dispute. As Gephart pointed out, some information can only

be completely understood after the event took place and so the idea of a definable incubation period is no appropriate illustration of reality (Gephart, 1984).

Keeping in mind that any definition of predictability must be incomplete since the assessment of information is subjective, a more abstract concept of the term is needed in this context. The concept used here therefore deals with a more general predictability which goes far beyond the case analysis proposed by Turner.

> **Definition 1:**
> A crisis is predictable, if place, time or in particular the manner of its occurrence are knowable to at least a third competent party and the probability of occurrence is not to be neglected.

At the first sight this definition seems to be not very helpful since almost any crisis could be knowable. Due to that, two special attributes have to be fulfilled before one can classify a crisis as predictable. First, the special kind of the crisis has to be knowable. For example it is known that a funicular railway can be derailed but it was not knowable before the events in Kaprun, Austria, happened, that it can burn down although it is operated without an engine. Nevertheless, to judge if a crisis is knowable or not might be a severe problem from time to time, but the expert witness called for may serve as a dependable solution. Furthermore, the probability of occurrence should exceed a threshold value, probably fixed by conventions or precedents. With these two caveats, application of this criterion is possible and, most important, it is elastic to future developments. Indeed, there only exist few crises that are predictable in the narrow sense as they are certain events for the decision makers with time, place and manner exactly known and a considerable probability of occurrence. An impact of a meteorite could be such an event but, as the example shows, these crises are rare and should not be regarded as reference.

To illustrate, predictable events (using knowledge available today) can be fires in public buildings, some of the accidents and disasters surrounding the transport or chemical industry or forthcoming crises like the predicted water shortage in some regions (e.g. Bruins, 2000; WBGU, 1998, 2000). For example, risks associated with chemical plants or navigation are well known for more than hundred years and a fire in a public building comes as no surprise, either. Predictability here results from a known exposure, going beyond a single case, and can be rooted to the properties of the systems concerned. It maybe is a weaker variant of the unavoidability stressed by Perrow as unexpected events are not predictable in their manner and therefore not normal ex ante.

In general, this attempt to mark predictability off does not serve for supporting the theories of Turner or Perrow since a generally predictable crisis is not necessarily caused by sloppy management or uncontrollable technical systems. If one wants to address technical, natural and social crises and considers for example generally predictable natural catastrophes like earthquakes, the need for another criterion of classification dealing with the influence possibilities is obvious.

Influence possibilities

Apart from the predictability, the influence possibilities are another functional identifying feature of crises. Only in case of crises and disasters that can be influenced directly, emergency managers are able to return to normality by reactive response within a reasonable timeframe or at best anticipate the event by prevention. A selective definition of that term is nevertheless even harder than above because it is necessary to distinguish between proactive and reactive influence possibilities. In this regard reactive possibilities are most pertinent because measures of prevention strongly depend on the predictability. Nevertheless, prevention of a predictable disaster will be much easier if the response is known and efficient. Measures of prevention then can be established without problems after the event first occurred and minimise risks of recurrence. Reactive countermeasures should furthermore have two attributes: They should have a sufficient effect as there are often desperate deeds to fight disasters, doing more harm than good, and they should exceed simple measures like evacuation. This leads to the following definition of interference:

> **Definition 2:**
> A disaster or crisis can be influenced if responses to stem the tide or to reduce damages by antagonising the causes of a crisis are known and possible to execute.

In other words, R (c_k) should be well-known and practical application of them should be proved and tested. Notice that the definition allows for discretionary graduations, meaning that a crisis is not necessarily easily influenced, or it can even be impossible to be influenced. But, as mentioned above, interference should exceed insignificant measures.

Insufficient influence possibilities result from diverse causes. One of the relevant reasons are unforeseen and uncontrollable interactions in complex technological systems as stressed by Perrow. Once an unexpected and dangerous process has started, it is hard or even impossible to stop it within a reasonable timeframe. Nuclear power plants are indicative of such technological

systems. But beside technical facilities other systems include the potential of intractable processes, too, namely social systems like crowds under stress, for example during demonstrations. Here, measures to control panic-stricken human beings are still missing. Natural systems like earthquakes or the atmosphere and its ongoing pollution are hard to influence as well. The last-mentioned instance furthermore points to the institutions involved as another cause of discontenting influence possibilities: Even if countermeasures are known, unwieldy conflicts of interest (as seen at the conferences on climate change in Kyoto or Buenos Aires concerning the global warming) impede their adoption.

Crisis Matrix

With the classification criteria established above several classes of crises and disasters can now be separated. Therefore a four-area matrix is used, allowing us to make a rough estimate of the exposure of different types of crises, of their frequency and later on of the relevant countermeasures.

Four types of crises are distinguished: conventional crises, unexpected crises, intractable crises and fundamental crises. Henceforth, the different classes of crises will be discussed in detail. First of all, this procedure includes the description of their characteristics and the brief introduction of relevant examples. Furthermore, as the usefulness of the typology is its presumably most important feature, generally valid proactive and reactive countermeasures will be introduced for each of the four subsets. In this regard two levels of intervention matter since both organizational and regulatory measures usually deal with crises and thus will be discussed. The space available here is much too limited to offer a comprehensive presentation. A detailed discussion of the proposed countermeasures can however be found in Gundel (2004).

Conventional crises are located in the first quadrant. They are predictable and influence possibilities are well known. Disasters of any scale in technological systems take the bulk of responsibility for such events as the risks associated with engineering research are often easy to anticipate and to handle. Thus, conventional crises can be traced back to the use of dangerous or maybe even ill-structured technological systems, whereas social or natural disasters will seldom be classified as conventional crises. For the organizations threatened by conventional crises, planning seems to be no great challenge since the relevant disasters are known and emerge isolated, countermeasures are proved and tested and interventions can be carried out rapidly (Boin and Lagadec, 2000). In addition, the probability of occurrence, possible losses and the costs of prevention are well known, too. Even though damages, loss of life or political consequences resulting from conventional crises are considerable in particular cases, these events are regarded as manageable by the staff and societies affected.

The amount of examples for that crisis type is sizable. Beside other events, the Estonia loss in 1994 is indicative of such crises as ferry disasters with roll-on/roll-off vessels are well-known since the Herald of Free Enterprise accident and can be fairly described as predictable, especially in stormy weather. Furthermore, influence possibilities were given but sloppy management and wrong ambition of the persons responsible impeded a more careful action. Therefore, expert commissions concluded that neither crew nor vessel were suitable for the dangerous crossing of the Baltic Sea (German Group of Experts, 2000). Other pertinent examples are the Bodensee Crash in 2002, the Summerland Fire in 1973, explosions in chemical plants (e.g. Bhopal 1984) or various electrical power outages. These events were surely conventional as similar disasters happened before and sufficient influence possibilities are known.

Although conventional crises may differ in some individual traits, recommendations how to prevent or counteract them can be given. In consequence of the known risks and the integrative approach needed to cope with conventional crises, organizations threatened with such occurrences could implement an integrated system of quality and crisis management, allowing them to implement wide countermeasures like qualified staff, ergonomically designed equipment or regular maintenance of the machines in an economically efficient way (e.g. Pun and Hui, 2002). Beside the advantage that such a procedure would possibly generate surpluses during disaster-free periods by influencing the quality of the services offered, the coordination of economic, safety and quality targets could be carried out simultaneously. Therefore, this proposal is not only regarded as a suitable solution to prevent or counteract conventional crises but should be the base of any corporate crisis management.

Regulatory policy is, beside countermeasures of organizations, another important instrument of achieving high reliability. Based on the well-known catastrophic potential of the systems or operations concerned, regulation counteracting conventional crises is existent ever since the relevant activities were performed. In Great Britain, for example, regulation concerning railway traffic or seafaring goes back to the years 1840 and 1876 (McLean and Johnes, 2000). Possible improvements could perhaps be gained due to an international unification of regulation, taking into account that a lot of dangerous activities today

take place in so called ''liability oases''. Furthermore, problems could arise when limitations of liability impede the payment of compensation as the responsible companies often go bust. A conceivable solution might be to connect the permissions for dangerous activities with a firm's capital resource to guarantee that compensation can be paid if a disaster occurs.

Unexpected crises, thus sensitive to influence but otherwise unpredictable crises, are, compared to conventional crises, rare. Nevertheless, they are more menacing due to the fact that influence possibilities are given but concerning the lack of preparedness the rescue squads have to implement them first. Again, unexpected disasters are caused by technological systems, now showing attributes that are anomalous, or infrequently by natural systems, developing over thousands of miles in spheres hard to see through by humans.

Even though it is ex-post hard or even impossible to size if a disaster was really unexpected or not since astonishment resulted from false assumptions made by the decision makers and the number of relevant events is limited in general, illustrative examples can be given. The tunnel blaze in Kaprun, Austria, in 2000, where a funicular railway, estimated as fire-proof because of the lacking engine, burnt down in a tunnel and killed 151 people surely was such an unexpected crisis. Due to civil engineering reasons no one had ever anticipated that constructions like this could contain the possibility of a major fire. Therefore, structural fire protection was not considered, a fact facilitating the emergence of the disaster and boosting the degree of damage. But nevertheless influence possibilities are given and the risk of recurrence can be minimised by providing structural fire protection or training the local fire brigades. Additionally, the unforeseen events unfolding during a forest fire in Mann Gulch, USA, killing thirteen smokejumpers and well-known to crisis researchers thanks to Weick (Weick, 1993, 1996), are indicative of an unexpected crisis. If the loss of the Titanic really was unexpected for all parties concerned is, however, controversial but I will come back to that point later.

All unexpected crises have in common that the manner of their occurrence was not predictable and therefore prevention has not been carried out. Most important tasks for the persons in charge of organizations, especially rescue squads and regulatory agencies, must be the improvement of information exchange to reveal coherences before a crisis occurs and to prepare the emergency managers for fighting unexpected and hitherto unknown disasters. Possible instruments could be the employment of higher qualified workers both as a think-tank and an insurance device (Bulmahn and Kräkel, 2002), the implementation of better information technology to facilitate information processing and the formation of homogeneous, long-lasting teams to tackle difficult and unexpected tasks effectively. A productive organizational measure could furthermore be the decentralisation of decision making-powers to guarantee that interventions are carried out rapidly (e.g. Roberts/Bea, 2001).

Intractable crises can be anticipated sufficiently but interference is almost impossible due to the attributes of the systems concerned, making responses difficult and preparedness hard, or the conflicts of interest surrounding them, impeding proactive countermeasures. Beside the fact that the possibilities of influence are rare, intractable disasters often bring up a degree of damage far beyond unexpected disasters, so that they are apparently more dangerous. Furthermore, some of these damages are irreversible. Technological, natural or social systems can be affected, for example nuclear power plants, crowds in stadiums or regions at risks of earthquakes. The Chernobyl incident was an intractable crisis since risks associated with nuclear power plants and the fact that Soviet plants were in a bad state were well-known but once the series of reactions at the reactor started, interference for the operators or later on the environmentalists was impossible. The Heysel Stadium tragedy, 39 persons were crushed to death during the UEFA-Cup final in 1985, stands for an intractable social crisis. Though the exposure of such a football match between Italian and British teams was known, police forces and rescue squads failed to subdue the situation after the Juventus Fans were panic-stricken. Surely poor organization, a ramshackle stadium and ill-prepared safety officials contributed to the disaster, but after it unfolded it was definitely intractable since crowds are in general hard to govern. Natural intractable disasters can be earthquakes or the global change, either not susceptible to influence like earthquakes or hard to influence due to political reasons and conflicts of interest like the global change.

All the abovementioned examples and any other intractable crises have in common that the danger in principle is well known and often easy to locate in time, space and kind, but as mechanisms of action are not explored in detail on account of the complexity, encroachments are hard to carry out into execution. Preparedness therefore is hard to achieve, keeping in mind that some of the activities described above like football matches or nuclear power generation are of use for society and hence the abolition proposed by Perrow does not seem to be an appropriate procedure. Organizational countermeasures against intractable crises should deal with unknown mechanisms of action by exploring the system involved and should focus on anticipating such disasters by promoting

something like a safety culture. Nevertheless, counteracting intractable crises by only one organization will be rarely effective. Usually numerous organizations or societies are affected so that political solutions and regulation represent the most important measures. Here, the activities of organizations and individuals bearing the risk of these intractable crises have to be regulated in an internationally unique and strict fashion. The abovementioned conflicts of interest and expert uncertainty, for example concerning power generation by coal-fired power plants or exhaust gas pollution in threshold countries and their effects on global change, often impede such an international regulation.

Fundamental crises are located in the fourth quadrant and represent the most dangerous class of crises due to the fact that they are neither predictable nor susceptible to risk. Responses are unknown or not sufficient and, since fundamental crises appear surprisingly or are even beyond comprehension, preparedness cannot be achieved. In fact such crises are rare but the combination of absent predictability and restricted or even missing influence possibilities supplies fundamental crises with an enormous potential of destruction. It is not only impossible to estimate all parameters necessary to prepare for such disasters, particularly time, place, probability or countermeasures, but also the extensive degree of expert uncertainty is problematic. While conventional or unexpected disasters take place as an event isolated in space and time, fundamental disasters furthermore often also start off swiftly but proceed for long periods of time and change in the meantime (Boin and Lagadec, 2000). Due to extent and duration of the crises, a lot of organizations, communities or persons enter the scene as victims or rescue squads, in the majority of cases with international background.

Beside inexplicable natural and technological disasters, social crises are to be found here. One of the most common examples is the terror attack of 9/11, an event based on appalling criminal intent and carried out with detailed scheduling, hard to predict due to the eccentric

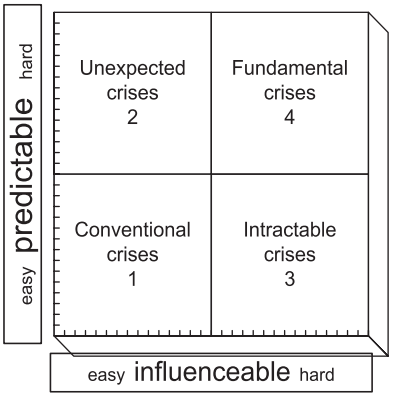

Figure 1: Crisis matrix

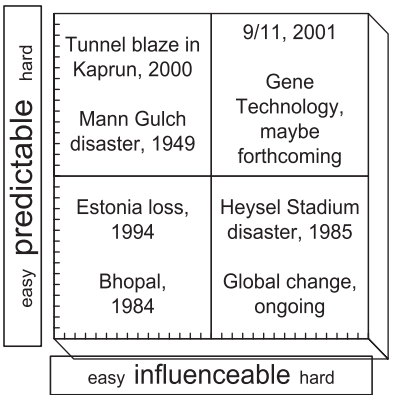

Figure 2: Examples

setting and undisclosed preparations, almost impossible to influence because of the irreversible consequences of the attacks. A future fundamental crisis could result from the application of gene technology, a domain relatively unknown but bearing hazardous risk of inexplicable new developments.

Recommendations how to counteract or even prevent fundamental crises are hard to find, as most of the germane future events are unknown and often impossible to forecast. Both organizational preparedness and safety regulation therefore have to deal with a high degree of uncertainty, a severe problem since possible countermeasures may include undesired effects like, for example, barriers to economic growth. The most important task to be performed should thus be the establishment of expert groups, allowing for all possible future crises and exploring appropriate countermeasures. Mitroff and Alpaslan recommend some practices that facilitate the work of such expert groups or any other executive dealing with fundamental or abnormal crises (Mitroff and Alpaslan, 2003). According to their remarks, a random-selection model of different crises and their combinations, so called internal assassins or spy games and exchange of experiences with executives in other companies could allow for the efficient planning for future, yet unknown crises. While these concepts are without doubt useful, their sole implementation is surely a deficient preparation as some presumably forthcoming fundamental crises will call for expert skills and scientifically proven countermeasures, a challenge almost impossible to cope with by executives of crisis prone companies. Hence, the importance of expertise in think-tanks cannot be overemphasised.

Regulation should be deposited to preliminary stages, for example illegal arms trade as part of terrorism, due to the problem that the matters of fact concerned are unknown, impossible to regulate or that advanced regulation could impede desirable technological or economic progress. If, for example, one wants to control dangerous outgrowths of gene technology, the strict

Figure 3: Countermeasures

monitoring of legal applications is a better way of preventing a fundamental crisis here than to interdict the whole gene technology, possibly impeding progresses in medical attendance or even generating illegal applications as alternative.

With the discussion of fundamental crises, the presentation of the crisis matrix is completed. Figure 2 shows, for closing illustration, the different crisis classes and relevant examples while Figure 3 summarises the proposed countermeasures.

Note that the deduction of class-specific countermeasures is only some kind of survey and therefore not exhaustive. Nevertheless, it can be considered a starting point for elaborate research integrating the findings of various sciences.

Discussion

The paper dealt with three questions: Why do we need a crisis typology and which properties should it have, what problems surround the typologies available at present and how could a new, more efficient typology look like? To sum up the answers to these questions, typologies are needed as they allow for presumably better scientific and practical examination of crises. But

they have to meet some attributes if their applicability should be possible, namely they should be useful for the deduction of countermeasures and furthermore some more technical characteristics should be fulfilled. The typologies today hardly meet these requirements as they are often outdated or generate heterogeneous subsets of crises. So, a new typology with new classification criteria, the predictability of a crisis and the influence possibilities before or especially while a crisis occurs, was launched, highly useful because of the now possible deduction of class-specific countermeasures.

Two main traits distinguish the new typology from other typologies. First, it is elastic as the classification criteria used allow for adjustment over time. Therefore, the reallocation of crises to the four subsets is possible if new insights are reached. Furthermore, I expect the typology to allow for the allocation of all future crises since the two classification criteria are defined broad enough and important traits of any crisis. Nevertheless, as history does not repeat itself, it is hard to decide that once and for all. Secondly, it is the first typology launched which exists of only four classes and facilitates the deduction of class-specific countermeasures. Its usefulness is hence a considerable step forward as other typologies are most of the times not launched for practical use but for classifying as an end in itself. Since the countermeasures sketched above can be seen as starting point only, it might be possible to allocate all applicable approaches to crisis research to one or more of the four subsets, providing decision makers with a veritable tool kit.

Beside the need for further development concerning the countermeasures, other improvements should occur over time. For example, one may encounter serious classification difficulties in particular cases even though the terminology used is in general accurately defined. Concerning the predictability as criterion, differentiation between information available ex-post and ex-ante is often almost impossible (Gephart, 1984) while assessment if a crisis is susceptible to influence or not crucially depends on the distinction between reactive and proactive interference. Taking the loss of the Titanic as an example, a somewhat unexpected disaster at that time since the vessel was regarded as unsinkable. Today, such a catastrophic occurrence can be fairly described as conventional disaster, bearing in mind that nautical disasters happen regularly and engineering progress equipped navigators with most advanced technological aid. Nevertheless, it is hard to judge if the state of knowledge in 1912 really enabled the executives to assess their hubris or if the loss of a modern, then benchmark setting ship was an unexpected disaster like the tunnel blaze in Kaprun due to the intrinsic, at first unknown limitations of any engineering achievement. These allocation problems in regard to past disasters are, however, well-known and a solution without complicating the typology is hard to provide. Furthermore, if one wants to make criteria more selective, an unintentional side effect could be the loss of flexibility.

Eventually, the introduction of a third criterion, namely if a crisis is irreversible or has an international dimension, might generate positive effects as, for example, intractable crises like the Heysel Stadium tragedy on the one hand or the Global Change on the other hand differ in that dimensions. Contrariwise, such an enhancement would cause further complexity, resulting in increasing ambiguity due to broad interpretation.

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