Improving resilience of organizations

by increasing mutual knowledge of stakeholders

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ABSTRACT

Managing accidents and crisis is a complex task, which is achieved by a large number of stakeholders. In order to identify appropriate responses to risk-prone situations, a classification in two categories has been proposed: risks of damage and risks of crisis (Wybo 2004). Risks of damage correspond to emergency management procedures and plans. Risks of crisis correspond to situations that escape from planning because of the overflow of the organization. Resilience of organizations is defined as their ability to resist to chaos and to maintain the situation under control. From the analysis of a large number of emergencies and crises caused by industrial and natural hazards, we try to identify what conditions increase the resilience of organizations. They have in common to increase the mutual knowledge of stakeholders about their strategies and roles and about the development of the situation.

Keywords

Risk management, crisis management, organizational learning, resilience of organizations

EMERGENCY MANAGEMENT VS. CRISIS MANAGEMENT

Emergency Management: a series of closed loops

The objectives of risk management are to suppress or to reduce hazardous events, but also to be able to react in the best ways when risk develops into accidents and crisis. To reach these objectives, organizations establish means and strategies for Emergency Management, covering prevention, protection and mitigation tasks.

When multiple organizations are involved, they design strategies and plans that define roles, procedures and cooperation schemes at each level: among the different stakeholders, among departments in each organization and among people in each department.

As long as each piece of this puzzle is at his right place, coordination and communication means are functional and each stakeholder is acting his role, the organization is in control of the situation by a series of closed loops.

In the last decades, a substantial improvement in technology reliability and risk prevention has been achieved, but in parallel, a steady increase of system complexity tends to create new kinds of risks. This complexity is often linked to the extension of technology and automatic devices that control the system, but it results also from the increase of the number of stakeholders and relations binding them. In a same way, the development of outsourcing that contributes to increase productivity, contributes also to increase the number of stakeholders and to decrease mutual knowledge, because of faster turn-over of people and companies.

Crisis Management: a series of open loops

When external or internal perturbations or events affect the situation, people first react by trying to identify the new situation and to apply existing procedures and plans, if any. If the situation escapes from this framework, either because there are no adequate procedures (the incident was not considered and never occurred before) or because defenses have not functioned, then the organization enters in a crisis and turns to a type of management based on experience and innovation.

In such situations, people will do their best to bring the system back into a known and stable state, while limiting damage and accident extension. But at the same time in organizations, groups or people find themselves isolated

from other stakeholders, with a sudden degree of uncertainty and autonomy. The result of this situation is the loss of global control and the development of a series of open loops: people have a reduced information on the situation and on the result of their actions.

"*Organizations or individuals that communicate poorly during crises often make bad situations worse. The TMI nuclear power accident, Exxon Valdez oil spill, and Challenger space shuttle explosion are three well-known examples that demonstrate how inadequate communication strategies can hinder an organization' ability to manage a crisis* ". (Marra 1998)

When stakeholders have no more sufficient knowledge of others, of their objectives, strategies and decisions, the risk of crisis sharply increases. There are pending tasks, non transmitted signals, misunderstanding among people, contradictory actions, and so on.

"*Any approach to disaster management that constraints or limits role flexibility and adaptability, therefore, is likely to create more problems than solutions*" (Webb 1999)

IMPROVING THE RESILIENCE OF A MULTI-STAKEHOLDERS ORGANIZATION

How to build organizations able to avoid crisis and form an obstacle to chaos? Which are the key factors that promote the setting up of organizational structures that are able to respond to crisis situations? A series of measures that contribute to achieve this objective can be identified.

A better knowledge of others: learning from drills

In order to be prepared for emergency management activities, risk-prone companies and rescue services organize on a regular basis exercises that simulate accidents and catastrophes. The purpose of such exercises is to train people to apply procedures and plans, to become familiar with technical systems and locations, and to evaluate the efficiency and appropriateness of procedures. These practical sessions have one more advantage: they can be organized with a periodicity higher than the turn-over of staff. By this way, teams are used to work together and if some needs for improvements are identified, the progress can be assessed during the next exercise, as it will be achieved by the same people in similar conditions. This is specially true when the exercise concerns very rare events and/or when the stakeholders have a high rate of turn-over.

When dealing with the management of crisis, the interest of such exercises in terms of training can be questioned. Crises are situations where plans and procedures are not appropriate, so how exercises can provide experience for such situations? By placing observers during emergency exercises, it can be observed that people playing their roles in the exercise go beyond the procedures describing their tasks: they develop communication and coordination activities with other people (inside and outside their organization) and they adapt their activity to the real context in which they are. If the debriefing of the exercise is focused on the strict application of plans and procedures, such deviations and extensions are evaluated negatively or hidden by the participants.

"*Given the emphasis on plans, even those that are impossible to execute, it is not surprising that departing from them is often cited as evidence of a failure. Disasters, however, break the rules that guide the ordinary conduct of business and government, at least for a period of time. Disasters create new environments that must be explored, assessed, and comprehended, change the physical and social landscape, and therefore require a period of exploration, learning, and the development of new approaches*". (Kendra 2003)

These deviations from the standard procedures are indicators of the ability of people to adapt to difficulties and by that, they reveal the need for adaptation of procedures and the ability of people to avoid destabilization and entering in a crisis.

From these observations, the introduction of specialized observers has been tested in several exercises, in order to identify these deviations and to be able to get the full picture of the exercise, from the combination of the points of view of the participants and the points of view of the different observers. Three kinds of observers have been defined: those who observe the activity of key people (information they receive and emit, people with whom they collaborate, decisions they make, etc.), those who observe a specific task (how it is achieved, difficulties encountered, who participates, what resources are used, etc.) and those who observe a specific place (who is there, what is done, how it is perceived by people, etc.).

Using this combination of points of view (people playing roles and specialized observers) during the debriefing session, a number of deviations have been identified, in particular the emergence of organizational patterns and

communication flows among stakeholders, some of them proving efficient to prevent the situation to turn into crisis. Capitalizing these deviations and studying their interest makes possible to promote their use to improve emergency procedures and plans, and to increase the mutual knowledge and efficient cooperation of stakeholders.

"*The reliability of learning of an organization is if it develops common understandings of its experience and makes its interpretation public, stable and shared*." (March 1991)

Sharing information about risks

The purpose of risk analysis is to pinpoint the components enabling a production system to remain safe, whether during normal operations or when dysfunction occur (Laurent 2003). The quality of risk analysis relies therefore on the capacity of the organization to gather and process knowledge on technical matters as well as on organizational and human aspects. This depends entirely on the way the risk analysis process is structured within the organization. A French pharmaceutical company has for instance organized its risk analysis process around a unique document constructed and approved by all stakeholders involved in the successive steps of the production process (from the laboratory to the production plant). This document is called SHARE (Safety Hazard And Risk Evaluation). SHARE starts to be constructed with the characterization of the risks of a new chemical reaction (*e.g.* reaction heat, decomposition temperature, chemical incompatibility, *etc.*). Practical data on process safety (*e.g.* time of reaction, temperature stages, safety equipment required, *etc.*) are added during the operational test phase in the pilot workplace. When the test phases are completed, and if the chemical process is industrialized, SHARE is transferred to the safety experts of the production plant. They use SHARE as a base for detailed risk analysis. SHARE is also translated into internal safety data sheets. During the whole risk analysis process, safety experts from laboratories, pilot workplaces and production plants work together around the same formalized document. SHARE addresses technical, human and organizational aspects. The fact that all of these experts need to agree and communicate on safety issues certainly contributes to improve process safety in the plants.

Training to basic preventive actions

Training is a relevant tool for prevention, but how to realize training program in prevention for everybody? We have studied a training program created by French professional fire fighters. A small team (2 trainers) has trained more than 20 000 persons since 1996.

The goal of this program is not to train fire-fighters, but to create among the trainees (citizens, high school students and operators of industrial plants) a culture of prevention and to develop safe behaviors in case of accident. By their experience, credibility and popularity, fire fighters are able to transfer a relevant message of prevention.

Results of this training sessions in terms of impact on risk representation and behaviors has been assessed by comparing answers to a questionnaire before and after the training on a sample of trainees (100 people). Results show an improvement in « awareness » of risk causes and safe behaviors. These first results illustrate the importance of developing specifics training programs for prevention. Safety training can not be only informative. We postulate that risk management requires to design specific training because confrontation between an individual and risk calls upon specific psychological mechanisms (Specht & al., 2005).

For (Slovic & al., 2004), modern theories in cognitive psychology and neuroscience indicate that there are two fundamental ways in which human beings comprehend risk. The "analytical system" uses algorithms such as probability assessment and the "experiential system" which is intuitive, fast, mostly automatic, and not very accessible to conscious awareness. Studies have demonstrated that analytic reasoning cannot be effective unless it is guided by emotion and affect (Damasio, 1994). From this debate around risk perception, some authors (Slovic & al., 2004) wonder about communication and training for risk management. According to them: « *On the one hand, how do we apply reason to temper the strong emotions engendered by some risk events? On the other hand, how do we infuse needed "doses of feeling" into circumstances where lack of experience may otherwise leave us too "coldly rational."* ».

By setting up this experience of training a large number of people about safe behavior in risky situations, firefighters are willing to increase the resilience of the emergency management at two levels. On one hand, this common set of knowledge and practice of safe behavior reduces the risk that a simple incident turns into a dangerous situation before they can intervene, and on the other hand, firefighters can predict the behavior of people and define more efficient strategies.

The adaptation of people and organizations under stress

The analysis of each crisis management enlightens in the general architecture of the organization, subsets of people who have been involved and their relations among themselves and with the outside world, whenever they belong to the organization or they are opinion relays. The analysis of the different networks that have "*emerged*" during emergency and crisis management reveals what we call the " *resilience network* ", which constitute the strengths of the system, when these organizational patterns were able to manage efficiently the situations (cf. fig. 1).

"*The level of reliability of an organized system depends on the capacity of its parties to develop cleverness clues needed to achieve informal settings in order to continuously correct and amend a set of structurally incomplete rules and devices*". [translated from (Bourrier 2001)]

Following the detection of alarming signals or the activation of an alert, some elements play the role of guide in the development of the organization's structure. Two kinds of guiding elements can be observed: leaders and action plans. In the first case, there is a leader, whose role in the organization, charisma or reputation will attract people and form the initial structure. In the second case, there is an action plan that is known and can be used by a first group of people as a reference, to initiate an organization following its indications. With the development of the situation, this structure will evolve due to a process of innovation and improvisation that will generally keep only the main directions from the initial plan.
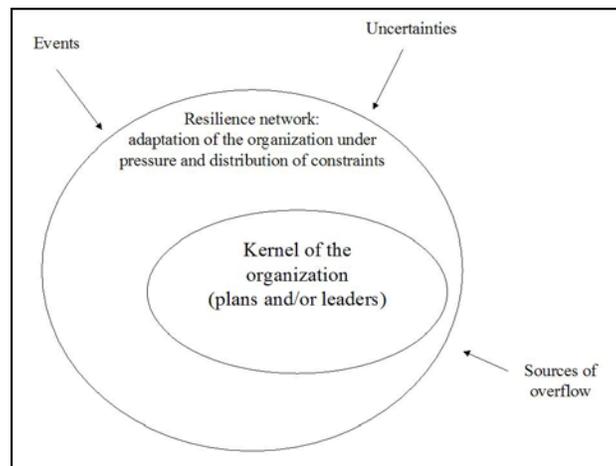

Figure 1: adaptation of an organization faced to risks of crisis (Wybo 2004)

"*The role of human being in complex systems is essential: he must achieve programmed and complex operations, but also supervise the system as a whole. In many cases, his job goes beyond the simple compliance to procedures because their only application is not enough to get the production. Moreover, if it were the case, automatic devices would replace people. Quite often, he must check the relevance of the procedure in the real context of the task and, in the eventuality of a gap, he must change procedure, complete prescriptions, or even invent new organization schemes to reach the goal, despite perturbations, while respecting safety requirements*". [Translated from (Leplat 1990)]

There is an unlimited number of organization types and combinations of actions that may put an end to a crisis situation. The different kinds of knowledge that are used or built during the management of such situations constitute an important wealth for organizations and companies, but they are often tacit and poorly shared among people.

Among the benefits of debriefing and analyzing accidents and crisis management unfolding, the identification of the strengths of the system that must be promoted and weaknesses that need to be corrected, is probably one of the most promising actions. It provides knowledge about the behavior of the system beyond its planned limits and allows the identification of key people, information flows and resources on which the system may rely to anticipate, prepare

and manage hazardous situations. Developing this knowledge, sharing it and improving the image of people who own it are, along with anticipation, important ways of increasing the resilience of organizations to crisis.

"*The actors involved in safety system failures are frequently the primary, sometimes the sole, source of information about what happened and why. The capacity to learn from accidents and develop preventive measures therefore depends on the ability to elicit information*". (McDonald 1997)

Setting up and developing an organizational learning scheme to make this knowledge visible and formalized is crucial. But it needs to establish a progress loop based on three principles: - respect of individuals, - trust in their ability to manage unexpected situations, - sharing information among stakeholders. It is also a way to reinforce the feeling of people to belong to the organization, which is a key factor for motivating them and encouraging their commitment in the management of emergencies.

The development of redundant control loops

During emergencies, the organization is quite often based on a central headquarter (generally seen as the "crisis room"), driving a number of teams and groups in the field of operation, in charge of the multiple tasks needed to manage the situation. One of the classical source of failure of this kind or organization is the deterioration or loss of communications between headquarters and field, either for technical reasons or because stakeholders are not used to work together in stressful conditions and they don't share common references, vocabulary and semantics. Under such difficulties, field groups feel abandoned, get a large autonomy and do their best to cope with difficulties, but at the same time people in the crisis room feel deaf and blind and are in a difficult position to define strategies and manage the situation.

We show below (cf. fig. 2) an example of organization that succeeded in such conditions, by establishing several closed loops of control. In January 2005, the airport of Paris faced a heavy snow storm and thousands of people were confined in the different terminals for hours, while airport staff were trying to clean tracks from snow, defrost airplanes and organize boarding of passengers, landings and take-off of planes. The general situation in the airport was chaotic and perceived as a crisis by most stakeholders, public and media, with the exception of one terminal, in which the situation was relatively calm and well organized.
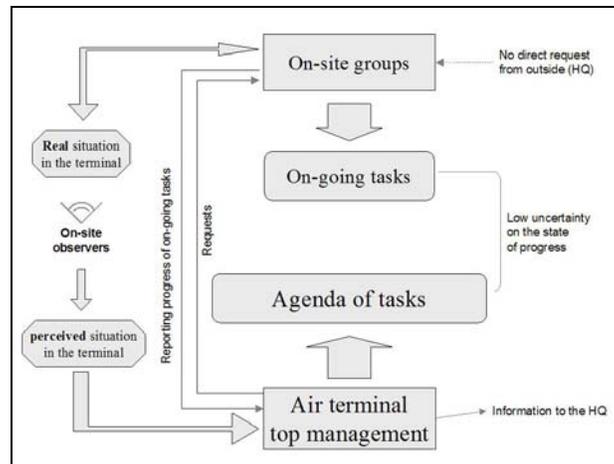

Figure 2: Emergency management in an airport terminal:
multiple closed loops

The main reason why the situation remained under control in this terminal comes from a set of three decisions taken by the terminal manager, which constitute closed loops:

- Requesting frequent reporting of progress of actions and difficulties from field groups;
- Preventing field groups from receiving direct orders from the crisis room and be the only one communicating with the crisis room;

- Placing a manager-level person in the field, to get realistic perception of the situation and its evolution, in order to adjust strategies and commands to on-site groups.

This last loop is probably the most important in the success. The terminal manager realized from past experiences that he was unable to get the full picture of the situation from his office, so he decided to go anonymously inside the terminal hall with his mobile phone and ask one of his assistants to stay in permanent contact with him and to play his role in his office (exchange messages with the headquarters). By this way, he kept a clear view of the situation, emerging difficulties and effect of measures taken by the on-site groups, and was able to adjust his strategy and decisions to the situation.

CONCLUSION

Developing preparedness to accident and crisis in an organization composed of many stakeholders is a complex task.

Managing emergencies can be achieved by creating organizational patterns to ensure the maximum efficiency of prevention and protection devices and procedures. Planning and anticipation are the key success factors.

Coping with risks of crisis needs more attention as these situations result from the overflow of organizations and the lack of control with existing means and strategies. Balancing conventionality and innovation, and learning from the analysis of crisis are key factors for managing risks of crisis.

"*Social roles are never performed mechanistically in rote fashion; rather, role performances always involve at least some degree of improvisation. At the same time, social roles are never completely improvised or invented from scratch; rather, role performances always involve some degree of conventionality. In a practical sense, a better understanding of how individuals improvise their role performances during the emergency period can help responding agencies and organizations better prepare for future disasters.*" (Webb 1999)

Managing accidents and crisis is always a matter of exceptional situations in deteriorated contexts. Preventing emergency situations to turn into crises corresponds to developing the resilience of organizations. This resilience is achieved at different levels in the organization: at the execution level, at the group level and at the management level.

Developing the mutual knowledge of people and a shared knowledge about risks gives to the organization the possibility to use the capacities of adaptation of people and to adapt procedures and roles to the changing context. Moreover, this mutual knowledge makes possible to keep the situation under control by combining in a series of closed loops a shared knowledge of the general strategy of management with local margins of action.

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