

On Improving Emergency Preparedness and Management with Delphi

Kimmo Laakso

Ahma insinöörityö ja University of Turku,
Finland Futures Research Centre
kimmo.laakso@utu.fi

ABSTRACT

An emergency brings together a group of individuals who often represent different organizations, resources, and roles. In order to be able to make the right decisions, individuals need to understand each other although they may be from different lines of business. In our research the target is to stress the importance of a common language in emergency management. Our plan is to gather a group representing the authorities, i.e. public sector actors, and a group representing companies, i.e. private sector actors, to communicate with the Delphi method on possible differences in the language used in different lines of business. The aim of this paper is to discuss the possibilities of using the Delphi method to make improvements to emergency management and to evaluate which kinds of organizations should be represented in our Delphi panel. This paper forms a part of a larger research study, the results of which will be useful, for example when improving the interoperability of management and communications systems.

Keywords

Delphi method, Emergency Preparedness and Management, Interoperability of Organizations

INTRODUCTION

Emergency preparedness and management is an important and topical research issue. Emergency situations can be caused either by natural forces or by human activity. We have to be prepared for possible emergency disasters at different levels of society, whether caused by the actions of a human being or the forces of nature. The 10-year anniversary of the New York terror attacks was in September 2011. The earthquake of Sendai and the ensuing tsunami and the nuclear disasters of Fukushima in 2011 are examples of emergency disasters of enormous scale, in which communication was an important issue in the organization of the rescue actions.

The concept of disaster has several definitions. Castrén, et al. (2006) define it as follows: “By a disaster we mean an incident, which is severe based on the amount of victims or the quality of injuries or based on the damage to/of environment and property”.

A disaster or a natural catastrophe can be for example:

- a nuclear disaster in a country or in a certain vicinity
- a severe disaster involving hazardous materials
- storms or frosts causing severe damage
- major disruption in the supply of energy, for example during exceptional weather conditions
- an explosion, fire or another severe act or accident
- a major air or railway accident
- a serious accident involving a passenger ship (e.g. Castrén et al. 2006, Ministry of Defense Finland 2010).

It is typical of disasters that they cannot be managed by an organization on daily-based preparation and resources alone. It is important to be aware of what has happened and what will probably happen and what are the consequences of the incident in terms of disaster management. It also has to be possible to form a concept of how damage and threats caused by an accident can be prevented and mitigated as effectively as possible. (Rantanen 2003, Leppäniemi 2011.)

Our environment is changing: public sector, economic life, and civil societies and their structures are changing. Internationalization, the network economy, and technological development have changed our outlook and modes of operation (NESA 2011). A new kind of awareness of disaster situations means better integration of public and private sectors (Prime Minister's Office, 2011).

One of the starting points for this integration is that the different actors should understand each other. The Director of the Accident Investigation Board of Finland, Dr. Veli-Pekka Nurmi, says: "The situation in a disaster is never so bad that things couldn't be made worse by weak communication and the poor flow of information" (Nurmi 2011).

For various reasons, different authorities or companies specialized in their own fields use different concepts and terms for the same issue, although the object domain is the same. Some of those differences may be explained with cultural differences or differences in organization cultures (e.g. Hofstede et al. 2010, Lewis 2005, Carver and Turoff 2007). In our research we also seek for other possible reasons. Communication between the players involved has a key role in cases of serious accidents. Notable is that:

1. There are several levels (from global to local level) of regulations and agreements that have to be followed, all of which use terminology that is not necessarily the same as that used by others.
2. There are several authorities that have to be able share information with each other and with companies.
3. There are companies that may cause a possible disaster or where a possible disaster may happen. In addition to regulations, companies may have international group or company policies that they follow.

These regulations, actors, and various lines of business may have different terminologies and concepts and ways of doing things. Finland is used as an example country in our research. However, we believe that the research results can be generalized internationally, although the social and legal systems are different.

The common goals of the authorities and companies are to guarantee the security of personnel and other people and in addition to prevent or minimize material damage and to help recover the functioning of society. In a given society there is only a certain amount of resources, which have to be used most effectively in planning preparation and for example in coping with disasters. (Prime Minister's Office 2011).

In ongoing SAVE research project our aim is with the Delphi process to bring together the authorities of different administrative sectors and corporate experts to give their views and their development ideas concerning the possible challenges in communication in relation to emergency preparedness and management. The SAVE project will be executed in cooperation with the Finland Futures Research Centre at University of Turku and Ahma insinöörityö Oy.

DELPHI APPLICATION

Research settings

The objective of our research is to produce new knowledge of emergency preparedness and disaster management for authorities and the business sector. The aim is to study emergency situations by using Delphi and to identify circumstances where different actors have recognized potential problems or risk situations related to the flow of information and communication. This will allow us to create an overall picture of communication challenges in disasters.

The aim is:

- to identify situations where there have been challenges or problems related to information flow in or between different organizations.
- to identify problem situations in different action phases. What are the challenges in the pre-accident preparedness phase, and on the other hand, what are the challenges in actual disaster situations?
- to receive development proposals for preparedness planning and action plans. How can risk management and action plans be developed so as to prevent or minimize all damage? How it is possible to develop accident management by means of education and training?

This knowledge can be utilized in the development of preparedness as well as in personnel education and training. This new knowledge can also be used in actions related to actual disaster situations where the role of collaboration is significant. The results will help e.g. when improving the interoperability of management and communications systems. This research project will also facilitate better situation awareness for the use of accident/disaster planning and management.

Delphi method

Delphi is a survey or interview method in which expert panelists' knowledge and presumptions on the issue or development process under study are collected in an interactive process. Delphi is especially useful when the phenomenon under study is complex or when the topic is somehow delicate – difficult to define, awkward to talk about, politically sensitive, etc. (e.g. Linstone and Turoff 1975, Laakso et al. 2011).

There are several objectives that indicate the use of Delphi in our research (Turoff 1970, Linstone and Turoff 1975, Turoff 2009); Delphi is suitable research method e.g. when

- exploring underlying assumptions or information leading to different judgments;
- allowing exchange of tacit knowledge among professionals
- seeking out information which may generate a consensus on a part of the respondent group;
- correlating informed judgments on a topic spanning a wide range of disciplines; and
- educating the respondents group as to diverse and interrelated aspects of the topic.

We considered that in our research the objectives are such that using of the Delphi is more than justified.

The fundamental difference between ordinary surveys and the Delphi method is the iteration and feedback used in Delphi. In contrast to Gallup-type surveys, opinions are not only collected for analysis, but information on the answers will be fed back to the panelists for comments and/or as a basis for the next round. With the help of this feedback, the respondents are obliged to give grounds for their choices. The building up of information proceeds round by round so that the previous round forms the basis for the next one, which is essential for the Delphi process (e.g. Linstone and Turoff 1975, Laakso et al. 2011).

Organizations represented in the Delphi panel and anonymity of panelists

According to many Delphi practitioners, the selection of the panel is one of the most critical phases of a Delphi study. In terms of the communication process, Delphi is well suited to setting up a communication structure among members who possess the same general core of knowledge and who are already well informed. However, for the needs of our specific study, the successful realization of Delphi also requires the design of a panel structure which allows many knowledgeable individuals from different disciplines or specialties, having a different working background and experience, to contribute information or judgments on the problem area which is much broader in scope than the knowledge that any single individual can possess. (e.g. Linstone and Turoff 1975, Kuusi 1999, Gordon 2009, Kuusi 1999, Hussler et al. 2011)

We are going to build a Delphi panel of around 30 people (Okoli and Pawlowski 2004). The objective is for about half of the experts to be representatives from various authorities and the other half from the business world, with backgrounds in different lines of business.

From the public sector will be invited:

- 2-3 Ministries; ministries that are e.g. responsible for policy making and development of legislation and other regulations concerning the topic of this research
- 9-10 State/Regional State Authorities
- 2-4 Local/Municipal Authorities.

From the business life will be invited:

- 4-5 Power/energy supply and telecommunications providers including e.g. nuclear power plant
- 8-10 Companies including e.g. chemicals production
- 2-3 Companies representing transportation including e.g. hazardous materials transportation.

At the time of writing, we are at the stage where we have identified the organizations from which we would like to have experts for our panel and the panelist selection process is in hand.

In this Delphi application, the complete anonymity of the panelists is considered unnecessary (Turoff and Starr 1996, Tapio et al. 2009). At the beginning of the first Delphi round, the panelists will be given the names of all the other participating panelists, but the individual answers and arguments shown to the panel will be anonymous. In our research we call this arrangement *semi-anonymity*.

1st Delphi round

The first Delphi round will be accomplished by means of recorded interviews. All 30 panelists will be interviewed personally in the first half of 2012. We are planning to use semi-structured interviews allowing interviewees the possibility to express their opinions on the research subject freely but keeping them on right track. The interviews will be recorded, transcribed, documented, and then analyzed. Through personal contact with the panelists we also wish to increase the commitment of the panelists for the next rounds.

The target of the first Delphi round is to find out what kinds of challenges or problems the panelists have encountered concerning emergency preparedness or disaster management. Interim Report 1 will be created and distributed to the panelists before the next Delphi round.

2nd and 3rd Delphi rounds

The second and third Delphi rounds will be carried out using Internet-based Delphi software (Turoff and Starr 1996, Landeta 2006). The second Delphi round will take place in late 2012. Questions and claims in questionnaire will be formulated based on the desk study and information from authentic interviews and Interim Report 1.

The focus of the second Delphi round is to concentrate on finding out the reasons for possible challenges and problems in communication. Are they perhaps based on regulation or agreements or just practices of a certain line of business? Interim Report 2 will be created and distributed to panelists before the last Delphi round.

The third Delphi round will be in the first half of 2013. With it we will try to find the solutions for possible problems in communication and to create suggestions to be used by the authorities and companies involved. The release of the final results of the research will be at the end of 2013.

SUMMARY

Although according to regulations, rescue authorities direct rescue operations at the accident site, clearly in disaster situations society relies increasingly on help from companies etc. In many situations related to disasters, the first responders in the situation are typically company personnel. Therefore it is important that they take appropriate action in the situation. It is crucial that these personnel can communicate and act as effectively as possible in an acute situation. One of the major communicational challenges related to disasters is that company personnel and other civilians are not professionals in the field of security or rescue.

The objective of ongoing SAVE research project is to get authorities and business life together to share their experiences on possible challenges or problems concerning communication especially when it comes to concepts and terminology. We also target the identification of situations where there have been challenges or problems related to the information flow in or between different organizations. The research has begun with a desk study of current regulations and finding out what authorities are responsible for what kinds of emergency situations (Figure 1). Then during 2012 and 2013 we will carry out a three-round iterative Delphi study with around 30 experts representing public sector authorities and private sector companies.

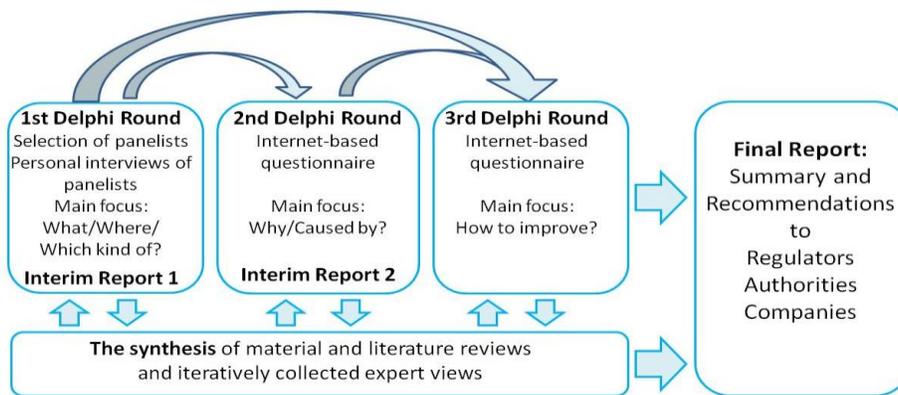


Figure 1. Workflow of the Research

Even though the focus is on disasters caused by/in business life in our research, we also expect the results of the research to be utilized on other occasions demanding interaction between actors. Finland is used here as an example country, but we believe that the research results can be generalized internationally, although the social and legal systems may differ. We hope that the results of our research will be useful for example when improving the interoperability of management and communications systems and also when developing regulative actions and when planning training of personnel.

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