

# A Theoretical Knowledge Transfer Model in Disaster Management in Malaysia

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## ABSTRACT

Managing knowledge effectively during a disaster event is crucial as it helps to ensure better decisions are made under a constrained situation. Managing a disaster would be hazardous if available knowledge is not managed effectively, as it will contradict what is either being planned or was expected earlier. Through the deployment of an effective knowledge management system, knowledge related to disasters can be collected, disseminated and stored effectively. In order to develop an effective knowledge management system, a clear understanding of the knowledge transfer process is required. Hence, this study will propose a conceptual knowledge transfer model for flood management in Malaysia. The methodology is divided into three phases, which are to propose, validate and evaluate the knowledge transfer model. The integration of knowledge transfer models is required in order to represent the multi-interactions process between stakeholders involved in managing floods in Malaysia. The proposed model will be helpful for the stakeholders involved in disaster management to understand the knowledge transfer process involved in managing floods in Malaysia.

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## 1. INTRODUCTION

Managing disaster situations would be hazardous if available knowledge is not managed effectively, as it will contradict either what is being planned or was expected earlier [1]. During the management of a disaster, making required knowledge available during the decision-making process is vital as faster than usual responses are needed to overcome dangerous situations, prevent further losses and, most importantly, save lives [2]. According to Sobel and Leeson [3], when managing a disaster event important knowledge issues are required to be known in order to solve diverse problems during the occurrence of a disaster. These include: what are the victims' needs; how badly are they affected; how to rescue the victims and how to control damages respectively. .

Previous works in knowledge management literature have highlighted the importance of implementing a knowledge management system (KMS) for managing disaster-related knowledge [1],[2]. For instance, the use of KMS can have the following advantages: it can help rescue agencies make better decisions under constrained situations [2]; it can collect and disseminate important information, as well as knowledge proceeding to and from the victims; and it allows involved parties (i.e., victims and rescue agencies) to collect, disseminate and store important knowledge related to the disaster [1].

In order to implement an effective KMS, understanding how the knowledge is transferred between involved parties is essential. Understanding how knowledge is transferred is the key to implementing a successful KMS. Previous works have focused on understanding the knowledge transfer process in management, business, education, and healthcare contexts. However, to the best of our knowledge no works

have been conducted which examine the knowledge transfer process within a disaster management context (i.e., floods, earthquake).

The knowledge transfer process in disaster management involves a more complex interaction which goes beyond the simple source – recipient or inter-firm interactions within and between organizations. Managing disasters involves a simultaneous knowledge transfer process between victims, experts (i.e., academicians, consultants), and rescue agencies (i.e., government and NGOs). Hence, having a clear understanding on how knowledge is transferred between the involved stakeholders (i.e., victims, experts, rescue agencies and NGOs) during a disaster is important as it can further guide towards the implementation of an effective KMS for managing knowledge related to disaster events.

Therefore, this study focuses on understanding the knowledge transfer processes that occurred during recent flood disasters in Malaysia. In general, this study is divided into three phases, namely: 1) to propose a knowledge transfer model; 2) to validate the proposed knowledge transfer model; and 3) to evaluate the proposed knowledge transfer model. However, for purposes of this paper, we will only discuss the conceptual development of the proposed knowledge transfer model. The development of this model is based on previous works that have examined the knowledge transfer process within and between organizations. For completeness, the overview of disaster management in Malaysia will be discussed in more detail in Section 2. The third section provides an overview of knowledge transfer processes based on previous works in knowledge management literature. Section four explains the proposed model of knowledge transfer relating to managing floods in Malaysia. This paper ends with a conclusion and recommendations for future works for this study.

## 2. DISASTER MANAGEMENT IN MALAYSIA

Over the past decade, it is estimated that almost two billion people have been affected by natural disasters such as tsunamis, hurricanes, floods, mudslides and earthquakes [4]. According to the Asian Disaster Reduction Centre (ADRC) [5], nearly 89 per cent of the population of Asian regions are affected by disasters. Malaysia is one of the countries which have been affected by natural disasters such as floods, landslides, hazes and forest fires [5]. According to a report by ADRC: in the year 2004, Malaysia was affected by the Indian Ocean tsunami which killed 80 people and affected 5,063; in the year 2007, this country was affected by torrential rains in the north-eastern, central and southern parts of Malaysia which killed 33 people and affected nearly 158,000 more; and recently in December 2012, two people died and 14,000 more were forced to flee their homes and seek shelter at relief centres due to monsoonal rains [6]. Although Malaysia is not unduly threatened by severe natural disasters and calamities (e.g., earthquakes), this country is nevertheless usually affected by floods. Due to extreme weather, this country has experienced extreme weather events ranging from freak thunderstorms to monsoonal floods which created havoc in the country [5].

To date, the National Security Council (NSC) has been identified as the champion in managing national disaster and relief efforts in Malaysia. Based on National Security Council Directive No. 20 (which is the main policy mechanism used for national disaster and relief management), the NSC is responsible for managing and coordinating twenty other related government agencies ([www.mkn.gov.my/mkn/default/](http://www.mkn.gov.my/mkn/default/)). The NSC has been given the highest authority by the Malaysian Government for, specifically: command and control; managing information related to disasters; identifying, assessing and monitoring disaster risks; and providing early warning of forthcoming disasters. The NSC is also the head of the National Disaster Management Council (NDMC).

When managing disasters, the NSC not only has to engage closely with these twenty agencies; it also has to work closely with experts (i.e., academicians, scientists, disaster experts, and NGOS) as well as victims in order to manage the disaster effectively. In addition, the NSC is also responsible for ensuring that the victims or potential victims are aware of the current situation and the standard operation procedures that will be used to manage disaster victims. Figure 1 depicts an overview of the parties involved in managing disasters in Malaysia, based on National Security Council Directive No. 20.

Figure 1 shows that managing disasters in Malaysia involves multi-interactions between stakeholders (i.e., victims, experts, the NSC, involved agencies and NGOs). During a disaster event, the NSC will transfer knowledge between the stakeholders. For instance, an expert (e.g., a meteorology expert) will consult with the NSC regarding the current situation and give a prediction of what may happen in the near future based on their analysis. During a disaster, the NSC has to keep in close contact with the twenty involved agencies to gather information so that it can help them make decisions. The NSC also has to communicate with the victims and advise them on the current situation. These multi-level interactions make the process of modelling the knowledge transfer process in disaster management complicated. Hence, to further help us with the modelling process, this study turns to previous works that have examined the knowledge transfer model. The next section discusses previous studies that have focused on the knowledge transfer process.

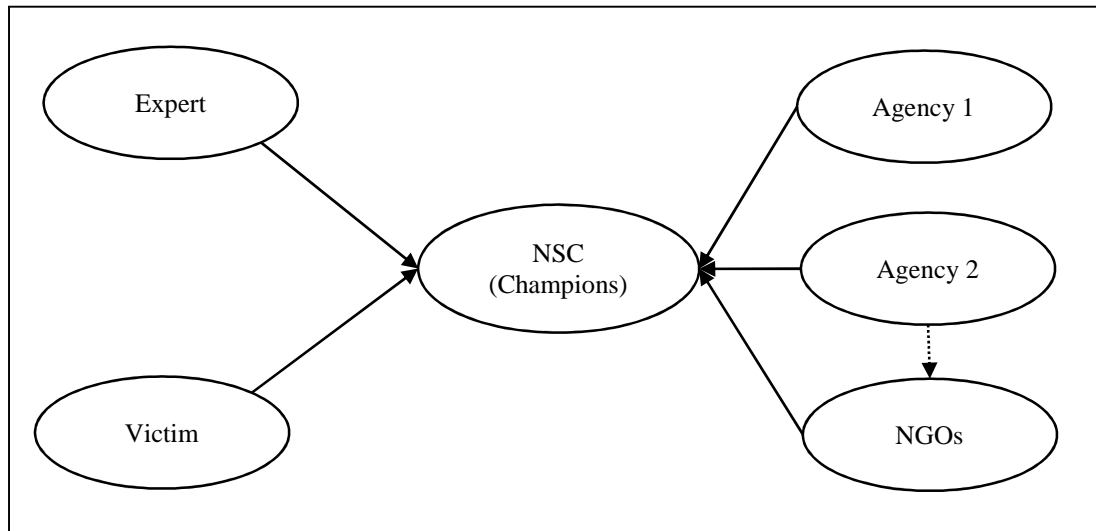


Figure 1. Parties involved in managing disasters in Malaysia

### 3. LITERATURE REVIEW ON THE KNOWLEDGE TRANSFER PROCESSES

From the literature relating to knowledge transfer, it can be seen that there are various ways being proposed to model a knowledge transfer process. In general, the process of knowledge transfer involves transferring knowledge within an organization (i.e., between expert and recipients) and between organizations (i.e., inter-firm). Table 1 shows previous works that have examined the knowledge transfer process within and between organizations.

Table 1. Knowledge transfer process based on previous literature

Author	Domain	Party Involved	Process
[7]	Within Organization	Organization to receivers	Acquisition → Communication → Application → Assimilation
[8]	Within Organization	Expert to receivers	Initiation → Implementation → Ramp-up → Integration
[9]	Within Organization	Receivers to organization	Motivation → Matching → Implementation → Retention
[10]	Between Organizations	Organization to organization	Conversion → Routing → Dissemination → Application

According to Gilbert and Cordey-Hayes [7], within an organization, knowledge is transferred between source (organization) and receiver by following four steps, namely: i) acquisition, ii) communication, iii) application, and iv) assimilation. According to these authors, before knowledge can be transferred, it must first be acquired. Organizations can acquire knowledge by scanning or searching either their past knowledge or individuals within the organization for new knowledge (i.e., experts). By doing so, it can help organizations to redirect activities, solve problems and increase performance. After the knowledge is acquired, it must then be distributed in either written or verbal form. At this stage, identifying the barriers of knowledge dissemination is advisable. An effective mechanism in communicating knowledge is required in order to encourage knowledge-sharing between employees within an organization. After the knowledge is acquired and communicated, the knowledge recipient needs to focus on how to apply the knowledge in their daily activities. Finally, the key process of knowledge transfer is the assimilation of the results and effects after applying the gained knowledge.

Meanwhile, according to Szulanski [8], knowledge within an organization can be transferred by understanding four distinct stages in knowledge transfer, namely: i) initiation, ii) implementation, iii) ramp-up and iv) integration. The initiation stage involves the ability to recognize the need to transfer knowledge so that uncertainty can be reduced or problems solved. At this stage, establishing the perceived reliability and trustworthiness of knowledge is important as it will determine the scope, cost and mutual obligation of the knowledge transferred between participants (i.e., expert and recipient). In the implementation stage, the establishment of ties between the expert and recipient is required. This is due to the fact that transferring knowledge requires the recipient to reconstruct and realign their existing understanding. Thus, at this stage, planning and making the new knowledge less threatening to the recipient is important. The third stage (i.e.,

ramp-up) involves identifying post-transfer performance of the transferred knowledge. In other words, the receiver of knowledge will try to establish satisfaction by acknowledging that the received knowledge is able to be used in a new environment. Finally, the integration stage focuses on the routinization of the new knowledge as a recipient of daily practice.

Kwan and Cheung [9] suggested that knowledge within an organization is transferred by following four stages, specifically: i) motivation, ii) matching, iii) implementation and iv) retention. According to these authors, knowledge transfer started only when involved parties (i.e., knowledge recipients) became motivated to acquire new knowledge. At this stage, a knowledge recipient should know what knowledge is required by them. The second stage involves identifying a suitable partner(s) (i.e., source) who is able to demonstrate its ability to provide the required knowledge. Understanding the characteristics of required knowledge is critical when generating successful matching. The implementation stage is largely about the ability of the recipient to absorb the obtained knowledge. This stage is considered completed when the recipient has achieved satisfactory results after using the obtained new knowledge. In the final stage, the newly-obtained knowledge will be institutionalized and become a part of the organization. The knowledge should be restored and able to be retrieved by others when needed.

According to Narteh [10], the knowledge transfer process between organizations involves the following stages, namely: i) conversion, ii) routing, iii) dissemination and iv) application. Conversion of knowledge refers to the process of converting existing knowledge into a form of knowledge that can easily be understood by others. Knowledge should be converted into a form of transferable knowledge that is easy to be absorbed by others (i.e., charts, manuals, or procedures). The routing stage involves the process of identifying which channel of communication is suitable to use when imparting knowledge to the receiving organization. Knowledge can be transferred to other organizations by strategic linkages, joint-venture partner interactions or by identifying important personnel who can facilitate the knowledge transfer process. The dissemination stage involves the process of assimilating acquired knowledge (from others) within the organization. This stage is important as it avoids unplanned knowledge migrations. The final stage comprises the use and evaluation of transferred knowledge. This stage provides feedback on the relevancy and usefulness of acquired knowledge.

Based on the reviewed literature, it can be seen that different knowledge transfer processes are required when different parties are involved (i.e., expert, knowledge-seeker and organization). For instance, within an organization where knowledge is transferred from expert to recipient; the experts firstly established their credibility by their own initiation so that their expertise could then be shared with others. Being able to establish knowledge reliability and trustworthiness will trigger the knowledge transfer process. On the other hand, knowledge that is transferred from a receiver (knowledge-seeker) was initiated by the personal motivation of parties concerned to acquire new knowledge. Recognising what new knowledge is needed will start the knowledge transfer process. As for the inter-organizational knowledge transfer process, this was commenced by converting existing knowledge into a form that can easily be understood by the receiving organization. The next section discusses the proposed knowledge transfer model for managing floods in Malaysia.

#### **4. A CONCEPTUAL FRAMEWORK FOR TRANSFERRING KNOWLEDGE DURING DISASTER MANAGEMENT**

Figure 2 shows a proposed knowledge transfer process for flood management in Malaysia. As mentioned earlier in Section 2, there are four stakeholders involved in managing floods in Malaysia, specifically: victim, expert, the NSC and other involved agencies. In this framework, 'victim' refers to those persons who are affected or might be affected by floods. The NSC, meanwhile, is the main agency who will coordinate and manage all the knowledge gathered from the other stakeholders. Finally, 'other involved agencies' refer to supporting agencies which have been defined in the NSC Directive No.20, as well as other supporting NGOs.

Within the context of flood management, experts from the public and private sectors transfer their expertise in handling and preventing floods to the NSC. Subsequent implementation of the knowledge requires the association of experts and the NSC to make the knowledge comprehensible and applicable successfully. Successful implemented knowledge regarding flood management will be identified and applied in a new environment. Next, the knowledge will be internalized and formed as a guide for managing future flood event problems.

In managing the flood victims, knowledge transfer occurs from the outset only when the victims are motivated to acquire new helpful knowledge in confronting the pre, during and post-flood situations. At this stage, victims should be aware of what knowledge they will require. In the second stage, the NSC will identify the related government agencies which can provide knowledge pertaining to flood management such as: shelter, food supplies and health assistance for the victims. These are the knowledge particulars required in

confronting the situation. In the implementation stage, victims internalize the knowledge and apply it when needed. It will also be stored by the NSC to be used by other victims when needed.

From an inter-organizational point of view, knowledge transfer is associated with the NSC and other related government agencies and involves conversion, routing, dissemination and application. The NSC provides general knowledge pertaining to managing disaster and specific knowledge in relation to flood management in the form of written documents, i.e. National Security Council Directive No. 20. Several methods are used by the NSC to disseminate the information related to floods, including: water levels, weather forecast and flood areas. Among the mediums used is online communication such as phone and email, or through face to face communication like formal and informal meetings.

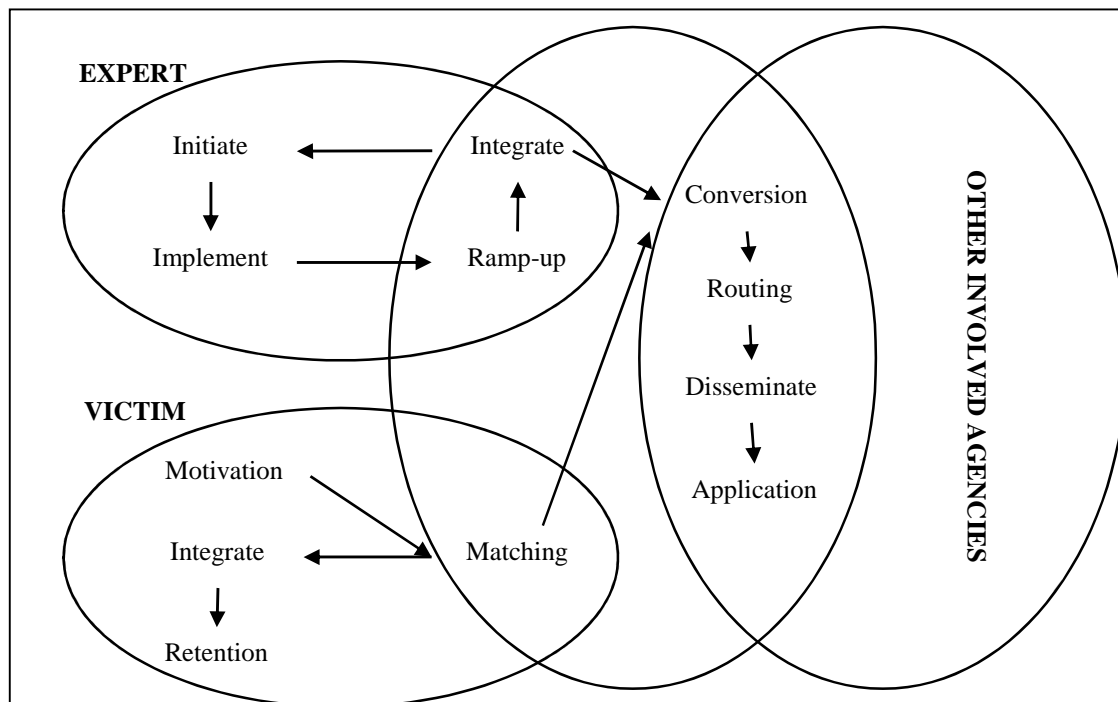


Figure 2. Proposed knowledge transfer processes for managing disasters

Knowledge obtained by the NSC and related government agencies will be promulgated within the organization and will then be used and evaluated in terms of its effectiveness. The related government agencies will then provide feedback on its relevance and the usefulness of the acquired knowledge to the NSC. The NSC will then store the knowledge for daily practice and also apply it for management of disasters other than floods.

Therefore, in the context of this study, the proposed knowledge transfer model combines the knowledge transfer model proposed by [8], [9] and [10]. Szulanski's knowledge transfer model is used to model the knowledge transfer process between an expert and the NSC; Kwan and Cheung's knowledge transfer model is used to represent the knowledge transfer process between a victim and the NSC; while Narteh's knowledge transfer is used to represent the knowledge transfer model between the NSC and other involved agencies.

## 5. CONCLUSION

This paper hopes to contribute to this field of research by: 1) examining the knowledge transfer process in managing disaster events in Malaysia; and 2) proposing a knowledge transfer model for managing floods in Malaysia. In terms of practical contribution, this study hopes to provide better understanding to the stakeholders involved in disaster events in Malaysia on the effective transfer of knowledge. We also hope that the outcome of this study can be the basis for other researchers or practitioners in helping them develop a robust knowledge management system for organizations involved in managing disasters.



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