

Inter-Organisation Practices for Humanitarian Supply Chain: A Case Study of Flood Disaster in Malaysia

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Abstract

Purpose: The aim of this study was to investigate the inter-organizational coordination within the HSC during one of Malaysia's worst flood disasters that decimated communities.

Design/methodology/approach: This study involved the use of a structured questionnaire, which was used as an interview guide on 15 respondents who were victims of the flood from the Kota Bharu community. Most of the respondents acknowledged to have received humanitarian aid that was provided by various groups of volunteers and NGOs.

Findings: Findings suggest agility, alignment, and adaptability as recommendations to improve the humanitarian aid supply in Malaysia.

Research limitations/implications: Given that humanitarian logistics is a topic that is currently in the spotlight, the current study has a salient opportunity to contribute to the growing body of knowledge in this subject.

Practical implications: Findings from this study is implied to develop a framework that will serve as a basis for the Malaysian government on HSC management in regulating national humanitarian relief during flood disasters. In addition, these findings hope to provide sound information to benefit relief agencies, NGOs and volunteers as a guide in coordinating the operation of flood disaster relief at an inter-organizational level. This study may help steer relief agencies to integrate and coordinate relief efforts, respond to the need of flood disaster and climate change in a timely manner, as well as adjust its configuration to cater to different objectives and needs of all stakeholders of a flood disaster relief.

Originality/value: This study fulfills the existing gap of a lack of discussion on inter-organizational coordination mechanisms. Specifically, the study generate a framework of inter-organizational coordination within the humanitarian supply chain. The framework extends existing knowledge of inter-organizational supply chain in the contexts of crises, while also serves as the basis for a more effective policymaking and implementation of humanitarian aids.

Keywords: Supply Chain Humanitarian Aid, Agility, Alignment, Adaptability HSC

Introduction

Humanitarian supply chain is an important element in the distribution of aid such as water, medicine, food and other necessities. This effort minimizes catastrophic events from natural disasters affecting its victims. However, literature suggest that humanitarian supply chain is not only inconsistent, but also unreliable and is slow to react to the needs of victims (Sivadas, 2018). A significant obstacle in this effort is the massive unpredictability in demand, supplies and evaluation, all of which also involves an environment of elevated time-based pressure. Hence there is a need for the humanitarian supply chain to be characterized by agility and lean (Tatham & and Christopher, 2014) as well as supported by effective donation process. Although Malaysia is generally spared from most of the natural disasters, but is however routinely affected by extreme climatic events including thunderstorms, monsoonal floods, droughts, landslides, and haze (Chan, 2015). A rural state in the north-east of Peninsular Malaysia called Kelantan is prone to flooding during the northeast monsoon season that typically occurs from November to January. Kelantan is bordered by Narathiwat Province of Thailand to the north, Pahang to the south, Terengganu to the south-east, Perak to the west and the South China Sea to the north-east region. In December 2014, continuous torrential rains resulted in a deluge which devastated the local communities in the state. The resulting economic repercussions far exceed the location and duration of the catastrophe itself. Apart from affecting the economic sector, it was observed that the health sector too was significantly affected in the aftermath especially psychosocial impact of this flood among the elderly and adult population (Wan Ahmad & Abdurahman, 2015). The disaster management efforts in Malaysia involve several organizations but suffer from a lack of effective documentation and clarification on roles and scope of various authorities and agencies. At this point, the status of information sharing and coordination between parties are ambiguous (Wan Ahmad & Abdurahman, 2015). Information sharing and coordination among authorities in flood management practices at the national level are inadequate and flawed. Othman, Ahmad, Suliman and Arshad (2014) found that issues related to poor coordination are often seen in the absence of legitimate documentation which involves cross-agency duties. And because of this ineptness and weak system, the country's flood management practice is riddled with challenges thus making it not only inefficient but may do more harm in an event of a catastrophe if it is managed and operated by an incompetent agency alike. Thus, a study to investigate the inter-organizational coordination in Humanitarian Supply Chain (HSC) during a flood disaster relief is deemed appropriate and timely.

Malaysia was hit by monsoonal floods in 2006, 2007, 2010, 2011, and 2014. These monsoonal floods killed people in various parts of the country according on its locality. This establishes the frequency and intensity of catastrophes in Malaysia throughout a period of 20 years, between 1998 and August 2018. Malaysia experienced 51 natural disaster events which include two floods recorded in 2018. Floods recorded the highest case of incidence among all forms of natural disasters. In Kelantan, three main rivers, Sungai Golok, Sungai Galas and Sungai Kelantan overflowed and flooded several districts including Bachok, Gua Musang, Jeli, Kota Bharu, Machang, Pasir Mas, Pasir Puteh, Tanah Merah, Tumpat and Kuala Krai. In 2016, he seasonal continuous heavy rains in the East Coast of Peninsular Malaysia from December 26 flooded Kelantan and Terengganu.

Large-scale flooding phenomena in Kelantan have racked up damages totalling up to RM1 billion (Wan & Billa, 2018). Although flooding have begun occurring in Malaysia since the 1920s, but the flooding in Kelantan in 2014 was deemed to be on par with a tsunami-level destruction and was the largest recorded disaster in the nation's history. This flood affected over 500, 000 people and amassed an estimated \$670 million (RM2.851 billion) worth of infrastructural damage. Parts of the state which had never before seen flooding was also

impacted as floodwater rose to unusually high levels (Salleh, 2019). The Kelantan Strategic Research Center has identified the overflowing of the Kelantan River as a major cause of this flood incident. Due to the recurrence of floods in the area, various agencies have undertaken flood mitigation projects, develop forecasting and warning systems in order to reduce the consequences of flood disasters. Incidents of disaster assesses Malaysia's capacity to respond to critical situations in terms of relief, readiness, and rebuilding.

Current approaches revealed to still be lacking, as seen during the flood crisis of December 2014 to January 2015, where almost 250,000 residents were displaced. Flood not only destructs livelihoods and is detrimental to public health and the environment, but also causes monumental costs to cover infrastructure damages. As such, efforts to minimize incidents and impacts of flooding would benefit all stakeholders, especially taxpayers in areas where flood disasters are frequent. Since natural disasters are unpredictable and unavoidable due to the vastitude of its severity and magnitude, it is imperative to efficiently manage disasters through sufficient preparations and timely responses. The HSC is vital in the delivery of aid, including medicine, food, and clothing. This helps are to minimize the consequences of a natural disaster on the local populace. However, it is evident that some elements of HSC are inconsistent (Sivadas, 2018). A major issue related to HSC is that the demand, supply, and evaluation are highly unpredictable, and these conditions exist in a critical environment under great time pressure. This shows the necessity for HSC to be lean and agile (Tatham & Christopher, 2014) as well as to be consistently supported by efficient funding processes. Therefore, the aim of this study is to understand the inter-organizational coordination in (HSC) during a flood disaster relief.

Literature Review

The need for Humanitarian Supply Chain Coordination

The government established the Natural Disaster Management and Relief Committee (NDMRC) in 1972 to coordinate flood relief efforts at all levels, including state, district, and national, in order to minimize damage and loss of innocent lives (Mohamad Sukeri & Shazwani, 2015). The Policy and Mechanism on Disaster and Relief Management on Land was shaped by the Permanent Operating Regulations (PTO) and National Security Council Directive No.20 (MKN, 2011) as well as involving and holding agencies accountable for disaster management. However, research have exposed gaps and concerns in the HSC during- and post-disasters in Malaysia (Chan, 2012). Although the government launched Directive No. 20 for pre-, during-, and post-disaster phases, but in an event when a natural catastrophe hits, the Directive was incapable of fully being implemented (MKN, 2012). This resulted in deaths of hundreds of innocent people and drew a widespread criticism from many researchers. In terms of flood warning, there are still many areas that requires interventions (Chan, 2015).

While NGOs and government entities in Malaysia have proposed plans of action to guide disaster relief management, there is no current framework for humanitarian aid work that is based on supply chain management concepts. Mentzer, DeWitt, Keebler, Min, Nix, and Smith (2001) described supply chains as the movement of goods from point of manufacture to point of consumption. Although there has been research on both humanitarian and commercial supply networks, but commercial supply chains have been thoroughly investigated compared to humanitarian supply chains. Such research has primarily concentrated on logistics and supply chain management, with an emphasis on top-down approaches. Supply chain management in the aftermath of disasters and the associated issues are critical and must be addressed through the development of appropriate socio-technical solutions. This research focuses on how to improvise supply chain issues through the examination and modification of management processes (Lee, 2004; Van Wassenhove, 2006; Apte, 2010). A HSC is the process

through which food, equipment, rescue teams, first aid supplies, and pertinent information are transferred between relief organisations and catastrophe victims (Sivadas, 2018).

Challenges of Disaster Relief Management

While relief assistance is vital for survivors, it can also create complications for the communities affected. According to research, it is critical for organizations to be observant and adaptable when it comes to meeting the evolving requirements of survivor groups (Apte, 2010). However, Apte (2010) reported that the disparate degrees of experience and objectives of each type of organization may be major obstacles to these objectives. Various agencies are involved in disaster relief efforts, and managing these organizations proves to be a challenging endeavour, as precision and speed are critical in such a risky environment. In Malaysia, the National Security Council (MKN) is in charge of flood relief activities. MKN's key issues are ineffective communication and coordination, jeopardizes the organization's capacity to carry out disaster relief operations successfully. Disaster relief efforts must make the most efficient use of available labour and resources in order to ensure minimal waste and rescue as many as possible. Each agency maintains its own website and portal and expertise is not shared or validated by other agencies arising concerns of access and clarity. For instance, even while reporting the same incident, different agencies may provide conflicting information. This could stir confusion and a lack of trust among the public at large.

The complexity of HSC management requires both government and private sector to have a well-managed and improved way of managing disaster relief. From planning to implementation and controlling of the supply plan, and not just taking into consideration to rescue but also the cost-effectiveness of the flow in ensuring resources leveraging and disseminating supplies are performed efficiently. Unfortunately, even though the structure of humanitarian chains is similar to most business supply chains, the humanitarian supply chain is often seen unstable (Oloruntoba & Gray, 2006). From government initiatives linked together with private institutions and non-governmental group efforts, a robust coordination of HSC management structure is evidently needed and must be aligned in the overall process. Therefore, a dire need for effective humanitarian logistics to react to catastrophes and to improve the subsequent humanitarian situation is warranted (Hellingrath, Link & Widera, 2013). Consequently, it is essential to coordinate HSC is imperative. Information management and information exchange are keys to a successful humanitarian response because relevant and timely information supports effective flows of goods, inter-organisational coordination, and appropriate decision making Altay and Pal (2014).

Furthermore, there are certain factors to avoid, such as speeding through rehabilitation without recycling beneficial resources, demolishing precious building materials, and hurriedly executing ad hoc plans. Moreover, it is not prudent to construct complex and rigid project designs or establish new organizations in a short period of time. Authorities should undoubtedly collaborate with local leaders to develop thorough disaster management strategies and processes. And not to mention that relocating individuals away from their professions and social relationships are discouraged. Authorities should be more sensible of Malaysia's multiethnicity and religious diversity prior to conducting bereavement therapy. According to Liu and Chan (2003), the National Disaster Response Mechanism (NDRM) is mostly carried out for monsoonal flooding and is proven to be ineffective which ought to be reformed and restructured in order to be more relevant and practical. The involvement of stakeholders is also lacking despite the government's emphasis on the importance of capacity building and the critical responsibilities of NGOs, particularly the Malaysian Medical Relief Society (MERCY), Red Cross, and Red Crescent to name a few prominent ones. There is a need for disaster management strategies to utilize modern technology and non-structural approaches to facilitate

international collaboration in the event of transboundary disaster situations as speed and efficiency will determine the kind of care one receives. According to Chan (2015), stakeholders' participation is severely weak despite authorities' recognition of the critical role of NGOs, particularly the Malaysian Medical Relief Society (MERCY), Red Cross, Red Crescent.

Method

In order to achieve the objectives of this study, a qualitative research was carried out and the type of approach that was followed was a case study research. The reason for adopting this study design is because it takes the researcher to deeper dive into the challenges and distress that the humanitarian aid and flood victims experience, respectively. This will enable the researcher to examine the data collected within the framework, which is HSC and its variables by inferring the data before deriving conclusions.

This study involved the use of a structured questionnaire, which was used as an interview guide on 15 respondents who were victims of the flood from the Kota Bharu community. Most of the respondents acknowledged to have received humanitarian aid that was provided by various groups of volunteers and NGOs. The respondents were between the ages of 35 and 50, where 10 of them were men (66.67 per cent) and the remaining five were women (33.33 per cent). The structured interview was intended to determine the weakness of the humanitarian aid provided by the volunteers and NGOs, in order to attain suggestions and recommendations so that the improved services can be developed for disasters in future. In order to attain this goal, the group was first introduced to some of the basic concepts of humanitarian aids. The items in the questionnaire are as follows:

Question 1: How did you receive information about the humanitarian aid?

Question 2: How did the humanitarian aid deliver supplies to the villagers?

Question 3: What would you like to recommend or suggest means of improvement to the government to improve operations in order to better prepare for disasters in the future?

Findings

The following presents an in-depth analysis of the challenges and means to collaborate between the higher learning institutions and industries to corroborate the findings. Findings were categorized according to the following theme: 1) How did you receive information about the humanitarian aid? 2) What are the difficulties that you encountered during the collaboration? 3) What is the conflict or discord between universities? 4) What is your expectation from higher learning institutions?

Question 1: How did you receive information about the humanitarian aid?

The first question was a general inquiry on how the local community received information about the humanitarian aid. The first respondent stated "we heard a rumour that the humanitarian aid from Terengganu will be coming but they could not access the village". Another respondent informed "we also got the information from the social media such as Facebook although we had limited access to the Internet". In addition "we also communicated with other family members from different areas to get more information and updates on their situation. Another respondents also informed "the humanitarian aid given by the police and uniformed bodies were among the first agencies that came to our rescue". There were no prior warning signs given to the villages as the floodwater rose rapidly.

Question 2: How did the humanitarian aid deliver supplies to the villagers?

The next question is how the humanitarian aid was delivered to the villages. The respondents explained “we, the villagers, stayed on higher grounds such as on top of the hill. We stayed on top of the hill and were prepared to receive any humanitarian aid that came from volunteers and NGOs. Another response also mentioned “most of the delivery of the humanitarian aid were delivered by land rovers and helicopters”.

Question 3: What would you like to recommend or suggest means of improvement to the government to improve operations in order to better prepare for disasters in the future?

The respondents recommended “we suggest to the government to improve the infrastructure to prevent if the flood will happen again. For example build high fortress and cliff. In addition, “we also suggest to improve the facilities and placement for the villagers to stay temporarily during the flood. In addition, “we recommend to have a warning sign to alert the villagers to evacuate before the flood happens. Furthermore, “we also expect the aid after the flood such as cooking gas, financial and volunteer to help for cleaning purpose”.

The findings from the interview identified three characteristics that required critical improvisation to refine the HSC structure: (i) agility, (ii) alignment (iii) adaptability.

Discussion and Conclusion

Agility

HSC require agility in order to cope with the inconsistent and unpredictable nature of its environment (Tatham & Christopher, 2014) and those changes often occur outside the chain itself. The effectiveness of a supply chain relies on how quickly it is able to respond to changes in supply and demand while incurring minimal losses. Every disaster incident not only necessitates various needs but challenges must also be addressed in ways that humanitarian organizations are obliged to perform operations simultaneously (Beresford & Pettit, 2011). Because of the diversity of natural disasters, therefore different forms of disasters call for unique intervention methods (Holguín-Veras et al., 2012). Interventions can be from providing emergency relief in the immediate aftermath of a disaster or helping communities to rebuild their livelihoods in the long-term to undertaking large-scale projects which will strengthen the community’s capacity to react to and recover from future disasters (Kovács & Spens, 2007). Agility can be achieved through coordinating stakeholders’ efforts and maximizing the organization's redundant capacity (Cozzolino et al. 2012). For agile management to be successful in humanitarian logistic supply chain management (HL-SCM), it entails several prerequisites such as the development of emergency plans, networking with suppliers, contingency stockpiling of equipment and goods, postponement of routine projects, low-cost stocks, and the establishment of a stable network of third-party logistics services.

Alignment

Strategic alignment within HSC is another critically important feature which defines the existence of common or compatible priorities and goals among all the sectors involved. Van Wassenhove (2006) theorized that the aim of alignment within HSC was to integrate the various interests of all the different members within the chain. Challenges such as having different goals and competing for donors can emerge in the effort to coordinate various organizations involved in relief aid efforts. It unites the interests of other participants within the supply chain, such as donation drives and organizers’ distribution centres. Alignment in supply chain can be developed through effective communication strategies, adequate training,

collaboration as well as maintaining transparency, which was also correlated with the findings from Holguin-Veras et al., (2012). Stakeholders emphasizes on strategic alignment in HSC so that both the donors' as well as victims' needs are met and the latter can be indemnified accordingly. Lee (2004) defined alignment as the capacity to "create incentives for better performance". Alignment is a much-needed element in supply chain because it acknowledges the reality that all organizations prioritize self-interest. Supply chain can attain success when the interests of all different parties are well aligned.

Adaptability

The third feature in HSC which is adaptability is essentially the ability of the organization to sense and adjust to long-term fundamental changes within the supply chain and market environment (e.g. economic progress, political and social change, demographic change, radical technological advances), as well as to respond to such changes by adjusting flexibly to the configuration of the supply chain such as developing new supply bases, relocating production facilities, and outsourcing. This conceptualization of flexibility as a dimension of supply chain adaptability is in line with Christopher and Holweg (2011), who defined structural flexibility as the ability of firms to build flexible options into the design of their supply chains in response to fundamental shifts in multiple variables that determine the supply chain and market environment. Structural sensing is crucial for supply chain adaptability as effective structural change requires mapping and understanding of relevant processes within the entire value chain (Aitken, Christopher & Towill, 2002).

Conclusion

It is pivotal for the public to understand what a crisis situation entails in order to execute an efficient course of action. This perception can tremendously alleviate survivors' and victims' distress and anguish while expediting recovery and response times. Issues related to a lack of coordination and responsiveness not only can gravely affect communities that have been decimated but also if not strategized well can result in wastage of resources. Improving the effectiveness of HSC activities may ensure that aid is delivered rightfully to the victims and that the government, community, and aid organizations are able to collaborate efficiently. Given that humanitarian logistics is a topic that is currently in the spotlight, the current study has a salient opportunity to contribute to the growing body of knowledge in this subject. Findings from this study is implied to develop a framework that will serve as a basis for the Malaysian government on HSC management in regulating national humanitarian relief during flood disasters. This endeavour is consistent with Malaysia's 11th Five Year Plan (2016-2020), which focuses on the five phases of disaster risk management (prevention, mitigation, preparedness, response and recovery). This is demonstrated by the establishment of the National Disaster Management Agency, a new body within the Prime Minister's Department. In addition, this findings hope to provide sound information to benefit relief agencies, NGOs and volunteers as a guide in coordinating the operation of flood disaster relief at an inter-organizational level. This study may help steer relief agencies to integrate and coordinate relief efforts, respond to the need of flood disaster and climate change in a timely manner, as well as adjust its configuration to cater to different objectives and needs of all stakeholders of a flood disaster relief.

References

Apte, A. (2010). Humanitarian Logistics: A New Field of Research and Action. Hanover, MA: Publishers Inc.

- Altay, N. and Pal, R. (2014). Information Diffusion among Agents: Implications for Humanitarian Operations. *Production and Operations Management*, 23(6), 1015-1027.
- Beresford, A. & Pettit, S.. (2011). Humanitarian aid logistics: The Wenchuan and Haiti earthquakes compared. *Relief Supply Chain Management for Disasters: Humanitarian, Aid and Emergency Logistics*. 45-67. <http://dx.doi.org/10.4018/978-1-60960-824-8.ch004>.
- Chan, N. W. (2012). Impacts of Disasters and Disasters Risk Management in Malaysia: The Case of Floods. In Sawada, Y. and S. Oum (eds.), *Economic and Welfare Impacts of Disasters in East Asia and Policy Responses*. ERIA Research Project Report 2011-8, Jakarta: ERIA. Pp.497-545.
- Chan, N.W. (2015) Chapter 12 Impacts of Disasters and Disaster Risk Management in Malaysia: The Case of Floods. In Aldrige, D.P., Oum, S. and Sawada, Y. (Editor) *Resilience and Recovery in Asian Disasters, Risks, Governance and Society*. Springer (e-Book), 239-265.
- Christopher, M. & Holweg, M. (2011) "Supply Chain 2.0": Managing Supply Chains in the Era of Turbulence. *International Journal of Physical Distribution & Logistics Management*, 41, 63-82.<http://dx.doi.org/10.1108/09600031111101439>
- Cozzolino, A., Rossi, S. & Conforti, A. (2012). Agile and lean principles in the humanitarian supply chain. *Journal of Humanitarian Logistics and Supply Chain Management*, 2(1), 16-33.
- Hellingrath, B., Link, D., & Widera, A. (2013). *Managing Humanitarian Supply Chains*. BVL International, Germany.
- Holguin-Veras, J., Taniguichi, E., Jaller, M., Aros-Vera, F., Ferriera, F. & Thompson, R. (2014b). The Tohoku disasters: Chief lessons concerning the post disaster humanitarian logistics response and policy implications. *Transportation Research Part A*, 69, 86-104.
- James Aitken, Martin Christopher & Denis Towill (2002) Understanding, Implementing and Exploiting Agility and Leanness, *International Journal of Logistics Research and Applications*, 5:1, 59-74, DOI: 10.1080/13675560110084139
- Lee, H. L. (2004). The triple-A supply chain. *Harvard Business Review*.
- Liu, P.S. and Chan, N.W. (2003) The Malaysian flood hazard management program. *International Journal Emergency Management*, 1(3), 2003, 205-214
- Malaysia, Kuala Lumpur Majlis Keselamatan Negara (MKN). (2012), Arahan No. 20. Dasar dan Mekanisme Pengurusan Bencana Negara. Malaysia: Jabatan Perdana Menteri.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., et al. (2001). Defining supply chain management. *Journal of Business Logistics*, 22 (2), 1-25.
- Mohamad Sukeri Bin Khalid and Shazwani Binti Shafiai, " Flood Disaster Management in Malaysia: An Evaluation of the Effectiveness Flood Delivery System," *International Journal of Social Science and Humanity* 5(4), 398-402, 2015.
- Oloruntoba, R., & Gray, R. (2006). Humanitarian aid: an agile supply chain? *Supply Chain Management: An International Journal*, 11(2), 115-120.
- Othman, M., Ahmad, M. N., Suliman, A., Arshad, N. H., Maidin, S. S. (2014). COBIT Principles to govern flood management. *International Journal of Disaster Risk and Reduction (IJDRR)*, (9), 212-223.
- Salleh, F. (2019). Retrieved 16 November 2019, from https://www.un.org/development/desa/family/wpcontent/uploads/sites/23/2019/06/EXPERT-GROUP-MEETING-ON-OLDER-PERSONS-IN-EMERGENCY_Fatimah-Salleh.pdf

- Sivadass Thiruchelvam, (2018). Development of Humanitarian Supply Chain Performance Conceptual Framework in Creating Resilient Logistics Network. *Malaysian Journal of Geosciences*, 2(1): 27-30.
- Tatham, P.H. and Christopher, M.G. (2014). "Introduction", in Tatham, P.H. and Christopher, M.G. (Eds), *Humanitarian Logistics*, Kogan Page, London, pp. 1-18
- Van Wassenhove, L. N. (2006) as cited by A. Cozzolino. (2012). *Humanitarian Logistics*, Springer Briefs in Business, 5-16.
- Wan Ahmad, W., and Abdurahman, S. (2015). Kelantan Flood 2014: Reflections from Relief Aid Mission to Kampung Kemubu, Kelantan. *Mediterranean Journal of Social Sciences*, 6(3 S2), 340.
- Wan, K. M., & Billa, L. (2018). Post-Flood Land Use Damage Estimation Using Improved Normalized Difference Flood Index (NDFI3) on Landsat 8 Datasets: December 2014 Floods, Kelantan, Malaysia. *Arab J Geosci*, 11. <https://doi.org/10.1007/s12517-018-3775-0>