

SMART

Journal of Business Management Studies

(A Professional, Refereed, International and Indexed Journal)

Vol-17 Number-2

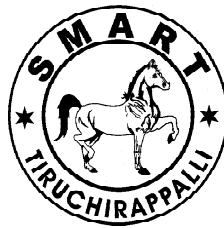
July - December 2021

Rs.500

ISSN 0973-1598 (Print)

ISSN 2321-2012 (Online)

Professor MURUGESAN SELVAM, M.Com, MBA, Ph.D, D.Litt
Founder - Publisher and Chief Editor



**SCIENTIFIC MANAGEMENT AND ADVANCED RESEARCH TRUST
(SMART)**

TIRUCHIRAPPALLI (INDIA)

www.smartjournalbms.org

**THE DETERMINANTS OF HUMANITARIAN SUPPLY CHAIN
EFFICIENCY- A CASE STUDY OF FLOOD DISASTER IN MALAYSIA**

Zarina Abdul Munir

*Faculty of Business and Management, Universiti Teknologi MARA,
Cawangan Selangor, Kampus Puncak Alam, 42300 Puncak Alam, Malaysia
zarin453@uitm.edu.my*

Muhammad Awais Bhatti

*School of Business, King Faisal Univesity,
Al-Ahsa, 31982 Saudi Arabia
mbhatti@kfu.edu.sa*

and

Veera Pandiyan Kaliani Sundram*

*Department for Technology & Supply Chain Management, Faculty of Business and
Management, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam,
42300 Puncak Alam, Malaysia
veera692@uitm.edu.my*

Abstract

The efficiency of the humanitarian supply chain, in helping flood victims, can be affected by various factors. However, only the determinants of agility, coordination and collaboration are critically discussed in this study. This research aims to predict whether the determinants of agility, coordination and collaboration significantly influenced the efficiency of the humanitarian supply chain, during the flood disaster, in a certain rural area in Kelantan, Malaysia. A survey was conducted, among 150 of respondents, who experienced the flooding. The data were further analysed, using Partial Least Square (PLS) analysis. The findings revealed that agility and coordination significantly influenced the efficiency of the humanitarian supply chain, among the three determinants. The implications of this study are vital to the government and private agencies, in the effort to offer an improved process of humanitarian aid to disaster victims.

Keywords: *Humanitarian Supply Chain, Coordination, Collaboration, Agility*

JEL Code: *H84 and C83*

Paper Received : *21-12-2020*

Revised : *04-03-2021*

Accepted : *28-04-2021*

*** Corresponding Author**

1. Introduction

The humanitarian supply chain is a vital component in ensuring aid to the communities in need. The distribution of humanitarian relief involves many parties, multiple processes and policies, as well as a vast amount of resources. **Ho, Au and Newtom (2002)** pointed out that commercial supply chains also share many of these characteristics and hence the study of humanitarian supply chains is not an entirely distinct field. Although humanitarian supply chains operate in incredibly varied environments and circumstances, their essential functions are quite similar to the industrial supply chain. This suggests that it is worthwhile to determine the components, which facilitate the success of industrial and commercial supply chains and apply them to humanitarian aid supply chains, where relevant. Humanitarian supply chains are constructed in high-pressure environments and they are often short-term.

2. Literature Review

2.1. Humanitarian Supply Chain

Elements, within the humanitarian supply chain, include openness, accountability, fair competition, ethics, performance, quality and cost-effective practices. Relief aid is comprised of food, shelter, water and healthcare. These are typically provided in a relief camp environment. **Richard (2010)** highlighted the fact that aid operations incorporate procurement, transport and delivery of aid resources. There are five primary elements, which should be taken into account, in order to ensure effective and efficient disaster management by stakeholders. **Gizaw and Gumus (2016)** stated that 80% of disaster relief undertakings rely on successful logistics operations, to guarantee effective and efficient humanitarian supply chains.

2.2. Coordination

The process of aligning the various parties, in a humanitarian aid project, in such a way that fulfills their mutual aims, by effectively and efficiently delivering relief and resources to victims, is known as coordination. According to **Tripathi (2020)**, the organizational information coordination should be adopted by the humanitarian project because changes in the environment are captured by it. Moreover, coordination is especially vital in logistics processes (**Rajagopal, et.al., 2017**), notably in procuring and delivering resources (**Azlina et al., 2020**). Coordination mainly functions to guarantee that the humanitarian aid flow runs with efficiency and fluidity.

2.3. Collaboration

Collaboration refers to the process of two or more interdependent groups, making decisions mutually (**Sundram, et.al., 2020**). Greater cooperation among members of a supply chain typically results in enhanced performance and reduced general cost (**Mkumbo et al., 2019**). Conceptually, collaboration involves suppliers, firms and customers and it extends from the stages of procuring raw material all the way to the delivery of the finished product (**Sundram et al., 2017a**). Collaborating, with parties outside the supply chain, has an impact on collaboration within the supply chain as well (**Sundram, et.al., 2016**). Evidence indicates that collaboration in cases of disaster management is vital in improving the planning and execution of humanitarian aid efforts, due to the fact that it would be challenging for any party to manage such a situation independently. **Mohd, et.al., (2018)** asserted that every stakeholder in disaster management must cooperate for the best interests of the victims. The collaboration between the government,

NGOs, private institutions and the wider community is crucial (Sundram et al., 2017b), in facilitating relief aid during floods in Malaysia (Mohd, et.al., 2018). Different stages of a disaster require different characteristics within a supply chain. Before the disaster, the supply chain should be optimal and lean but during the disaster, the supply chain must be fully agile and responsive. Cooperation and collaboration must co-exist between all stages and parties involved (Selvaraju et al., 2019) so that humanitarian relief can be delivered as efficiently as possible.

2.4. Agility

Agility is defined as the capacity to create and sustain the necessary flexibility and responsiveness, to cope with unexpected or short-term logistics issues, uncertainties and risks. Agility is vital in ensuring that flood victims receive timely food and medical treatment, so that they can maintain a reasonable level of comfort and morale. Many studies emphasize the importance of agility and how it makes the humanitarian supply chain more sensitive and flexible to the needs of victims (Charles, et.al., 2010). Therefore, agility is a basic condition for an organization to function because it dictates organization's capacity to react to changes in an effective and timely way (Rajagopal et al., 2016)

3. Statement of Problem

The problem of humanitarian supply chains is the problem of collaboration, coordination and agility, within the supply chain. Irrera (2018) posited that failed communication and weak coordination can deeply compromise the delivery of humanitarian aid. This could be seen in the flooding disasters of 2004 in Peninsular Malaysia. In this situation, landslides obstructed primary routes and severely limited the ability to access relief centers and deliver necessary emergency supplies. This reflected weaknesses

in the coordination level of the humanitarian supply chain because disaster management operates in three levels and each level functions through a committee with its own responsibilities.

4. Need of the Study

The need of this study was to determine the relationship between agility, collaboration and coordination, towards the efficiency of humanitarian supply chain. This study is important to improve the practices and process of humanitarian supply chain in Malaysia.

5. Objective of the Study

The objective of this study was to identify the relationship between agility, collaboration and coordination, for efficient humanitarian aids supply chain practices in Malaysia.

6. Hypotheses of the Study

In this study, three hypotheses were formulated, for testing.

- i. Agility has significant effect on efficient humanitarian supply chain practices.
- ii. Collaboration has significant effect on efficient humanitarian supply chain practices.
- iii. Coordination has significant effect on efficient humanitarian supply chain practices.

7. Methodology

In this study, a quantitative approach was taken, to ascertain the significant influence of coordination, collaboration and agility, on humanitarian supply chain practices.

7.1 Sample Selection

A convenience sampling technique was utilized, to obtain 150 samples. The respondents were chosen, based on their experience of being victims of flood disasters in Kelantan. The data of the respondents were obtained from the committees, who provided the temporary shelter to the victims.

7.2 Sources of Data

The response rate of this study was 147 questionnaires out of 150, at 98 percent response rate and they were considered valid for use in the analysis.

7.3 Period of the Study

This study was conducted over a period of 24 months. The data collection took about one month. After data collection, the next process was data analysis, to assess the result.

7.4 Tool used in the Study

The items, used in this study, were adapted from several previous studies, to determine the coordination, collaboration and agility of the humanitarian aids (Selvaraju et al., 2019). The research framework model for efficient humanitarian supply chain is presented in **Figure-1**. Responses were collected on a five-point Likert scale, where 1=strongly disagree and 5=strongly agree.

8. Data Analysis

In this study, the Partial Least Square analysis, incorporating the structural model and measurement model, was used for the analysis. In the measurement model, the item loading value, for every reflective measurement item, exceeded the recommended threshold of 0.707, as suggested by **Hair et al. (2016)**. In addition, the composite reliability values exceeded 0.70, while the AVE value of each construct was greater than 0.50 (**Hair et al., 2016**). To assess the discriminant validity, as suggested by **Fornell and Larcker (1981)**, criteria were applied to evaluate discriminant validity (**Hair et al., 2016**). Under the structural model analysis, the assessment of path coefficient, hypothesis testing and R square values, were undertaken.

8.1 Demographic Factors

The majority of respondents were males (65.3per cent), compared to female respondents

at 34.7%. 47 percent of respondents' age ranged from 17 to 25, while 44.9 per cent of respondents proved to be single. The great majority of respondents were of Malay descent (90.5 per cent), who reported 1 and 5 family members (67.3 per cent).

8.2 Convergent Validity

Table-1 shows the items of collaboration, coordination and efficiency, meeting the threshold values, which explained their relevance to this study.

8.3 Discriminant Validity

In this research, the AVE was confirmed to be higher than the row and column values in **Table-2**, indicating that the constructs did not have any discriminant validity.

8.4 Structural Model

The structural analysis revealed that R Square (R^2) of 48.8 per cent, regarding the efficiency of humanitarian aid distribution, could be explained by the factors of agility, collaboration and coordination. The path coefficient, displayed in **Table-3**, indicated that the effect of agility ($\beta = 0.498$, $p < 0.01$) did have significant influence on the efficiency of the humanitarian supply chain. Thus Hypothesis 1 was supported. Furthermore, the effect of coordination ($\beta = 0.239$, $p < 0.01$) also significantly influenced the efficiency of humanitarian supply chain and hence the Hypothesis 3 was also supported. In contrast, the finding found that collaboration ($\beta = 0.041$, $p < 0.01$) did not significantly influence the efficiency of humanitarian supply chain. Hence Hypothesis 2 was rejected.

9. Findings of the Study

9.1 Relationship between agility and efficiency of humanitarian supply chain practices.

- ♦ The finding revealed that the agility exercised significant effect on efficiency of humanitarian supply chain practices.
- ♦ Hence agility is considered an important determinant of humanitarian supply chain practices.

9.2 Relationship between collaboration and efficiency of humanitarian supply chain practices.

- ♦ The finding revealed that collaboration did not have significant impact on humanitarian supply chain practices.
- ♦ The collaboration practices did not contribute to the efficiency of the humanitarian supply chain.
- ♦ Hence collaboration must improve better practices in future.

9.3 Relationship between coordination and efficiency of humanitarian supply chain practices.

- ♦ The finding revealed that coordination exercised significant effect on humanitarian supply chain practices.
- ♦ Therefore, coordination was identified as a determinant of efficiency of humanitarian supply chain.

10. Suggestion

The finding suggests that coordination, during the humanitarian aid, should ensure that everyone received the supply of aids. In other words, Co-ordination between different agencies or committees is essential for the success of disaster management.

11. Conclusion

To conclude, agility and coordination proved to have significant influence on humanitarian supply chain efficiency while collaboration did not have significant influence. Findings suggest

that the government and private agencies should plan their disaster management strategies, to make them more systematic and structured.

12. Limitation of Study

This study was limited to the respondents in Kelantan, which is an area mostly affected with flood.

13. Scope for Further Research

The future study could examine more flood victims, to assess the challenges and the effectiveness of the humanitarian supply aid.

Acknowledgements

This study received financial support, from FRGS Research Grant, awarded by the Kementerian Pelajaran Malaysia; Project code: FRGS/1/2019/SS01/UiTM/02/43 [600-IRMI/FRGS 5/3 (445/2019)].

14. References

- Azlina, M., Muhammad Zaly, S. M. H., Mohd Hafiz, Z., Sundram, V. P. K. (2020). Reverse Logistics Activities for Household E-Waste Management: A Review. *International Journal of Supply Chain Management*, 9(2), 312-318.
- Charles, A., Lauras, M., & Van Wassenhove, L. (2010). A model to define and assess the agility of supply chains: building on humanitarian experience. *International Journal of Physical Distribution & Logistics Management*, 40(8/9), 722-741.
- Fornell, C., & Cha, J., (1994). Partial least squares. In Bagozzi, R. P. (Ed.). *Advanced methods of marketing research* (pp. 52-78). Blackwell Business, Cambridge, MA.
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 18(3), 328-388.

- Gizaw, B. T., & Gumus, A. T. (2016).** Humanitarian relief supply chain performance evaluation: A literature review. *International Journal of Marketing Studies*, 8(2), 105-120.
- Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016).** *A primer on partial least squares structural equation modeling (PLS-SEM)*. SAGE Publications.
- Ho, D. C., Au, K. F., & Newton, E. (2002).** Empirical research on supply chain management: a critical review and recommendations. *International journal of production research*, 40(17), 4415-4430.
- Irrera, D. (2018).** The EU Humanitarian Aid Policy and NGOs: A Theoretical Overview. In *EU Emergency Response Policies and NGOs* (pp. 27-44). Palgrave Macmillan, Cham.
- Mkumbo, F. A. E., Ibrahim, A. R., Salleh, A. L., Sundram, V. P. K., & Atikah S. B. (2019).** The Influence of Supply Chain Practices and Performance Measurement Practices towards Firm Performance. *International Journal of Supply Chain Management*, 8(3), 809-819.
- Mohd, S., Fathi, M. S., & Harun, A. N. (2018).** Humanitarian Aid Distribution Framework for Natural Disaster Management. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 42(3/W4), 343-349.
- Rajagopal, P., Azar, N. A. Z., Atikah S. B., Appasamy, G., & Sundram, V. P. K. (2016).** Determinants of supply chain responsiveness among firms in the manufacturing industry in Malaysia. *International Journal of Supply Chain Management*, 5(3), 18-24.
- Rajagopal, S., Krishnamoorthy, B., & Khanapuri, V. B. (2017).** Modelling linkages of logistics performance in the supply chain- A study of the Indian textile industry. *SMART Journal of Business Management Studies*, 13(2), 26-34.
- Richards, P. (2010).** Ritual dynamics in humanitarian assistance. *Disasters*, 34(2), 138-146.
- Selvaraju, M., Bhatti, M. A., Sundram, V. P. K., & Azmir, S. (2019).** The Influence of Critical Success Factors of Lean Six Sigma towards Supply Chain Performance in Telecommunication Industry, Malaysia. *International Journal of Supply Chain Management*, 8(6), 1062-1068.
- Sundram, V. P. K., Atikah, S. B., & Chandran, V. G. R. (2016).** *Supply Chain Management: Principles, Measurement and Practice*. University of Malaya Press, Kuala Lumpur.
- Sundram, V. P. K., Atikah, S. B., Akmal, A. O., & Zarina, A. M. (2017a).** Green supply chain management practices in Malaysia manufacturing industry. *International Journal of Supply Chain Management*, 6(2), 89-95.
- Sundram, V. P. K., Atikah, S. B., Hafiz, M. Z., Azimah, D., Shahrin, N., & Thirunavukkarasu, K. (2017b).** *Supply Chain Logistics: A Malaysian Perspective*. Petaling Jaya, Selangor: Malaysian Logistics and Supply Chain Association.
- Sundram, V. P. K., Chandran, V. G. R., Atikah, S. B., Rohani, M., Nazura, M. S., Akmal, A. O., & Krishnasamy, T. (2016).** *Research Methodology: Tools, Methods and Techniques*. Petaling Jaya, Selangor: Malaysian Logistics and Supply Chain Association.
- Sundram, V. P. K., Prem, C., & Atikah, S. B. (2020).** The Consequences of Information Technology, Information Sharing and Supply Chain Integration, towards Supply Chain Performance and Firm Performance. *Journal of International Logistics and Trade*, 18(1), 15-31.
- Sundram, V. P. K., Rajagopal, P., Nur Atiqah, Z. A., Atikah, S. B., Appasamy, G., & Zarina, A. M. (2018c).** Supply chain

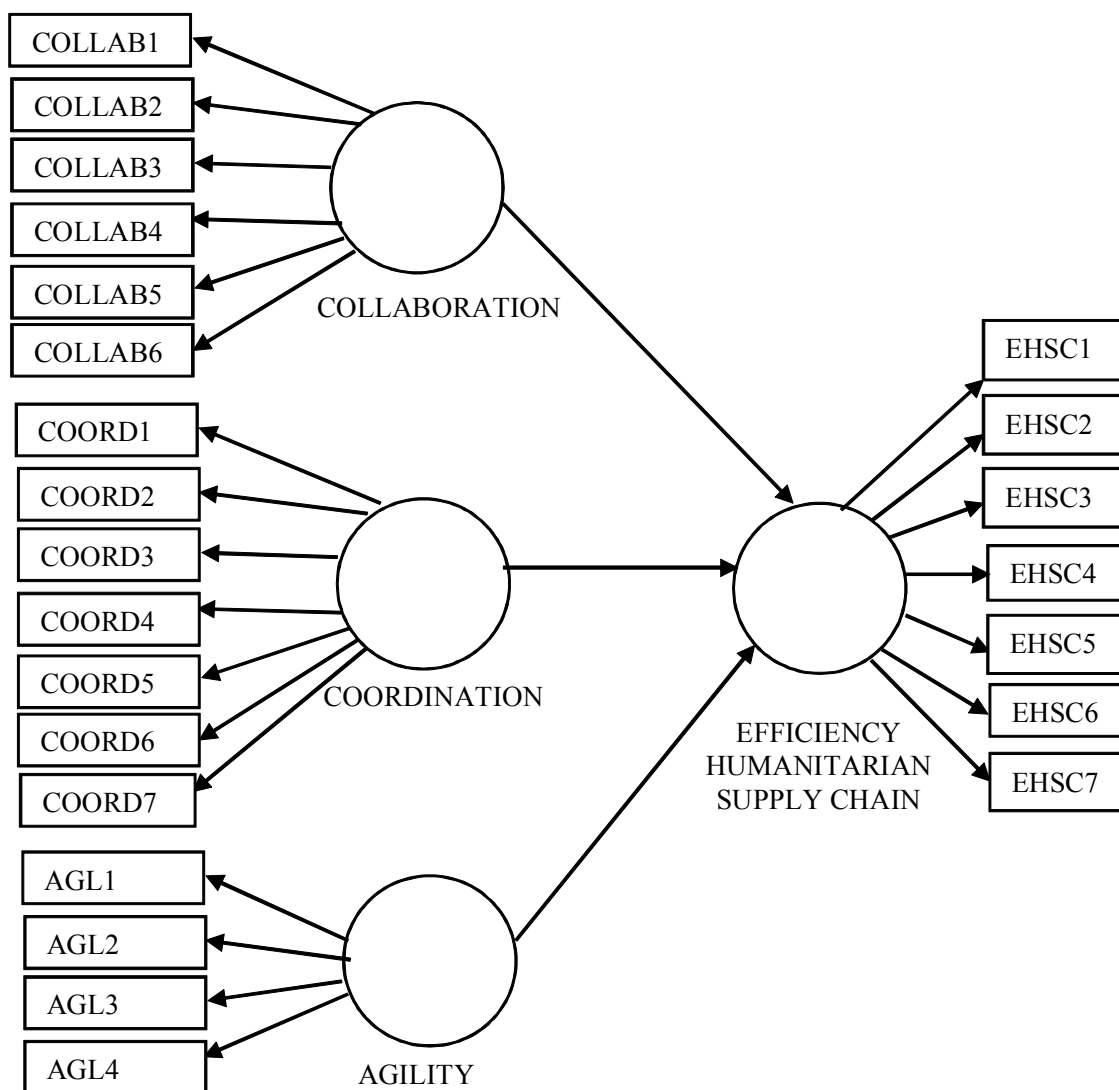
responsiveness in an Asian global electronic manufacturing firm: ABX energy (M). *International Journal of Supply chain management*, 7(2), 23-31.

Tripathi, A. (2020). The integration of the supply chain in the core company strategy: The moderating role of supply chain uncertainty.

SMART Journal of Business Management Studies, 16(1), 43-54.

Zulfakar, M. H., Chan, C., Jie, F., & Sundram, V. P. K. (2019). Halal accreditation and certification in a non-muslim country setting: Insights from Australia halal meat supply chain. *International Journal of Supply Chain Management*, 8(1), 10-17.

Figure-1: Research Framework Model for Efficient Humanitarian Supply Chain



Source: Framed by Authors

Table-1: Convergent Validity of Dependent and Independent Variables

Constructs	Indicators	Factor Loading	(CR)	(AVE)
Agility	AGL1	0.743	0.801	0.511
	AGL2	0.851		
	AGL3	0.74		
	AGL4	0.47		
Collaboration	COLAB1	0.752	0.868	0.526
	COLAB2	0.738		
	COLAB3	0.6		
	COLAB4	0.815		
	COLAB5	0.627		
	COLAB6	0.793		
Coordination	COORD1	0.78	0.866	0.519
	COORD2	0.645		
	COORD4	0.668		
	COORD5	0.767		
	COORD6	0.778		
	COORD7	0.672		
	Efficiency Humanitarian Supply Chain	EHSC1		
EHSC2		0.74		
EHSC3		0.693		
EHSC4		0.756		
EHSC5		0.731		
EHSC7		0.735		

Source: Primary data computed using SmartPLS 3

Table-2: Discriminant Validity Taking AVE Square Roots

Constructs	1	2	3	4
1. Agility	0.715			
2. Collaboration	0.394	0.725		
3. Coordination	0.581	0.562	0.721	
4. Efficiency Humanitarian Supply Chain	0.653	0.372	0.551	0.736

Source: Primary data computed using Smart PLS 3

*Note: The diagonals (denoted in italic) represent the AVE while the off-diagonals are squared correlations

Table-3: Structural Analysis Indicating Relationship Between Variables of Study

Path Coefficient	B	SE	t	P-value	F Square	LL	UL	Result
Agility → Efficiency Humanitarian Supply Chain	0.498	0.10	4.982	0	0.308	0.296	0.665	H1: Supported
Collaboration → Efficiency Humanitarian Supply Chain	0.041	0.098	0.422	0.673	0	-0.127	0.249	H2: Not Supported
Coordination → Efficiency Humanitarian Supply Chain	0.239	0.081	2.954	0.003	0.075	0.066	0.382	H3: Supported

Source: Primary data computed using SmartPLS 3