An Exploration of Humanitarian and Disaster Relief Supply Chain Integration (HDR-SCI) for Different Types of Aid Organisation

JiheeKim [1], Stephen Pettit[2], Irina Harris[3] and Anthony K. C. Beresford[4]

Logistics and Operations Management, Cardiff Business School, Cardiff University,
Aberconway Building, Colum Drive, Cardiff, CF10 3EU, UK.
[1] KimJ14@cardiff.ac.uk, [2]Pettit@cardiff.ac.uk, [3]HarrisI1@cardiff.ac.uk, [4]Beresford@cardiff.ac.uk

Abstract

Research related to Supply Chain Integration (SCI) in the commercial sector has been widely documented and discussed in the academic literature, and SCI is often seen as being central to the successful implementation of supply chain management. On the other hand there has been limited attention paid to SCI in the humanitarian aid and disaster relief area where the objective is moved from one of economic improvement to one of delivering aid more successfully, and thereby achieving humanitarian imperatives such as reducing the human impact of an environmental event, and in the medium term saving lives. Although there are some studies examining collaboration, cooperation and coordination in a humanitarian context these are only partly related to full SCI. Therefore, this research explores the SCI activities of some major aid organisations in the context of the preparedness and immediate response phases of sudden onset natural disasters. The research is based on qualitative comparative design approach. Data were collected from semi-structured interviews and secondary source material. The key findings of this study are that the strategic, tactical, or operational level of SCI depends on the type of organisation and the phase in which the integration occurs. It also shows the divergent needs and context surrounding these aid actors towards SCI.

Keywords: Disaster relief, Humanitarian relief organisations, Supply Chain Management, Supply Chain Integration.

1. Introduction

Humanitarian and disaster relief supply chain management (HDR-SCM) is generally situated in a more extreme and unpredictable context than its business counterparts. HDR-SCs are not regularly operated like their for-profit counterparts and its system is "the epitome of temporary supply chains" (Maon et al 2009 in Fawcett and Fawcett 2013). In chaotic situations, one of major factors is the number and range of aid actors involved in the response to disaster: from supranational aid agencies (e.g. UN) and governmental organizations (GOs) to diverse types of non-governmental organisations (NGOs) (Kovács and Spens 2009). There are multiple aid actors with various specialities and "coordination of assistance is vital" for efficient SCM amongst them (OCHA 2010b cited in Larson 2012, p. 2). However, the issues of 'coordination, collaboration and integration' among aid actors cannot be easily implemented in HDR-SCM. Many organisations have their own agendas and ways of aid delivery, and are in direct competition for funding. These factors affect their relationships and there is 'little collaboration' among them (Thomas and Kopczak 2005).

Supply chain integration (SCI) has been considered "vital to supply chain management" (Chen et al. 2009) and its positive influence has been widely discussed in literature (Frohlich and Westbrook 2001). Given the multi-dimensionality of SCI, it is clear that adoption of this concept allows development of effective relationships between aid actors across aid activities through frameworks based on diverse segments of SCI. The primary aim of the research is to investigate humanitarian and disaster relief supply chain integration (HDR-SCI) from the different perspective of major aid actors in particular when they deal with the sudden onset of natural disasters. In this research following research question was developed: *How does horizontal supply chain integration of suppliers from different types of aid organisations (UN, NGO, GO) in humanitarian aid vary in the context of sudden onset of natural disasters in different phases of the disaster management cycle?*

2. Literature Review

2.1 Disaster Types, management phases and major aid actors

Different management skills and activities are consequently required for HDR-SCM and they depend on the different types and phases of disaster management. Primarily, disasters can be divided into natural (e.g. earthquake, tsunami, epidemics, drought) and man-made (e.g. war, terrorist attack, environmental pollution, political/refugees) disasters and both have slow and sudden onset cases (Van Wassenhove 2006; Kováćs and Spens 2009). Compared with man-made disasters, natural disasters account for a much smaller proportion of disaster relief operations (Van Wassenhove 2006). Nonetheless, natural disasters cannot be neglected because most deadly disasters are due to natural causes (Abbott 2008, p. 4). In particular, rapid-onset natural disasters on average contribute 90% the overall economic losses from natural disasters (Munich RE 2011-2015). Furthermore, natural disasters tend to bring about impact severely on lives, particularly to those in vulnerable areas (World Bank 2001 cited in Maon et al. 2009). Therefore, this research focuses on sudden onset natural disasters.

Literature demonstrates three clear phases of disaster management: preparedness: immediate response and aftermath (Lee and Zbinden 2003; Kovács and Spens 2007). This research focuses on the phases of preparedness and immediate response, because these are relatively more important than the aftermath phase in responding to disasters effectively and 'being well prepared result in being effectively responsive' (Van Wassenhove, 2006). Indeed, the more investment at the stage of preparedness, the less the overall cost of the response (Tatham and Pettit 2010). In the immediate response, aid supplies should be delivered quickly and at the same time aid actors' efforts should be coordinated in a broader response network (Maon et al. 2009; Tatham and Kovács 2010).

Many authors refer to five major humanitarian aid providers: the non-governmental organisations; the United Nations agencies; the governmental organisations; the military and; private business. Of these actors, key actors are chosen for this study: NGOs, the UN agencies and GOs. In general, the military does not consider humanitarian aid as one of their major tasks rather they recognise it as the task of relief agencies (Bryman et al. 2000 cited in Pettit and Beresford 2005). In the case of private businesses, they tend to "focus on economic objectives" (McLachlin et al. 2009) and provide "support to NGOs and governments" (Vega and Roussat 2015). Hence, it cannot be said the private sector is a direct aid provider for the beneficiary, working at the same level with other aid actors. Rather, they can be regarded as a service provider for the other aid actors for profits. Kovács and Spens (2009) discuss that there are different ideas and activities in HDR-SCM among aid actors. They depict the different perspectives of stakeholders, namely humanitarian organisations and governmental organisations towards challenges they meet in HDR chains. Particularly, regarding the competitive environment as a source of challenge, humanitarian organisations want a more coordinated environment which is also relevant to the concept of SCI.

2.2 Dimensions of Supply Chain Integration.

SCI has been studied from various angles in terms of dimensions, directions and degrees of SCI. Academic literature has looked into SCI with "two key integration dimensions: internal and external" (Bernon et al. 2013). Internal integration is pertinent to "integration across various parts of a single organisations", while external integration 'examines integration between organisations' (Pagell 2004). For external integration, there are many players involved such as suppliers, manufacturers, distributors, customers, competitors and other non-competitor organisations. Integration with customers, internally and with suppliers can be regarded as horizontal, whilst integration with competitors, internally and with non-

competitors can be viewed as being vertical (Barratt 2004). Mason et al. (2007) apply this model to transport management by using "four different potential relationship partners, suppliers and customers on the vertical axis and complementors or competitors on the horizontal. Likewise, this can be applied on the humanitarian and disaster relief context (Figure 1). The upstream/downstream integration partners can be converted to 'suppliers/logistics service provider' and 'beneficiaries' respectively, which forms the vertical integration. In the horizontal relationships, 'other aid actors-majorly NGOs, UN and GOs' are replaced in the position of complementary players or competitors.

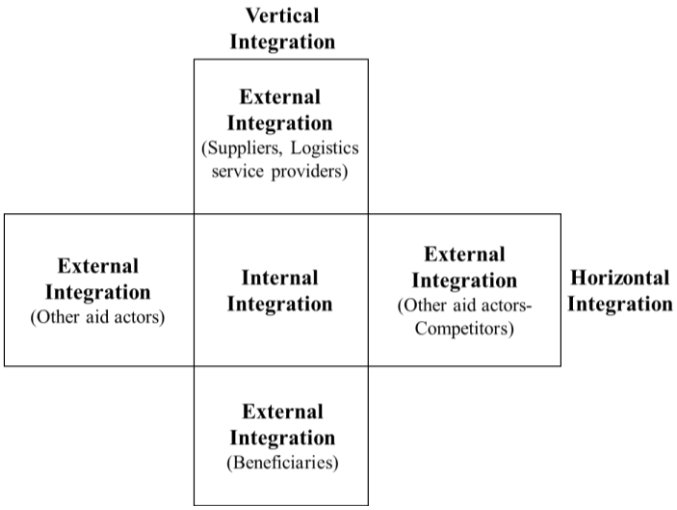

Figure 1. Forms of Supply Chain Integration in Humanitarian and Disaster Relief (Adapted from Baratt 2004; Mason et al. 2007.

In addition, some literature presents degrees of SCI towards suppliers and customers (Frohlich and Westbrook 2001; Childerhouse and Towill 2011), and others view SCI from different levels: the strategic, tactical and operational levels of activities (Stevens 1989; Alfalla-Luque et al. 2013). Similarly, Whipple and Russell (2007) develop a typology of collaborative relationship in three levels: "collaborative transaction management; collaborative event management; and collaborative process management". Larson (2012) adopts this concept of relationship into humanitarian logistics and specifies the activities for humanitarian contexts.

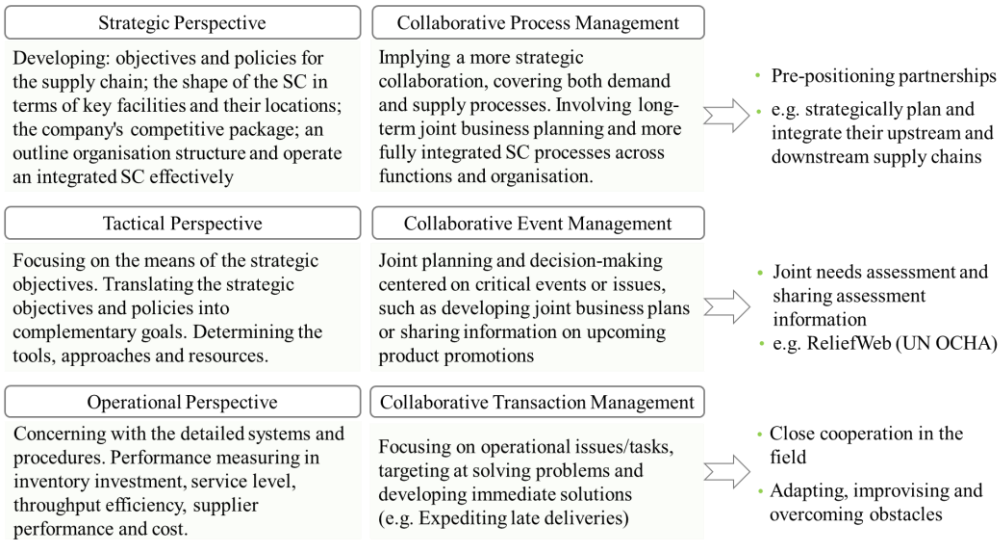

Figure 2. Typology adapted for the Humanitarian contexts (adapted from Stevens 1989; Whipple and Russell 2007; Larson 2012).

It can be argued that these three types of relationships can be matched with the three different levels of integrated SCs (Figure 2). At the strategic level, there is a tendency to form an integrated supply chain system in order to diminish the barriers between functions or units. At the tactical level, decisions or determinations are made for important issues to operate and set more detailed objectives derived from strategic goals. At the operational level, practical operations and detailed procedures are focused.

2.3 Conceptual Framework

Figure 3 presents the conceptual framework established for the current research. The framework comprises of two main categories: the levels of SCI and the first two phases of natural disaster relief management. This framework is applied respectively to three major actors: NGOs, UN and GOs.

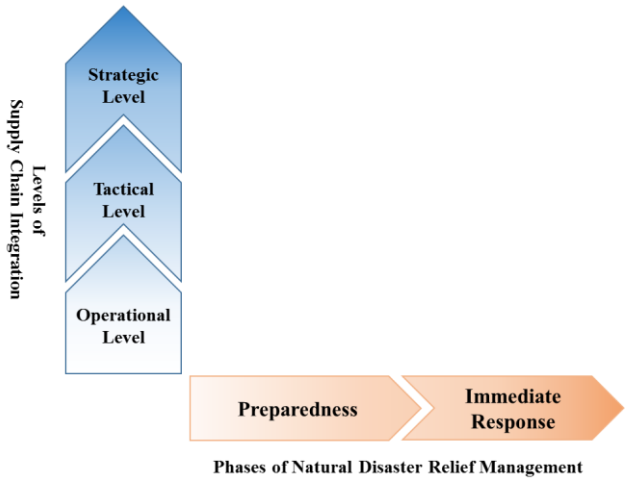

Figure 3. Levels of Supply Chain Integration in Different Phases (authors).

3. Methodology

In order to gain in-depth understanding of different actors' stances, this exploratory study adopts the qualitative approach. This study uses the comparative design as 'an extension of a case study design' by comparing three different cases for better understanding of social phenomena (Bryman and Bell 2011, p. 63). "In quantitative research it is frequently an extension of a cross-sectional design", while adopted in qualitative research it is more likely to be an extended case study design (Bryman and Bell 2011, p. 67).

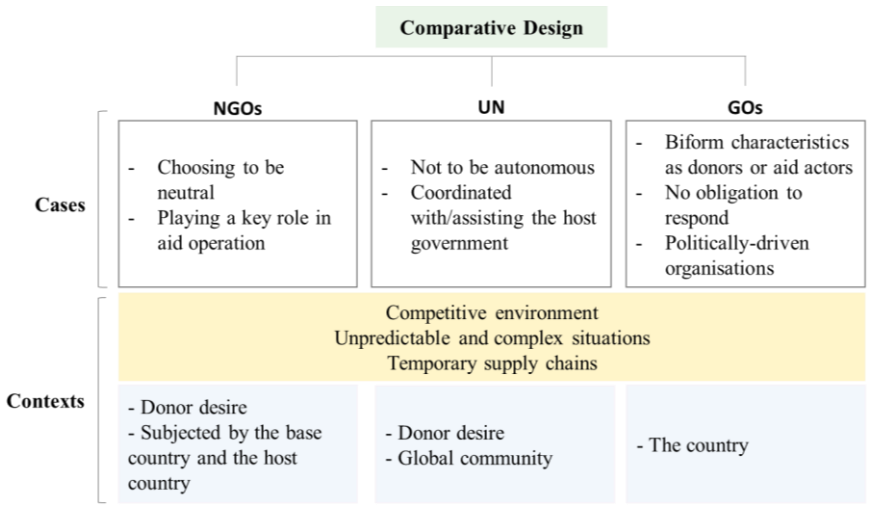

Figure 4. Framework of Comparative Design (authors).

In order to establish reasonable research scope, Baxter and Jack (2008) propose three ways of binding cases: "(a) by time and place (Cresswell 2003); (b) time and activity (Stake 1995); and (c) by definition and context (Miles and Huberman 1994)". In this study, the cases are bounded by the last factor where multiple aid actors are the subjects of the analysis. As illustrated in the literature review, they were categorised by the types of organisations: NGOs; UN; and GOs. Although there are different aspects and diversity in each type of organisations, each type of organisations is located in the specific context (Figure 4). These contexts are significant so as to construe the phenomena and cannot be separated from the cases when explaining them. From this point of view, the case study research design is useful to understand both the cases and the contextual conditions related to the cases (Yin 2014, p. 16).

This study adopts the interviews and documentation as supplementary data. The interviewees selected for the semi-structured interview are 'a particular type of respondent', namely elites who have rich experiences and expertise in the relevant areas. Four interviews were conducted with experts in HDR-SCM as depicted in Table 1. Each interviewee has many years of experience working in humanitarian and disaster relief organisations. The purpose of this study is to amass an in-depth understanding of SCI, in particular that formed in the humanitarian and disaster relief contexts, rather to generalise 'the rule of relationships'.

No	Interviewees	Cases	Location	Position
1	**NGO A**	Non-Governmental Organisations	International /Western Europe	Head with 28 year experiences
2	**NGO B**		International	Director/Head with over 23 year experiences
3	**UN A**	United Nations	the Middle East	Senior supply coordinator with 28 year experiences
4	**GO A**	Governmental Organisations	Western Europe	Senior manager

Table 1. Interviewees for the semi-structured interview.

4. Findings: characteristics of aid actors and phases of disaster management

4.1 Characteristics of Major Aid Actors

In general, NGOs are the first responders in many rapid onset natural disasters. The only actor to move before the NGO is the host government's military as they usually have the role of 'insuring basic access, evacuating people and re-building infrastructure'. While NGOs meet "the basic needs" by providing medicine, medical professionals, food assistance and recurring items, they are very keen to "assess the problem" and identify priorities on the ground quickly as a first stage. It seems that this makes them responsive to the needs of beneficiaries. This traditional aid operation works certainly for the first week after the massive disaster while the local market is closed. However, it is usually based on the physical SCs that require a high cost of setting up for airfreight, transportations, warehouse management, and labours. Recently, NGOs have considered cash programming as an alternative and compatible way of aid distribution because it is very cost effective and innovative programme.

When starting the relief operations, UN agencies, like most humanitarian agencies, work with "self-initiatives", in particular at the area where they have running programmes or existing projects. At the same time, there are requests to participate in the disaster relief management within UN agencies, from international/local NGOs or in most cases the host government. UN usually tries to establish basic SCs to get relief operations started quickly and provide beneficiaries elemental relief items in the very early stage. Referring to the interviews (UN A), it seems that UN tries to *"cover all the recurring needs whether they are goods or services"*. For example, in the case of the goods, there are recurring relief items such as 'blankets, tents

and kitchen sets', while for recurring services there are search and rescue tasks. Also, they try to coordinate within the UN system and with other aid actors such as international or local NGOs by shaping common operations and logistics. Given this, it can be argued that the UN agencies are relatively involved with a variety of aid actors working flexibly and putting more effort on coordination with other aid actors. With respect to this, one of the interviewees pointed out that *"they (UN agencies) have to coordinate across all the UN bodies and all the NGOs and take their information and try and collect that to one picture…".* That is to say, it implies that UN often takes a lead role in coordination amongst multiple actors. This can result in slow process of operations because UN has to concern a number of actors and donors and need to build up a coordination system.

For GOs, they take a different approach to the NGOs and the UN because the nature of GOs is different from other humanitarian organisations. Intrinsically, GOs can be more sensitive about political drives and issues than other organisations. In general, the GOs directly cooperate with the host government of the affected country and cannot start the emergency relief assistance without a request from the host government. Hence, their roles are more focused on primary supporters and donors to the agencies of UN and NGOs who are relatively neutral in terms of politics and recognised as primary humanitarian aid actors. For instance, GOs make a donation to UN agencies to help them start emergency relief operations in the initial moment, and also provide facilities from the stockpiles or cash directly to their NGO partners. At the same time, GOs send search and rescue teams on the request of the host government and also can make use of domestic resources such as a medical response team, fire service resources, or military. This team is categorised in 'humanitarian basis for the short-term scheme right after the event and usually focuses on the first three months. This assistance is distinguished from the long-term programme of 'development basis'. GOs tend to use their own resources and information for humanitarian and disaster relief based on the regular suppliers and qualified partners. At the very early stage of the immediate response phase, GOs organise their own planes which is very important transportation in the first hours. They prefer to start relief operations independently or cooperate with limited partners at the early stage because it takes time to establish temporary SCs for all the aid actors. Additionally, because GOs usually have a specialised department or merely a few staff that can respond rapidly to international disasters, it is not easy for them to coordinate with many other aid actors. Instead, they prefer working with regular partners and look for appropriate ones that can deliver quickly and access the most vulnerable beneficiaries. These are all dependent on the situation since GOs work flexibly depending on the specific context of the situation.

Table 2 provides an insight into differences between three cases for major aid actors where their roles and activities are differentiated based on different concerns and issues. NGOs are more focused on agility and try to be more responsive to beneficiaries' conditions. Consequently, they tend to work closely with beneficiaries and find practical solutions that fit to ever-changing conditions surrounding beneficiaries. However, within the group of NGOs as one of many organisation types, a large number of organisations exist and their target beneficiaries and operation styles are unique. Next, the UN focuses more on fundamental base of common SCs and aim to function as a coordinator that makes the operations smooth and quick. It has to collaborate with many other aid actors and donors that can make the process slow. Lastly, GOs have to consider many facets. They need to concern themselves with the nation's political drive and the people's attention and this can limit its aid activities and participations. At the same time, GOs need to act as a response team conducting emergency relief practices. Hence, GOs need to find reasonable and moderate ways of disaster response

such as spreading donations all around diverse humanitarian organisations and using reliable selected partners.

Category	NGO	UN	GO
Role	Usually act as a first responder working on the very front line	Often act as a key coordinator	Two roles: key donors and response teams
Concerns	Focus on agility and the needs of beneficiaries	Focus on establishing common SC to help multiple actors respond quickly	Focus on two factors: political drives and the most reasonable way of operations
Relief Activities	Try to be innovative and less costly rather than using a traditional way of operating	Try to cover all the recurring needs	Support the UN system, send a response team and work with regular qualified partners
Issues	Internal integration, different target beneficiaries	Slow process due to a number of actors and donors involved	Limited activities due to the political context and a high media profile

Table 2. Characteristics of major aid actors (based on the interviews and secondary data).

4.2 Phases of Natural Disaster Management

Naturally, undertaking activities in the preparedness phase is not a simple issue and tends to have complex facets. NGO B described the complexity of the preparedness phase that: *"in the resource poor environment, it is very hard to get people to change their life styles"*. Preparedness activities vary depending on the contexts and situations. When aid actors prepositioning goods, they keep trying to find 'the most high risk context', and look into 'vulnerability, poverty and less sustainable likelihoods'. After evaluation, aid actors usually have preparedness activities such as mitigation planning or preparedness program running through regional offices. These activities are associated with the long-term development programs because it is easier for aid actors to use existing programs for better efficiency. Plus, they need to take the country's infrastructure and conditions such as national insurance or policies into consideration. This is because building a prevention system costs considerably more and takes more time. Consequently, for the policy makers it is not an easy decision to prioritise 'resourcing and practising'. Despite these difficulties, most aid actors recognise that dealing with massive natural disasters is beyond their own capacities and they need to discuss with each other prior to the potential event. Hence, UN and NGOs try to use cluster systems or regular partnership, for instance, using common logistics framework or hiring aid workers.

HDR-SCM in the immediate response phase can be characterised as follows: (a) temporarily and suddenly formed SCs; (b) involvement of a great variety of aid actors (new /inexperienced); (c) slowed by disrupted and damaged infrastructure; and (d) needs for a strong coordinator. First of all, when the sudden onset of natural disaster occurs, in general there is no supply function in the early stage because many actors do not run regular operations or distributions in the specific affected area. The supply chains in rapid onset natural disasters, consequently, tend to be temporarily built up in a very short time. Additionally, in a more devastating and natural disaster, a wide range of humanitarian actors are requested to join regardless of the types of specialities. Some of them are not specialised in natural disaster relief management because the aid agencies that are specialised in natural disasters cannot deal with massive disasters without the participation of others and neither can the host government. Next, natural disasters usually generate serious damage and destruction, and in the first place even the search and rescue tasks are extremely challenging. Due to this complex and destructive environment, it is not easy to establish the foundations for providing relief items and services and their tasks of SCM can be often halted or slowed. Lastly, in the chaotic situation, leadership is a crucial issue. NGO B asserted the importance of coordinator's role: *"it is amazing how one person (a very good coordinator) with the right back-up can make a difference"*.

5. Analysis

5.1 Non-Governmental Organisations

Figure 5 illustrates that NGOs have distinct activities in each phase of natural disaster relief management. As mentioned above, preparedness programmes are sometimes led by the host government and humanitarian actors need to join them accordingly. These kinds of programmes are usually long-term projects, sometimes lasting over three years. At the same time, it seems that in many cases preparedness programmes are coordinated by the UN. NGO A said that *"anything we did for the disaster preparedness, we would report to the UN coordinator"*. This means that in this phase UN and NGOs share information about the plan, progress, achievements and so on.

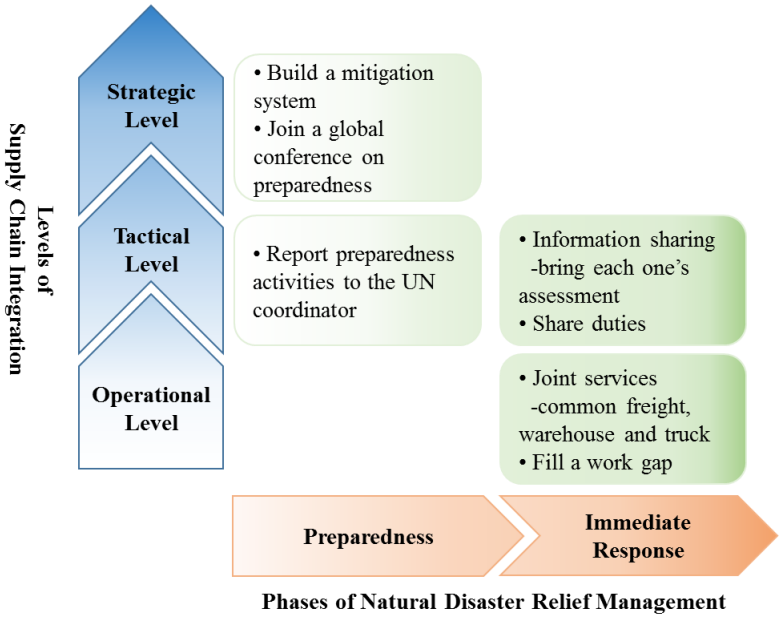

Figure 5. Framework of NGOs' Activities in SCI (authors).

NGOs tend to have activities focused in the strategic and tactical realms during the preparedness phase. Based on studies of rapid onset disasters, they try to build a prevention system which is robust and which has the capacity to be of use. They do this in tandem with the host government and other aid actors. In addition, NGOs also join global UN conferences regarding disaster preparedness such as the 'UN world conference on disaster risk reduction'. At the conference, 'the governments surrounding NGOs, UN and other international organisations look at the whole agenda with respect to disaster preparedness' (NGO B). This can help NGOs to update their own agendas and adjust their policies or strategies. In the tactical level of SCI, NGOs report the progress of preparedness to the UN coordinator. Although they cannot share resources on the operational level because each aid actor has *"different mandates, different budget and different donors, they still try to share information and knowledge with other aid actors"* (NGO A). This can help other aid actors to determine the allocation of resources.

In the immediate response phase, NGOs focus on the tactical and operational levels of SCI. NGO A emphasised the importance of the tactical and operational levels as follows: *"prepositioning supplies is the means to the end. If you have not got the capacity to manage the people, to access the people and to identify their needs and to distribute what they need, then the operations are not going to work"*. This is because it is common to see a large proportion of prepositioned supplies remain in the containers, not distributed. Thus, in this

phase NGOs try to make the operations flow smoothly and efficiently. For this, they share assessment information and divide responsibilities with other organisations to avoid unnecessary duplication. It seems that NGOs have 'quite limited competency' in collaborative needs assessment. Individual non-governmental organisations tend to do their own assessments. Each organisation has a different mandate and distinct objective and consequently it takes a great deal of time to proceed with common assessment. Instead, they try to share the result of assessment for more efficient allocation of resources. Plus, if there are any tasks that are not covered, they try to fill the vacuum of assistance. They also share common airfreight, warehouses and transportation with other cluster members.

5.2 United Nations

The UN tries to cover a wide range of activities in the preparedness phase. It can be argued that they tend to prepare thoroughly for responding to a sudden onset of natural disasters. Also, Figure 6 illustrates a broad variety of SCI activities of UN across all the levels of SCI through many coordinating groups in the preparedness phase. First of all, the UN 'clusters' play the pivot role to integrate SCs with other aid actors. There are 11 cross-cutting clusters that have been created since the 2004 tsunami for the purpose of avoiding duplication (Tatham and Pettit 2010). In particular, the logistics cluster take the role of providing common services such as 'a common trucking pipeline', to reduce congestion in a port, and to share useful information (Tatham and Pettit 2010). Furthermore, it has an agreement to temporarily share personnel with principle NGO partners for a short period.

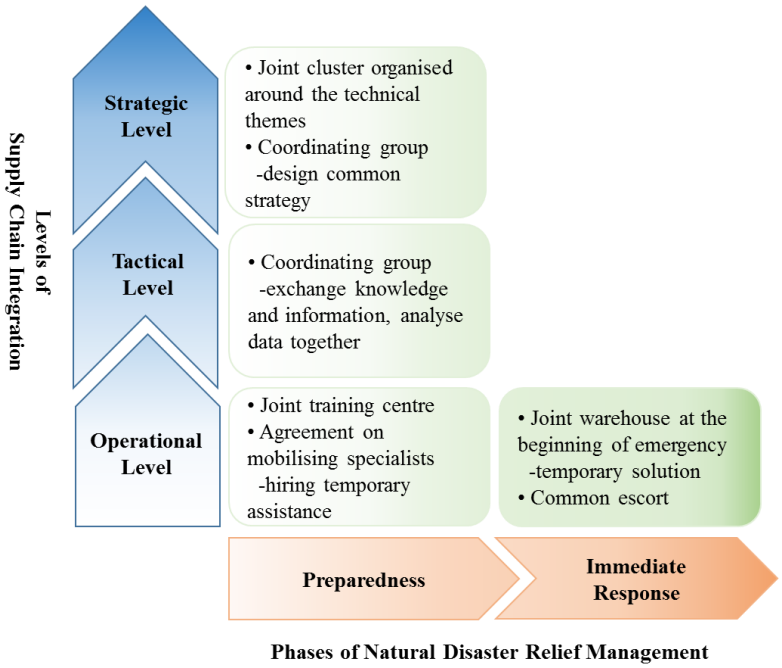

Figure 6. Framework of UN's Activities in SCI (authors).

During the immediate response phase, UN highly focuses on their activities on the operational level. At the very beginning of immediate response, more coordination is needed because many aid actors depend on common services until they establish their own SCs. UN A highlighted the significance of the start of the aid operation: 'at this stage speed is vital and this depends on common services being available'. Indeed, the common services in procurement, warehouses, and transportation are essential to start relief operations quickly in a chaotic situation. When SCs are stabilised and settled, relatively less coordination is required between aid actors. Generally, in affected areas there are not enough available

resources and the prices can become higher than usual if aid actors are competing against each other. Hence, they try to establish a common service group to save time and costs and make the most of available resources without the hindrance of competition or waste. This is usually carried out by the logistics cluster system or regular coordinating groups that were organised in the preparatory phase.

5.3 Governmental Organisations

In the case of GOs, Figure 7 demonstrates that they place great emphasis on the tactical level of SCI in the preparedness phase, while they cover the tactical and operational levels of SCI activities in the immediate response phase. These integration activities are usually conducted based on a facility network with reliable NGO partners. GOs meet these partners on a regular basis and form strong networks with them during the preparedness phase.

During this immediate phase the role of NGO partners is very important, because these partners 'collect information and feed it back to GOs' about the needs on the ground or detailed situations. Plus, for the first seventy two hours to the first week after the event, usually the UN system tries to establish common service system in SCs. Thus, GOs firstly work with their regular partners to secure agility on disaster relief operations and then try to collaborate with the UN system after the common SCs are stabilised. They look at partners that *"have already presence on the ground to deliver aid items quickly and ability to get things out to people who are most vulnerable" (GO A).* Based on the collected information, they provide the partners with goods from the stockpile or cash to encourage buying from local markets.

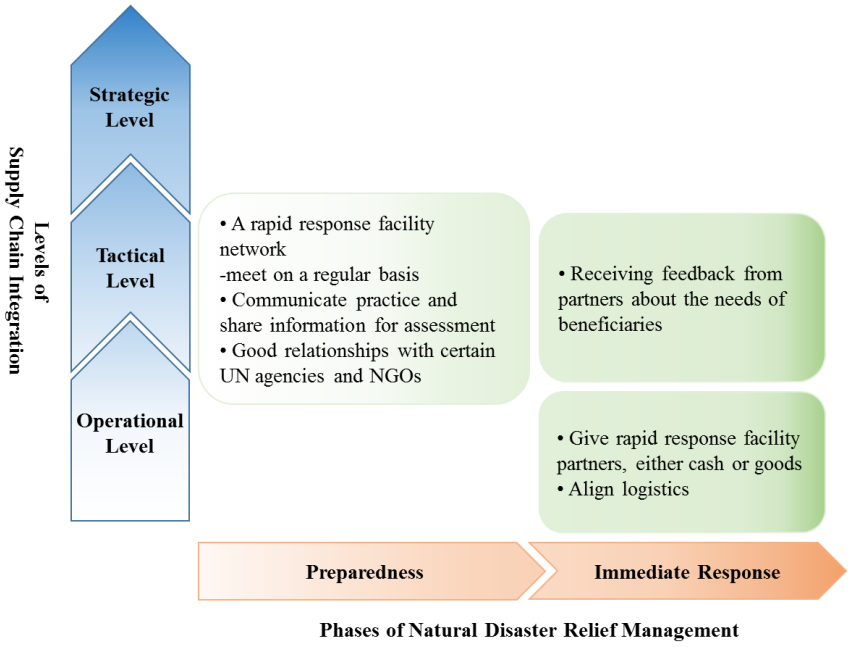

Figure 7. Framework of GOs' Activities in SCI (authors).

5.4 Cross-Case Patterns

The case analysis part shows that there are different needs and stances between aid actors in terms of the time and the levels of integration. However, it is also apparent that there is a common tendency in all cases. The strategic level of SCI only takes place during the preparedness phase. There is a trend that the SCI activities are more common at the strategic and tactical levels across all major actors in the preparedness phase. In contrast, the tactical and operational levels of SCI activities stand out in the immediate response. Among all three actors, there are no SCI activities at the strategic level during the immediate response phase.

Aid Actors	Tactical Perspective /Preparedness	Operational Perspective /Immediate Response
NGOs	• Report preparedness activities to the UN coordinator	• Joint services - common freight, warehouses and trucks • Fill a work gap
UN	• Coordinating group - exchange knowledge and information, analyse data together	• Joint warehouse at the beginning of emergency - temporary solution • Common escort
GOs	• A rapid response facility network - meet on a regular basis • Communicate practice, and share information for assessment • Good relationships with certain UN agencies and NGOs	• Give rapid response facility partners either cash or goods • Align logistics

Table 3. Common Perspectives among Major Aid Actors (authors)

All actors have one level of SCI in common at each phase (Table 3). During the phase of preparation all three aid actors have SCI activities in the tactical level, while they have the operational level of SCI in the immediate response phase. In the former phase, they actively share assessment information for better decision making in resource allocation and preliminarily build a strong network between them. After the occurrence of a natural disaster, they all try to integrate SCs in the operational level, however, their counterparts are different. NGOs and UN use common services together based on the cluster system, whilst GOs tend to closely work with their own facility NGO partners and partially use joint logistics services with the other aid actors. Normally, GOs do not share warehouses or aid staff.

6. Conclusion

While SCI had been widely covered by academic research, use of the concept in humanitarian situations is under-researched, particularly in terms of different levels of SCI. This paper analyses the SCI activities of major aid actors in a systematic way. The conceptual framework was applied to all major actors and allowed to visualise the SCI activities according to the different two phases and the levels of SCI. This research found that there are more differences of SCI activities among three cases at different response phases.

7. Acknowledgement

Our special thanks to Prof. Helen Walker and Dr Anne Touboulic for providing key contacts. We also wish to thank the four members of aid organisations for participating in the research. We would like to acknowledge the financial assistance provided by the Economic and Social Research Council (ESRC).

8. References

Abbott, P. L. 2008. *Natural disasters*. 6th ed. London: McGraw-Hill Higher Education.

Alfalla-Luque, R. et al. 2013. Supply chain integration framework using literature review. *Production Planning & Control* 24(8-9), 800-817.

Barratt, M. 2004. Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal* 9(1), 30-42.

Baxter, P. and Jack, S. 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report* 13(4), 544-559.

Bernon, M. et al. 2013. An exploration of supply chain integration in the retail product returns process. *International Journal of Physical Distribution & Logistics Management* 43(7), 586-608.

Bryman, A. and Bell, E. 2011. *Business research methods*. 3rd ed. Oxford : Oxford University Press.

Chen, H. et al. 2009. Supply chain process integration: a theoretical framework. *Journal of Business Logistics* 30(2), 27-46.

Childerhouse, P. and Towill, D. R. 2011. Arcs of supply chain integration. *International Journal of Production Research* 49(24), 7441-7468.

Fawcett, A. M. and Fawcett, S. E. 2013. Benchmarking the state of humanitarian aid and disaster relief: A systems design perspective and research agenda. *Benchmarking: An International Journal* 20(5), 661-692.

Frohlich, M. T. and Westbrook, R. 2001. Arcs of integration: an international study of supply chain strategies. *Journal of Operations Management* 19(2), 185-200.

Kovács, G. and Spens, K. M. 2009. Identifying challenges in humanitarian logistics. *International Journal of Physical Distribution & Logistics Management* 39(6), 506-528.

Lee, H. W. and Zbinden, M. 2003. Marrying logistics and technology for effective relief. *Forced Migration Review* 18(3), pp. 34-35.

Larson, P. D. 2012. Strategic Partners and Strange Bedfellows: Relationship Building in the Relief Supply Chain. In: Kovács, G. and Spens, K. (Eds.). *Relief Supply Chain Management for Disasters*. PA: Business Science Reference, 1-15.

Maon, F. et al. 2009. Developing supply chains in disaster relief operations through cross-sector socially oriented collaborations: a theoretical model. *Supply Chain Management: An International Journal* 14(2), 149-164.

Mason, R. et al. 2007. Combining vertical and horizontal collaboration for transport optimisation. *Supply Chain Management: An International Journal* 12(3), 187-199.

McLachlin, R. et al. 2009. Not-for-profit supply chains in interrupted environments: the case of a faith-based humanitarian relief organisation. *Management Research News* 32(11), pp. 1050-1064.

Munich Re. 2015. *Loss events worldwide 2010-2014: percentage distribution*. Available at: https://www.munichre.com/touch/naturalhazards/en/homepage/index.html [Assessed: 10 September 2015]

Pagell, M. 2004. Understanding the factors that enable and inhibit the integration of operations, purchasing and logistics. *Journal of Operations Management* 22(5), pp. 459-487.

Pettit, S. J. and Beresford, A. K. 2005. Emergency relief logistics: an evaluation of military, non-military and composite response models. *International Journal of Logistics: Research and Applications* 8(4), 313-331.

Stevens, G. C. 1989. Integrating the Supply Chain. *International Journal of Physical Distribution & Materials Management* 19(8), 3-8.

Tatham, P. and Kovács, G. 2010. The application of "swift trust" to humanitarian logistics. *International Journal of Production Economics* 126(1), 35-45.

Tatham, P. H. and Pettit, S. J. 2010. Transforming humanitarian logistics: the journey to supply network management. *International Journal of Physical Distribution & Logistics Management* 40(8/9), 609-622.

Thomas, A. S. and Kopczak, L. R. 2005. From logistics to supply chain management: the path forward in the humanitarian sector. *Fritz Institute* 15, 1-15.

Van Wassenhove, L. N. 2006. Humanitarian aid logistics: supply chain management in high gear. *Journal of the Operational Research Society* 57(5), 475-489.

Vega, D. and Roussat, C. 2015. Humanitarian logistics: the role of logistics service providers. *International Journal of Physical Distribution & Logistics Management* 45(4), 352-375.

Whipple, J. M. and Russell, D. 2007. Building supply chain collaboration: a typology of collaborative approaches. *The International Journal of Logistics Management* 18(2), 174-196.

Yin, R. K. 2014. *Case study research: design and methods*. 5th ed. Thousand Oaks: Sage.