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## Humanitarian Supply Chain/logistics: Roadmap To Effective Relief Effort

Ik-Whan Kwon

*Saint Louis University*, kwoni@slu.edu

Sung-Ho Kim

*Yonsei University*, kimsungho@yonsei.ac.kr

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## Humanitarian Supply Chain/logistics: Roadmap To Effective Relief Effort

### Cover Page Footnote

Footnote There are some differences in concept between cooperation, coordination and collaboration. Coordination is a process to link each activity without any inherent value ("I do it because I am told to do so). No feeling and no vision. Cooperation is a voluntary action by two players to link each area of supply chain since the two players see some value for their own company in terms of cost, price and profit ("I do it because I see some immediate benefits for me"). Collaboration is a process of creating value for the entire players along the supply chain. Price and cost seldom enter into this process ("I do it because I see a long-term value for me and for my organization. It fosters creating trust and produce "serial equity" as opposed to "spot equity"). (Pekman, Kamauff, and Myhr, 1998).

## HUMANITARIAN SUPPLY CHAIN DESIGN FOR SUSTAINABLE OPERATIONS: INVESTING IN PREPAREDNESS STAGE OF OPERATIONS

Ik-Whan G. Kwon, Saint Louis University  
Sung-Ho Kim, Yonsei University, Republic of Korea

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*Between the years of 2000 and 2012, natural disasters caused \$1.7 trillion in damage and affected 2.9 billion people (dosomething.org). In the Americas (ranked second globally in terms of natural disasters) between 2007 and 2016, disasters caused 255,033 deaths, 898,816 injuries and damages worth \$470 billion (Disasters, 2017). In 2016 alone, natural disasters caused \$175 billion in damage with 8,700 lives (Munich RE, 2017). The above numbers reflect only the amount of physical destruction and do not include indirect losses such as unemployment, environmental consequences, and business disruptions. Therefore, the full impact of these catastrophic events is much greater than these numbers suggest. Response to and management of disaster relief supply chain is considered different from that of commercial supply chain/logistics in many aspects. This paper argues that investment in the preparedness phase is much more effective than spending on the operation side of relief efforts. This paper proposes a new humanitarian supply chain design with emphasis on investing in an infrastructural phase of humanitarian supply chain.*

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Keywords: Rules of Engagement, Humanitarian Supply Chain, Supply Chain Optimization, Impartiality, Neutrality

### INTRODUCTION

Data from EM-DAT (2012), the international disaster database, suggests an alarming upwards trend of the number of natural disasters occurring worldwide over the last fifty years. From 1965-1975 there were approximately 71 occurrences of natural disasters per year worldwide. However, if we take that same ten year span from 1995-2005, we get an average of approximately 403 natural disaster occurrences per year. That is a little more than five and a half times what it was only twenty years earlier. Eleven percent (11%) of the people in the natural disaster areas lives in developing countries, but the disasters occurring in developing countries account for 53% of the recorded deaths (Kovacs & Spens, 2011). If damages caused by political conflicts (war, terrorist attacks, etc.) are considered, the economic and human suffering would exceed far more than information provided above.

Although humanitarian crises happen every year around the globe, it is not an easy task to forecast the exact locations, time and magnitude/scale of such disasters making long range relief planning and corresponding responses difficult and inefficient at best. Donor's reluctance in investing in humanitarian relief infrastructure coupled with unpredictable occurrences increase the relief efforts more than necessary (Heaslip, 2012). It appears that donors are more willing to

donate goods and money in response to urgent pleas by international relief agencies on a case by case episode. Once such urgency subsidies, donors in many cases withdraw their pledge and in some instances, not willing to fulfill their original pledge. One NGO reports that in 2015 only 53% of pledges were collected (\$10.9 billion out of \$19.8 billion pledged) (ICVA, 2017). In the refugee crises in Darfur, Western Sudan and after hurricane Mitch, for example, aid agencies received only a third of the pledged funds (Oloruntoba, 2005). Of pledged, in many instances, the amount is too small with the wrong kind of materials that are practically useless in reducing human suffering (United Nation Department of Humanitarian Affairs, 1993). In some cases, the assistance fund met only 10% of the estimated needs (Haavisto, Kovacs, & Spens, 2016). Finally, many materials donated are misplaced due to an absence of well-thought out planning or lack of logistics personnel. Some experts plead that “we do not need a donor’s conference rather we need a logistician conference.” (Shane & Bonner, 2005).

Some experts may argue that humanitarian supply chain/logistics is fundamentally different from that of commercial supply chain/logistics, and, therefore operations of these two supply chain models produce different outcomes and should not expect the same results. This paper, however, will argue that the operational principles are the same and therefore outcomes should be same on the different measuring areas (e.g. profits vs. saving lives) (ICVA, 2017).

The purpose of this paper is to outline a comprehensive humanitarian supply chain/logistics design employing a commercial supply chain/logistics framework. Emphasis, however, will be directed to the preparatory stage of supply chain operations in relief efforts. Studies show that a well-prepared infrastructure in prepared stages is much more effective in saving lives than investing money and materials in the operational phase of relief effort (Pettit, et al., 2011).

This paper is organized as follows; 1. Introduction, 2. Literature review in humanitarian supply chain/logistics, 3. Designing humanitarian supply chain, 4 Summary and conclusion, 5. Agenda for future study in humanitarian supply chain/logistics.

## **LITERATURE REVIEW IN HUMANITARIAN SUPPLY CHAIN/LOGISTICS**

Since it is claimed that the disaster relief effort is about 60 to 80 percent logistics, one could speculate that the best way to achieve the goals is through efficient and effective logistics operations systems and supply chain management (Van Wassenhove, 2006). Therefore, building humanitarian logistics capacity and operational effectiveness has formed a critical foundation of global humanitarian relief effort undertaken by the international community. The speed of humanitarian aid after a disaster depends on the ability of logisticians to buy, transport and receive supplies at the site of humanitarian relief efforts (Thomas, 2005).

Humanitarian logistics in general can be defined as “the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin (sourcing, warehousing and distribution centers) to the point of consumption (disaster area) for the purpose of alleviating the suffering of vulnerable people. The function, therefore, encompasses a range of activities, including preparedness, planning, procurement, packaging, transport, warehousing, tracking and

tracing, and custom clearances (Thomas & Kopczak, 2005). Apte (2009) is more specific in defining humanitarian logistics in his attempt to bridge the humanitarian logistics to supply chain management: humanitarian logistics is that special branch of logistics which manages response supply chain of critical supplies and services with challenges such as demand surges, uncertain supplies, and critical time window in the face of infrastructure vulnerabilities.

#### A. Rules of Engagement

Humanitarian supply chain/logistics, unlike commercial supply chain, operates under and within four very important and unique set of principles. The humanitarian supply chain should be based on; humanity, neutrality, independence and impartiality. Humanity aims at delivering assistance without discrimination based on religion, political ideologies, race, and social values. Neutrality, on the other hand, refers to the provision of aid without taking sides in a conflict caused by political, social, religion or any other reasons. Humanitarian aid is based on humanitarian needs only for basic necessities such as food, water, and shelter, clothing and medical treatment. As such, there is no room for discrimination based on political ideologies. Impartiality implies that action is based on a need base alone. Humanitarian assistance pre-conditioned based on political and social change should not be tolerated and rejected under this principle. Finally, independence mandates a complete separation from political, economic, and military intervention when delivering relief items and services. The independence principle mandates no military or coercive conditions to be imposed as a condition of receiving humanitarian aid (Seipel, 2011). Smith (2007) called these principles the basic rules of engagement for NGOs, providing them with a mandate and framework of references under which to operate, as well as influencing the degree of cooperation with other personnel in governments, military organizations or religious institutes.

#### B. Three Stages of Operations

Humanitarian relief operations cover three phases of engagement; preparatory stage (*Stage 1*), response to urgent needs (*Stage 2*) and reconstruction (*Stage 3*) (Kovacs & Spens, 2007, italics added). Uncertain funding sources, amount and timing by potential donors make long term planning in Stage 1 difficult if not impossible. A sudden influx of goods in response to disasters sometimes overwhelms the supply chain operations clogging distribution channels and hampering overall relief operations. Furthermore, inappropriate aid materials (e.g. winter blankets in Bangkok Flood in 2007) were clogging warehouses and distribution centers hampering speedy distribution of critical materials to the needed areas/regions. One United Nation report states that "... consistently, many of the internationally supplied relief goods flown into countries... prove to be inappropriate and unnecessary... and may even be a barrier to more important deliveries." (United Nations Department of Humanitarian Affairs, 1993).

#### C. Investing in Preparedness Stage (Stage 1)

Adequate funding in Stage 1 is very important and usually determines how quickly and efficiently an aid agency can respond to some disaster areas (Jahre & Heigh, 2008). It has been shown that a \$1 investment in Stage 1 usually creates \$3 worth of value in relief operations (Stage 2) (Haavisto, Kovacs, & Spens, 2016). Nevertheless, most, if not all, relief responses have

been focused on and around Stage 2 where the donors' contributions are greatly exposed to the global news media. Once such urgency fades away or political interest is low, aid inflow usually either stops or is not honored (Comes & de Walle, 2016; Oloruntoba, 2005; ICVA, 2017). Case can be made that sound investment in supply chain infrastructure (Stage 1) will minimize the extent of damage and human suffering during relief operations (Stage 2). It is debatable whether reconstruction (Stage 3) is within the realm of humanitarian relief supply chain. Humanitarian relief effort is a response to onset disaster where capacity of local resources, personnel and infrastructure are unable to minimize human suffering. Once such disasters are controlled/managed and basic infrastructures are restored, the reconstruction phase should be left to the local governments and communities since the requirements for reconstruction is quite different from that of responding to relieving on-set disaster (Stage 2).

#### D. Foundation of Supply Chain

The foundation of supply chain rests upon information sharing. Information sharing usually leads to trust among partners who in turn build avenues where collaborative initiative can be commenced (Kwon & Suh, 2004 and 2005). Supply chain vision based on a sound foundation enables the players to execute supply chain tools more efficiently and effectively to achieve the ultimate corporate goals; profit and revenue. Recent research indicates supply chain optimization based on a strong collaborative foundation improves overall performance measured by financial metrics such as revenue, profit, shareholder's return (Kwon, Hong, & Hamilton, 2012; Henke, Stalkamp, & Yeniyurt, 2014; Partidas, 2015; Kwon, Hong, & Kim, 2017; Saenz, Gupta, & Makowski, 2017). A similar argument can be made that humanitarian supply chain built on a strong foundation may result in better outcomes in terms of reducing human suffering. Commercial supply chain operates under a competitive environment where innovation and entrepreneurial spirit guides their journey. The rules of engagement in humanitarian supply chain, on the other hand, are bound by four principles that may limit and, in some instance, may compromise the relief efforts.

#### E. Building Relationship

One of the most important areas missing in humanitarian supply chain/logistics is the avenue and opportunity where collaborative process can be initiated. Under such situation, long term strategic planning is almost impossible in the humanitarian supply chain/logistics area. Lack of long term planning tends to deprive opportunities where a serious relationship building platform can be initiated between donors and NGOs and NGOs and recipients. Nevertheless, coordination, cooperation and collaboration among stakeholders are imperative in relief supply chain to realize a maximum benefit out of chaotic situations <sup>a</sup>.

When circumstance is not tenable for the relationship building process, a "swift trust" model is suggested as the second-best alternative (Tatham & Kovacs, 2011). The concept of swift trust is based on circumstances where a hastily formed cooperative network (HFN) is tentatively formed among players to maximize the relief efforts. HFN has fundamental elements that provide a basic platform where initial coordination and cooperation can be formed that may ultimately and hopefully lead to collaborative agreements in the long run. Unfortunately, HFN is

a short-term concept with no sustainable prospective. Absence of sustainable operations may cause redundant processes in each on-set disaster relief theater that wastes scarce resources.

A lack of sustainable dialogue among and between major players (mostly donors and NGOs on behalf of recipients of aid) precipitates inefficient and ineffective resource allocations in urgently needed areas. Under this circumstance, long term strategic planning is very challenging and an attempt to create reasonable/measurable key performance indicators (KPI) is almost impossible. Lacks of universally accepted performance indicators in many occasions hamper mission success (Heaslip, 2012) and raise doubts by donors as to the effectiveness of their investment (donation). Table 1 summarizes some of the differences between commercial and relief supply chain management.

*Table 1. Similarities and Differences of Main Characteristics between Commercial and Relief Supply Chain and Logistics*

Attributes	Commercial	Relief
Foundation	Collaboration	Coordination, Cooperation
Metrics	Profitability	Saving lives
Ownership	Consumers/Shareholders/ Stakeholders	NGOs/Donors
Strategies	Pro-active	Re-active
Funding sources	Retained earnings, Debt, Equity	Donation
Planning horizon	Long-term	None
Supply chain models	Push-pull	Pull
Approach	Pro-active	Re-active
Demand	Predictable	Unpredictable
Rules of engagement	Competitive environment	Humanitarian principles

Metrics for commercial supply chain is corporate's profitability/revenue while it is how many lives are saved and relieved suffering in humanitarian supply chain. In humanitarian relief operations, there is no pre-determined target to achieve since on-set disasters occur unpredictably without warnings which makes a long-term planning difficult if not impossible. Speed of response is often compromised under a degraded logistics infrastructure where roads, ports, and air fields are in most cases either destroyed or not in working condition. On top of unusable or non-existent logistics infrastructures, communication networks become disrupted making rapid deployment of goods and services to the needed areas difficult and in many occasions impossible.

Fragmented NGOs deployed at disaster areas with no collaboration among players creates a situation where control and command becomes almost impossible causing gluts of needed goods in some areas while shortage of critical goods and services in some other areas within the same disaster region (Pettit & Beresford, 2005). In addition, since most NGOs are interested in responding to urgent needs in a very short time period (Stage 2), donors seldom interested in the outcome of their investments. Waste becomes perpetuated as there is no established metrics by which the outcomes are measured, compared and evaluated. A lack of steady funding

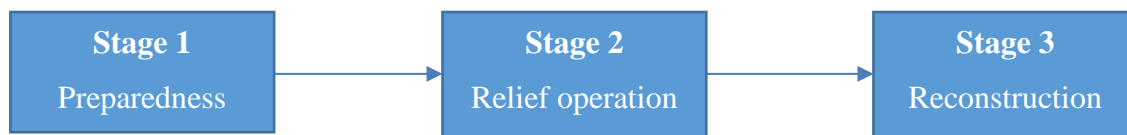
opportunities especially in Stage 1 (preparedness) makes it even harder to optimize the scarce resources to maximize the outcome (saving lives) per dollar invested.

Commercial supply chain often uses both forecasting (push model) and market demand driven plan (pull model) to optimize their supply chain operations. With data analytics, demand based forecasting (pull model) is feasible now than ever in commercial supply chain. However, in humanitarian supply chain, forecasting disaster occurrences (push model) is almost impossible. React to disasters has been the norm than exception in humanitarian relief history. Accordingly, they have to rely exclusively on demand pull response. As a result, it is not uncommon to witness gluts in some disaster areas and shortages in other places.

## DESIGNING HUMANITARIAN SUPPLY CHAIN

Network design in humanitarian supply chain in general and preparedness stage (Stage 1) in particular is a challenging task since future event is unknown and therefore uncontrollable (Simchi-Levi, 2010). Risk management principles may guide us with a basic framework for network design under extreme uncertain environments. Risk management calls for defining the nature of risk, assesses the likelihood, estimates economic/human costs and prepares mitigating strategies. In humanitarian supply chain, types of disaster include flood, tsunami, earthquake, famine, and other nature induced disasters that result in economic and human suffering. Although it is difficult to forecast with reasonable accuracy the likelihood of such disasters occurring, records exist indicating prevalence of such occurrence in certain areas/regions more than others (e.g. famine in Africa, tsunami in Indian ocean, flood in Southeast Asia and the Caribbean region, and earth quacks in Japan, etc.). Monte Carlo model may estimate with reasonable accuracy the likelihood of occurrences (Mooney, 1997; Banomyong & Sodapang, 2012). Mitigating strategies may be followed and in place.

Based on the existing literature, we argue that humanitarian supply chain consists of three sequential phase; preparatory phase (Stage 1), operational phase (Stage 2) and reconstruction phase (Stage 3). We propose that Stage 1 is further segmented into three parallel stations; educational and training station, requirements for within 72 hours disaster station, and requirements beyond 72 hours disaster station. Summary of sequential and parallel roadmap is shown in Figure 1 and Figure 2 below.



*Figure 1.* Humanitarian Supply Chain Model



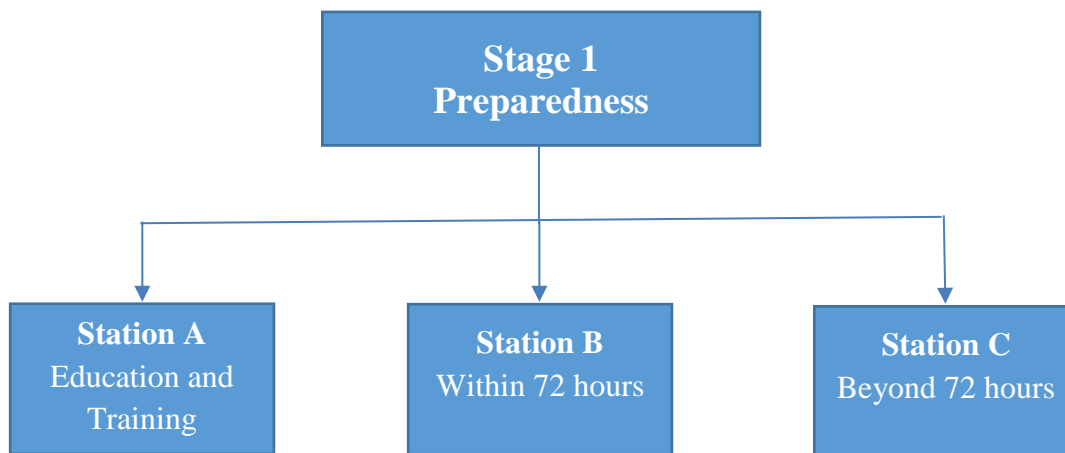


Figure 2. Preparedness Stage

History of disaster recovery shows that the recovery effort would be much more effective and successful if humanitarian relief organization invest in the preparedness phase of relief operations (Stage 1) (Wakolbinger & Toyasaki, 2011; Petti, et al., 2011). Without firm and well-thought out planning in Stage 1, recovery efforts may not achieve the maximum goals and targets.

Investing in Stage 1 requires three areas of preparation as shown in Figure 2; education and training of personnel (Station A), preparing essential items within 72 hours from disaster (Station B) and beyond 72 hours (Station C). Disaster areas/regions are unable to handle/manage massive international relief aid unless infrastructure is in place ready for receiving, storing, and distributing essential goods and services and evacuating and treating the wounded.

***Educating and training relief personnel (Station A).*** In order to prepare and execute relief operations, trained professionals should be in place for the task. Foremost, logisticians should be trained who can direct efficiently and effectively urgently needed essential goods and services to the disaster areas. It should always remind us that 60 to 80% of the total relief fund is spent on logistics related areas. Well thought out strategies for recruitment, retention and career planning in this area must be developed (Heaslip, 2012). Medical and health professionals should be located, recruited and retained for emergency calls. Since the urgent need is to save lives, emphasis should be in the areas of emergency medical response at this stage. Along with medical and health related personnel, engineers need to be trained and educated for disaster relief operations especially in repairing bridges, roads and air fields to transport needed items to the disaster areas. Modern communication personnel should be also trained and retained with the most advanced portable equipment available. Finally, personnel in the command and control field should be adequately trained to maintain safety and security of relief personnel as well as people affected by the disaster.

***Preparing immediate needs (Station B).*** Needs for immediate relief become critical within 72 hours from the on-set disaster. Infrastructure is destroyed, communication networks are disrupted cutting off vital information with the rest of the international communities, transportation networks are degraded and unusable, availabilities of basic human needs such as

food, water, medicine, clothing, blankets, etc. either unavailable or destroyed. Banomyong and Sodapang (2012) in their supply chain response model proposed a timeline response to relief efforts in each activity. According to their simulating model, information flow to trigger response should take place within 3 hours, coordinating mechanism within 13 hours, physical flow within 22 hours, and clearance activity within 37 hours making total responding time within 72 hours. Most importantly, a spirit of collaborative formation can be launched at this stage. The foundation of any supply chain including humanitarian should be rested upon collaborative spirit among the key players. No better place to initiate and engage this process than in Station A (Kovacs & Spens, 2007). Success of humanitarian relief efforts depends on a large extent to how well each country in general and countries known to be vulnerable to natural disasters in particular prepare for potential disasters. Investment into and funding for the preparation stage will minimize human suffering during relief operations (Stage 2) and speed up recovery efforts (Stage 3). Although no one can predict the types and extent of disasters in the future, literature indicates there are a few items essential for survival within a short period of time (usually 72 hours) and beyond until massive international relief arrives.

***Essential items within 72 hours (Station B).*** According to Schulz and Heigh (2009), the Logistics Resources and Mobilization Department (LRMD) of the International Federation of Red Cross and Red Crescent (IFRC) recommend relief items for a maximum of 5,000 families within 48 hours and further 15,000 families in 14 days anywhere globally. It includes:

- Non-perishable food items (should be sensitive to local customs and culture) (United Nations Department of Humanitarian Affairs, 1993)
- Portable drinking water
- Clothing and blankets (should be weather sensitive) (Thomas, 2005)
- Emergency medical items including hygiene
- Battery operating portable communication equipment
- Tents (weather sensitive)
- Cooking utensils and corresponding fuels

***Essential items for beyond 72 hours (Station C).*** Once immediate needs for survival in on-set disaster area are minimally prepared and met, and the situation is stabilized, the relief plan at this stage should direct their attention to preparing sustainable operations within Stage 1 until outside international aid arrives. The main purpose of operations at Station C is to stabilize the infrastructure in the stricken areas to prepare for sustainable relief efforts in Stage 2. Important operational concepts at this stage are to prepare for relief effort beyond 72 hours until massive international relief aid starts to pour into the affected areas/regions. Some of the items needed for this stage of operations may include:

- Trained security personnel to protect people and road/bridge/air fields
- Logistics experts to distribute massive supplies to right places at right moments
- Engineers to repair essential roads, bridges and airfields for transfer of urgent relief items
- Secured warehousing and distribution facilities to house incoming supplies
- Translators/Interpreters who coordinate relief effort with international agencies on the Ground (Mohman & Jalalzai, 2008)
- Light tractors to clear roads and bridges

- Water purifiers and hygiene dispensers
- Field hospitals (tent) equipped with emergency surgical operations
- Fuel storage tanks
- Others

The categories listed above are more or less in line with the US 10 classifications of relief items (Skoglund & Hertz, 2012).

**Local sourcing.** Another area that needs to be addressed in Station B is a sourcing decision. Sourcing for relief management is based on “think global, act local” principle. Local sourcing is considered preferable whenever possible as it brings local suppliers into the disaster community where local customs, culture, rules and regulations can be easily incorporated into sourcing decisions and processes. Products and services in disaster areas become easily adapted to their needs. In addition, local sourcing helps the local economy that creates relief capacity where further resources can be drawn (Heaslip & Kovacs, 2016). One study claims that in disaster relief operations, up to 65 per cent of the costs have been connected to procurement (Schultz & Soreide, 2008).

Local sourcing also makes it possible to pool resources to take advantages of economies of scale. Attention should be from “a low-volume, high margin” business towards a “high-volume, low margin” goods and services under disaster relief sourcing (Ellis, 2011). Finally, local sourcing provides a rare opportunity where supplier relationship management (SRM) can be initiated that strengthens the supply chain foundation. As discussed earlier, one of the most challenging areas in humanitarian supply chain operations is an absence of an avenue where a solid foundation can be initiated using collaborative spirits among key players. Hastily Formed Networks (HFN) lack the fundamental principle of collaborative framework and is incapable of providing value that commercial supply chain would routinely create. Local sourcing may provide a basic framework where a trust-based collaborative foundation can be established.

Another advantage of local sourcing is that preparation is based on local culture and custom avoiding unwanted and/or unnecessary relief items brought into the relief areas from outsiders (U.N. Department of Humanitarian Affairs, 1993). The cultural issue becomes critical as both the people affected and the ones helping often come from different backgrounds with their respective ways of doing (Sohn, Merilainen and Grant, 2016). Concurrence of these two different cultures and customs could cause unwanted conflicts and resentments.

Although local sourcing provides advantages in many aspects of relief supply chain operations, it also raises some challenges. If the disasters occur in the same areas/regions where local sourcing depends on, immediate responses to the needs may be in jeopardy. The situation may be further complicated when and if the international relief agencies are erroneously under the impression that essential goods and services are available through local relief sourcing. International relief effort may be delayed causing further agony and suffering.

**Transportation and warehousing strategies.** Designing for ideal distribution centers/warehousing locations is not an easy task since disasters erupt with no advanced warnings. However, the sites should be in such areas away from suspected locations such as foothills of

mountains and banks of river where flood may overwhelm facilities. In addition to distribution facilities in local/regional areas, the floating warehouse concept should be also entertained. Floating warehouses similar to Doctors Without Borders business model should be strategically located in the areas/vicinities where likelihood of disaster occurrence is high. Floating warehouses can and should be used as educational and training facilities as well during the non-emergency period. Since the concept is “floating”, accessibility to this educational facility is economical and effective.

Transportation network using local assets should be mapped, and essential food, water, medical items and other basic items should be identified and properly located throughout potentially affected areas. Postponement strategy may be initially deployed for some of the necessities such as tents, cooking utensils, blankets, etc. until a clear picture emerges as to the extent and nature of disasters become known (Heaslip & Kovacs, 2016). Considering the extent of initial capital investment in this stage, vendor managed inventory (VMI) strategy should be considered to mitigate capital requirement (Christopher & Tatham, 2011).

***Military relief involvement.*** There is some debate whether military rescue operations at this stage (Stage 1-B) is appropriate and even desired. Since some countries especially underdeveloped countries do not have the capacity to prepare for any potential disaster, military involvement seems to be a very attractive alternative. Military can quickly deploy to any disaster area worldwide within 48 to 72 hours (Seipel, 2011). In addition, the military has three most important assets that civilian relief agencies may not have; command and control, communication networks and fleet of transportation. However, military involvement at this stage raises a question of the “impartiality” principle in rules of engagement. Potential gains from military involvement at this planning stage should be carefully weighed against a possible negative effect that may derail the entire relief process.

## SUMMARY AND CONCLUSION

Humanitarian supply chain has not performed well as expected in the past due to a poorly understood concept of supply chain foundation. As a result, resources from potential donors have been heavily channeled to relief operations on an ad hoc basis. An absence of a well-coordinated command and control created the situation where scarce resources have been wasted leaving unfinished relief business to local communities. Such a short-sighted practice is not sustainable and humanitarian supply chain has been considered as temporary relief logistics tools.

It is time that we re-think relief supply chain from a sustainable prospective. Pouring resources into Stage 2 (operations) does not solve fundamental issues. Rather it perpetuates a culture of deepening the dependency on foreign interventions. Creating local relief infrastructures (Stage 1) is the best way to address the situation (Jahre & Heigh, 2008). It has been shown that a \$1 investment in Stage 1 often equals to \$3 in disaster response (Stage 2) (Haavisto, Kovascs & Spens, 2006). Investment in Stage 1 may not be an attractive exposure that donors may want. But this process (investing Stage 1) strengthens the foundation for responding to the future disasters and encourages the local supply chain community involvement who eventually takes process ownership. Local ownership is critical in building sustainable relief

infrastructure consistent with local customs and culture (Phillips, 1993; Mohamand & Jalalzai, 2008).

As Dowty (2011) mentioned, humanitarian aid has failed to reach its potential for relieving human suffering because all too often problems are poorly articulated and solutions are imposed by donors without regard to the local cultural imperatives of people in need. It is time for humanitarian supply chain communities to re-direct their focus from response (Stage 2) to preparedness (Stage 1) based on supply chain principles.

## **AGENDA FOR FUTURE STUDY IN HUMANITARIAN SUPPLY CHAIN/LOGISTICS**

Humanitarian supply chain/logistics has performed less than its potentials in spite of huge international contributions to the events. Several factors have contributed to such less than optimal performance. Absence of unified command and control created opportunities for many individual players to act alone in many cases to maximize their own agenda. As a result, shortage of certain goods and services in one disaster area while a surplus in other areas. A lack of unified coordination creates wasteful results. Misconception that humanitarian supply chain/logistics addresses only response to an emergency situation creates imperfect humanitarian relief supply chain framework. As a result, waste perpetuates and effectiveness of supply chain operations is in many cases compromised. A sound supply chain concept based on collaborative agreement/understanding among and between donors, NGOs and recipients needs to be developed under a grand plan of global relief supply chain/logistics strategies. There are currently over 210 relief organizations in the world and each has no or limited interaction and coordination with others. Duplicative services and materials become inevitable under this situation.

Another area that needs to be addressed is understanding of the importance of the preparedness stage in humanitarian supply chain management. Research has shown that return on investment in the preparedness stage is higher than investing in the operations stage. Nevertheless, most global donors are willing to fund only relief operations. As a result, it takes three times more money to provide the same rescue results. A global educational campaign is needed to convince the donors of the economics of investing in the preparedness stage of relief operations.

Regardless of the investment preferences by the donors, it is imperative to establish a humanitarian supply chain network at local levels. The ownership of such initiatives should be in local communities supported by international relief organizations. Local ownership is critical to improve the relief efforts. The scope of preparedness should be such that sufficient relief materials and services are available within 72 hours of disaster. Local sourcing and an educational and training system for disaster preparedness also foster the local economy and community solidarity in relief efforts. International relief organizations should play important roles in establishing local relief networks through education and training support. A close coordination between these two groups of relief organizations will lead to a solid supply chain/logistics foundation where a collaborative framework can be introduced. Once such framework is in place, the efficiency and effectiveness of relief supply chain achieve their ultimate goal; relief of human suffering. At which point, sustainable humanitarian supply chain becomes reality.

## FOOTNOTES

<sup>a</sup> There are some differences in concept between cooperation, coordination and collaboration.

*Coordination* is a process to link each activity without any inherent value (“I do it because I am told to do so). No feeling and no vision. *Cooperation* is a voluntary action by two players to link each area of supply chain since the two players see some value for their own company in terms of cost, price and profit (“I do it because I see some immediate benefits for me”). *Collaboration* is a process of creating value for the entire players along the supply chain. Price and cost seldom enter into this process (“I do it because I see a long-term value for me and for my organization. It fosters creating trust and produce “serial equity” as opposed to “spot equity”). (Pekman, Kamauff, & Myhr, 1998).

## REFERENCES

- Apte, A. (2009). Humanitarian Logistics: A new field of research and action, Foundations and Trends in technology, Information and OM, 3(1), 1-100.
- Banomyong, R., & Sodapang, A. (2012). Relief supply chain planning: Insights from Thailand. Kovacs, G. and Spens, K. Eds. Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics, IGI Global, 31-44.
- Christopher, M., & Tatham, P. (2011). Humanitarian Logistics, Introduction. Kogan Page.
- Comes, T., & Van de Walle, B. (2016). Information systems for humanitarian logistics: concepts and design principles. Haavisto, I., Kovacs, G. and Spens, K. Eds. Supply Chain Management for Humanitarians, Kogan Page.
- Disasters (2017). Preparedness and mitigation in the America, March (Issue 123).
- Dosomething (2015). Retrieved from [www.dosomething.org](http://www.dosomething.org).
- Dowty, RA. (2011). Humanitarian logistics: a cultural perspective. Christopher, M. and Tatham, P. Eds. Humanitarian Logistics, Kagan Page, 201-214.
- Ellis, D. (2011). The supply network’s role as an enabler of development. In: Christopher, M. and Tatham, P. Eds. Humanitarian Logistics, Kagan Page, 265-178.
- EM-Data (2012). From Ira Haavisto (2012), 208-224.
- Haavisto, I. (2012). Disaster impact and country logistics performance. Kovacs, G. and Spens, K. Eds. Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics, IGI Global, 208-224.
- Haavisto, I., Kovacs, G., & Spens, K. (2016). Supply Chain Management for Humanitarians. Kogan Page.

- Heaslip, G. (2012). Challenges of civil military cooperation/coordination in humanitarian relief. Kovacs, G. and Spens, K. Eds. Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics, IGI Global, 147-172.
- Heaslip, G., & Kovacs, G. (2016). Setting up a humanitarian supply network. Haavisto, I., Kovacs, G. and Spens, K. Eds. Supply Chain Management for Humanitarians, Kogan Page.
- Henke Jr., JW, Stalkamp, T., & Yenyurt, S. (2014). Lost supplier trust and lost profit. Supply Chain Management Review, 18(3), 24-32.
- HFN Research Group. (2006). HFN defined, Retrieved from [www.hfncenter.org/cms/node/117](http://www.hfncenter.org/cms/node/117).
- ICVA (2017). The Grand Bargain Explained: An ICVA Briefing Paper, March.
- Jahre, M., & Heigh, I. (2008). Does failure to fund preparedness mean donor must prepare to fund failure in humanitarian supply chain? NOFOMA Proceedings, Helsinki, Finland.
- Kovacs, G., & Spens, K. (2007). Humanitarian logistics in disaster relief operations. International Journal of Physical Distribution and Logistics, 37(2), 99-114.
- Kovacs, G., & Spens, K. (2011). Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics. Business Science Reference.
- Kwon, IW., Hong, SJ., & Hamilton, J. (2012). "Trust and Transaction Cost in Supply Chain Cost Optimization: An Exploratory Study". A Chapter in Inter-Organizational Information Systems and Business Management: Theories for Researchers by IGI Global Publisher, 107-119.
- Kwon, IW., Hong, SJ., & Kim, SH. (2017). Does Collaborative Relationship in Supply Chain Pay-Off? International Journal of Organizational and Collective Intelligence, 7(1), 45-55.
- Kwon, IW., & Suh, T. (2004). Factors Affecting the Level of Trust and Commitment in Supply Chain Management. International Journal of Supply Chain Management, 40(2), 4-14.
- Kwon, IW., & Suh, T. (2005). Trust, Commitment and Relationships in Supply Chain Management – Path Analysis. International Journal of Supply Chain Management, 9(5), 26-32.
- Mohman, H., & Jalalzai, F. (2008). Mistaken by Afghan translators endanger lives, hamper antiterrorism effort. Radio Free Europe, September 2.
- Mooney, C. Z. (1997). Monte Carlo Simulation, Series: Quantitative Applications in the Social Sciences. Sage University Paper, Thousand Oaks, CA, 07-116.
- Munich RE. (2017). Natural disaster caused \$176 billion in damage in 2016.

- Oloruntoba, R. (2005). A wave of destruction and waves of relief: Issues, Challenges and Strategies. *Disaster Prevention and Management: An International Journal*, 14(4), 506-21.
- Partidas, B. (2015). Closer Relationships lead to superior planning. *Supply Chain Management Review*. May/June, 70-72.
- Pekman, RE., Kamauff, JW., & Myhr, N. (1998). An empirical investigation into supply chain management: A perspective on partnership. *Supply Chain Management Review*, 3(2), 53-67.
- Pettit, S., & Beresford, AKC. (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.
- Pettit, S., Beresford, A., Whiting, M., & Banomyong, R. (2011). The 2004 Thailand tsunami reviewed: Lesson learned. Christopher, M. and Tatham, P. Eds. *Humanitarian Logistics: Meeting the challenge of preparing for and responding to disaster*, London: Kogan Page, 103-120.
- Phillips, B.(1993). Cultural diversity in disasters: sheltering, housing, and long term recovery. *International Journal of Mass Emergencies and Disasters*, 11(1); 99-110.
- Saenz, M.J., Gupta, R., & Makowski, C. (2017). Finding Profit in Horizontal Collaboration. *Supply Chain Management Review*, January/February, 16-22.
- Schulz, S., & Heigh, I. (2009). Logistics performance measurement in action within a humanitarian organization. *Management Research News*, 32(11), 1038-49.
- Schultz, J., & Soreide, T. (2008). Corruption in emergency procurement. *Disasters*, 32(4), 516-36.
- Seipel, J. (2011). The impossible interface? Combining humanitarian logistics and military supply capabilities. Christopher, M. and Tatham, P. Eds. *Humanitarian Logistics*, Kagan Page, 215-231.
- Shane, S., & Bonner, R. (2005). UN chief urges immediate aid for tsunami-torn countries. *New York times*, January 6.
- Simchi-Levi, D. (2010). *Operations Rules: Delivering customer value through flexible operations*, MIT Press.
- Skoglund, P., & Hertz, S. (2012). Local sourcing in peacekeeping: A case study of Swedish military sourcing. Kovacs, G. and Spens, K. Eds. *Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics*, IGI Global, 103-122.



- Smith, MG. (2007). Civil-military interaction: Building civil society during conflict. *Australian Journal of Multi-disciplinary Engineering*, 6(2), 225-36.
- Sohn, M., Merilainen, ES., and Grant, D. (2016). Decision making in humanitarian logistics in *Supply Chain Management for Humanitarians: Tools for Practice*, KoganPage:103123.
- Tatham, P., & Kovacs, G. (2011). Developing and maintaining trust in hastily formed relief networks. Kovacs, G. and Spens, K. Eds. *Relief Supply Chain Management for Disasters: Humanitarian Aid and Emergency Logistics*, IGI Global, 173-195.
- Thomas, A., & Kopczak, L. (2005). *From logistics to supply chain management: The path forward in humanitarian sector*, Fritz Institute 2.
- Thomas, A. (2005). Improving aid effectiveness: Two studies suggest solutions. *UN Chronicle* 4: 61-63, Retrieved from <http://www.fritzinstitute.org/PDFs>.
- United Nations Department of Humanitarian Affairs (1993). *Disaster Management Training Programme. Logistics (1st Ed.)*. New York, New York.
- Van Wassenhove, LN. (2006). Humanitarian aid logistics: Supply chain management in high gear. *Journal of the Operations Research Society*, 57(5), 475-89.
- Wakolbinger, T., & Toyasaki, F. (2011). Impacts of funding systems on humanitarian operations. Christopher, M. and Tatham, P. Eds. *Humanitarian Logistics*, Kagan Page, 34-46.