

Georgia Southern University

Digital Commons@Georgia Southern

Association of Marketing Theory and Practice
Proceedings 2013

Association of Marketing Theory and Practice
Proceedings

2013

The Effects of a Disaster's Onset on the Humanitarian Aid Supply Chain

Micheal J. P. Dwyer

University of West Florida, dwyer.michaelj@gmail.com

Follow this and additional works at: https://digitalcommons.georgiasouthern.edu/amtp-proceedings_2013



Part of the [Marketing Commons](#)

Recommended Citation

Dwyer, Micheal J. P., "The Effects of a Disaster's Onset on the Humanitarian Aid Supply Chain" (2013). *Association of Marketing Theory and Practice Proceedings 2013*. 14. https://digitalcommons.georgiasouthern.edu/amtp-proceedings_2013/14

This conference proceeding is brought to you for free and open access by the Association of Marketing Theory and Practice Proceedings at Digital Commons@Georgia Southern. It has been accepted for inclusion in Association of Marketing Theory and Practice Proceedings 2013 by an authorized administrator of Digital Commons@Georgia Southern. For more information, please contact digitalcommons@georgiasouthern.edu.

The Effects of a Disaster's Onset on the Humanitarian Aid Supply Chain

Michael J. P. Dwyer

University of West Florida

ABSTRACT

Through the development of an illustrative model, this conceptual paper argues that the relative timeframe of the onset of a disaster – whether slow or sudden - is related to the form of the supply chain response of the humanitarian aid organization. Further, a proposed method for researching the interrelationship between the nature of a disaster and how it affects the formulation of the humanitarian aid supply chain is offered. Several contributing characteristics of humanitarian aid supply chains are identified and described within the context of the model. Finally, several potential avenues for future research are described including the efficiencies that may be realized from prepartnering among humanitarian aid organizations and suppliers. The ultimate goal of this research is to aid humanitarian aid organizations in fully realizing their goals through better understanding and administration of their supply chains.

INTRODUCTION

Humanitarian/disaster relief supply chain (HDRSC) is a relatively new discipline in academics. As such, much of the theory that underpins it remains uncovered. These findings are surprising because the number of disasters worldwide has been growing alarmingly in recent history. As the number of disasters grows, so too does the number of people affected. The second outcome of more disasters worldwide is the reach, impact, and number of humanitarian aid (HA) organizations operating in the affected regions (Day, Melnyk, Larson, Davis, and Whybark, 2012). Of chief concern here, because of its absorbing an estimated 80% of HA organizations' resources, is the supply chain management and logistics components of the HA operation (Van Wassenhove, 2006). Through the development of an illustrative model, this conceptual paper will argue that the relative timeframe of the occurrence of a disaster is related to the form of the supply chain response of the HA organization and the included characteristics of HA supply chains. Further, a proposed method for researching the interrelationship between the nature of a disaster and how it affects the formulation of the HA supply chain will be offered. Finally, several potential avenues for future research will be described.

The nature of HDRSC operations is different from the typical commercial supply chain, which is its obvious analogue (Day et al., 2012). However, the history of HDRSC is like that of commercial logistics' rising prominence as a core business function and potential competitive advantage in the market environment (Kovacs, Tatham, and Larson, 2012; Kovacs and Spens, 2007). Originally, HDRSC was seen as merely a cost of getting the aid to the intended recipients; and because of the potential for loss of life, any cost might be deemed acceptable provided the distress of the aids' recipients was alleviated. As time has progressed, HA organizations have recognized the growing importance of developing and cultivating their

logistics operations and personnel in order to be more responsive with scarce, difficult-to-acquire resources (Kovacs, Tatham, & Larson, 2012). These resources are donated by government entities, corporate sponsorships, or private interests whether in the form of money or in-kind aid (Olorunjoba and Gray, 2006). Naturally, because the recipient does not pay for aid received, the focus of the HDRSC moves in two separate directions, namely the distressed population and the donors supplying the resources to help (Kovacs and Spens, 2009).

The relationship of HA organizations to their donors and other supply chain network members makes the situation that the organization must navigate more difficult as uncertainty is around virtually every corner in responding to a disaster (Olorunjoba & Gray, 2006). The linear relationship leading from the suppliers to the point of consumption in the typical commercial supply chain, by contrast, has better predictability of demand within the served market (Kovacs & Spens, 2007). Sudden on-set disasters, by their very nature, offer only a limited ability to forecast demand (Tatham and Pettit, 2010). Further, if a HA organization has no previous ties to a country or an ongoing humanitarian effort within the region, then it is unlikely that supply will properly meet demand -- at least in the initial response (Rottkemper, Fischer, Blecken, and Danne, 2011). Thus, this disconnect creates the framework under which the HA organization must operate in order to achieve any sort of disaster relief for the victims.

Further, the challenges associated with constructing a HA supply chain have been described by some as wicked problems. Wicked problems have several key characteristics, but in sum, a problem is wicked because it lacks an agreed upon referential framework in which to be evaluated and solved (Tatham and Houghton, 2011). In many ways, the varied nature of disasters hobbles constructing formulas and quantitative research applicable to all disasters. As HDRSC research progresses, it may be likely that a stronger, more robust referential framework will surface and the problems at the depths of the iceberg may be uncovered (Tatham & Houghton, 2011).

At times HA organizations have ongoing operations within a distressed area that may be affected by yet another concurrent disaster. Ongoing operations or “embedded relief” would provide a way of supplying targeted aid for the second disaster because of the supply chain’s previous penetration into the area (Rottkemper et al., 2011). Having an established connection with the stricken area, the HA organization would be better able to forecast the potential needs of the distressed population by being better positioned to gather information (Tusiime and Byrne, 2011).

HA organizations must balance the interests of the supply chain network members, namely donors, logistics providers, aid agencies, militaries, governments, and other non-governmental organizations (NGOs); (Kovacs & Spens, 2007). All the while, the HA organization must attend to its given mandate and operate within the confines of the HA space. As presented by Van Wassenhove (2006), the HA space is an area bounded by impartiality, neutrality, and humanity. In this way, HA organizations are afforded access to distressed areas simply to distribute aid without an ulterior agenda that may run contrary to the local government or factional interests in the region. Otherwise, HA organizations may expose themselves to partiality or non-neutrality and lose potential on-the-ground partners in the affected region or, worse, risk the threat of

violence depending on the nature of the disaster (Kovacs, Tatham, and Larson, 2012). In the dynamic environment following a disaster, the challenges confronting HA organizations are manifold. The following literature review will describe aspects of the unique environment confronting HA supply chains.

LITERATURE REVIEW

The approach of this literature review is to describe some of the explored components of HDRSC research. The concepts as adopted and adapted by HDRSC researchers will include disaster response and commercial supply chain stages; demand, supply, and fulfillment management; agile and lean supply chains within the HA context; the relative timeframes of disasters' occurrences; the practice of prepositioning aid in disaster-prone areas; the concept of postponement; the effects of convergence among HA organizations; and the interaction of HA organizations with media outlets and its effect on donations.

In a normal operating environment, the commercial supply chain goes through several stages. These stages from beginning to termination are preplanning, initiation, ramp up, steady state, and finally, termination or transformation (Day et al., 2012). The stages of creating, implementing, and ramping-down a HA supply chain, as synthesized from Pettit and Beresford (2009) and Rottkemper, Fischer, Blecken, and Danne (2011), are preparedness, immediate/short-term response, response, and recovery/reconstruction. A key difference between commercial supply chain management and disaster response is the temporal features usually associated in constructing a HA supply chain (Oloruntoba & Gray, 2006; Kovacs & Spens, 2007). Where commercial supply chains could conceivably be planned to go on indefinitely, HA supply chains are typically planned to be only temporary, unless the HA operation is a form of long-term relief.

The three components integral to constructing a supply chain are managing demand, supply, and fulfillment. Meanwhile, in the HDRSC context, a number of unique problems surface. Demand management is difficult because initial upstream information flows to the HA organization may not be dependable, useful, or correct due to incongruence between the procedures and abilities put in place by the HA organization (Tusiime & Byrne, 2011). Because of this disconnect, many HA organizations are forced to respond without demand information, creating a push form of distribution to the region (Tatham and Pettit, 2010; Kovacs & Spens, 2007). However, as time elapses and more becomes known of the affected region the demand model moves from push to pull as better demand information flows upstream to the HA organization (Kovacs & Spens, 2007).

Supply management is also more difficult in the HDRSC setting. Oftentimes donations do not come in the form of money to the aid organization. Instead, the donations come in-kind. The difficulty in receiving in-kind donations is that they require warehousing until the disaster comes to pass (Kovacs & Spens, 2007). Unfortunately, some in-kind donations may not help in the relief effort. In this way, in-kind donations have, a number of times, choked supply chain channels and ports (Kovacs & Spens, 2007). Also, many times, local suppliers and retailers are sometimes the first to respond, so if the HA organization has no previous connection with the region there is no way of telling what is already available (Rottkemper et al., 2011). In this way,

potential redundancy and supply chain underutilization of capacity might present itself, thus undermining the potential optimal distribution of aid given the constraints of the HA organization (Pettit & Beresford, 2009).

Fulfillment management is another difficulty in that reaching those in need of relief might be near to impossible because of infrastructure concerns. In many disaster areas the local infrastructure is nearly destroyed or severely degraded (Pettit & Beresford, 2009; Kovacs & Spens, 2007). As such, the supply chain managers have had to be very resilient in coming up with ways to mitigate the effects on the supply chain. Further, instances have occurred when differing capabilities at different points in the supply chain have prevented aid from being distributed. To explain, if aid makes it out of port to a central distribution location that is forklift capable, but the aid is transported downstream from that point by backpack, the heavy packages would not be able to be transported by foot (Kovacs and Spens, 2007). Thus, HA organizations have had to limit the size of some of the aid packages in order to ensure that they reach their destination. This situation leads to another difficulty encountered by HA organizations, namely the last mile problem (Balcik, Beamon, and Smilowitz, 2008). Serving varied communities affected by disasters that have differing logistical capabilities, HA organizations have had to adapt in order to ensure, for instance, the safety and hygiene of food products and refrigeration of different medications. The members of supply chain performed these activities sometimes in the absence of clean water or refrigerated vehicles (Kovacs & Spens, 2007).

The fulfillment element of supply chain formulation requires the universally lauded characteristic of HA supply chains, which is their inherent agility (Day et al., 2012; Oloruntoba & Gray, 2006; Van Wassenhove, 2006). An agile supply chain is the ability of the supply chain to adapt to given environments, means, inputs, and needs of the stricken population. As demonstrated earlier, the environments in which HA organizations operate are never typical because disasters come in a myriad of forms (Van Wassenhove, 2006). Further, the means by which to construct supply chains change with the differing capabilities afforded by the affected area and what resources the HA organization has at its disposal. Finally, the input requirements for demand fulfillment differ depending on the region and the type of the disaster. Thus, in order to exact the goals of a given HA organization's mandate, agility and adaptability are essential and have to be built into the supply chain (Pettit & Beresford, 2009; Kovacs & Spens, 2007; Van Wassenhove 2006).

However, a stark contrast is drawn with the HA organization's ability to remain agile while also lean. Leanness in a supply chain is a fundamental concern in order to keep costs at a minimum and limiting waste while still fulfilling the demand of the aid recipients. The trade off from having to remain so agile has not necessarily led to leanness in the HA supply chain (Oloruntoba and Gray, 2006). Because of limited information at the onset of a disaster, an organization may not be able to efficiently deploy resources (Tatham & Pettit, 2010; Kovacs & Spens, 2007). This characteristic has led to some incredible examples in HA case studies. For instance, during the initial response to a disaster, a HA organization was able to deploy trucks laden with aid from every available node for a stricken city. The trucks encircled the city until they were called to distribute their aid at a given point in the city (Kovacs & Spens, 2007). Demand was met to the

extent possible; however, the system may have been qualified as inefficient and not lean because of the trucks' having to wait to distribute aid at an expensive inventory carrying cost.

Another key element of the HDRSC is the nature of the disaster itself. The kind of disaster and the timeframe in which it occurs will have an indelible impact on the kind of supply chain that forms. Typically disasters are separated into two categories, whether slow-onset or sudden-onset, and then broken down into their causes, whether naturally occurring or man-made (Van Wassenhove, 2006). Examples of sudden-onset disasters include earthquakes, tornadoes, and hurricanes in the natural column and terrorist attack, coup d'état, or chemical leak in the man-made column. Examples of slow-onset disasters include famine, drought, and poverty in the natural column and political and refugee crises in the man-made. Slow-onset disasters tend to gather distress, slowly culminating over time, whereas sudden-onset disasters are more akin to a swift, knock-out punch to a community. The response of HA organizations to the timeframe of the disaster is a major point in the trouble of planning (Van Wassenhove, 2006).

In order to overcome some of the demand uncertainty in areas where sudden-onset disasters are frequent, several HA organizations have begun to practice prepositioned aid. Essentially, prepositioned aid is storing high demand aid items in areas nearby, yet safely away from, probable disaster areas (Balcik and Beamon, 2008). In this way, HA organizations are better able to answer the call for aid from the region. Unfortunately, the drawbacks to prepositioned goods are the same as the commercial sector's, which are the inventory carrying costs. Further, if the goods are needed elsewhere at a moment's notice the costs for moving the goods from the regional warehouse back into the HA organization's global supply chain may be higher than continuing to store the goods at the central, international depot (Tatham and Pettit, 2010).

Postponement in terms of developing a supply chain is the concept in which decisions are pushed to later points in time in order to ensure the supply chain remains as agile as possible (Oloruntoba & Gray, 2006). To demonstrate, a computer components manufacturer that is capable of building a total computer may elect to allow the components to remain as components in the supply chain up until it is tasked to build the entire computer. In this way, the manufacturer can avoid redundancy is avoided and meet demand for parts as well as computers efficiently. In terms of the HDRSC literature, postponement has been posited as a way of generalizing aid goods to the point that they are operable in a number of settings. These general goods would be warehoused until a demand was placed on the supply chain. An HA organization, World Vision Inc., keeps aid in distributable packages that it can deploy at a moment's notice to anywhere globally. These packages are meant to sustain several volunteers for a short period and aid a number of people until a more robust and integrated supply chain effort can be mounted (Kovacs & Spens, 2007).

Another key area of HDRSC research is the relationship of media outlets to HA organizations and the effect it has on donations. Since donations are the primary means by which HA organizations acquire their resources, visibility in the media is paramount in order to call for resources (Oloruntoba & Gray, 2006). This need for visibility and the donations it garners creates a competitive environment among HA organizations as they vie for media attention to their causes during a disaster. Unfortunately, the logistical component, integral to the operation

of HA activities, is often overlooked as it is behind the lines of the point of the consumption of aid (Kovacs, Tatham, and Larson, 2012, Kovacs and Spens, 2009). In sum, the media outlets overlook the single largest cost in distributing aid and alleviating distress. The outcome creates a situation where people want to see their donations guided in the form of aid to the victims of a disaster; however, the networking and processing of the aid remains behind the scenes, although it is absolutely essential (Day et al., 2012). Another problem presents itself in that HA organizations receive most of their donations after a disaster has occurred. As such, the procedures necessary in creating a supply chain may be missing until they must be developed on a contingency basis for a given disaster (Day et al., 2012).

The proposed model is a synthesis of two models, one developed by Balcik, Beamon, and Smilowitz (2008) and its outgrowth an embedded relief model developed by Rottkemper, Fischer, Blecken, and Danne (2011). The point of the synthesis was to describe two supply chain constructions in tandem; however, the model is limited to a conceptual basis. Also, the typical supply chain associated with disaster onset timing will be paired to the type of supply chain that may be likely to develop (Day et al., 2012, Van Wassenhove, 2006). In order to become more aware of the underlying elements of HA supply chain formulation, such baseline work in supply chain construction may be useful in other areas of research. The methodology section will describe the model in detail then apply the described aspects of HDRSC research and how they potentially apply to the proposed methodology of the study.

MODEL AND METHODOLOGY

The model presented in Figure 1 provides a visual representation of two potential supply chains within the context of a HA organization. At first, the HA organization receives inputs in the form of donations. Those donations undergo a transformation process through the HA organization as it interacts with potential and partnered suppliers to provide aid. Once donations take the form of physical goods, they may enter the downstream flow of the supply chain passing through a developed and ongoing operational system that was already in place in the area. However, in the event of a sudden-onset disaster with no previous connections developed within the affected area, an ad hoc supply chain forms by any means available and necessary to distribute aid. At times, donations are received in the form of physical goods. For instance, food stuffs donated to Feed America may be past their sell-by date for commercial purposes, but remain considered safe to distribute in a donation capacity for a limited time. In this way, the goods that might have been considered obsolete inventory for a commercial vendor transform into viable distributable aid for those in need.

To demonstrate, the ongoing humanitarian effort generally includes warehouses, whereas the ad hoc, immediate response humanitarian effort includes large planes shipping aid at a moment's notice (Kovacs & Spens, 2009). Under this light, it is discernible that the latter is much more costly than the former within the context of higher inventory carrying costs (Tatham & Pettit, 2010). Also, information flows upstream are discernibly less orchestrated in the ad hoc scenario, undermining HA efforts because of the limited ability to manage demand (Tusiime and Byrne, 2011).

The model's constituent elements include several abbreviations. DP stands for distribution point. The subscripts denote different distribution points allowing subscript N to allow for greater than the several illustrated discrete distribution points in the ad hoc HA supply chain (HASC). RD stands for regional depot with the subscripts posited in the same manner as the previously described distribution points in the ad hoc scenario. The star immediately below the HA organization denotes the decision point at which the organization determines what kind of distribution network it is going to construct relative to the disaster to which it plans to respond whether sudden-onset or slow-onset. Further, the relationship of the organization to the type of supply chain is also embedded in the mandate or prescribed goals of the organization (Van Wassenhove, 2006).

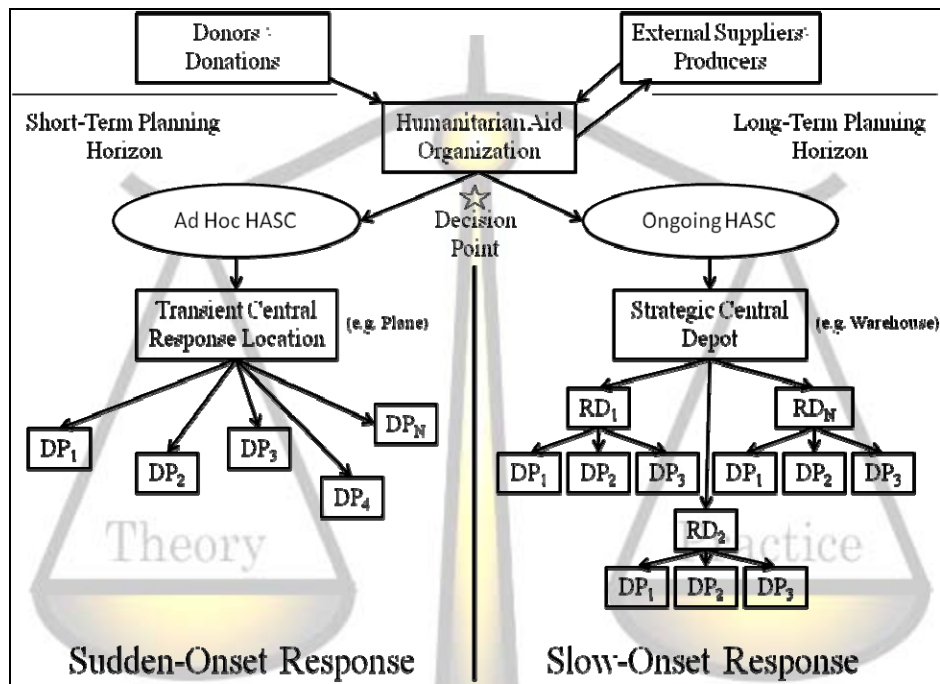


Figure 1: Humanitarian Aid Supply Chain Disaster Timing Response Model

The key feature of the model is the environment in which the two systems operate, which is in the ongoing effort with a potential slow-onset disaster or the ad hoc with a potential sudden-onset disaster. As demonstrated in the structure of the model, the ad hoc scenario is not as orderly as the ongoing HA supply chain. The difference between the ad hoc and ongoing captures the timeframe in which the two supply chains are constructed whether in a sudden-onset environment or slow-onset disaster environment. There are a number of factors articulated in the preceding literature review that impact these two supply chain formulations and will be described in the following section.

The model is not meant to posit a discrete two instances, in that, oftentimes as ad hoc supply chains develop and evolve through the disaster response process they become more like an ongoing system in the use of warehousing and sea/ground-based transport instead of using aerial ports as the only intermediary between the global supply chain and the distribution points. As the supply chain ramps up, already it is undergoing a transformation as more information

becomes available to the HA organization. This evolution is characteristic in supply chain stages described in the literature review in the supply chain's agility.

Also, the model incorporates relative planning timeframes. In the ongoing scenario, mid- to long-term planning is more tenable because of the greater availability and feasibility of demand forecasting in the distressed region with better upstream information flows. However, in the ad hoc scenario, short-term planning must be used because of the immediate nature of the response and the likely unavailability of reliable demand forecasting. Along with demand forecasting and management, supply and fulfillment management become necessary as the supply chain works to its desired end (Kovacs & Spens, 2007).

Uncovering much of the ongoing work that is happening in HA supply chains will begin in the form of case studies. As such, as a method for approaching this research – in order to overcome its wicked tendencies – interviewing members of the supply chain and its logisticians is the first step to discovering some of the essential qualities of HA supply chains (Tatham & Houghton, 2011). A recent study performed by Day et al. (2012) made inroads in developing some of the key concepts of HA research along with elucidating several of the problems encountered by practitioners in the field. Some of these challenges included “coming to a better understanding of demand signal visibility, information management and relief coordination in a changing environment, disaster relief planning, and managing relationships and developing trust along the supply chain” (p. 32). The model in Figure 1 attempts to tie disaster relief planning together in a cogent fashion coupled with the onset features of a disaster.

A preliminary case study was undertaken in interviewing a U.S. Marine who worked as a finance technician during the Marine's deployment of HA efforts to the Philippines in 2009. The mission, decidedly, was to help the indigenous population in construction projects. Examples of these projects included building community multi-use facilities and bridges as well as drilling communal wells.

Many parallels were found between the NGO efforts in current research and the U.S. military's formulation of its HA supply chain. Placed in the context of the model, donations took the form of tax resources from the Department of Defense's budget. Supplies came from both local suppliers when available and were shipped in from the military's global supply chain when not available locally. Prepositioning of aid, here in the form of construction materials and equipment, was present as well because of the Marines' presence in the Philippines and the equipment and personnel available on base. Where the typical HA organization must attend to the media, here the U.S. was interested in developing a positive relationship with the Philippines. In this striking parallel, the mission's reception by the Philippines was tethered to the outcomes of the U.S. government's previous efforts and relationship to the country. Of course, resources would be pulled from the endeavor if the political climate changed, a situation which does not run analogously to HA organizations' needs for donations.

Further, because of the slow-onset nature of the disaster, poverty, the Marines were able to create a more stable, orderly supply chain as illustrated in the model in Figure 1. One clear example of this stability was the Marines' ability to build roads to the communities that required the aid:

It was good because we were leaving a footprint for them to build on later and improve their conditions. In this way, we were helping lift them out of poverty. The road was a byproduct of our efforts to build the school, but it was still there after we left and it made transportation much easier for them (B. Brown, personal communication, October 23, 2012).

More investigation will be required; however, lessons learned from the military may prove beneficial to NGOs and other HA organizations. Conducting further research may aid in fleshing out some of the conceptual elements characteristic to the problems encountered by HDRSC practitioners. In this way, the wicked aspects to the problems encountered by HDRSC may be alleviated.

SUGGESTIONS FOR FURTHER RESEARCH

As addressed in the introduction, this paper is interested in pairing the onset features of a disaster with the potential type of supply chain, whether in an ongoing or ad hoc effort. Because of the relationship of costs to the type of effort, it makes sense for a HA organization, if having to remain in the distressed area for any amount of time, to move away from the ad hoc effort to the more cost-effective, ongoing effort with physical warehousing and sea/ground-based transportation (Kovacs & Spens, 2009). The major issue arises where planning is involved and its attendant timeframe. However, the model is predicated on the thinking that a sudden-onset disaster leaves a HA organization developing a response on a contingency basis. After all, sudden disasters prevent at least some preparation from taking place. Thus, the HA organization is forced to incur the added costs and deploy what resources it has remaining to the affected area (Tatham & Pettit, 2010). Further, the natural outcome has been to build a great deal of agility into the deployment of HA supply chains. Unfortunately, agility does not necessarily come with leanness as explored in the literature review.

On the other hand, should the HA organization have an ongoing effort in the distressed region or strategically prepositioned aid, then it will be better prepared to respond to the disaster. However, this prepositioning too can be costly, but not as costly as last-minute planning. Thus, the planning horizon fits into the model as the ad hoc supply chain is formed at a moment's notice and initial response must be coordinated quickly. The ongoing effort requires preparation and long-term planning in order to perpetuate and materially support the HA supply chain. After all, the stakes are high in responding to a disaster with a possibility for loss of life (Kovacs & Spens, 2009)

In developing the model, the supply chain's operational layout is how the HA organization decides to approach its response to a given disaster, whether probable or in progress and whether sudden- or slow-onset. Regardless of the planning horizon, type of disaster response, or logistics effort, very little can be made certain in the context of forecasting a disaster and planning for every kind of response. As mentioned earlier, scholars and HDRSC practitioners have elected to deploy prepositioned aid in order to counteract some of the problems endemic to immediate response. Unfortunately because of the relative newness of the practice, little research has been

performed on whether this practice is an acceptable way to lower costs in distributing aid over the long-term (Rottkemper et al., 2011). Regardless, research has suggested an interest by U.S. government agencies in engaging in the practice of prepositioning aid internationally. For instance, the United States Agency for International Development has shown an interest in prepositioning aid for disaster relief in southwest Asia (Trestrail, Paul, and Maloni, 2009).

The goal of lowering costs obviously, here in HA supply chain research, is to ensure a greater number of aid-needing victims are reached and helped. It has been suggested that HA organizations should keep aid in its most generic form warehoused centrally in order to be ready for a potential disaster (Oloruntopa & Gray, 2006). In this way, HDRSC could employ postponement principles as described in the literature review. Regardless of the method chosen, warehousing costs still exist, undermining efforts in keeping a lean supply chain with resources in a convertible form prepared to adapt to any contingency. The model in Figure 1 merely presents a framework in which to engage in further discussion and research into the questions interesting HDRSC research and potential avenues of application.

In order to build more agility and leanness into HDRSC efforts, postponement could take another form besides the prepositioning of generalized goods. Uncertainty in the supply chain stems from the nature of the disaster; the logistics operations available in the region for distributing aid, whether by 3PLs or in-house capabilities; the remaining region's infrastructure; the potential presence of civil unrest; etc. After all, one of the key elements of a disaster is literally the collapse of a society's ability to respond to a disaster (Wassenhove, 2006). In answer to one of the findings in the Day et al. (2012) study, disaster relief planning, a positive course to take in further research may be prepartnering initiatives' benefits to the HA supply chain effort.

The HA organization may be better able to cope with uncertainty in the planning horizon and supply chain formulation by keeping postponement near the point of entry of resources into the system, namely donations. Prepositioning goods in probable distressed regions is a manner of performing the same thing; however, it lowers the adaptability of the resources to a given disaster and undermines the expediency of the deployment of those resources should they be required at another site (Balcik & Beamon, 2008). In order to offset the costs of potentially storing that inventory, prepartnering may be the answer for HA organizations to continue to remain agile while also building leanness into the supply chain.

Prepartnering is the concept of establishing relationships with suppliers with integrated IT networks in order to place orders and set up integration quickly into the HA organization's supply chain prior to engaging in distributing aid for a disaster. In this way, HA organizations would be aware of the demand they would be able to place with their supplier partners and make orders based on the ability of the suppliers to meet that demand within a given timeframe. Furthermore, because of agreed upon prices prior to the demand placed on the supply chain, HA organizations may reap some savings in the short-term. At present, there is a little evidence of prepartnering with suppliers among HA organizations (Balcik & Beamon, 2008).

Prepartnering would allow for a greater adaptability for contingency-based planning and would give the HA organization more options in developing an aid distribution response to a disaster at

the decision point of its response. In effect, disaster relief planning would be placed at the forefront of developing supplier relationships instead of scrambling to acquire the goods needed to distribute. This vein of research may bear fruit.



REFERENCES

- Balcik, B., & Beamon, B. (2008). Facility location in humanitarian relief. *International Journal of Logistics: Research and Applications*, 11(2), 101-121.
- Balcik, B., Beamon, B., & Smilowitz, K. (2008). Last mile distribution in humanitarian relief. *Journal of Intelligent Transportation Systems: Technology, Planning, and Operations*, 12(2), 51-63.
- Day, J., Melnyk, S., Larson, P., Davis, E., & Whybark, D. (2012). Humanitarian and disaster relief supply chains: a matter of life and death. *Journal of Supply Chain Management*, 48(2), 21-36.
- Kovacs, G., & Spens, K. (2007). Humanitarian logistics in disaster relief operations. *International Journal of Physical Distribution and Logistics Management*, 37(2), 99-114.
- Kovacs, G., & Spens, K. (2009). Identifying challenges in humanitarian logistics. *International Journal of Physical Distribution and Logistics Management*, 39(6), 506-528.
- Kovacs, G., Tatham, P., & Larson, P. (2012). What skills are needed to be a humanitarian logistician? *Journal of Business Logistics*, 33(3), 245-258.
- Oloruntoba, R., & Gray, R. (2006). Humanitarian aid: an agile supply chain? *Supply Chain Management: An International Journal*, 11(2), 115-120.
- Pettit, S., & Beresford, A. (2009). Critical success factors in the context of humanitarian aid supply chains. *International Journal of Physical Distribution and Logistics Management*, 39(6), 450-468.
- Rottkemper, B., Fischer, K., Blecken, A., & Danne, C. (2011). Inventory relocation for overlapping disaster settings in humanitarian operations. *Operational Research Spectrum*, 33(3), 721-749.
- Tatham, P., & Houghton, L. (2011). The wicked problem of humanitarian logistics and disaster relief aid. *Journal of Humanitarian Logistics and Supply Chain Management*, 1(1), 15-31.
- Tatham, P., & Pettit, S. (2010). Transforming humanitarian logistics: The journey to supply network management. *International Journal of Physical Distribution and Logistics Management*, 40(8/9), 609-622.
- Trestrail, J., Paul, J., & Maloni, M. (2009). Improving bid pricing for humanitarian logistics. *International Journal of Physical Distribution and Logistics Management*, 39(5), 428-441.
- Tusiime, E., & Byrne, E. (2011). Information systems innovation in the humanitarian sector. *Information Systems Innovation in the Humanitarian Sector*, 7(4), 31-51.

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

ABOUT THE AUTHOR

Michael J. P. Dwyer is currently a matriculating Masters of Business Administration student at the University of West Florida in Pensacola, FL. Michael received his B.A. in Philosophy from James Madison University in Harrisonburg, VA. After his Honorable Discharge from the United States Air Force, he currently works as a graduate research assistant in the Marketing and Economics Department at UWF. Presently, Michael is working on several projects related to supply chain management and organizational behavior in the logistics context.

