



A study of coordination challenges in humanitarian supply chain

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Abstract

The humanitarian supply chain (HSC) aims at providing relief to affected people in the wake of a disaster at right place and at the right time to reduce their suffering. HSC operations can be categorized into three phases - pre-disaster preparedness phase, post-disaster response phase and rehabilitation phase. HSC operates under complex conditions with large number of stakeholders such as donors, NGOs, government, local self-help groups (SHGs), etc. and face unique set of challenges compared to the commercial supply chains. Achieving coordination in the humanitarian setting is entwined with the dual objective of saving lives and achieving efficient utilization of resources. The coordination in HSC becomes unique in comparison to commercial supply chain owing to multitude of factors such as operating philosophy of HSC, number and diversity of actors, donor expectation and funding structure in HSC, competition for funding, impact of media on the relief activities, unpredictability associated with operational environment, resource scarcity and oversupply and cost of coordination. Hence in this research, certain issues related to coordination in HSC are explored.

A detailed literature review of both academic and practitioner reports was undertaken to identify the nature of research conducted in HSC in last two decades. Detailed review of literature gave insights into the attributes of the previous studies on operational phases, type of disaster, type of coordination problems, demography, geographical perspective, HSCM phase, stakeholder, etc. The major findings of the review and research problems formulated are as follows.

World Conference on Disaster Risk Reduction (DRR) (2005) instituted Hyogo Framework for Action (HFA) for improved risk reduction and recent review of these activities in 2015 revealed multiple shortcomings towards reducing the risk. One of the major shortcomings was poor coordination between the stakeholders, which lead to fragmented implementation, increased costs, lack of standardized disaster response procedures, and ineffective response mechanisms. Since the impact of disaster vary across the geographies, the stakeholders usually disagree on the type and nature of preparedness activities and since, the DRR capabilities depend upon the type of disaster, the capability building should focus on high impact disasters. This led to the first research problem



RP 1: What are the disasters to be focused upon during the preparedness phase? How can the same be identified for various countries and continents?

In the post disaster scenario, poor coordination results in increased suffering, overlapping and duplication of relief activities, increased cost of operations, slow and inequitable distribution of aid materials, etc. Though the importance of coordination is well appreciated in the preparedness phase, the complexities associated with the humanitarian operations such as conflicting and competing mandates, unregulated nature of operations, donor regulations and impending lack of resources, make coordination between the actors quite difficult. Furthermore, the coordination activities involve a certain cost for the humanitarian agencies, such as dedicated resources in terms of man power, infrastructure, space, etc. and it often disincentives smaller humanitarian agencies (HA) to be part of coordination initiatives unless effectiveness of the coordination activities can be measured. This leads to the second research problem:

RP 2: What are the factors affecting coordination and how can the effectiveness of coordination activities be measured?

Coordination mechanism in commercial SC is well defined, however, they are all not valid in HSC owing to differences in operating philosophy, sharing the cost of coordination, resource sharing and ownership structure and risk/reward sharing between the entities (Xu and Beamom, 2006). For instance, commercial supply chain coordination models such as quick response, vendor managed inventory might be suited only for large agencies, product standardization is not conducive in relief operations, 4PL and shipper collaboration too have low potential for implementation. Hence,

RP 3: What mechanisms can be used for improving coordination in Humanitarian Supply Chain?

These three research problems are diverse and has to be addressed from the point of view of the stakeholders; the humanitarian agencies (HA) and the buyer supplier relationship in humanitarian supply chain. The first model (research problem 1) i.e. classification of disaster based on the impact aims to address the coordination issues between the stakeholders at a stakeholder level, where it becomes imperative for the stakeholders to identify the most impactful disasters within a geography and to plan and coordinate the DRR activities. Addressing RP1 lead to proposing a new classification schema for the disasters based on the impact. This helps in identifying the disasters with most impact across geographies. Furthermore, it helps policy makers to prepare disaster oriented DRR strategies



The second and third model (research problem 2) focuses on the coordination problem at an organizational level. This part of the thesis provides insights to HA in identifying the factors affecting and their interdependence on each other. Further, it also helps the practitioners to quantify the effectiveness of the coordination initiative undertaken to both justify the cost of coordination and to improve inter-organizational association to achieve the same. Major contributions of the inter-relationships model addressed as part of RP2 are twofold. Firstly, the study explored the relationships between the multiple factors affecting coordination. Though extant literature talks about the coordination in HSC and the factors affecting coordination, it is silent on the nature of interaction between these factors. Secondly, the empirical investigation based on a large scale disaster such as Chennai floods helped to better understand the practical implications of the coordination in HSC and how these factors affect the effectiveness of relief activities. Major contributions of the model on measuring the effectiveness of coordination include a novel measurement index, which can be used as a measure to quantify the effectiveness of coordination activities in terms of perceived benefits of coordination.

Finally, the contracts model explored the use of options and QFDi contracts as mechanisms to achieve coordination between the HA and aid supplier at an operational level. The models operationalized the options and QFDi contracts in the HSC context from a buyer-supplier dyadic relationship anchored in the preparedness phase aid procurement planning. For the options model, the coordination between the two parties can be achieved over a range of option and exercise price combinations rather than point estimates while still maintaining the system optimality. Furthermore, the decision variables for supplier is decoupled from the demand distribution allowing greater flexibility to both parties without deviating from systemic coordination. Furthermore, the study also provides insights into the pricing policies to be adapted by the supplier and the flexibility in pricing implicitly allows the parties to select the prices depending upon the risk appetite and still achieve system optimality.