Emergency Preparedness and Performance Measurement in Humanitarian Organizations in Asia

A Collaboration Between

EMERGENCY PREPAREDNESS
AND PERFORMANCE MEASUREMENT
IN HUMANITARIAN ORGANIZATIONS
IN ASIA

ACKNOWLEDGEMENT

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EXECUTIVE SUMMARY

This white paper discusses two important issues in humanitarian relief organizations (HROs) operating in Asia. The first is the preparedness for emergency operations and the second is the performance measurement within HROs.

In the first study, we examine the overall preparation strategies of international HROs in Southeast Asia from the ground up, and offer a better understanding of the HROs' emergency preparations. Based on field research on six large international HROs in Indonesia, the largest country in Southeast Asia, this study investigates the preparation strategies they are using and their ramp-up processes during an emergency. Because of the relatively stable political environment and a vibrant private sector in ASEAN in comparison to the other disaster-prone regions in developing countries, the HROs in Southeast Asia normally conduct both development programs and emergency relief operations. Due to the unpredictability of the timing, location, and magnitude of a future disaster event, HROs use both their internal and external resources for emergency preparations. Internal resources such as development funding and manpower are leveraged to provide emergency relief when the need arises. Leveraging on time, framework agreements are signed with suppliers to fix supply prices that will be charged during an emergency. External resources such as local partners are trained in normal times to prepare for emergency operations.

Findings on emergency preparedness can apply to similar HROs. For most HROs running both emergency and development programs, they should leverage their resources for emergency preparations. Instead of focusing on development programs per se, HROs could plan ahead to use their resources for potential emergency needs. They should train their own staff as well as local HRO partners with the necessary knowledge and skills for emergency operations. Knowledge such as HRO policies and procedures for relief operations, and skills such as demand estimation after a disaster would be valuable when emergency relief activities start. Rather than specialization, ambidexterity in both relief and development operations could be the direction of an HRO's human resource development. Besides the limited pre-positioned relief goods due to funding constraint, HROs could leverage on their commercial partners for goods storage to increase their prepositioning capacity and save their daily warehousing costs.

The second study on performance measurement is funded by UPS Foundation. A large humanitarian organization, Save the Children International (SCI), initiated the project and engaged TLIAP to conduct the study with the support of several other HROs. It is a joint study of TLI-AP and SCI. This study demonstrates how the Supply Chain Operations Reference (SCOR) framework and its associated performance attributes can be adapted to the humanitarian supply chain. We are able to map the generic supply chain processes of humanitarian organizations and develop a set of twenty-four KPIs for HROs to measure and monitor their supply chain performances effectively. These metrics cover the key elements of quality, time, and cost in humanitarian supply chains, and assist humanitarian organizations to measure their performances in terms of agility, responsiveness, reliability, and cost

effectiveness along the whole supply chain processes. More importantly, from these metrics, organizations are able to benchmark internally against previous periods, externally with other humanitarian organizations, and set objectives with quantifiable goals, all of which support continuous improvement. It will enable humanitarian organizations to provide timely aid and efficient use of donor funds for value.

The validation of the draft KPIs with HROs shows the importance of these KPIs as well as the difficulty in their implementation. Only five KPIs (percentage of orders delivered in full, percentage of orders delivered in time, current on hand inventories, sourcing cycle time, and current purchase order cycle time) of the original twenty-four can be easily implemented in most HROs based on their existing procedures and practices. The weakness in cost measuring exists in most HROs. They need to improve by integrating their internal procedures across other operations functions such as finance, awards management and distribution activities, for more effective measurement of their supply chain performances, especially in the supply chain cost estimation. Using organizational Monitoring, Evaluation, Accountability & Learning (MEAL) systems could support this process.

1. EMERGENCY PREPAREDNESS IN HUMANITARIAN ORGANIZATIONS

1.1 Introduction

As most disasters are characterized by a surge in demand for supplies and other resources such as manpower, relief efforts are geared to procuring and delivering goods quickly which in turn demands sophisticated preparation before the emergency. However, the preparedness in relief operations is complicated by the demand uncertainty and various operational constraints. While most of the existing literature on emergency preparedness focuses on supply prepositioning, it is relevant to note that other preparation issues such as funding and manpower management are seldom discussed. To help fill this research gap, this study examines the preparation strategies of the humanitarian relief organizations (HROs) from the ground up and, in doing so, hopes to offer a better understanding of the HROs' emergency preparations.

However, rather than examining the preparation strategies of the HROs in general, this study focuses on the HROs in Southeast Asia. Having a relatively stable environment and better infrastructure, ASEAN member countries are mainly battling against Mother Nature. Furthermore, international HROs in these countries spend most of their effort and resources on development programs and only conduct emergency operations when the need arises. Based on field research on six large international HROs in Indonesia, the largest country in Southeast Asia, this study investigates the preparation strategies they are using and their ramp-up processes during an emergency.

1.2 Literature Review and Research Gaps

While the response to every disaster is different in terms of the type of disaster, the number of people affected and the resources needed, the basic components are quite similar [1]. However, it is already too late to start to develop new solutions after the disaster has struck and the demand for relief has peaked. To respond effectively to an emergency, the HROs must prepare their existing resources well before the start of the emergency.

One common proactive strategy is prepositioning. In other words, positioning locally procured relief items in areas vulnerable to natural disasters before an emergency. In addition to proactive preparation, the literature also discusses reactive actions such as investing in additive capacity after the disaster. But there are still many gaps in our knowledge about their preparedness for emergencies. For example, it is well known that HROs experience many political constraints in the field. While it is much more cost effective to preposition supplies and other resources beforehand, there are relatively limited financial resources available in advance for a disaster as most resources only flow in after a disaster has taken place [2]. Another issue not well studied in the literature is the role of collaboration in the emergency preparedness phase [3]. Due to the uncertainty of the location of the incoming disaster, international HROs may not have sufficient local knowledge, and therefore need to

collaborate with local government agencies and other local HROs. However, many local HROs are development-focused and may not have much experience in emergency relief operations [4]. Thus the question arises as to how international HROs are able to build up a network with capable partners without compromising their operational effectiveness.

1.3   Research Methodology

The focus of the study is Indonesia, a disaster-prone state and the largest country in Southeast Asia. Many large international HROs have country or regional offices in Indonesia to support their extensive operations and development programs. Moreover, Indonesia is a democratic country with a vibrant private sector and strong networks of local HROs. Most international HROs operating in Indonesia focus on various development programs rather than emergency relief, and only move to emergency operations for a short period (normally a few months) after the onset of a large-scale disaster.

Six international HROs with offices in Jakarta, including SCI, were interviewed in June 2013. Among the rest five participating HROs, Organization A is a UN-related global humanitarian organization, Organization B and C are large religious NGOs, and the rest two Organization D and E are secular NGOs. All of them are large organizations with recent annual incomes ranging from US$200 million to US$4 billion, and have operations in many developing countries. All interviewees were senior logistics staff with many years of field experience in Asia.

1.4   Results

The interview results show that HROs have developed several strategies in preparing for potential emergencies.

1.4.1   Supply Preparation

Interviewees generally agreed on the importance of prepositioning, but they also highlighted several other issues - especially that of funding. Organization A specializes in emergency food supplies and it allocates a large percentage of donations as working capital to preposition stocks for future emergencies. The emergency stock of the other international HROs is much less as their emergency supplies are normally non-food items. For example, Organization B typically plans its propositioning stock for a week's needs.

Except for Organization A, all other organizations are mainly running development programs, and most of funding is allocated to these programs with limited emergency funding. To overcome such funding constraints, they typically tap into their development program funds for emergency needs. Such leverage increases the emergency responding capability of the HROs significantly.

In addition to the funding, a supplier agreement is crucial. To speed up the process of supply ordering when the need arises, HROs often sign framework agreements with their key suppliers. The Specialist of Organization E explained:

> *"To speed up the ordering in an emergency, we have a pre-bid process in normal times. We invite all suppliers to our office and explain to these commercial people what kinds of emergency response we are doing after the onset of a natural disaster. We explain to them why we can't fix the quantity of our order, and sign pre-agreed contracts with them. The contracts would fix the price but not the order quantity. The trade-off of the demand flexibility is the short duration of the agreements. Suppliers are only willing to fix the price for six months, and the extension of these agreements would depend on the market condition then."*

We would note a balance between the framework agreements and spot market purchasing. HROs are clearly investing their time and effort in normal times for a fast response in the aftermath of an emergency. On the other hand, while signing the framework agreements can speed up the procurement process in the emergency response phase, the time and effort spent on these agreements can be wasted if no large-scale emergency takes place during the duration of the agreement. HROs thus tend to focus on identifying a number of critical items with sufficient volumes to make the effort of framework agreement negotiation worthwhile.

1.4.2   Manpower preparation

Manpower is one critical resource in humanitarian operations but there is often a shortage due to funding constraints [5]. Many interviewees agreed that it is the more difficult task in the ramp-up process, and HROs basically use a leveraging strategy to meet their manpower needs.

HROs first look to their existing staff, many of which are assigned to the development programs, and also leverage their external resources for manpower needs. They may rely on their local partners for manpower in the last mile delivery, and often hire their former staff (past resources) which can reduce their screening and job training costs significantly.

Such a leveraging requires a careful management of talent pools by keeping track of former employees, and systematic training of current staff for multiple tasks as they may be posted to emergency posts in the future. Personal diversification rather than specialization is the key in the human resource development in the HROs.

1.4.3   Partner preparation

In addition to being a source of manpower, local partners are also important for the HROs in the task assessment and last mile delivery. Clearly the existence of a good relationship with the local HROs and government agencies in the implementation of development programs is likely to lead to a smoother collaboration in emergency operations. Organization E gave some insight into this process of the partnership building:

"It is hard to find good partners, but we have to do the work before the disaster. You have to identify local HROs in high-risk areas as potential partners for emergency operations whose local knowledge and contacts are of great value to us. Before the disaster, we have training and workshops for the local HROs as our contribution to the partnership. We regularly conduct programs such as Disaster Reduction Programs at the village level with the local HROs and community organizations, for both training and socialization purposes. Our partners have to be educated on our value and policies and so we can work smoothly during an emergency. They are normally short of funding for such programs, and thus are interested in the partnership as well. We don't want to spend time on such things during an emergency when they can be done at the preparation stage."

In addition to the vertical partnership with the local HROs, a number of international HROs also use their horizontal partnerships with the other international HROs to support their emergency responses.

1.5   Conclusion

This study explores the preparedness strategies of large HROs in Southeast Asia, and highlights the leveraging of their resources that are available in normal times for emergency response. Because of the relatively stable political environment and a vibrant private sector in ASEAN (in comparison to the other disaster-prone regions in developing countries), the HROs in Southeast Asia normally conduct both development programs and emergency relief operations. Due to the unpredictability of the timing, location, and magnitude of a future disaster event, HROs use both their internal and external resources for emergency preparations. Internal resources such as development funding and manpower are leveraged to provide emergency relief when the need arises. Leveraging on time, framework agreements are signed with suppliers to fix supply prices that will be charged during an emergency. External resources such as local partners are trained in normal times to prepare for emergency operations.

Our findings may be applicable to similar international HROs in Southeast Asia and, potentially, even more broadly. For most HROs running both emergency and development programs, they should leverage their resources for emergency preparations. Instead of focusing on development programs per se, HROs could plan ahead to use their resources for potential emergency needs. They should train their own staff as well as local HRO partners with the necessary knowledge and skills for emergency operations. Knowledge such as HRO policies and procedures for relief operations, and skills such as demand estimation after a disaster would be valuable when emergency relief activities start. Rather than specialization, ambidexterity in both relief and development operations could be the direction of an HRO's human resource development. Besides the limited pre-positioned relief goods due to funding constraint, HROs could leverage on their commercial partners for goods storage to increase their prepositioning capacity and save their daily warehousing costs.

In addition, the idea of leverage can be applied to the horizontal partnership between the international HROs with similar development programs. They could form consortia to coordinate their operations in a large disaster-prone country to ensure coverage while reducing effort duplication. Thus in any location following the onset of a disaster, the consortium members can participate in relief operations either by themselves or through their HRO partners.

2. TLI-AP—SCI JOINT STUDY ON PERFORMANCE MEASUREMENT IN HUMANITARIAN ORGANIZATIONS

2.1   Introduction

To improve humanitarian logistics operations, performance measurement is the first step. Moreover, despite its significance, performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain [6]. This study attempts to address this research gap and develop a set of key performance indicators (KPIs) which could be used by HROs in their logistics operations at the country level. We develop a performance measurement framework for the supply chain processes with reference to the Supply Chain Operations Reference (SCOR) model and its associated performance metrics. With the support from SCI, we were able to map a generic relief chain and developed a performance measurement framework. Twenty-four KPIs are proposed based on SCOR, which are then validated by both SCI and other international HROs joining the study.

2.2   Performance Measurement in Literature

Performance measurement is defined as an activity that is performed by managers to attain predefined company goals [7]. There are many works related to supply chain performance measurement with various approaches, different objectives and industrial settings [8]. To measure the performance of a supply chain systematically, reference process models could be valuable tools [9]. A reference process model represents specific ordering of work activities across time and place, including clearly identified inputs and outputs [10].

The most widely used reference process model to represent the upstream and downstream processes of a supply chain is Supply Chain Operations Reference (SCOR). It is developed by the Supply Chain Council (SCC) to evaluate the overall effectiveness of a supply chain. It integrates the business concept of process re-engineering, benchmarking, and measurement into its framework [11].

SCOR features four level of supply chain management. Level 1 is the point at which a company establishes its competitive objectives. It focuses on five areas of supply chain such as plan, source, make, deliver, and return. Level 2 defines 26 core process categories that are possible components of a supply chain. Level 3 provides a company with more detailed information from Level 2 process categories to set a successful goal for its supply chain improvement, and Level 4 is industry-specific for a company to define for its areas of improvement.

In general, performance measurement in humanitarian organizations is less established in comparison to the commercial world. While there are some well-known generic frameworks for commercial firms such as the SCOR model, there is not any universally accepted performance measurement framework in humanitarian organizations and it is difficult to develop appropriate metrics [12]. Moreover, many

humanitarian organizations do not have appropriate performance measurement metrics, and those that do tend to make the mistake of employing too many metrics [13], which stretches their resources in data tracking and maintenance. Another challenge often faced by humanitarian organizations is the lack of data and system to capture information. Additionally, data gathering varies from country to country and there is no consistency in data definition, which creates difficulty in the development of a proper performance management framework.

2.3   Proposed Framework

To develop a set of logistics performance indicators, we use both performance attributes and logistics processes developed above as classification dimensions. The five performance attributes – reliability, responsiveness, agility, cost, and asset management in original SCOR model were carefully evaluated. We adopt four performance attributes from SCOR model, reliability, responsiveness, agility, and cost.

On logistics processes, we similar adopt SCOR processes based the context of humanitarian operations. We take SCI (and other similar international HROs) as the focal company in our analysis and focus on supply chain processes under its control. In order to make the performance measurement framework manageable, considering the complexity of the humanitarian supply chain, the generic catalog of indicators or KPIs is structured in a hierarchy of three levels, in consistent to the SCOR model [14].

At Level 1, original SCOR Level 1 processes are plan, source, make, deliver and return. In the context of humanitarian operations, HROs normally do not manufacture humanitarian goods and collect return relief items. We thus remove make and return processes and add store to highlight the storing process in relief operations. Processes in Level 1 of the framework are plan, source, store, and deliver. KPIs at this level would contain indicators that reflect the overall performance of the HRO. The list of KPIs we adopted at this level is "order fulfillment cycle time" and "upside supply chain flexibility".

At Level 2, Processes plan and source are further breakdown into three sub-processes, P1 (plan source), P2 (plan store), P3 (plan delivery); S1 (source for goods going to be stored), S2 (source for goods going for immediate distribution). KPIs at Level 2 provide more detailed measures for each combination of performance attribute and logistics processes. Most KPIs we adopted at Level 2 are closely related to KPIs we adopted at Level 1. Total 13 KPIs are adopted at this level, including "percentage orders delivered in full", "delivery performance to customer commit date", "documentation accuracy", "perfect condition", "sourcing cycle time", "assembly cycle time", "delivery fulfillment cycle time", "upside source flexibility", "upside delivery flexibility", "cost to plan", "cost to source", "cost to deliver", and "supply chain risk mitigation cost".

In the model development at Level 3, the main supply process processes are mapped according to the SCOR processes. We similarly adopted nine important KPIs at Level 3 to measure related Level 3 processes. Seven of them are measuring some high impact aspects with potential to deliver tangible benefits to HROs, including "risk mitigation plan", "external event response", "current on hand

inventories", "in stock %", "current purchasing order cycle time", "cost to manage product inventory", and "cost to manage performance of supply chain". The other two KPIs, "store documentation accuracy" and "delivery documentation accuracy", are more detailed measure of Level 2 KPI "documentation accuracy" and can help the analysis of the Level 2 KPI.

2.4   KPI Validation Results

We have surveyed several international HROs, and got responses from seven of them between May and June 2013. The respondents are asked to evaluate the **importance** and **implementation difficulties** of each KPI with five-point Likert scales ((1, 1) = (not important at all, not difficult at all) and (5, 5) = (very important, very difficult to implement)).

Based on these quantitative feedbacks, we first classify the 24 KPIs into four regions in a 2X2 dimension of importance versus difficulty as shown in Table 1. The proper strategy for KPIs in Region I is to implement them, and the reasonable strategy for KPIs in Region IV would be not to implement these KPIs. The strategies for KPIs in Region II and Region III would be trickier. HROs may need to examine these KPIs individually to decide whether to measure them or not.

IMPLEMENTATION

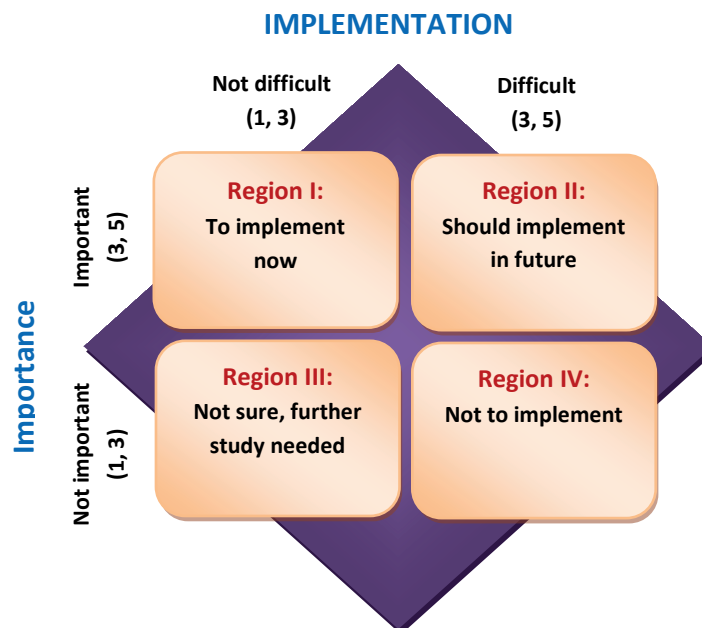|	Not difficult (1, 3)	Difficult (3, 5)
Important (3, 5)	**Region I:** To implement now	**Region II:** Should implement in future
Not important (1, 3)	**Region III:** Not sure, further study needed	**Region IV:** Not to implement

Importance

Table 1: General strategy for KPI implementation

As all KPIs are valued as important, we further differentiate KPIs by importance to two groups, highly important (average importance score at 4 and above), and less important ones (average importance score between 3 and 4). We can then divide the 24 KPIs into four sub-groups by importance and difficulty as shown in Table 2.

	Not difficult (1,3)	Some difficulty [3,4]	Very difficult [4,5]
Highly important [4,5]	• % goods are delivered in full and on time • Current on hand inventories • Source cycle time • Current purchase order cycle time	• Three KPIs on Documentation accuracy • Perfect condition • Order fulfillment cycle time • In stock % • External event response • Cost to manage product inventory	• Cost to plan • Cost to source • Cost to delivery • Supply chain risk mitigation cost
Relatively less important (3,4)		• Risk mitigation plan • Assembly cycle time • Delivery cycle time	• Upside supply chain flexibility • Upside source flexibility • Upside delivery flexibility • Cost to manage performance of supply chain

Table 2: Current KPI matrix by importance and difficulty

The first sub-group (in light grey) consists of KPIs that are highly important and easy, which are expected to be implemented quite quickly. Five KPIs are in this sub-group, including "% orders delivered in full", "delivery performance to customer commit date", source cycle time", "current on hand inventories", and "current purchase order cycle times".

The next sub-groups (in light green) are highly important but having some difficulties to measure (score between 3 and 4). 8 KPIs, including four KPIs on reliability (three KPIs on documentation and KPI "perfect condition"), three KPIs on responsiveness ("order fulfillment cycle time", "In stock %", and "external event response"), and one KPI on cost ("cost to manage product inventory").

The third sub-group (in green) is important KPIs but very difficult to measure. There are total 4 KPIs in the group, and are all related to the cost. It shows current financial system in HROs does not fit with costing for supply chain operations.

The last sub-group (in light orange) is less important KPIs but also difficult to measure. These KPIs are not in priority in this project.

3. CONCLUSIONS

The concept of performance measurement framework is well established in commercial organizations but generally lags in humanitarian organizations. Transferring the know-how and experience in performance measurement from commercial to humanitarian organizations makes good sense. SCOR model, being a framework that links business process, metrics, best practices and technology to improve the effectiveness of supply chain management, is a logical next step in the evolution of performance measurement in HROs.

This study demonstrates how the SCOR framework and its associated performance attributes can be adapted to the humanitarian supply chain. We are able to map the generic supply chain processes of humanitarian organizations and develop a set of twenty-four draft KPIs for HROs to measure and monitor their supply chain performances effectively. The validation of the draft KPIs with HROs shows the importance of these KPIs as well as the difficulty in their implementation. Only five KPIs out of the original twenty-four KPIs can be easily implemented in most HROs. The weakness in cost measuring exists in most HROs. They need to improve by integrating their internal procedures across other operations functions such as finance, awards management and distribution activities, for more effective measurement of their supply chain performances, especially in the supply chain cost estimation. Using organizational Monitoring, Evaluation, Accountability & Learning (MEAL) systems could support this process.

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A Collaboration Between

The Logistics Institute – Asia Pacific
National University of Singapore
21 Heng Mui Keng Terrace, #04-01, Singapore 119613

Tel: (65) 6516 4842 · Fax: (65) 6775 3391
Email: tlihead@nus.edu.sg · URL: www.tliap.nus.edu.sg