



# A humanitarian logistics framework for the Philippines: The case of Typhoon Haiyan

## INTRODUCTION

Logistics being used for humanitarian operations is known as humanitarian logistics. It is defined by Thomas (2003) 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 to the point of consumption for the purpose of alleviating the suffering of vulnerable people. Logistics in the humanitarian aspect is vital; it plays a critical role during disaster relief operations. It bridges the gaps between the different stages of the operations. It is also crucial because the success and the time duration of the response of major humanitarian programs depend on how effective the logistics plan is. Logistics also help out in the collection of data for future references regarding emergency preparedness (Thomas, 2003).

Our study was prompted by the onslaught of Super Typhoon Haiyan, which caused thousands of deaths and damages to property in the Philippines in 2013. The Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA) recorded that the typhoon reached 235 kilometers per hour (km/h) of maximum sustained winds and 275 km/h of wind gusts (United Nations Office for the Coordination of Humanitarian Affairs, 2013). Massive devastation was brought about by the strength of the typhoon.

Typhoon Haiyan saw the government and various humanitarian organizations working together in managing programs and relief operations for the victims. However,

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obstacles, such as (1) blocked roads, (2) damaged airstrips and seaports, (3) insufficient supply of fuel, (4) destroyed infrastructures – electrical lines and satellite servers – were encountered which affected the operation of humanitarian logistics. Given this background, we formulated a humanitarian logistics framework to facilitate the delivery of disaster relief operations by analyzing the current state of humanitarian logistics in the country.

## FRAMEWORK

For this study, we compared and contrasted the various major frameworks used in humanitarian operations management. Despite the limited number of academic studies and other literature in the field of humanitarian logistics, a number of frameworks exist. The frameworks covered in this study also involve some models of supply chain management in humanitarian operations management.

The supply chain used in business and the one used in humanitarian operations management have similarities and differences. The supply chain management of businesses is just a small part of the supply chain management of humanitarian operations management, according to Jane Coyne from Medicins Sans Frontieres (MSF) (as cited in Tabbara, 2008, p.21). Kovacs and Spens (2007) pointed out that “some of them are not directly linked to the benefits of satisfying the demand” (as cited in Tabbara, 2008, p.24). In emergency response management, the various organizations involved in humanitarian operations management follow their own model for emergency response.

Tabbara (2008) suggests that the solution is to integrate the different actors in the humanitarian logistics supply chain. Integration should start at the first stage of the process, which is to assess the needs of the population, by allowing logisticians to be part of the assessment. Then the military and non-military activities should be coordinated properly as well to improve the “effectiveness of the supply chain and to guarantee the adequate delivery of aid” (Tabbara,

2008, p.59).

The framework proposed by Chandraprakaikul (2010) comprises of three phases in humanitarian logistics, before the disaster or preparation, during disaster or response, and after disaster or reconstruction. Each has its respective activities, approaches, strategies, key elements and performance measurement. The Preparation Phase includes mitigation activities that prevent, reduce, or lessen the negative effects of emergencies, and preparedness activities that create plans on how to respond to disasters. The Response Phase, which also serves as the action, is done before, during, and after disaster, with the goals of saving lives, reducing the damages in properties, and developing recovery plans. The Reconstruction Phase comprises recovery activities that aim to restore operating standards of infrastructural systems and improved life for the long-term through project management.

Table 1 is a matrix of components from the frameworks presented by Kovacs and Spens (2007), Tabbara (2007), and Chandraprakaikul (2010). In addition, we took into consideration the suggestion of Tabbara (2008) that actors must be integrated in the frameworks he presented in his study. These actors play a large role in times of disaster as they are the providers of the materials and goods needed. Also, these actors are the key implementers of plans and are responsible for providing aid needed by the affected areas. They are the ones who formulate strategies that aim to mitigate and minimize the impact of natural disaster and provide improved disaster response (Tomasini and Van Wassenhove, 2009).

Table 1. *Humanitarian logistics framework*

ACTORS	PHASES		
Government	Preparedness	Response	Recovery
Military Humanitarian Organizations	ACTIVITIES		

The framework also shows the phases of humanitarian logistics, preparedness before the disaster, response during the disaster, and recovery after the disaster.

The key actors were identified through the study made by Kovacs and Spens (2007) and Tomasini and Van Wassenhove (2009). For the study, we will focus on three actors: the local government, the Philippine military, and the humanitarian organizations that were directly involved in the humanitarian operations during Typhoon Haiyan.

The study posits that there is a need to create a humanitarian logistics framework in order to improve the efficiency and practices of the current humanitarian operations management in the Philippines because there were many negative feedbacks from the victims of the typhoon such as the slow or delay in the distribution of the relief goods. If such problems or challenges are addressed with proper humanitarian operational management techniques then the humanitarian logistics in the country would be more efficient and effective.

## METHODS

In order to determine the current practices of humanitarian logistics in the Philippines during and after the onslaught of Typhoon Haiyan, we interviewed a number of government agencies and authorities, military, and humanitarian organizations. Consistent with the case study approach espoused by Yin (2009) we utilized both primary and secondary sources of information.

From the government sector, we interviewed representatives from the Tacloban Local Government Unit (LGU), Calupian local government and the Barugo local government, both of which are part of Leyte province, Department of Social Welfare and Development (DSWD) and the National Disaster Risk Reduction Management Council (NDRRMC). From the military sector, we interviewed the Philippine Air Force (PAF) and Philippine Navy. From the humanitarian organizations, we

interviewed representatives coming from the Philippine Red Cross; Action Against Hunger (ACF) International; World Food Programme (WFP); the United Nations Office for the Coordination of Humanitarian Affairs (OCHA); and, the United States Agency for International Development (USAID).

## RESULTS

In this research, we determined the current practices in humanitarian logistics executed by the different actors such as the Philippine government, military forces, and humanitarian organizations that were involved during the typhoon Haiyan relief operations.

We used Table 2 as a guide for the discussion of the findings to achieve the objectives of the study. We classified the different insights gathered from the interviews according to the phases of humanitarian

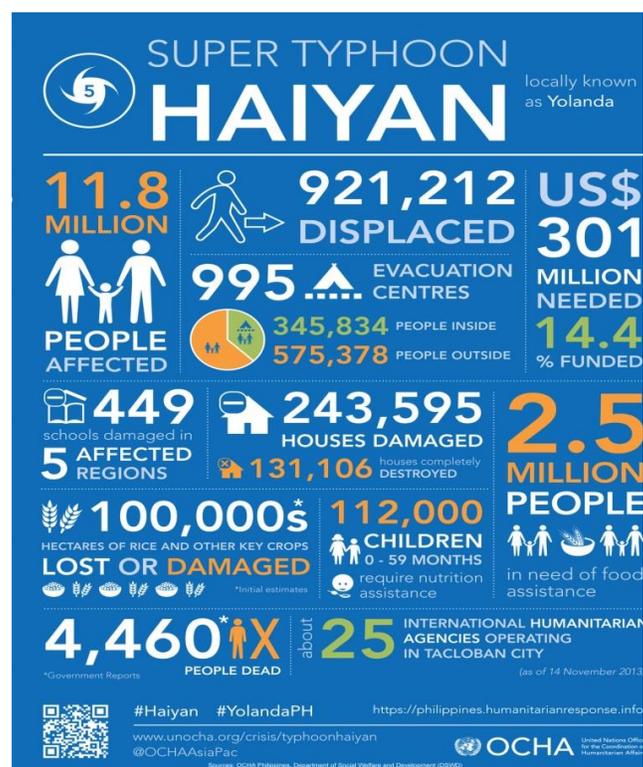


Figure 1. Relief efforts guide for typhoon Haiyan

Table 2. *Humanitarian logistics framework in the Philippines*

ACTORS	PHASES		
	Preparation	Response	Recovery
	ACTIVITIES		
<ul style="list-style-type: none"> <li>• City government in Tacloban</li> <li>• NDRRMC</li> </ul>	<ul style="list-style-type: none"> <li>• Local area knowledge</li> <li>• Resources and Information Technology</li> <li>• Education</li> </ul>	<ul style="list-style-type: none"> <li>• Inventory management</li> <li>• Warehousing management</li> <li>• Fleet management</li> </ul>	<ul style="list-style-type: none"> <li>• Post-disaster assessment</li> <li>• Knowledge management</li> <li>• Reconstruction plan</li> </ul>
<ul style="list-style-type: none"> <li>• Philippine Air Force</li> <li>• Philippine Navy</li> </ul>			
<ul style="list-style-type: none"> <li>• Philippine Red Cross</li> <li>• ACF International</li> <li>• WFP</li> <li>• USAID</li> <li>• OCHA</li> </ul>			

logistics, namely preparedness, response, and recovery, to highlight the activities of the various actors.

### Challenges

The interviews conducted with both government officials and employees and humanitarian organization representatives together with the different secondary sources such as situation updates used identified challenges that were encountered in the course of humanitarian operations management. The researchers had obtained information from two perspectives – government and humanitarian organizations.

#### Communication system

Since typhoon Haiyan severely damaged the communication infrastructure in Leyte, the government units and organizations experienced difficulties in communicating. Although satellite phones were provided to facilitate transmission of messages, these were few and it was hard to assess the extent of the damages and to coordinate immediate response effort.

#### Transportation capacity

According to the Philippine Army, the capacity of the Philippine transportation infrastructure is limited so goods were not delivered immediately. Transportation like air assets cannot be deployed all the time since they need maintenance. Thus, affected municipalities cannot receive immediate feedback.

#### Monitoring of goods

The monitoring of the goods that entered and exited the different hubs in Leyte were done manually immediately after the typhoon because there were no forms or computers that could properly document inventories. Information was not sent to the donors soon enough due to the problems encountered in tracking the donations.

#### Strategies and alternatives

##### Assessment forms

Assessment forms can aid in informed planning and

decision making to provide efficient response. They can provide standard documentation, consistency and uniformity on type of data across different areas. Having standard documentation allow the determination of the current state of infrastructure and logistical capabilities in order to do much-needed renovations and improve these infrastructures and logistical capabilities for better performance of humanitarian operations management (Logistics Cluster, n.d.).

### **Information and communication emergency systems**

To address the challenge encountered due to inadequate communication systems, more satellite phones must be purchased and information and communication emergency systems must be set up (Ergun et al, 2010) in order to expand the communication capabilities of the country and not be vulnerable whenever a natural disaster such as Typhoon Haiyan damages the telecommunication system.

### **Certification in Humanitarian Logistics**

One of the ways to improve humanitarian logistics is through enrichment of the skills and knowledge of those performing the tasks, by undergoing standardized training and qualification programs, in order to increase competency of humanitarian logisticians (Steele, 2010).

### **Inventory planning and control**

Since demand, in cases of natural disaster, is uncertain and local supply is limited, inventory prepositioning must be done and the use of inventory management systems to keep track on the quantity and the quality of the prepositioned stocks must be on hand (Ergun et al, 2010). This strategy can address the issues in monitoring of goods.

### **Inventory forms**

Inventory forms can be used to keep track of inventory

whenever there is no electricity thus preventing the use of technologies such as computers and inventory management systems. These forms require standard inventory data thus resulting to uniformity and consistency of data when used by the different actors in their tracking of inventory.

### **Delivery scheduling**

In order to address the limited transportation capability, partnership with Third Party Logistics (3PL) can be considered because they have flexible transportation services. Moreover, collaboration between warehouses and 3PLs through scheduling of delivery can reduce transportation cost and improve delivery rates (Cornerstone Solutions, Inc., 2007). In addition, scheduling of when to use available fleet can be done by having delivery schedules. The existing fleet can be maximized and maintained by incorporating maintenance schedules considering the set schedules for delivery.

### **Procurement management**

Because of ever-changing demand, unstable relief operation environment, and the unavailability of accurate information on the amount of necessary supplies of relief goods to meet the needs of the affected population, the government and humanitarian actors participating in the relief operations rely on rough estimates to procure the goods (Fritz Institute, 2003). Additionally, Lima, Widera, Hellingrath, and Goncalves (2013) explained that since humanitarian operations require timely response, organizations have no option but to use the information accessible to execute rapid decision-making in procuring the supplies needed.

### **Procurement system**

Ambituuni (2011) described procurement as one of the major activities in logistics operation. Thus, utilizing a system that will allow the integration of information and effective management of the activity is required to identify the demand to know the right quantity, ensure quality,

Table 3. *Proposed Humanitarian Logistics Framework*

ACTORS	PHASES		
	Preparation	Response	Recovery
	ACTIVITIES		
<ul style="list-style-type: none"> <li>• City government in Tacloban</li> <li>• NDRRMC</li> </ul>	<ul style="list-style-type: none"> <li>• Local area knowledge</li> <li>• Resources and Information Technology</li> <li>• Education</li> </ul>	<ul style="list-style-type: none"> <li>• Inventory management</li> <li>• Warehousing management</li> <li>• Fleet management</li> <li>• Procurement Management</li> </ul>	<ul style="list-style-type: none"> <li>• Post-disaster assessment</li> <li>• Knowledge management</li> <li>• Reconstruction plan</li> <li>• Humanitarian operations evaluation</li> </ul>
<ul style="list-style-type: none"> <li>• Philippine Air Force</li> <li>• Philippine Navy</li> </ul>			
<ul style="list-style-type: none"> <li>• Philippine Red Cross</li> <li>• ACF International</li> <li>• WFP</li> <li>• USAID</li> <li>• OCHA</li> </ul>			

guarantee cost effectiveness, and assure the delivery of the goods from the source to its destination.

Usually, suppliers undergo bidding. However, due to the high demand for relief items after the typhoon, DSWD distribute relief items immediately. DSWD cancelled the bidding processes to accommodate and distribute relief items immediately. DSWD and other actors can look for available standard procurement systems (SPS) or service providers that would suit their needs. Such systems are used by procurement entities for business process and data management standardization since it can provide order tracking, improved accountability and it is paper-less (Logistics Cluster, n.d.).

The system, known as Systemic Process Model (SPM), proposed by Lima, Widera, Hellingrath, and Goncalves (2013), facilitates the procurement procedure through a decision support tool – employing quantitative models

– that can be structured and modified during the preparation stage of the operations depending on the intensity of the disaster. Therefore, identification of demand to acquire the right amount of supplies can be accomplished.

### HUMANITARIAN OPERATIONS EVALUATION

Humanitarian operations must be assessed and documented in order to keep track of the performance every after operations. Customized or industry-specific key performance indicators (KPIs) and/or performance metrics such as SCOR metrics can be used to identify the current humanitarian performance (Cornerstone Solutions, Inc., 2007). Tracking of operations is important since it is a valuable input for the continuous improvement of humanitarian operations (Ergun et al, 2010).

Table 3 provides a humanitarian logistics framework

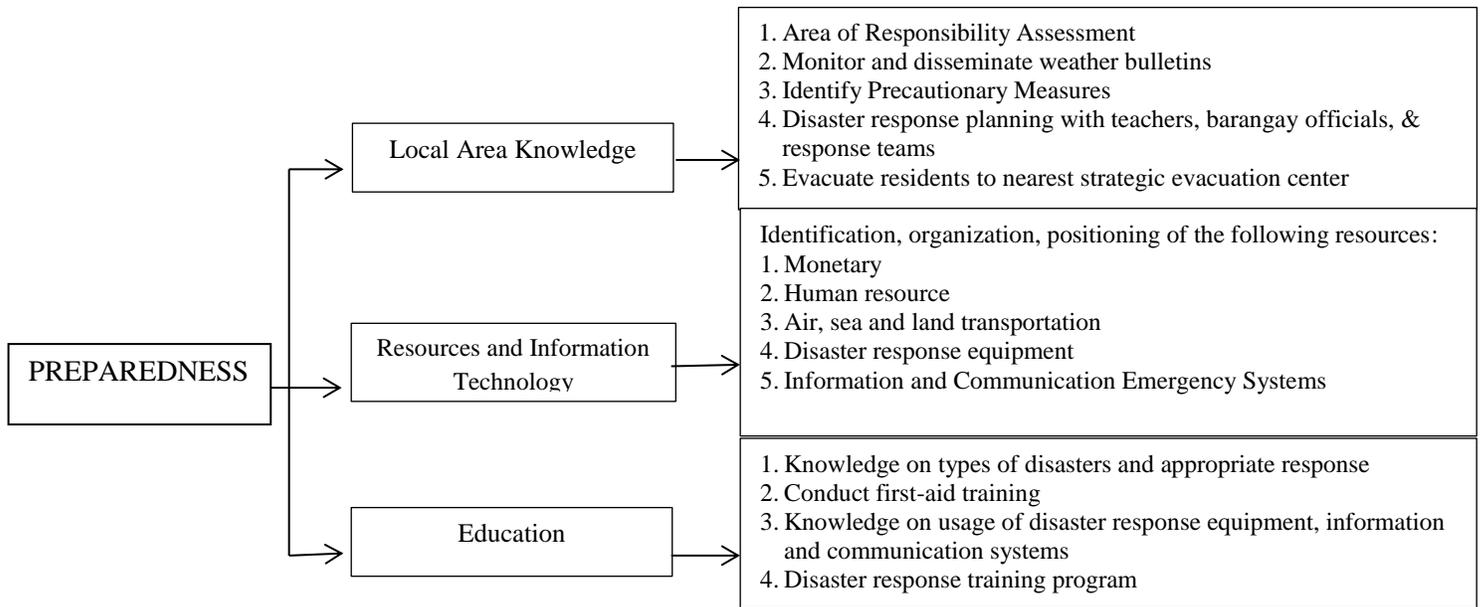


Figure 2: Preparation phase standard activities

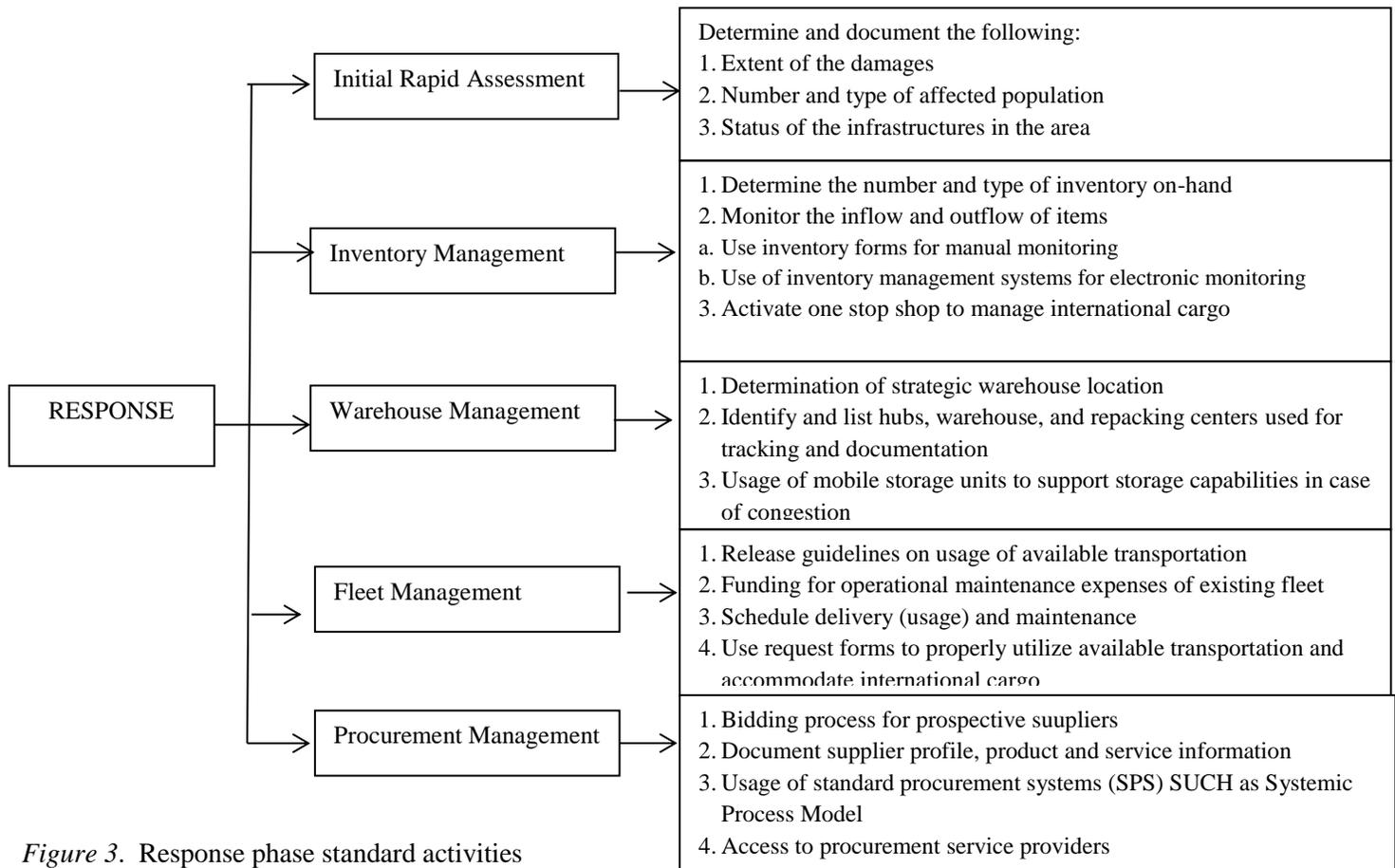
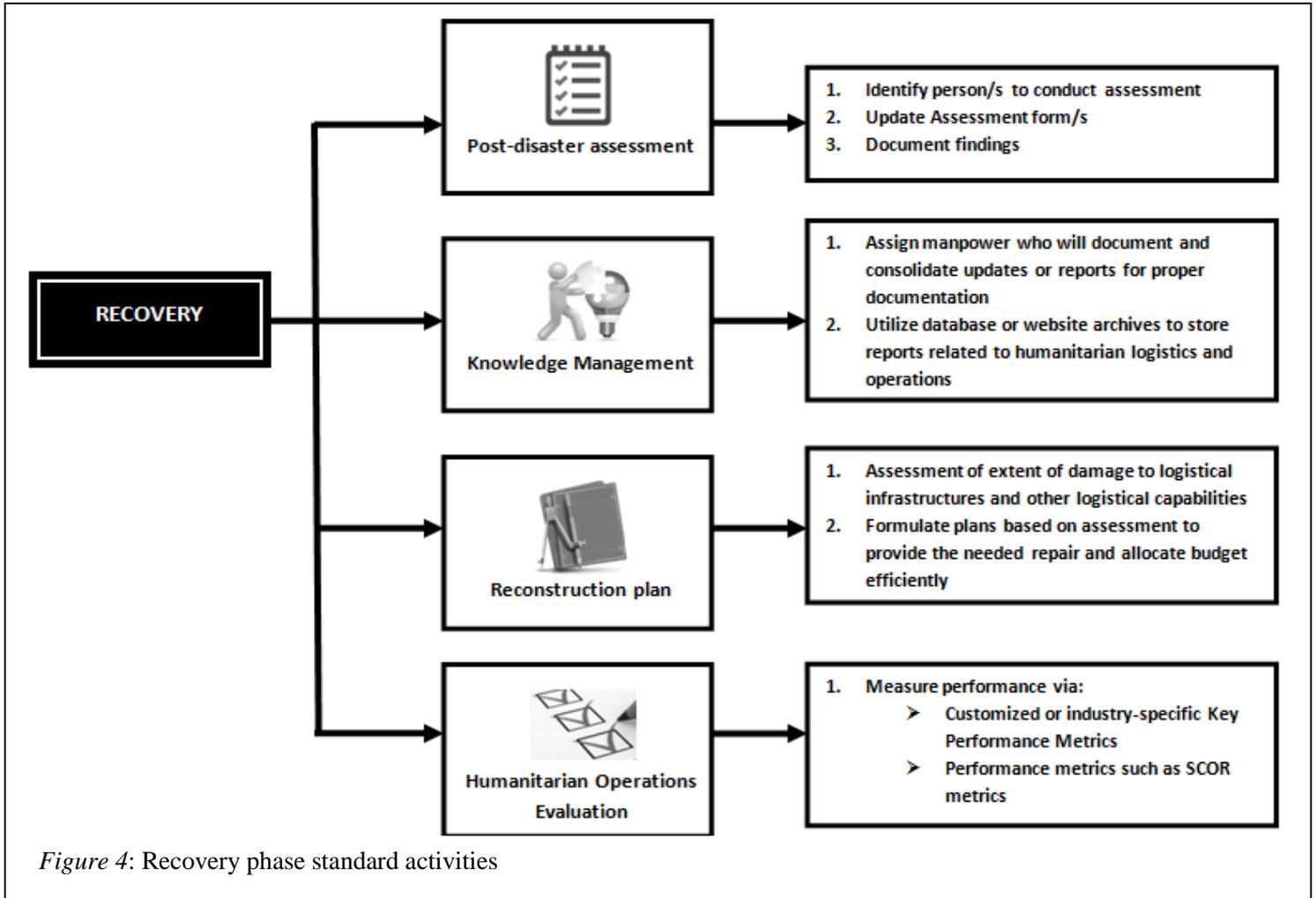


Figure 3. Response phase standard activities



that can be applied elsewhere. The proposed framework combined the activities identified from the theoretical frameworks used in the study, the current humanitarian logistics practices, and the strategies that addressed the challenges encountered by the actors. Moreover, we added the practices that are currently executed by logistic entities like the Logistics Cluster as part of the main activities because these strategies were identified as best practices in supply chain management or necessary humanitarian logistic activities that will help improve the humanitarian logistic practices in the Philippines. These strategies, based from entities' practices, are Procurement Management and Total

Quality Management in the response phase and humanitarian operations evaluation in the recovery phase. Figures 2, 3 and 4 show the standard activities necessary for preparation prior to the landfall of disaster, for response after disaster, and for recovery and rehabilitation. The main activities per phase were broken down to illustrate the standard activities that play an important role in the implementation of the main activities. These standard activities were derived from the identified humanitarian logistic practices executed in Typhoon Haiyan humanitarian operations. In addition, the strategies suggested to aid the challenges encountered by the actors were included as standard

activities in order to prevent the challenges from occurring again thus gaining efficiency in the humanitarian logistics in the Philippines.

## CONCLUSION

In this paper, we wanted to address how a humanitarian logistics framework can be modeled in the context of the humanitarian operations management brought about by Typhoon Haiyan. The current humanitarian logistics practices are not entirely efficient and must be streamlined to improve the humanitarian operations in the country. In order to do so, we constructed a humanitarian logistics framework (Figure 6) equipped with standard activities for every phase of the humanitarian logistics, and these standard activities are geared towards the minimization of the negative impacts of natural disasters through improved humanitarian logistics processes.

First, we determined the current practices of humanitarian logistics in the Philippines through interviews done with the different representatives from the government, military, and humanitarian organizations involved during the typhoon Haiyan operations. Second, we identified the challenges in humanitarian logistics encountered by the government, military, and humanitarian organizations through the interviews conducted. Third, we provided strategies and alternatives that can be used to address the humanitarian logistic challenges that were identified. These strategies were derived from the best practices in supply chain management.

Given the framework, future researchers can use empirical data in order to model the pre, during and post-disaster needs of the community. Various quantitative techniques such as optimization and simulation can be modeled using the framework as criteria for decision-making. However it is expected that data would be severely limited after the onslaught of disasters but simulation models and other optimization

techniques can improve humanitarian operations management in order to minimize the impacts of disasters on the lives of people.

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