

FUNDAÇÃO GETULIO VARGAS  
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

WHAT MAKES A HUMANITARIAN SUPPLY CHAIN RESILIENT?  
THE RELEVANCE OF THE CAPABILITIES FOR RESILIENCE WITHIN  
HUMANITARIAN SUPPLY CHAIN AND THEIR IDENTIFICATION WITHIN THE  
TYPHOON YOLANDA.

EMILIE PEYROCHE D'ARNAUD DE SARAZIGNAC

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## ABSTRACT

Hundreds of millions of people are affected by disasters each year. For some countries in Asia, natural disasters became something common for which they need to be prepared. Humanitarian supply chain is a recent research topic, which refers to the whole relief process that takes place once a disaster occurs, from the donors to the end beneficiaries. Because of recent economic stresses, and thus, higher donor's requirements and because of greater media coverage of deadly natural disasters such as the Typhoon Yolanda in 2013-2014; humanitarian organizations need to be transparent and they require being resilient enough in their supply chain process for better results, and thus recognition. Resilience has been studied within commercial supply chain context. However looking at this notion within the humanitarian sector, which has different characteristics, is a new concept that integrated the literature of this field. The purpose of this thesis will be to contribute with new insights and inputs in order to enrich further researches on the capabilities for resilience of humanitarian supply chains. It will look at the evidence of these capabilities for resilience through a qualitative case research on the Typhoon Haiyan (Yolanda) that was one of the deadliest typhoon that ever make landfall in the Philippines.

*Key Words: Humanitarian Relief, Supply Chain, Resilience, resilience capabilities, Natural Disasters, Typhoon Yolanda*

## RESUMO

Centenas de milhões de pessoas são afetadas por desastres a cada ano. Para alguns países da Ásia, os desastres naturais se tornaram algo comum para os quais eles precisam estar preparados. A cadeia de fornecedores humanitária é um conceito logístico recente, que se refere a todo o processo de ajuda que acontece uma vez que ocorre um desastre, desde os doadores até os beneficiários finais. Por causa de tensões econômicas recentes, e por causa de uma maior cobertura da mídia sobre os desastres naturais mortais tal como o Typhoon Yolanda em 2013-2014; organizações humanitárias precisam mostrar transparência em suas ações e precisam provar a capacidade de resistência da cadeia de abastecimento para melhorar ainda mais os programas de doação. Resiliência tem sido estudada no contexto da cadeia de fornecedores de uma empresa comercial. No entanto olhar para essa noção dentro do sector humanitário que tem características diferentes, é um novo conceito raramente explorado antes. O objetivo desta tese será contribuir com novos insights e contributos, a fim de enriquecer ainda mais pesquisas sobre a capacidade de resiliência das cadeias de fornecedores humanitários. Vamos analisar as provas desses recursos para a resiliência através de uma pesquisa qualitativa sobre o caso Typhoon Haiyan (Yolanda), que já foi o tufão mais mortal das Filipinas.

*Palavras Chave: Operações humanitárias, cadeia de suplementos, Resiliência, Capacidade de resiliencia, desastres naturais, tufão Yolanda*

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## 1. Introduction

Environment is changing and these changes can pose threats as it is the case for natural or man-made disasters, and their effects can be quickly disastrous. Countries, communities, organizations and individuals are the main victims of those changes. Beside human, the losses are also economic. (Jüttner, 2005).

The literature predicts an important growth in the number of disasters. The researchers Michel-Kerjan and Slovic (2010) who made the point that the costliest disasters have occurred these past decades, were mainly due to the rapid growth of the world population; the concentration of this population and their assets in areas that present high environmental risks and finally, because of the increasing socio-economic interdependency. According to them these factors highly increase the frequency and intensity of the natural catastrophes.

In 2012, the European Commission published a report on the impact of natural disasters on developing countries, and in most of the cases, those countries are not able to deal with the challenges themselves, and therefore need international aid and relief. (Jorge Andrade da Silva and Lucian Cernat; 2012). However, disaster is seen as something that organizations and communities should be prepared for. One way to face uncertainties, crisis, challenges and rupture in one's activities is to be resilient (McKinsey on Supply chain: Select Publications, 2011): Indeed *Le Livre Blanc Defense et Sécurité Nationale France 2008* defines resilience as the capacity of a structure (country, company or system) to resist to the consequences of a shock, crisis or disaster and to quickly re-establish its functioning process, thus regain its nominal regime. Resilience is a concept characterized as multidimensional (Walker et al, 2002; Callister, 2003). It has a strong significance in the organizational theory and psychology's area (Barnett and Pratt, 2000); supply chain management (Sheffi, 2005) and strategic management (Hamel and Valikangas, 2009). Resilience is the ability from an organization to bounce back from disruption. (Sheffi, 2005).

Humanitarian Supply chain (HSC) is a complex concept, which involves various different types of actors and stakeholders with the unique purpose to save human lives and to amortize the structural and economic consequences of the disasters. It provides a large range of products for survival, from medicine to food, including shelters, clothes etc. (Kovacs and Spens; 2007; Holguin-Veras et al 2012). It is defined by Thomas (2005) 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 point of origin to point of consumption for the purpose of meeting the end beneficiary's requirements" (p.18).

According to Christopher (1992), The supply chain is a network of organizations that are involved through upstream and downstream linkage through activities producing values in the form of end products delivered to the last consumer. He goes further saying that unfortunately, humanitarian organizations haven't given that much attention to logistics, and never put it as core function with the need for strategic decisions for good management of the global chain as it is the case in the business sector.

Many of the best practices from the business sector can be implemented to humanitarian relief. Indeed, commercial and humanitarian supply chain have a lot in common, even if their final objective are different, and even if the performance of humanitarian supply chain is not measured in term of "surplus", but in terms of "lives saved" (Trunick, 2005; Pettit and Beresford, 2006); they have an organization and system that one could define as alike.

However differences remain, and McLachlin et al. (2009), highlight one of the major existing difference and claim that humanitarian supply chain are unfortunately unstable as they are strongly influenced by other actors; and due to a lack of coordination and joint-planning between all those actors, the chain often results to inefficiency.. The influence of the donors is visible mostly on the allocation of the funds and resources that they want to be on direct relief (food and health) rather than trainings, preparedness, information system etc. (Oloruntoba and Gray, 2006; Wassenhove, 2006; Kovacs and Spen, 2007). Since the event of disasters is growing (Michel-Kerjand and Slovic; 2010), researchers have become more focused in the subject of humanitarian supply chain efficiency and resilience. Sheffi (2005), claims that *Resilience* as the requirement for the inevitability to disruption that could face the supply chain.

The literature on humanitarian supply chain in general is new and only after 2005, humanitarian logistics had become an attractive topic of research for academic researchers in the supply chain paradigm. Resilience of a country or population after the onset of a disaster is a concept that was quickly integrated by academics (Pettit and Beresford; 2009). Furthermore, as we can highlight in the 2013's Industry Agenda of the World Economic Forum; Resilience is also a well-established concept in the business field; however, Dubey (2014) emphasize the fact that unfortunately Resilience within the field of humanitarian supply chain researches still is foetal.

Therefore we proposed the following research question, *what are the main capabilities of resilience in humanitarian supply chains?* The main capabilities for Resilience will be presented in depth through the literature review.

The main objectives of this thesis are to investigate the capabilities for resilience of a humanitarian supply chain. As the response for disasters have four main phases, (Preparedness, Response, Rehabilitation and Mitigation phase) the purpose of this thesis will emphasize the importance of being resilient in the response, rehabilitation and mitigation phases that follow the onset of a disaster; This thesis conducted a case study of a disaster, the Typhoon Haiyan (Yolanda) that happened in 2013-2014 in Philippines. Primary data was collected with respondents from two humanitarian organizations that were within the numerous actors that formed the humanitarian supply chain that was set after the disaster. The first organization is a new set structure related to the French Commercial Chamber which canalizes private funds toward humanitarian organizations on the ground; the second organization is a French NGO internationally known that acts toward international solidarity for the relief, reconstruction and mitigation after the disaster. Other sources of information, such as Humanitarian Organizations reports, were also used to collect secondary data about this event.

This thesis will first highlight in its literature review the main capacities that make a humanitarian supply chain resilient, and will use them for the construction of data collection process, to build a case study protocol and to finally, do an analysis of the concept through Yolanda's case in order to evaluate the possibility to think in term of resilience when looking to humanitarian supply chain management.

This Thesis is organized in six sections, the first section is the present introduction, and then the thesis will conduct an in-depth literature review to highlights the relevance of the concept stated above. It will then present the methodology used to collect data on the third section. The fourth section will present those data and will conduct an analysis of them in relation to the humanitarian supply chain that took place after Yolanda's disaster, with the empirical elements received from the two organizations interviewed. The fifth section will conclude the thesis by highlighting the main learning issued from our data collection and analysis. Finally the sixth section will encompass all the references used for the writing of this thesis.

## 2. Literature Review

The purpose of this literature review is to deepen the definition and knowledge of humanitarian supply chain management by reviewing trends and studies led in this area of research. It will, also, give an insight on how one should look at the role of resilient capabilities for overall efficiency of the humanitarian supply chain when conducting qualitative researches on the Typhon Haiyan.

This literature review is based on journals articles that are mainly found on Emerald Insight, mainly in five journals: *International Journal of Logistics*, *International Journal of Physical Distribution and Logistics Management*, *International journal of Production Economics and Management Research News* and more recent articles were found in the *Journal of Humanitarian Logistics and Supply Chain Management* which promotes academics research targeting humanitarian public and private sector organizations. It also used the Fritz Institute website to get access to other specified articles.

All articles related to HSC Management are new; publications on this precise topic go from 2005 to 2014. We have already acknowledged that researches in this domain are recent. Furthermore, Kovacs and Tatham (2009) highlighted that academics have drawn their attention on the subject only after the Indian Ocean Tsunami of 2004, one of the most covered from the media these past years. In this literature assessment, one can highlight different subtopics. Those recurrent topics are: Coordination, Challenges in Humanitarian logistics, Distribution, Facility location, HSC model, inventory management, and performance management with the concept of resilience.

### 2.1 Classification of Disasters

According to Makota and Kaplan (2005), Hazards or disasters are events, phenomena or human activities that cause damages on lives, economy, society and environment. Moreover, following the International Strategy for Disaster Reduction, a disaster is a “serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.” ([www.unisdr.org](http://www.unisdr.org)). Van Wassenhove (2005) describes disasters as “a disruption that physically affects a system as a whole and threatens its priorities and goals”. He has attempted to classify disaster according to their cause (natural vs man made) and the speed of the onset (Table 1).

	<i>Natural</i>	<i>Man-Made</i>
<i>Sudden-Onset</i>	Earthquake Hurricane Tornadoes	Terrorism Attack Coup d'Etat Chemical Leaks
<i>Slow-Onset</i>	Famine Drought	Political crisis Refugee Crisis

Table 1: Classification of Disasters (Van Wassenhove, 2005)

While slow-onset disasters are predicted and allow a better organization planning for humanitarian organisations, sudden-onset disasters strike with surprise and the damages are bigger (Van Wassenhove, 2005). Sudden-onset disasters, will therefore, call for rapid deployment combining in a challenging way various actors of different nature. Sudden-onset disasters are unpredictable, and it is for this type of disasters that humanitarian organisations need to review their way to use their supply chain in order to have enough agility to provide a quick and thus efficient response for the sake of the human lives (Van Wassenhove, 2005).

Earthquakes inflict high costs in the form of casualties, injuries and physical damage especially when it happens close to urban areas. It is first characterised by ground failure (Lindell, Prater & Perry, 2007).

Hurricanes and typhoons are the most dangerous disasters, they can cause secondary hazards such as tornadoes and floods (Lindell et al, 2007).

In Belgium, exists a database called the Emergency Database, which provides all the humanitarian organisations a base for vulnerability assessment for the disasters. ([www.emdat.be](http://www.emdat.be)). The classification they used is similar to Van Wassenhove's one, however they do not take into considerations political crises as disasters. ([www.emdat.be](http://www.emdat.be)). Although, today one can look at the situation in Syria, and make the assumption that a political crisis can also lead to a deadly humanitarian crisis and situation. The Emergency Database has gathered historical information on past disasters, and has noticed, an increasing trend in disasters on a yearly base. (Table Index; EMDAT). Indeed the Fritz Institute ([www.fritzinstitute.org](http://www.fritzinstitute.org)) has predicted, based on data gathered and specified studies, that natural disasters will increase another five-fold in the next fifty years. This is due to the degradation of environment, the rapid pace of urbanisation and a growing population. (Roh, Beresford & Pettit, 2008).



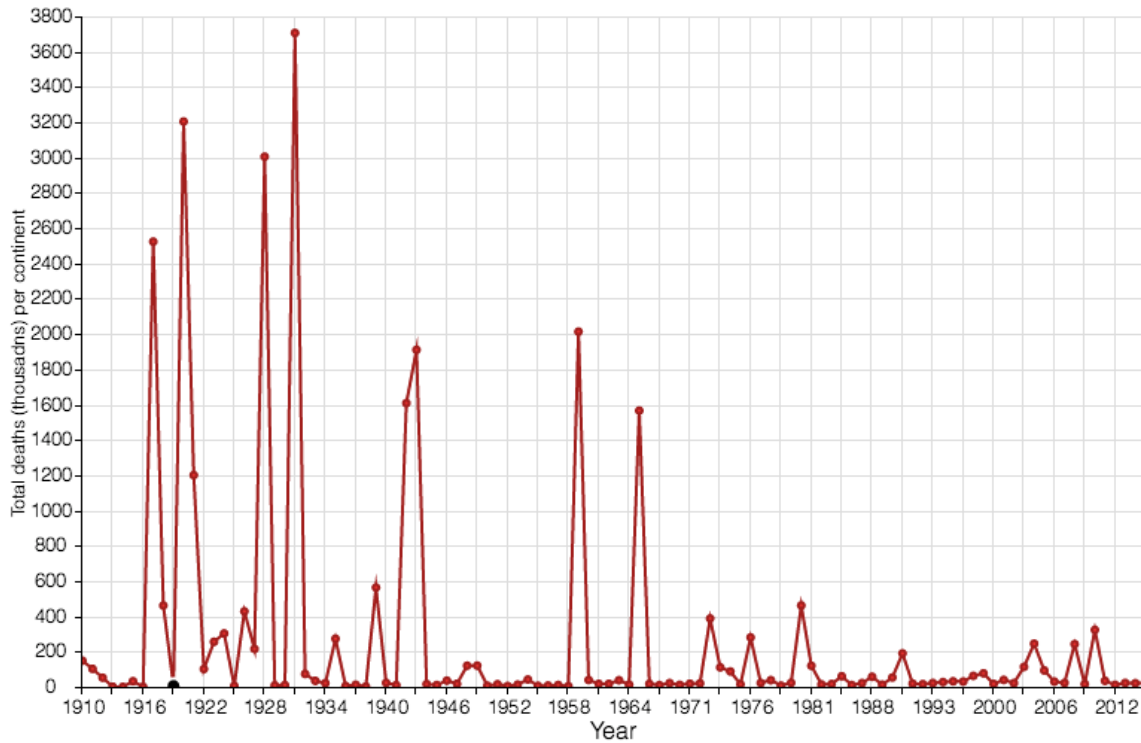
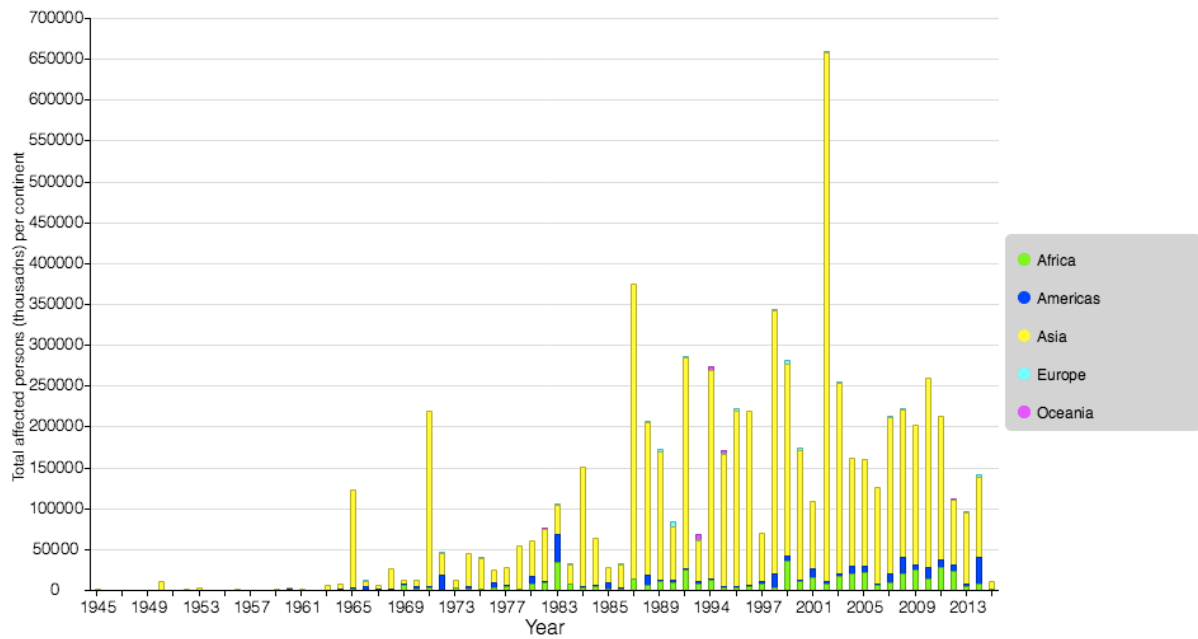


Figure 1: Number of people killed by natural disasters 1900-2014 ([www.emdat.be](http://www.emdat.be))

While the overall amount of disasters had increased significantly, one can notice on the figure 1 that the number of victims of those disasters has decreased steadily in the same time. This is mainly due to a better preparedness and the emergence of best practice in the field of relief (Red Cross Crescent Climate Guide, 2007, p 15).

The Emergency Database also gives us the possibility to access data concerning economic losses issued from natural disasters.

On a geographical base, there is also an uneven relation between the number of disasters that happened on different continent and the percentages of population affected by them in the respective continents. As we can notice on the figure 2 (Total affected by natural disasters by continent), Asia has held the most of damaging disasters (more than 80%). This area mainly suffers from poor infrastructure and lack of funds for relief operations, which leads them to call for international aid.



EM-DAT: The OFDA/CRED International Disaster Database - [www.emdat.be](http://www.emdat.be) - Universite Catholique de Louvain, Brussels - Belgium

Figure 2: Total affected by all type of disasters by Continents ([www.emdat.be](http://www.emdat.be))

As noticed through the figures presented in this section, the frequency of the disasters has singularly increased these past decades. The earth is becoming overloaded, and so many physical changes have affected the ecosystem. Indeed, today, the number of man-made and natural disasters is doomed to increase due to important changes in our environment. Thomas and Kopczak (2007) claim that this increase will be over five times the number of the disaster happened these past fifty years. This put pressure on humanitarian organizations. Indeed, they face with logistics complexity, poor infrastructure and unstable environment (Cassidy, 2003)

## 2.2 The main characteristics of humanitarian supply chain (HSC)

After looking in more details the characteristics of natural disasters, this following part will deepen one's global knowledge on Humanitarian Supply Chain (HSC). It will look at the field of humanitarian relief to understand better humanitarian logistics, its different phases of action and the concept of humanitarian supply chain within the school of academics.

### 2.2.1 Humanitarian Relief

The United Nations defines humanitarian relief as "aid that seeks to save lives and alleviate suffering of a crisis-affected population. ([humanright.change.org](http://humanright.change.org)). In its definition, UNISDR

highlights that a society victim of a disaster cannot deal with relief with its own resources. Most of the resources need to be external to the country. UNISDR (United Nation International Strategy for Disasters Resolution) International aid can be provided by:

- *Foreign countries* (Public funds, civil protection, fire fighters, military means). The European commission is, for example, the first international provider of funds and relief aid.
- *International Institutions*: The United Nations had, for example, set up an international system for disaster's response named OCHA (Office for the Coordination of Humanitarian Affairs). This office usually sends teams from UNDAC (United Nations Disaster Assessment and Coordination) to evaluate the situations.
- *Non-Governmental Organizations*: In the case of disasters, two types of NGOs intervene: 1) NGOs for Charity such as Medecins Sans Frontières ou Red Cross International Comitee, International Federation of Red Cross and Red Crescent Societies (IFRC), which are more specialized for emergency relief; 2) The NGOs for development such as Action Contre la Faim (ACF).

Ergun (2009) qualifies the governments and NGOs as the primaries parties involved. HSC is directly affected by the abilities from the government to set the right political and economic conditions that allow HSC management to act. The second significant players are the donors (public and private organizations); indeed, contrary to traditional supply chain management, HSC cannot count on the end consumers for financial resources. The chain is therefore shaped as a Y rather than an O (Van Wassnehove, 2005). Wassenhove (2005) goes further claiming that donors should rather be seen as the primary players. He says that lately, all feedbacks from the missions have to go back directly to the donor organizations that have recently increased their influence through transparency and accountability incentives. He concludes on this point by saying that humanitarian supply chain holds another responsibility than commercial supply chain: Besides delivering goods and services to beneficiaries, it also has to manage value to donors and stakeholders.

These actors engage in two kinds of actions: Relief activities (short-term activities focused on minimizing immediate risks to human health and lives) and Development activities (longer term activities that focuses on self –sufficiency and sustainability of communities) (Balcik and Beamon, 2008). The humanitarian organizations, also, have different mandates that define their boundaries. These mandates define the type of relief they are specialised in, such as the items to deliver, the beneficiaries on which to focus and the type of partners they can have (Balcik & Beamon, 2008). Humanitarian organisations also have to act within the whole humanitarian

space, meaning that they have to respect neutrality, impartiality, humanity. They are not allowed to favour a group of beneficiaries. This is clearly notified within the United Nations declaration and guideline for humanitarian action, and it is an important aspect of humanitarian relief that one shall acknowledge to better understanding how humanitarian supply chain is constructed for resilience (Van Wassenhove 2005).

#### 2.2.1.1 *The main phases for intervention of Humanitarian Relief*

Most of the research and articles published on the topic of HSCM focus on the challenges that can occur while a relief mission is deployed. Kovacs and Spens (2009), identify the challenges of humanitarian logistics in respect to the different disasters, and the different phases of those disasters, which require a different type of humanitarian organization. The main challenge for humanitarian organizations, yet, is the fact that the number of disasters is doomed to increase for the next few years, which is the reason why to reach quick efficiency and set up a model of organization process toward this aim have become essential these last decades. (Michel-Kerjand and Slovic; 2010).

Indeed, according to the UNDP's critical perspective of 2008 on the link between humanitarian Assistance and Natural disasters, development aid has always fuelled debate on how these missions were embedded in the strategic and political considerations of the donor countries. This was especially strong during the cold war, which explains why literature on the management of those missions was rare or inexistent until the beginning of the 90s. However the increasing happening of natural and man-made disasters within the past years have called the attention of the school of academics to study the topic in order to try to give to the international community the possibility to better prevent a high roll of death when those hazards happen (Oloruntoba 2005).

The Annual Disaster Statistical Review of 2011 has reported that 332 natural disasters were registered, and only for the year of 2011, 30 773 people were killed in a natural disaster, 244.7 million had suffered and, Guha-Saphir et al (2012) have mentioned that for this only year, the economic costs have risen up to 366 billion of US\$.

Responses to disasters have also different stages, and the challenges within the organization process of humanitarian relief are different depending on the phase for intervention. Van Wassenhove (2005) and Alexander (2002) with the figure 3 has identified four phases in disaster management related to humanitarian supply chain:

-**Mitigation:** Preventing effects of disasters. This phase has for objective to diminish the probability of disaster's onset and the consequences of the disasters in case of their happening.

For example: improve infrastructure to absorb consequences of a disaster. (Van Wassenhove, 2005)

**-Preparedness:** This phase also takes place before a crisis. It dwells on the establishment of new process for adapted response for future crisis. Such as, educating people, pre-postponement of stocks and decentralization process.(Alexander, 2002)

**-Response:** It is the actual emergency response phase. It encompasses all actions to be done after a crisis. Altay and Green (2006) explained that response is the utilization of resources and emergency process, which have for objective to preserve human lives, the environment and the socio-economic structures. (Altay and Green, 2006)

**-Rehabilitation:** This phase follows the response phase, and focus on activities that could re-establish the functioning of the perturbed system. For example, rebuild infrastructure.

In its empirical part, this thesis will focus on the response, rehabilitation and mitigation phase and will highlight the main capabilities for resilience in those phases. The speed of onset of this phase defines the ability of the supply chain to be enough resilient to come back to its original status. (Altay and Green, 2006)

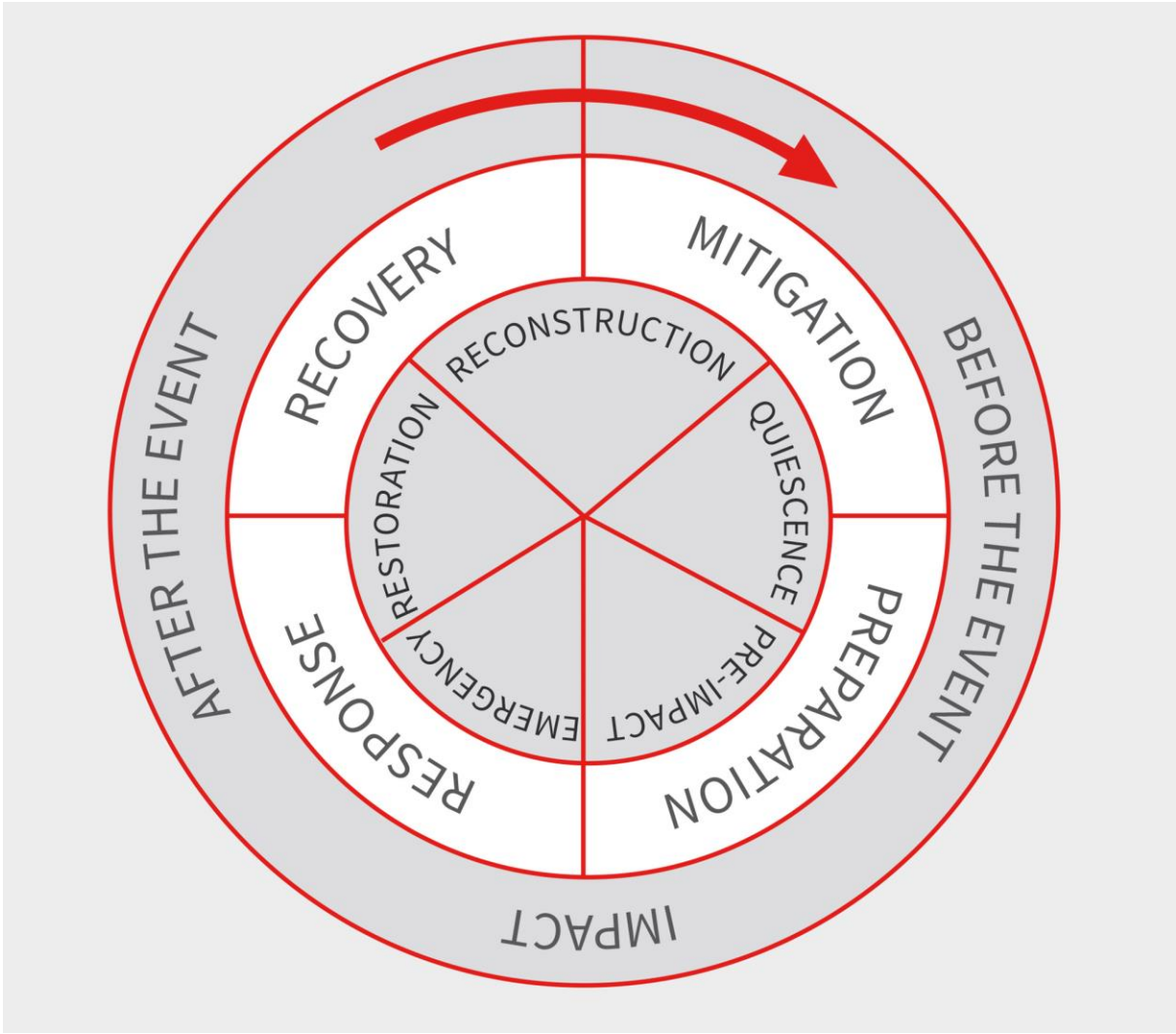


Figure 3: Cycle of life of Humanitarian relief (Alexander, 2002)

Furthermore, Kovacz and Spens (2007) underline three different stages that must be acknowledged when an organization implements an operation and seek efficiency of its supply chain. Indeed each phase will require a different strategy and tactic of action. These phases are the disaster management preparation (that embeds planning and training), the immediate response (that looks at evacuation, distribution and coordination) and the reconstruction phase (which targets reconstruction and development decisions-making). For Haddow and Bullock (2004), as for Tomasini and Van Wassenhove (2009), there is a fourth phase which is the mitigation phase, which would target the avoidance or prevention of disasters. According to Whiting and Ayala-Ostrom (2009), the focus of logistics in most humanitarian organizations has been in direct relief rather than in systems that would reduce expenses or improve the efficiency of relief in the long run. In humanitarian organization there is a huge difference between the costs incurred during the normative state and the costs of the emergency responses – 75% to 80 % of the total costs could be allocated to the response phase. While the humanitarian logistic management is able to reduce costs through more efficient management of the chain, it allows it to reach better resilience for more human life saved .(Whiting and Ayala-Ostrom; 2009)

### ***2.2.2 Humanitarian Logistics and Humanitarian Supply Chain.***

According to Beamon and Balcik, (2008), and Stevens (1989); supply chains is defined as gathering all activities and process that are involved in the production of goods from its raw material's stage to the final consumption stage. Scott and Westbrook (1991) and New and Payne (1995) go further claiming that supply chain is a virtual business unit, which should be treated as an entire one in all business assessment of performance.

As Russell and Taylor imply in their paper of 2009, supply chain has to be integrative from flow of goods, to flow of information in order to lower the costs and reach a more responsive end consumption (Russell and Taylor, 2009).

On the other hand, logistics constitutes a process of supply chain management. As part of SCM, it plans, implements and control the flow of goods, services, and related information. Indeed, as supply chain manages all links between businesses involved in the whole process of

production, Logistics transfers the goods from a place to another. To be clear, SCM is broader and includes Logistics (Ballou, Ronald H, 2006) and this is explained through figure4.

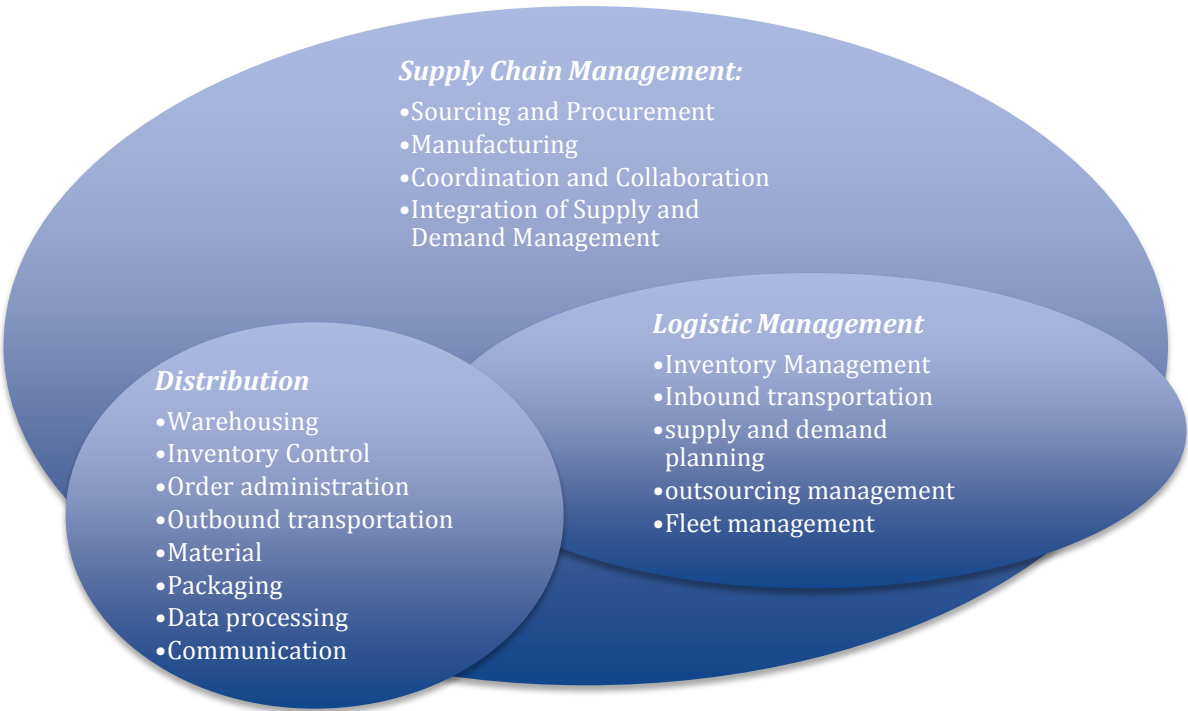


Figure 4: Main differences between Supply Chain Management and Logistics Management (Russel & Taylor; 2009)

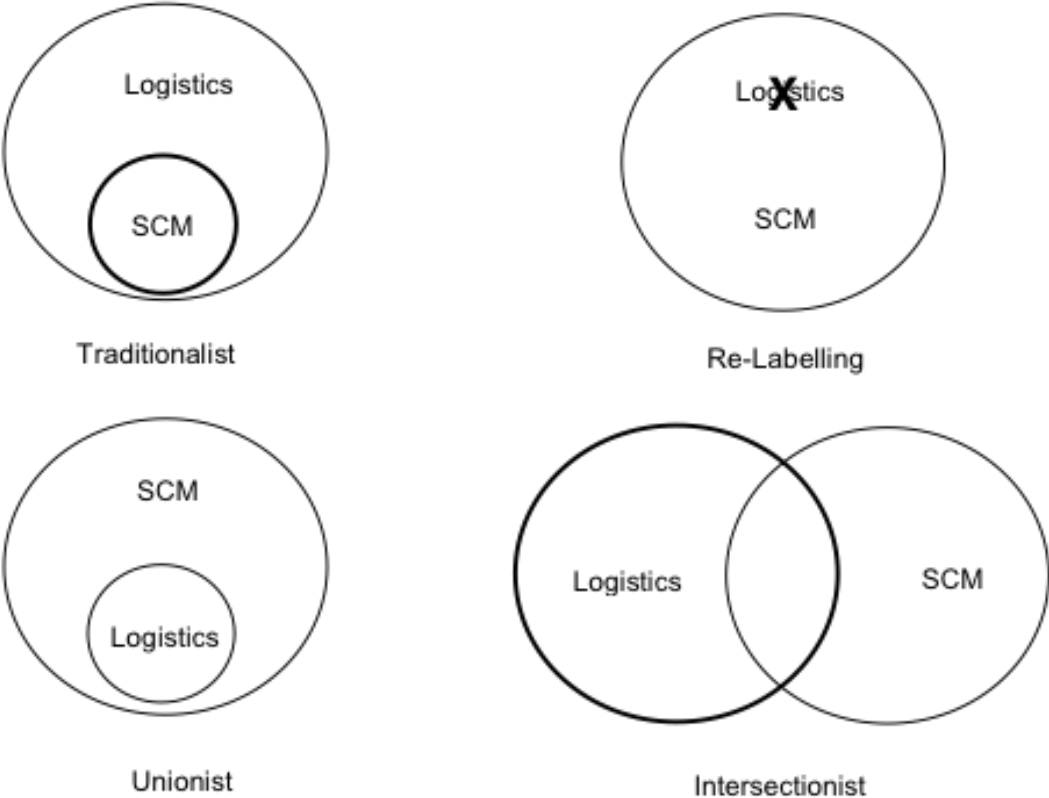


Figure 5: Perspectives on Logistics versus Supply Chain Management (Larson and Halldorsson, 2004, p1 9)

On the figure 5, the traditionalists see SCM as part of logistics. The Re-labelling see supply chain as the new name of logistics, which occurred, with the modernisation of logistics techniques and business relative issues. In contrary to the traditionalists, the unionists see logistics as being part of SCM. Finally the Intersectionists think that both are interrelated in terms of strategy. (Larson and Halldorsson, 2004)

Furthermore, Thomas and Kopczak (2005) gives an other and more general differenciation between those two terms. They define humanitarian logistic 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 alleviate the suffering of vulnerable people” (Thomas and Kopczak, 2005).

Sheu (2007) in his paper on the challenges of emergency logistics management, goes further in already including in his definition of humanitarian supply chain the critical elements of a successful operation claiming that management has to “match available supplies with highest priority needs in the shortest possible time under constraint of limited funding” (Sheu, 2007). This definition takes into account the notion of emergency and limited resources that are the main challenges to undertake within the functioning of a humanitarian supply chain. In other words, an efficient supply chain, which acts within the humanitarian sector, has to be able to deliver the right thing in the right quantities to the right people in the right place and right time. (Sheu, 2007)

Tomasini and Van Wassenhove (2009) have summarized the entities of a Humanitarian Supply Chain as the 5Bs (Boxes, Bytes, Bucks, Bodies and Brain):

- Boxes: All physical flux of products from the donors to the beneficiaries and vice-versa (Recycling).
- Bytes: All flux of information (tracking).
- Bucks: Financial flux which represents credit's conditions.
- Bodies: Human resources of the chain
- Brain: Knowledge, Know-how and competencies.



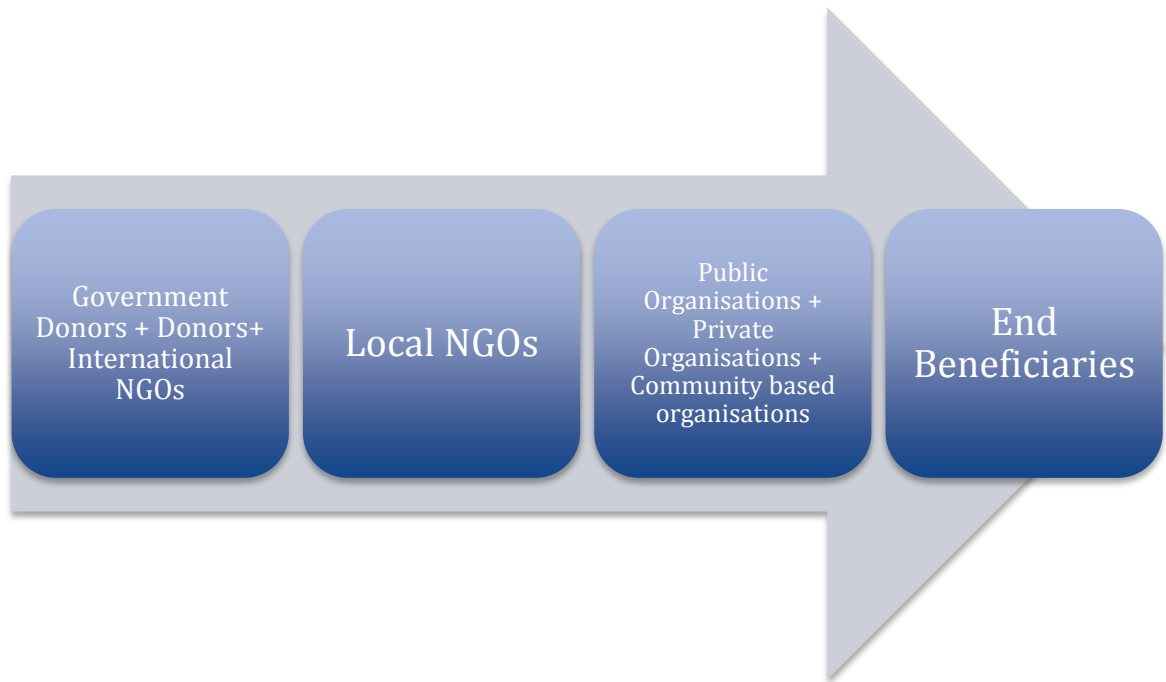


Figure 6: Simple model of humanitarian supply chain (Thomas & Kopczak, 2005)

The figure 6 above represents a simple model of humanitarian supply chain. Donors and International NGOs are the main suppliers (in term of funds and relief) for local NGOs which will redistribute material toward more specialized organisations for the final beneficiary. In humanitarian logistics, the end customer does not create demand. (Kovacs and Spens, 2007). Therefore, all actors are not linked to profit, and are part of a more complex supply network in which their role will depend mostly on their own motivations. The figure 12 resumes what Kovacs and Spens (2007) have stated to be a more complex representation of the network of actors within a humanitarian supply chain:

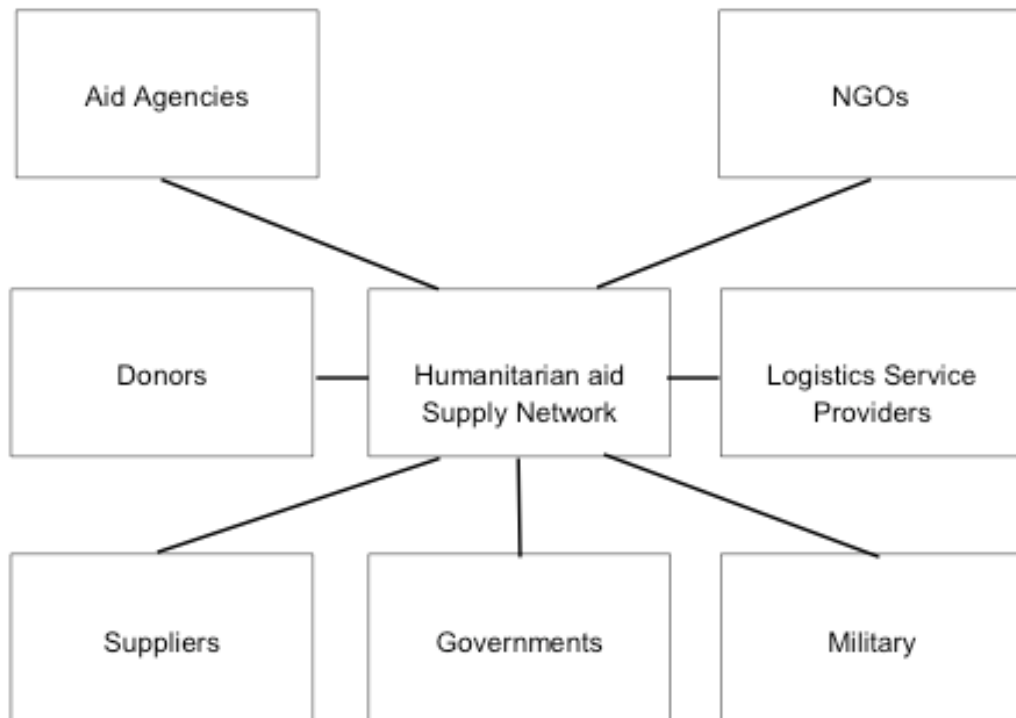


Figure 7: Actors in the Supply Chain Network of Humanitarian Aid (Kovacs and Spens, 2008).

The donors are considered as vital actors as they provide funds to support relief efforts (private, individual or country specific). Other actors include the military, the government, logistic providers (3PL) and other NGOs. Kovacs and Spens (2007) didn't include the end beneficiaries in their model as they stated that they are not able to shape demand, as it is represented by NGOs and aid agencies (they represent the interest of the beneficiaries).

Finally, relief is mainly characterized by irregularities of size, timing, and location. These characteristics also are the main challenges of HSC. As global emergencies increase in number but also are becoming more and more complex, inventory in humanitarian supply chain has to adapt every time a bit more. Beamon and Kotleba (2006) have drawn their researches on different management strategies that could be applied to inventory in HSC. They have highlighted few critical success factors that can play in favour of humanitarian inventory performance. Whybark (2007) also highlights the main characteristics of relief inventory from acquisition to distribution. Tysseland (2009) studied the ability for a small country military force or non-governmental organisation to maintain the equipment inventory. He highlights the role that plays the environmental context, the structure of the said organization and governance in affecting the whole inventory planning within HSC. He concludes that Governance and

organizational structure are the main elements that determine the whole inventory performance in relief operations.

### **2.3 The relevance of cross-learning capabilities with the commercial supply chain**

It would be interesting to compare the HSC structure with its commercial counterpart. This chapter will employ the term “cross-learning potential” as the possibilities that a commercial and humanitarian supply chain have in common. The term was used by Van Wassenhove (2005) in his lecture at the INSEAD of France on the subject that private sector logistics could be used to improve disaster’s relief sector logistics.

As it has been already mentioned, humanitarian supply chain doesn’t have any profit target and mainly counts on voluntary work and donors to achieve its goals, which is different from regular supply chain where the main stakeholders own the chain (Wassenhove, 2006). Furthermore, its source of revenue is materialized through funding and donations. The goals are also different, as HSC need to respond as quickly as possible to different interventions within different environment (Wassenhove, 2006). Finally, Beamon and Balcik (2008), also highlight differences in the performance measures, where HSC include intangible services, mission that are not measurable, unknowable outcomes and the variety of interests of all the stakeholders present on the chain.

<i>Topic</i>	<i>Business SCM</i>	<i>Humanitarian SCM</i>
Main objective	Maximise profit	Save lives and help beneficiaries
- Demand Pattern - Supply Pattern	- Fairly stable - Mostly predictable	- Irregular - Donations
Flow Type	Commercial products	Resources like vehicles, shelters, food...
Lead Time	Predetermined	Zero Lead time
Inventory Control	Safety Stocks	Challenging inventory control
Delivery network structure	Location of Warehouses and DCs	Ad Hoc distribution facilities
- Technology - Performance measurement	- Highly used - Standards supply chain metrics	- Less used - Time to respond to disasters, meeting donor's expectation, % of demand supplied

Table 2: Main differences between business SCM and Humanitarian SCM (Ertem et al 2010)

Ertem et al (2010) have classified the main differences between humanitarian and commercial supply chain. Here the explication for table 2: One might think that such a classification is rather well appropriated for our general understanding of humanitarian supply chain. Beside the difference between the general objectives and the fact that for humanitarian supply chain, uncertainty clearly leads missions, and inventory; one shall highlight the importance of the volatility of demand, which cannot be predicted in the humanitarian field (Ertem et al, 2010). Indeed, uncertainty about the situation and the volatility of the demand are closely linked. As the situation post-disaster is uncertain, demand also cannot be predicted correctly and therefore supply is difficultly predictable. (Ertem et al, 2010).

The type of supplies is also different depending on the type of supply chain. Commercial supply chain will focus on one or few types of products, while humanitarian supply chain has a flow of supply, which differs depending on the phase of relief, the nature of the disaster, and the donors available. (Ertem et al, 2010). In humanitarian supply chain, there is zero lead-time, and therefore no possibilities to correctly assess inventory and make sure that costs of inventory are reduced. Indeed, lead-time is the medium time needed for a product to reach inventory from

its original demand. In commercial supply chain, as the supplies are always the same, the demand is more or less stable and thus predictable, lead time is easily countable and therefore can be applied to the whole inventory process that companies need to correctly assess to reduce costs of warehouse, and costs of demand unfulfilled (Ertem et al, 2010). In humanitarian supply chain management, lead-time cannot be applied to inventory assessment. The demand is volatile, unpredictable; the supplies differ (and therefore their time for export), the locality for supplies also cannot be predicted; thus inventory cannot use lead-time for better efficiency (Ertem et al, 2010). Finally, the type of technology also differs between humanitarian and commercial supply chain. Less technology is used in the former, as financial resources are much scarcer (Ertem et al, 2010).

Concerning this part of the literature review, Wassenhove (2006) is the pioneer of researches concerning the link and cross learning possibilities that exist between a model of business logistic logic and functions and a humanitarian supply chain management. He proposed a model inspired from the commercial area, to be applied for disaster's logistics. In this model he highlights five key elements, which are human resource, management of knowledge, operational management, financial resources and the community (Wassenhove, 2006).

Oloruntoba and Gray (2006) also claimed the importance of the commercial know-how that could be applied to humanitarian supply chain management. Their main findings concern the importance of agility within HSCM. As humanitarian supply chain are limited in time, or in other words, have a short existence, but also as the environment make this kind of supply chain unstable and exposed to many chocks, but also as they emphasize this link between relief and long-term development, they ought to include agility in their management (Oloruntoba and Gray, 2006).

Kovacs and Spens (2007) also have dwelled their researches on the plausible existence of parallels between humanitarian logistics and business logistics. They highlighted the importance for HSC to learn from business logistics (Kovacs and Spens, 2007).

Perry (2007) also presents a model in his researches on humanitarian logistics, claiming that as for commercial supply chain, humanitarian supply chain need to involve a continuous disaster management planning that should start even before the response action when the crisis occurs (Perry, 2007).

Finally Jahre and Jensen, and Richey (2008) have deepened their researches on the link that exists between humanitarian chain management and the theoretical dimension known learnt in

business school such as organization theory, communication theory, and competing values theory and relationship management. They claim that, as for its commercial counterpart, literature on humanitarian supply chain can also have a strong theoretical background (Jahre et al, 2008).

#### **2.4 Performance indicators of the humanitarian supply chain management: Efficiency and effectiveness**

Thus, the main elements that differ between HSC and commercial SC are the fact that the goal of HSC is to save lives in providing different type of products (from food to medicine) but also services and assistance. One also should remember that financial sources do not come from the beneficiaries, but from the donors on a voluntary basis, therefore performance measurement is critical to non-governmental organisations accountability (Jahre et al, 2008).

In order to fulfil their goals on which hundreds of human lives depend, and in order to keep receiving financial funds that would allow relief organization to keep involving themselves in humanitarian operations, Humanitarian organizations must have effective performance measurement systems that would improve the efficiency of relief operations and highlight the performance of the whole HSC (Gunasekaran and Kobu, 2007). Indeed, Kaplan affirms that performance measurement is a fundamental element for improvement of SCM. In measuring performance, HSC actors would involve better communication, transparency and efficient decision-making as they have a base for assessing their operation (Kaplan 1990).

Tomasini and Wassenhove (2009), claim in this sense, that humanitarian organizations are ought to be more efficient in their operation as they feel pressure from the increase number of disasters, the rising cost of the operations and most of all, the responsibility they have to report accountability over the donors and the beneficiaries. Performance review is therefore an important element of the theoretical background that in which HSC is embedded. However, one of the main challenges facing HO is the development of suitable performance measurement system (Tomasini and Van Wanssenhove 2009).

According to Blecken (2010), 55% of the HOs still don't report performance measures, 25% declared to control a few measures and only 20% of them measure performance on a constant basis line. In the following lines, we will see how literature has explained this lack of existence of performance measurement system (Blecken 2010).

Measuring performance in HSC allow the chain to be more effective and efficient and transparent toward the international community and the main donors. Chow et al. highlighted the multidimensionality of performance, as the chain itself has different dimensions (Chow et

al; 1994). Therefore, performance measurement should be evaluated through different ways. Gleason and Barnum (1986) go further in the definition of performance measurement and management in separating the definitions of efficiency (“doing the things right”) and effectiveness (“doing the right thing”) (Gleason and Barnum, 1986). For them and for Mentzer and Konrad (1991); when the main goals and objective of logistics and supply chain are achieved, one can speak about effectiveness. Efficiency would rather look at the means used to achieve those goals, such as a good ratio of resources or capacity (Mentzer and Konrad, 1991).

Beamon and Balcik (2008) compare the efficiency of performance measurement system between commercial supply chain and HSM, and end up presenting a useful framework for assessing performance in the relief domain. This framework includes metrics of performance on the resource (cost efficiency), on the outputs (response time, quantity and quality of the delivery) on the inputs (its flexibility within the response, the locality, through the nature of the supplies). They assessed the difficulty related to measurement of performance in HSCM as organizations tend to focus more on evaluating the efficiency of their inputs rather than their outputs (Beamon and Balcik; 2008).

Sink et al (1984), Gunasekaran, and Kobu (2007), also have studied performance within commercial supply chain to highlight few dimension of effectiveness and efficiency to be taking into account when assessing performance of HSC. Those dimensions are the identification of needs, and bottlenecks in the process, the comprehension of the organization’s own process at all level in order to reveal what is not perfectly known, to ensure the stability in time of the decision-making as it should be based on facts rather than supposition. Tracking is also an important dimension to take into account when measuring performance of the logistical operations, and finally the facilitation of a more transparent cooperation and communication. (Sink et al, 1984; Gunasekaran and Kobu 2007)

All the recent literature on this topic highlight the difficulty to institute good and comprehensive performance measurement for HSC, therefore all articles on this topic highlight a special feature of performance measurement, however they don’t provide a model that could apply to all HO. Gunasekaran has based performance measurement on the operational level involving strong strategy in order to clarify how this level’s responsibility drives concluding performances. (Gunasekaran et al 2004).

On another hand Lai et al (2002), have based their assumptions on performance measurement through a study on reliability and responsiveness of HSC actions. Finally, Giannakis (2007), evaluate performance through collaboration potential and abilities within the HSC.

Tatham and Hughes; Jahre and Heigh and Widera and Hellingrath meet Blecken's assumption by saying that some critical elements that unfortunately are part of the whole HO's operations process that prevent performance to be measured (Blecken et al 2009, Davidson, 2006; Widera and Hellingrath, 2011; Tatham and Hughes, 2011; Jahre and Heigh, 2008). Those elements encompass the absence of operation's data central archiving, limited info capacity, unstable environment, media exposure that can have a negative impact and effect on the measurement of performance of the operations, problems concerning capacity and potential in human resources and the fact that humanitarian response could be on the disaster or on the reconstruction post-disaster. In other words, the fact that there is a conflict between short term and long-term objectives also affects measurement performance in the humanitarian sector. They emphasize that difficulties to capture strong data prevent performance measurement within HSC (Tatham and Hughes, 2011). Furthermore time pressure and high stress unable humanitarian logistic workers to save and report data for the sake of international knowledge on humanitarian logistics issues. Finally, the link between performance management and the funding of the operations is a relatively new subject that affects HSCM, this demonstrates that until now performance management measures were seen only as secondary (Tatham and Hughes, 2011).

Some authors have defined few tools and elements for performance. Such as the balance scorecard of Kaplan and Norton (1992), used to assess efficiency of commercial supply chain. De Leew (2010) also used the Kaplan's balanced score card in the humanitarian supply chain sector and concluded that the four principal elements of the balanced score card, that are customer's perspective, internal perspective learning and financial perspective could be applicable to humanitarian logistic (de Leeuw, 2010). However McLachlin (2009) concluded that the balanced scorecard could not be implemented by humanitarian organizations as they have different objective than companies that are economics rather than social (McLachlin et al 2009). Moe (2007) also have used the balance score card to come to the conclusion that natural disaster management should be seen as a project management in which the donor's perspective as well as the beneficiaries feedback, the learning and the internal process of the HSCM all play a major role in each of the phases of the disaster (in order: preparation phase with a focus on the donor's perspective, emergency relief when looking at the beneficiaries perspective, the rehabilitation through the whole internal process perspective and the recovery phase that is link to the learning inputs.) (Moe et al, 2007).

Schulz and Heigh (2009) have tested the "Development Indicator Tool" (Red Cross and Red Crescent Societies / IFRC) which was created in order to guide continuous performance of logistic units within the humanitarian sector. Their conclusion highlight the fact that such a tool



or model for performance measurement management should be kept simple to be adaptable, and that the key factor for successful performing management is the integration of all the stakeholders present in the chain. Indeed, they claim that successful process results from good and stable relationship between internal and external stakeholder. While testing existing models and tools, these authors did not manage to bring new elements on performance measures that could be applied to humanitarian supply chain sector (Schulz and Heigh, 2009).

However, Davidson (2006) was one of few who had managed to develop four performance indicators following her researches with the IFRC on the south Asia earthquake of 2005. These indicators are the *appeal coverage* (ratio between appeal coverage and items delivered which determines if the organization were able to meet a high percentage of its appeal during a mission), *donation to delivery*, that measures the time that took an item between its donation to its delivery and helps organization to improve their delivery system depending of the results of this performance measure, *financial efficiency* that measures budgeted price in comparison to real prices paid, and the ratio between transportation costs and the total cost of the delivered items; and *assessment accuracy* that measure how accurate was the organization's staff assessment of the beneficiaries needs when looking at the real use of the delivered items (Davidson, 2006). Van Der Laan (2009) also have acknowledged the lack of accurate data problem in humanitarian supply chain and recommended that organization must therefore assess their service rather than their cost performance. Through a large literature review and the application of the elements he had found on few case studies, he offered few type of qualitative assessment measures rather than quantitative that are: *The accuracy of stock records*, that gives insights on what to order and when is the re-purchase point the most efficient, *realized service level*; that looks like the *assessment accuracy* measure emphasized by Davidson and which treats the ratio of relief items that have been delivered at the right place in the right time, and *stock efficacy* that is a stock turnover ratio that indicates that different order policies must be applied in function of the different type of the items delivered (Van der Laan et al 2009),

## **2.5 Critical Success Factors (CSF) and the concept of resilience**

Lamothe (2010) emphasises the fact that, within the critical factors of success (CSF) that the academics still need to research, the issue on the behaviour of the supply chain faced to uncertainty remains the central subject (Lamothe, 2010). Uncertainty is the state of lack of information on an event and its consequences (*International Organization for Standardization, ISO 31000 Guide 73:2009, def 1.1*). A question, then arise; "In spite of the onset of a crisis,

how to maintain logistical performance? In other words, what could be seen the resilience capabilities of a humanitarian supply chain?”

McLachlin (2009) claims that HSC are unstable due to their environment heavily influenced by political and military actions, and inefficient due to the lack of cooperation, coordination and free flow of information through organized communication (McLachlin, 2009). Poor infrastructure and lack of organization regarding the origins but also the final destination of the supplies, doesn't make HSCM more efficient and effective. Oloruntoba and Gray (2007), but also Wassenhove (2005) and Kovacs and Spens (2007) also take into consideration the Donor's requests, saying that they also play a role in the efficiency of HSCM: They often ask for their funds to be spent on what is more relevant and more visible, such as material, food or healthcare or even precise locations, rather than on other implied indirect services such as better system of information, training or even preparedness for future disaster (Oloruntoba & Gray,2006; Wassenhove, 2005; Kovacs and Spens, 2007). Oloruntoba goes further when he assesses humanitarian supply chain relation to commercial supply chain with his claim that agility must be the key for more efficient HSCM. Although they have similarities, they also have huge differences linked to their instability and short-term existence. Therefore, they must integrate stronger agility in their management (Oloruntoba 2006).

Finally, Pettit and Beresford (2009) have done research on concepts of the critical success factors applied to the HSC, and selected the critical success factors that all HSCM should take into account such as: Strategic planning, resource management, transport planning, capacity planning, information management, technology utilisation, human resource management, improvement, supplier relations and supply chain strategy. (Pettit & Beresford, 2009).

### ***2.5.1 Capabilities of Resilience within the humanitarian supply chain management***

Resilience is the main concept of this research study. Indeed, one ought to evaluate the capacity for a humanitarian supply chain to be resilient onset a disaster. According to the dictionary Merriam-Webster, Resilience is “a body's capacity to get back its size and format after a deformation caused by external stress.”. In other words, Resilience highlights the ability of something to come back to its initial state after some changes (Merriam-Webster, 2014). Carpenter et al (2001) describe three type of resilience: 1) When a body or an organization manage to support external stress and remain as it is, 2) When a body or organization manage

to auto-organize external forces; 3) When a body or organization manage to build a system which learns and adapt itself (Carpenter et al, 2001)

Literature research on Resilience within the supply chain in general still is a new domain. And the studies on the concept within the humanitarian supply chain system are even more inexistent. Blackhurst et al (2011) reinforces this idea in saying that Resilience within the supply chain “still is in its childhood”.

In 2004, Christopher *defines Resilience* as the ability for a system to return to its original state after a rupture. (Chirstopher 2004). Fiksel highlights that resilience is the capacity for a company or a system to survive, adapt itself and grow within an unstable environment (Fiksell, 2006). Ponomarov and Holcomb (2009) go further in the concept, as they linked it to the supply chain per se. They claim that resilience is the capacity for a supply chain to prepare itself for unexpected events, to be able to respond efficiently to the linked ruptures, and to keep maintaining the continuity in the operations even after the breakthroughs (Ponomarov and Holcomb, 2009).

#### 2.5.1.1 *The main proprieties of Resilience*

Resilience is complex and can be divided in three phases (Pettit et al, 2010):

- Before the crisis: Action to reduce vulnerability
- At the crisis point: management of the response
- After the crisis: Until the reestablishment of the socio-eco system.

Resilience depends on the understanding of the concept of vulnerability; in other words, Pettit et al (2010) claims that a supply chain, more or less resilient, will have a different vulnerability when facing unexpected events (Pettit et al, 2010). Indeed, Yossi Sheffi (2005) claims that Resilience is the ability of an organization to successfully confront the unforeseen (Sheffi; 2005). He affirms that this is not new, as it has always been seen as an essential element for success. He goes further than Jüttner and Maklan (2011) by saying that resilience is not only synonym of risk control, but it is the ability of this risk management to be better positioned face to competition and try to gain advantages from the disruption. Finally, Pine (2009) assesses that Resilience is determined by the factors socio-economics of a country. He says that more a country holds a strong social, economic and environmental capital, more it would be able to reconstruct itself quickly. To address these factors for each country allows to understand its capacity for resilience (Pine, 2009).

### 2.5.1.2 *The main capabilities that result in a resilient supply chain*

The five principal capabilities for Resilience that this literature review ought to highlight are: Culture of Risk Management, Collaboration, Visibility, flexibility and agility. All these five concepts are closely linked to each other and allow overall resilience of the supply chain. However, we will highlight the fact that agility, even if it is seen as a capability of resilience, it could also be seen as an alternative or complement to Resilience (Christopher and Peck, 2004).

#### 2.5.1.2.1 Culture of Risk Management

(Christopher and Peck, 2004; Sheffi and Rice, 2005; Sholten et al, 2014)

Associated to this idea of external risks that ought to be managed to control the vulnerability of the chain, Jüttner and Maklan (2011) have positioned the concept of risk management and compliance within the supply chain for a better resilience. They claim that it has the objective to reduce the vulnerability of the chain and though increase its resilience (Jüttner and Maklan, 2011).

Risk management within the supply chain is one of the best ways to maintain a supply chain resilient. It has three main objectives: 1) Reduce the probability that unexpected events occur; 2) Reduce the effect of the rupture; 3) Learn from the past and encompass knowledge to improve the risk management function of a supply chain. (Knemeyer, Zinn & Eroglu, 2009).

Christopher and Peck (2004) claim that to enhance risk management, is to be able to create a culture for risk management in the supply chain. Such culture allows the whole process of encompassing information, and transformation of this information into action. (Sheffi & Rice, 2005). Indeed, Faisal and Shankar (2006) highlight that the important factors for such a culture of managing risk are the share of information, the trust between partners, agility of action and response between the latter, strategic planning, share of knowledge about risks within the supply chain and finally the continuous evaluation and analysis of these risks. Christopher and Peck (2004) reaffirm that such a culture needs to be shared between all actors and sector of the supply chain. Beside the organizational level of such culture, Weick (1993) also emphasizes the importance to have such a risk management vision at the individual level. Another important point cited, is the capacity to acknowledge the risks and to understand them in order to build a stronger risk management culture for the future (Ponomarov & Holcomb, 2009). Christopher and Peck (2004) claim that such acknowledgement and understanding of risks need to be done at three level:

- 1) At the operational level, on the ground where humanitarian give their straight response; Klassen (2013) studied the best way to acknowledge risks at this level, which is through observation of the operational issues.
- 2) At the evaluation level, where the whole relief action is evaluated, when reports are released for the donors and the international community (Christopher and Peck, 2004);
- 3) At the strategic level when humanitarian work on the procurement of resources, and the political (multilateral and bilateral) interactions for the continuity of their relief action (Christopher and Peck, 2004).

These three levels can integrate themselves in the three main stages of relief response to events we have seen in the first pages of this thesis that are Response, Rehabilitation and Mitigation.

#### 2.5.1.2.2 Collaboration

(Chritsopher and Peck, 2004; Jüttner and Marklan, 2011; Pettit and Beresford, 2013)

Collaboration helps to manage response when the supply chain actors are facing unexpected events. Collaboration is the key word of description of supply chain. Outside the structure of their organizations, humanitarians need to work on their collaborative behaviour with the donors, with the government of the recipient country, with other organizations (multilateral or NGOs) and finally with the locals for enhancing services and provide relief on the ground (Wassenhove 2006).

Pettit (2013), defines the collaboration as the aptitude to work with another for common benefices. Jüttner and Marklan (2003) have integrated this capacity at the three levels we have detailed above (operational, strategic and political). Real time collaboration allow companies to have choice within its suppliers and switch if needed which give them much more ability be resilient and mark the difference in market share (Pettit, 2003). Indeed, Humanitarian organization need to enhance collaboration with all donors, in case of a Bid that does not t happen fast enough when an event stroke (Kovacs and Spens, 2007). Ponomarov and Holcomb (2009) associate resilience to collaboration when the management of the supply chain is able to maintain connectivity between all its actors. Craighead (2007) highlights the importance of information sharing and communication for collaboration. Indeed, within the humanitarian supply chain, overlaps of activities between actors happen easily, this is the reason why communication between all shareholders and actors is essential for better effectiveness (Kovacs and Spens, 2007). Hardy et al (2003) and Power et al (1996) emphasize that collaboration is closely linked to risk management as it helps information sharing, the construction of knowledge and the transformation of this knowledge to collaborative actions (Hardy et al, 2003;

Power et al, 1996). Indeed, Christopher and Peck (2004) agreed with this concept by saying that collaboration allows better resilience as the information sharing reduce uncertainty for better action.

#### 2.5.1.2.3 Visibility

(Christopher and Peck, 2004, Jüttner and Marklan, 2011; Brandon-Jones et al 2014)

The concept of visibility in the supply chain is defined by Francis (2008) as the localisation and the transition of all status that transit within the chain. Statuses are therefore seen as information, messages, values, and decisions beside the actors per se (Francis, 2008). A successful supply chain functions from the beginning to the end, and need to be visible from one way to the other (Christopher and Peck, 2004). Data needs to be visible across the whole chain to enable early warning of risks, and therefore better risk management. The supply chain resilience needs to enhance good visibility for effectiveness and it could be summarized in the share of relevant information (Jütner and Marklan, 2011). Enabling visibility within the supply chain requires use of technology and expertise at the top level of management (Heaney, 2013).

In humanitarian sector, information sharing, data sharing on transit, products, needs, availability of stocks and distributing points available and reachable enhance the whole visibility of the chain, and therefore its capacity to be resilient (Maghsoudi, 1996). Increase supply chain visibility improve humanitarian operations by providing data for more effective decisions. Maghsoudi (1996) highlight a common set of visibility needs in the humanitarian sector: Robustness (to the contextual challenges); tracing and tracking of products and inventory (important visibility need, it helps to gather information needed for management decisions); share information (as the whole humanitarian system is, by nature, uncoordinated and fragmented); information technology, such as software for monitoring and reporting also increase visibility (Maghsoudi, 1996; Kovacs and Spens, 2007).

Indeed, several mature technologies help tracing and tracking process of humanitarian supply chain. Barcodes (1D and 2D) allow data capacity attached to products; Radio Frequency Identification (RFID) is like barcodes (chip) within products that enable suppliers to change data if needed. Global Positioning System (GPS); it reports time, location and movement of the products. Mainly used to track vehicles, it can be used in the most distressed regions (Maghsoudi, 1996). Technology linked to mobile phone is also used for the visibility of humanitarians supply chain (SMS), however it depends on the state of the infrastructure of the country. Finally software such as Helios, Eden and Resource Map allow humanitarian to better

track their resources, their supply and allow a better accountability and therefore transparency of their action (Privett; 2014).

Craighead (2011), goes further in associating visibility to the supply chain's resources acknowledgment and by linking it to risk management as it enable better prevention top down or bottom-up processes. Indeed, visibility contributes to the supply chain resilience as it allows all its actors to be aware of the ruptures and risks in a part or another of the chain in order to mitigate effectively their consequences (Craighead, 2011).

Visibility is also a capability present in all the phases of the disaster's response. At the mitigation and preparation phase, it helps for the anticipation of events and risks, at the response phase it helps for coordination and therefore reduce overlaps, at the rehabilitation phase it allows better acknowledgement and transparency for further resources procurement. (Wassenhove, 2006).

#### 2.5.1.2.4 Flexibility

(Jüttner and Marklan, 20011, Scholten, 2014, Sheffi and Rice, 2005; Weick; 1993):

It is defined as the aptitude of a system to adapt itself and to react to the modifications of its environment. Supply chains need to be flexible enough to allow rapid recovery after disruption, and therefore to be resilient (Schutz and Tomasgard, 2009).

Flexibility is present at two points of the supply chain, inventory flexibility (which follow quantity in the demand) and distribution flexibility (that allow to make change in the deliveries time and location). These two points are therefore essential for resilience of humanitarian supply chain (Schutz and Tomasgard, 2009). Jüttner and Marklan (2011) define flexibility as the capability to change options quantity and heterogeneity in order to deal with uncertainty, alterations and changes in the market.

Flexibility also passes by the ability to forecast demand and enable performance of the chain (Zhao, Xie & Leung, 2002). Uncertainties is the keyword of humanitarian sector, it reduces reliability in terms of delivering at right time, at right amount and quality to the beneficiaries. Therefore operating in a flexible supply chain helps humanitarian organizations to rapid adapt themselves. Therefore flexibility is essential to risk management as uncertainty predominates (Chen & Yano, 2010).

Flexibility is also present at all stage of response to disasters. Skipper and Hanna (2009) suggested the existence of planning processes that can enhance flexibility at the mitigation and preparation phase (Skipper & Hanna, 2009). At the response and rehabilitation phases, the possibility to change products (postponing, we will look at this concept with more details in the

part which focuses on agility) and distribution points also is part of the flexibility capability of the supply chain.( Kleindorfer & Saad, 2005). Beside postponement, Tang (2006), emphasizes other strategies that enhance flexibility, such as pre-positionnement of stocks, decentralization of stocks, alternatives for transport (boat, bike..) (Tang, 2006). Bode et al (2011), also claim that the existence of emergency stocks (safe stocks) is also a precondition for flexibility (Bode et al, 2011);

Sheffi and Rice (2005) highlight the important link that exists between flexibility, risk management and collaboration. They say that flexibility of activities of the actors enhances collaboration and therefore a better risk management for overall resilience of the supply chain.

Flexibility is closely linked to the capacity of agility, and can be therefore confounded. Following Goranson (1992), the main differences between *agility* and *flexibility* is that flexibility is a planned adaptation to unforeseen circumstances, whereas agility is an unplanned adaptation to unforeseen circumstance. In this thesis, as we treat humanitarian supply chain, which is therefore a concept that deals with uncertainty on the event that could happen, the damages and the needs later on, these two capabilities could be easily confoundable. In humanitarian supply chain, the actors show flexibility through their way to plan intervention. Prepositioning stocks and decentralizing the supply chain are the two mains examples of flexibility' s capability within humanitarian supply chain (Sheffi and Rice, 2005).

#### *2.5.1.2.4.1 Decentralization: A pre-position of stocks*

##### *Sources of supplies*

The figure 8 highlights the lifecycle of a relief operation and the resources deployed. Organizations need to provide the beneficiaries with critical items and service in a limited time. (Balcik and Beamon, 2007).



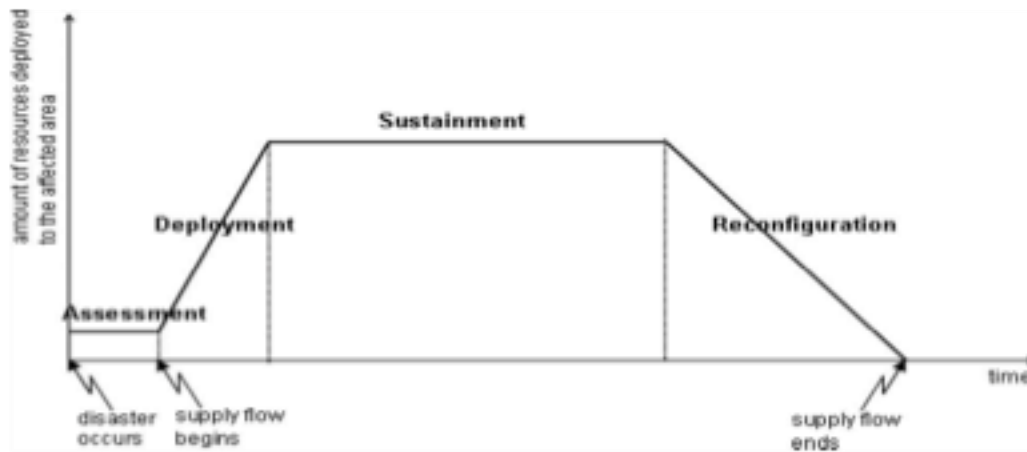


Figure 8: The lifecycle of a relief operation (Balcik and Beamon, 2008)

Balcik and Beamon (2007) state that the sources of supplies have three different forms: local, international and prepositioned stocks (those already on the place of the disaster).

Using local suppliers helps to boost local economy. Transportation costs are low due to short distance to the damaged area. However, relying only on local suppliers is risky as they also might be victim from the disaster.

Using international suppliers offers a bigger choice in terms of products. However the delivery time is longer and transportation costs higher. When targeting international suppliers, humanitarian organizations often invite them to bid (bidding process) in order to evaluate in better terms of costs the offers comparing them to competitors. (Balcik & Beamon, 2007) However, as this process takes time, the humanitarian organizations usually sign pre-purchasing agreements with suppliers. Integrating suppliers to the supply chain could streamline the chain, but still today it isn't a common procedure (Balcik & Beamon, 2007).

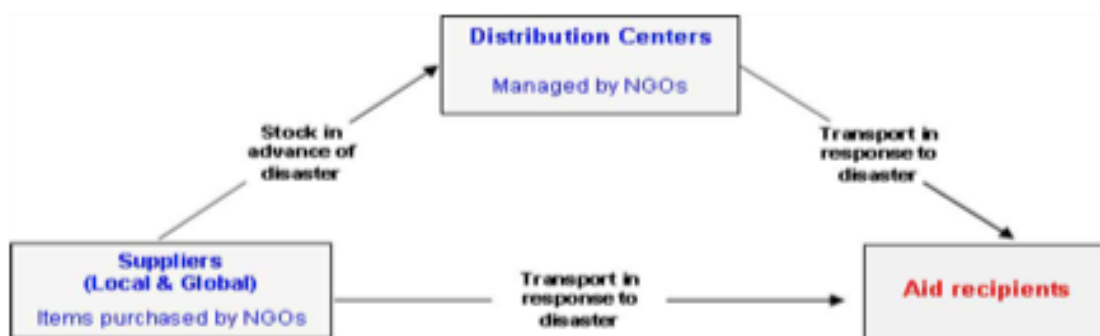


Figure 9: Three possible sources of supplies for humanitarian organizations (Balcik and Beamon, 2007).

Because of the weight of time consuming within the management of humanitarian supply chain, Humanitarian Organisations often stock ready-to-dispatch items in location where it can be quickly deployed. Using hybrid method (meaning in the first time after the onset of the disaster to use ready-to-use stocks and on the second time call for global and local suppliers) is the most common used method nowadays. Using this strategy allow humanitarian organization to maintain a certain flexibility in case of unforeseen events, which they commonly deal with (Balcik and Beamon, 2007).

#### *2.5.1.2.4.2 Decentralization's main issue: Decisions regarding facility locations*

According to Balcik and Beamon (2007) decisions on facility location directly affect the performance of relief operations, since the warehousing and their inventory level immediately impact response time and costs. Many humanitarian organizations have avoided the use of stockpiles, (complicated and expensive), however as we have seen above, using only suppliers is risky. Roussel (2008) claims that in a supply chain, transport costs account for 62% of the overall costs. Therefore he recommends that the sourcing of goods must be the closest possible to the beneficiaries.

Roussel (2008) concludes his study by highlighting the fact that locations must be chosen in concordance with relationship with authorities, the political stability of the area, the coherence with ongoing operations, the access to reliable transportation infrastructures, possible constraints to imports and exports, opportunities for sourcing and the presence of partners.

The number of warehouse also plays an important part in the decentralization process of the chain. It is commonly known within business literature that supply chain must increase its stocks within fewer warehouse (to reduce costs of warehousing), however according to Roh, Beresford and Pettit (2008), with fewer warehouses in the relief chain, there is a greater pressure on transport: Increase lead-time would then cost in term of human lives. They affirmed that some international humanitarian organizations such as the WFP allow NGOs to store their relief goods in the warehouses of their network. The existence of such warehouses simplifies the work of logisticians.

#### 2.5.1.2.5 Agility

(Christopher and Peck, 2004, Wieland and Wallenburg, 2013; Oloruntoba and Gray, 2006):

Agility is defined as the capacity to answer quickly and adequately to short term changes that concern demand, supply and the environment (Lee, 2004). This part will be more descriptive as agility is the most important capability for resilience of a SC (Kenda and Wachtendorf, 2003; Christopher and Peck, 2004; Jüttner and Marklan, 2011; Wieland and Wallenburg, 2013).

The term of agility begun its way within literature on management at the beginning of the 90s when Womack et al (1991) popularised the concept of lean production, which was already the main object of Krafcik's work (1988). However, it was only in 1999 that literature gave a clear picture of the concept of agility when Yusuf (1999) has published his work on this concept in the *International Journal of Production Economics*, which focuses on agile manufacturing as a whole. He was the first to claim that agile systems of management have to be flexible, to use technologies, information, visibility and knowledge in order to respond quickly to demand, and be able to face unpredictability within this demand. Gunasekaran (1998) went further by affirming that indeed, agility is the key for strong competitive organization.

The concept of agility in supply chain would therefore be defined as the ability of the whole network to gain competitive advantage through rapidity of response and flexibility to uncertainty (Sharp et al, 1999; Christopher, 2000; Zhang and Sharifi, 2000; Swafford et al, 2006; Wieland and Wallenburg, 2012). Marksell (2001) defines it as "the ability to thrive and prospers in an environment of constant and unpredictable change".

Van Hoek (2001) gave the definition, which would correspond the most to our domain of research: He claims that agility is about the organisation capacity to be responsive to customers and market turbulence. Bennett and Kottasz (2000) also claim in this way, that as the customer to satisfy within humanitarian supply chain (the one who is source for revenues) is the donor, therefore agility should address the volatility of funding. Instead of addressing volatility of demand, humanitarian supply chain- and here remains the main difference with commercial supply chain- needs to address volatility of supplies.

Within commercial SCM techniques, an agile supply chain has shown being able to respond to volatile and dynamic markets (Aitken et al; 2002). Van Hoek (2001) affirms that agile supply chain are better integrated within other organisations and show better responsive capability. Indeed, the concept of agility captures how organisations can resume productive capabilities through level of knowledge and skill, innovation, management new techniques, and

physical facilities (Aitken et al; 2002). Lin emphasizes that change and unpredictability of business require the SC to be agile, which would enable organizations to meet market queries while being more cost efficient, and therefore mitigate risks (Lin et al, 2006). Indeed, Manuj (2008) claims that uncertainty would therefore be under control when a supply chain proves to be flexible through both its resources and coordination with other actors.

Finally, as for the other capabilities for Resilience we have seen before, agility is linked to them: Indeed, Christopher and Peck (2004) associated the notion of agility with **visibility** and **speed**. According to them, being agile is being able to hold a global and clear vision of all the elements and process that compose the chain. But it is also combined with the capacity to be able to take decisions quickly. Indeed, Bakshi and Kleindorfer (2009) associated also the notion of speed with the capacity of the system to reconfigure itself after a crisis. Jüttner and Maklan (2011) go further deep in the link between speed and agility claiming that more quick are the actors in their decision making, lighter would be the losses in claiming that speed actually holds the most important role in the preparation, the response and recuperation phases (Jüttner and Maklan; 2011). Agility could also be associated with **flexibility**. (Scholten et al, 2014; Jüttner and Maklan; 2011). The authors affirm that flexibility represent the network's reconfiguration of the chain. Finally, Wieland and Wallenburg (2013) go further in their research claiming that agility can be made possible only through **collaboration** and cooperation of the different actors of the chain.

#### *2.5.1.2.5.1 Why humanitarian supply chain needs to be agile?*

The relief industry has overlooked commercial techniques for their management of supply chain (Frenton, 2003; Rickard, 2003). However, as the pressure from the donors that request accountability in the relief missions is increasing, commercial techniques must be assimilated for a more resilient supply chain. Researches have suggested that by adopting agility's technique from commercial supply chain management inputs, NGOs will tend to increase supply chain efficiency while deepening the effective use of their resources (Frenton, 2003; Rickard, 2003). Indeed, supply chain agility and resilience are the two main determinants of the pre-disaster and post-disaster supply chain performance measures. In brief, to be able to regain quickly its original state, in other words, to be able to proceed to resilience, a humanitarian supply chain has to show agility. (Kovacs & Spens, 2007, 2011; Holguin-Veras et al, 2012).

In humanitarian supply chain, performance is measured in term of human lives, rather than in terms of surplus in stocks. All the actors involved in the network operate to serve the mankind and to ensure that recovery can be done. (Holguin-Veras et al; 2012). The complexity

of the chain depends mostly on the nature of the supplies and which are heavily needed. This requires the chain to be agile, to be adaptable and to have capacities to recover quickly, which means to have resilient properties. (Charles et al, 2010).

These past years, academics have noticed that donors have increased their request in transparency and accountability from NGO's in return for their sponsorships (Holguin-Veras et al; 2012). As Donors are the only financial resources of the humanitarian supply chain, humanitarian organizations seek to meet these conditions in order to gain long-term commitment from the latter. Therefore, they will tend to include more professionalism in the management of their operations, thus the supply chain (Thomas and Kopczak, 2005). Indeed, humanitarian supply chain differs from its commercial counterpart on the origin of its financial resources. Donors fund NGOs and other relief organization, however as recent financial crisis but also the multiplication of disasters around the world have increased money consciousness of the former, organizations are more and more asked to provide transparency on the allocation of those resources, and efficient results (Roh et al, 2008). Oloruntoba and Grey (2009) advised that a lack of efficiency today directly result in the loss of funding.

The importance of agility for improving the resilience of supply chain management is explained in the different works of few academics specialized in the area. Agility within supply chain network; but also integrated by all the actors of this network, is seen as the most important element for resilience (Christopher and peck; 2004). Indeed it is necessary to be agile in order to be able to respond quickly to unpredictable events (Pettit and Croxton; 2010).

When disasters occur, NGOs have to quickly set up a supply chain management to alleviate the victims. Similarly, to commercial supply chain, relief supply chain involves process of planning and controlling the flow of goods and information in a cost efficient way. However, unlike commercial supply chain, demand cannot be anticipated. Therefore, a high level of agility is required (Thomas and Kopczak, 2005).

The composition of relief supply chain is also a reason why it has to be agile. Humanitarian supply chain is composed of various actors and they are all engaged within a unique objective: provide relief to save human lives (Rameshwar Dubey et al 2014). According to the empirical work of Dubey et al (2014), the probability of failure of a humanitarian supply chain network under pressure by external forces will be higher is the number of players is also higher. The authors claim that more players also means a higher need for agile supply chain. They will have to increase reliability between them to be agile. This will help them to reduce the risks and build a mitigation strategy (Rameshwar Dubey et al 2014).

To be agile, a chain needs to be integrated. Which means that all organisations within the chain need to be integrated to achieve agility (Van Hoek et al, 2001). Indeed, as Power

(2001) emphasized, the effectiveness of an organisation's response is determined by the effectiveness of all its partners, therefore integration is one of the solution for agility. Integration must be intern and extern for better results on global resilience. They define agility as the ability for the chain (integrating all actors from the suppliers to the beneficiaries) to adapt itself to the changes within the market, the external crisis and events. The agility of each of those actors within their field of action will contribute to the whole agility of the chain (Power et al; 2001).

In the figure 16, Hoek et al (2001) have illustrated the elements of an agile supply chain. They claim that to be agile, organisations must share knowledge and information (network integration). Technology is the key to virtual integration that would help this bigger network integration. However, beside this, achieving market sensitivity requires the incorporation of the principle of postponement. (Hoek et al; 2001).

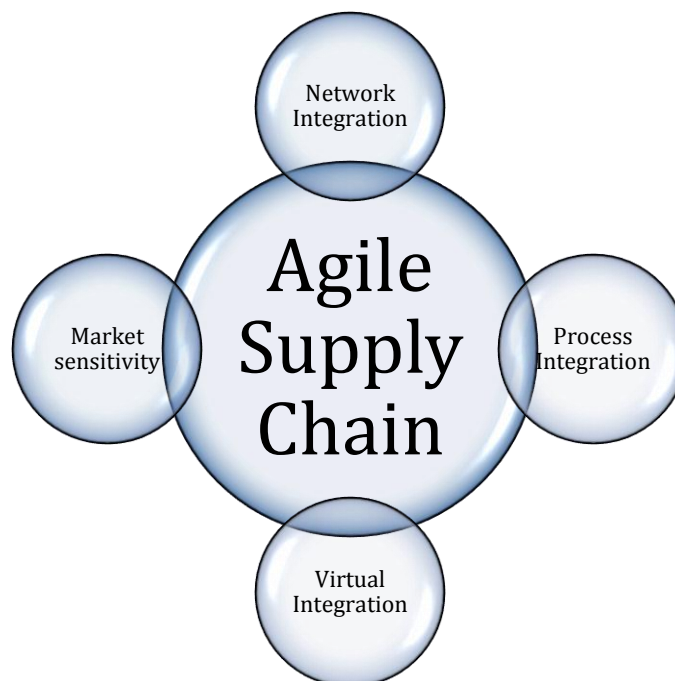


Figure n°10: Elements that make a supply chain agile (Hoek et al, 2001)

As decentralization and prepositioning stocks could be seen as elements from the capability for flexibility, stock postponement can illustrate the capability for agility.

#### *2.5.1.2.5.2 Concept of Postponement.*

When a supply chain faces uncertainty of demand, which is quite the case in the relief sector, there is a concept withdrawn from commercial management techniques, which is the

concept of postponement. Aitken claims that postponement is the main building stone of an agile supply chain (Aitken et al, 2002).

Hoek (2000) defines postponement as the realization of agile vision through the use of various common platforms that would help the identification of the customer for further production adaptability. He affirms that this reduces uncertainty, and thus increase efficiency in the production. The response will be therefore more sensitive to the demand (Hoek, 2000).

In order to enhance agility, the material decoupling point of a commercial supply chain (the ultimate point within the supply chain where the products still doesn't have its final form) should be one of the last of the chain. It means that once the demand is certain, the last step of the chain before distribution would be the product's assembling (Stevenson and Spring, 2007). In other words, the decoupling point is when the product takes the shape that the customer needs, therefore it would be defined as the moment for customization within the supply chain (Van Hoek, 1997). Indeed, Olorunfoba and Gray (2006) suggest that organisations hold generic instead of prepositioned stocks, which would be a better strategy to respond to the closest way possible the evolution of the customer's needs. Market sensitivity would thus be better achieved by NGOs.

Christopher and Towill (2000) affirm that an agile supply chain also holds an information decoupling point (The point where the information on demand enters the supply chain, and therefore helps for better forecast). They claim, therefore, the existence of two decoupling point as source for agility for a supply chain: The first one would be the customization point that should be as far as possible downstream and; the second one the demand information, (which inform on the demand, the needs, the consumer) which should be the most upstream possible (Christopher and Towill, 2000). They think that these two decoupling points would therefore create a supply chain able to combine leanness, efficiency upstream, agility, and effectiveness downstream. Indeed decoupling point of the informative level also would facilitate market sensitivity (Christopher and Towill, 2000).

Both in the preparedness and response phase, Humanitarian Organizations constantly need to find the right equilibrium between efficiency and speed (Pettit & Beresford, 2009). For this, they can postpone the differentiation of goods as close as possible to the demand in order to reduce the risk of uncertainty. They speculate by sending not finished stocks to decentralized locations (Pettit & Beresford, 2009).

Postponement is found within manufacturing and logistics. Logistics postponement means delaying the forward moving of goods through the supply chain in order to find the best locations for decoupling points (Jahre, Jensen & Litsou, 2009). On the other hand,

manufacturing postponement relate to the final product formation at the most disaggregated level of the manufacturing process (Jahre, Jensen & Litsou, 2009).

	<b>Logistics speculation</b>	<b>Logistics postponement</b>
<b>Manufacturing speculation</b>	<i>Full speculation strategy:</i> preparedness through prepositioning stocks of finished goods at decentralized points	<i>Logistics postponement strategy:</i> preparedness through centralized stocks of finished goods and investments in transport and goods handling capacity
<b>Manufacturing postponement</b>	<i>Manufacturing postponement strategy:</i> preparedness through prepositioning semi-finished goods at decentralized points. Assembling, bundling, packing and labeling goods locally	<i>Full postponement strategy:</i> preparedness through investing in relations with suppliers of semi-finished goods and investments in transport and goods handling capacity

Table n°3: Alternative postponement / speculation strategies (Jahre, Jensen & Listou, 2009)

Humanitarian organizations can postpone logistics by making agreements with suppliers and logistics service providers (3PL), or they can speculate with the occurrence of disasters by decentralizing their distribution network (Jahre, Jensen & Litsou, 2009). For this, humanitarian supply chain needs to have an effective informative infrastructure and good evaluation and assessment tools on the field level to enable this final postponement of stocks and thus a good responsive action (Jahre, Jensen & Litsou, 2009).

*2.5.1.2.5.3 Agility through the different phases of a disaster’s response*

How agility can be evaluated within all the pre and post phases of the disaster? **The mitigation** phase is essential as it gives space for the creation of relations between the capability to be agile, but also other capabilities of the chain that help resilience, such as capabilities of collaboration, flexibility and visibility (Christopher and Peck, 2004). This relation’s build up results in the gathering of plausible options of future actions in case of the onset of a disaster.

When humanitarian supply chain management faces the onset of a disaster, it will have to modify its general functioning. Craighead (2007) defines the **preparation phase** as the moment for the supply chain actors to articulate their options (established prior the disaster) in order to reduce the negative impacts that will follow the onset of the disaster. Sheffi (2005) reinforces the fact that this articulation has to be fast especially when knowing that one of the main characteristic of a disaster is its unpredictability (Sheffi & Rice Jr, 2005). The lapse of time, which can exists between and alert, a warning, and the disaster’s onset could last few minutes. The preparation phase is reserved for the actors to plan the best actions that could



result in a strong mitigation of the negative impacts of a disaster. This planning has to be quick in order for the supply chain to respond more efficiently to the disaster. Speed resulting into agility helps the supply chain to be resilient, and therefore respond efficiently to rupture and disasters (Scholten et al, 2014).

In **the response phase**, agility consists in being the best way to respond adequately to disasters. As humanitarian supply chain has to deal with uncertainty, emergency, and constant objectives dismantling, they ought to be agile (and thus put into practice all the agility's capabilities) to be able to reduce the number of victims (Scholten et al, 2014)..

In the **recuperation phase**, agility plays the role of reallocation of resources, tracing and knowledge building. One could then see agility illustrated as the capability of the chain to learn from the past event, and the management decisions within the response phase in order to improve resilience for future events (Scholten et al, 2014)..

### 3. Methodology

This thesis aims to present a qualitative research, which consists of an investigation that seeks an answer to a question; and for this it uses predefined set of procedures, collects evidence, and products findings applicable beyond the boundaries of the study. (Bernard HR; 1995). Its ability to provide textual description on the human side of an issue makes it its main strength. (Pope C, Mays N; 2000). The three main methods used in a qualitative research are participant observations, interviews and focus group. This qualitative research aims study *what makes a humanitarian supply chain resilient, and the relevance of the capabilities for resilience within humanitarian supply chain and their identification within the case of the typhoon Yolanda.*

First, the research approach needs to show a certain justification of the rationale, which is behind the research (Eisenhardt and Graebner, 2007). In our case the research is explanatory as it asks *what* makes a humanitarian supply chain resilient, *why* it needs to be resilient, and *how* from the theoretical background and with the concepts we have highlighted in the literature review help us to identify them on the field.

Even as a single case study, the case of the typhoon Haiyan (also named Yolanda) was chosen for two initial purposes: first, because it was the strongest typhoon that ever landed on the Philippines; and then, beside the human, social and economic disaster it represented, this typhoon became the milestone of a whole new humanitarian approach toward their long-term actions in the country. This case was also chosen because of the inputs it offers to the main concepts of the literature review on the resilience of humanitarian supply chain.

In the literature related to qualitative research methodology, Voss et al (2002) has highlighted that fewer the number of case, greater is the depth for observation. As I have chosen to focus on one historical case, I had the opportunities to go deeper in the humanitarian supply chain that got evolved after the typhoon, and had the opportunity to drive two interviews.

There are various data sources one can use to build a qualitative case study, and the combination of these sources has allowed me to use a multiple method or triangulation method for the use of those different data (Choi and Hong, 2002) for their increased reliability (Benbasat et al, 1987). The data sources I used are mainly:

- **Interviews:** My research is based on two interviews (semi structured and open-ended) that took place through the exchange of emails, written questions-answers and some Internet based conference calls. I didn't record them, however, I have a written base for general questions I have asked at my first contact (Annexe 2 and 3). My contacts helped me to understand how resilience could be explained within the humanitarian world through the Yolanda's case. I had the opportunity to speak with them at many times, which allowed me to deepen my findings, and to understand the real connection that exists between my literature review and the activities of their organizations in the Philippines. The protocol of the interviews is situated in Appendix. I have built this protocole following the main findings of the literature review. After my first contact (while still studying the literature) had few questions from the protocol. However through the other contact I had with these two interviewees, I managed to develop in more depth the other questions present in my protocol.
- **Archival sources:** I based my qualitative research on other sources such as reports from the USAID, European Commissions, Oxfam and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and official reports from the International Federation of Red Cross and Red Crescent (IFRC). This other type of sources provided space for comparison between what was generally recorded after the onset of the disaster and how the latter was experienced internally speaking with the NGOs interviewed. The interviewees gave me some sources that are common in their everyday work. I also found some of the archival sources on the website of the organizations and NGOs.

The multiple data sources collected for this case study, allow the researcher to give insight and highlights the concepts and findings from previous studies and summarized in the literature review. (Yin, 2009). To allow deeper observation and avoid confusing outcomes, the case study focuses on humanitarian supply chain field in the Philippines (Zahra et al 2000);

Therefore , I chose two French NGOs that acted in the Philippines during the response; rehabilitation and mitigation phases post Yolanda. These NGOs were selected for the facility of contact we had with their mains representatives and their unique and strategic place and role they played within that humanitarian supply chain. The NGOs activities have participated to the conception of Resilience. Indeed I have noticed the manifestation of the main capacities for resilience highlighted and explained in the literature review through the study of the organisation's activities and through my direct contacts with each one of the interviewees. They are the following:

- Flexibility
- Collaboration
- Visibility
- Culture of risks
- Agility

Finally, the case building went through the linkage between the existing literature that allowed the thesis to have a base for explanation for a question asked and the new findings in a pattern-matching approach, which explores theoretical replication to the Yolanda's case. (Yin, 1998).

#### **4. Data Presentation and Analysis**

For the result analysis, as humanitarian supply chain works on a chronological line, this chapter will undertake another approach: It will first encompass all activities from the organizations interviewed within the four phases of relief intervention (chronological approach). It will then allocate each one of these activities, strategies, and managing decisions within the five capabilities of resilience the thesis has previously highlighted (qualitative approach). The results will then be divided according to the five main capabilities that make a humanitarian supply chain resilient: Flexibility, Agility, Risk Management, Collaboration and Visibility. It will look at the application of those capabilities to what happened in the Philippines in 2014 through the response, rehabilitation and mitigation phases that followed the typhoon. Indeed, as the two organizations contacted have entered the Philippines right after the onset of the typhoon, it is therefore difficult to assess the preparation phase; however as typhoons are common in the Philippines, the mitigation phase post Yolanda can be analysed in this way.

The analysis will link the literature with the results. The two contacts in the Philippines that had accepted to answer to the research's questions are a Executive Director from France-

Philippines United Actions, an organism from the French Chamber of Commerce which aims to redirect all funds received from France (Private and Public) for NGOs acting in the Philippines, and the Philippine's Country Director of Acted that has played a deciding role after the onset of the typhoon Yolanda.

Furthermore, all data presented in this chapter are based on the results issued from the interviews and some archival data with due references.

#### **4.1 The Typhoon Haiyan (Yolanda) and the humanitarian actions.**

##### **4.1.1 *The Philippines***

The Republic of the Philippines is situated in the southeast of Asia. The country is constituted of more than 7000 islands, but only 2000 are inhabited. The islands are mostly volcanic, and most of them still are active. Situated on the tectonic barrier with the American continent, the country still is victim of volcano's actions, earthquakes, typhoons and strong rains that still shape the physics and geography of the archipelago (Gultiano et al, 2003)

In 2009, the World Bank has made a list of the threats that are arising caused mainly by climate change (droughts, floods, storms and rising sea level) and made a list of the 12 countries at higher risk from the climate change (Irin News Report; 2009). The Philippines are number 5 on this list. It leads the list of the nations most in danger facing strong storms and typhoon. The Typhoon Yolanda remains one of its strongest and most deadly typhoon never happened in the history of the country. (Irin News Report; 2009)

In 1992, the Convention of United Nations on Climate Change (CUNCC, 1992) had retained eight factors that characterise countries that can be affected by climate change. The Philippines presents most of them:

Characterisations recognized from UN	Philippines
Country with low altitude (p.19 Art 4.8)	Yes
Country with coastal zones (P.19 Art 4.8)	Yes
Country with zones of forest (P19 Art 4.8)	Yes
Zones exposed to floods and droughts (P 19)	Yes
Country exposed to natural disasters (art 4.8)	Yes
Developing country with fragile ecosystem (P 19 art 4.8)	Yes
Country exposed to pollution (art 4.8)	Yes
Pays without littoral (Art 4.8)	No

Table 4: The Philippines is vulnerable to effects of climate change, (CUNCC, 1992)

Furthermore, socio-economic factors also play an important part in evaluating the risks. The country director of Acted Philippines has stated that 25,2% of the population is poor, and disasters have tendencies to affect them dis-proportionately, making them more vulnerable to stresses.(Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016)

As seen through the literature review, logistics in humanitarian operations is vital. It holds the most essential role during humanitarian operations in allowing the linkage between different stages of the operations. However, most importantly, it can define the effectiveness and efficiency of humanitarian operation through its capacity to make it resilient especially during the prevention phase which predicates the capacity for humanitarian organisations to be best prepare for the future onset of disasters. (Thomas, 2003).

#### **4.1.2 The Typhoon**

The Philippines has a strong history of deadly typhoons.

Since 1964, 49 typhoons have passed through the archipelago.

The deadliest were : Emma (1967) ; Georgia (1970) ; Joan (1970) ; Kate (1970) ; Patsy (1970) ; Rita (1978) ; Betty (1987) ; Nina (1987) ; Mike (1990) ; Angela (1995) ; Zeb (1998) ; Babs (1998) ; Megi (2010) ; Haiyan (2013). However smaller typhoons have also passed through the country on average every two years ; but since 2010 17 typhoons have happened (in 5 years !) (The National World Newspaper ; issued on the 8th November 2013).

Typhoons are cyclics in the country, and this cyclic nature can be detected if the country holds strong data base on the history of its disasters. 2016 will aslo be a typhoon year for the Philippines as the climate change became even more noticeable. (Acted's Country Director,

personal communication, 11<sup>th</sup> of January 2016). The country director of Acted Philippines goes further by stating that « between 1975 and 1994 the philippines have had experienced 162 hydro-meteorological disasters (...) while in the period between 1995 and 2014 the country have had experienced 258 hydrometeorological disasters – an increase of 160%. ».(Acted’s Country Director, personal communication, 11<sup>th</sup> of January 2016)

Despite preparedness and evacuation, on the 8<sup>th</sup> November 2013; the strongest storm to make landfall in recorded history, the typhoon Haiyan (Yolanda), passes through the Philippines at a speed of 235km/h, made more than 6300 dead and wiped entire villages out of the map (Figure 1). 14 millions of people across nine regions of the country were affected on a way or another by the storm. (Humanitarian Response website; accessed on the 25 October 2015) The disaster led quickly to a humanitarian crisis. Some areas were strongly hit such as the province of Leyte and eastern Samar that was out of power, water and telecommunication for various days. (Lum, T. et al; 2014). The economic impact was, and still is, quite important; and the infrastructure of those regions was completely destroyed. In total, 14.1 million people had been affected and around 4 million people remained displaced from their home. The number of killed reached 6,201 and more than 1,785 remained missing. (Lum, T. et al; 2014)

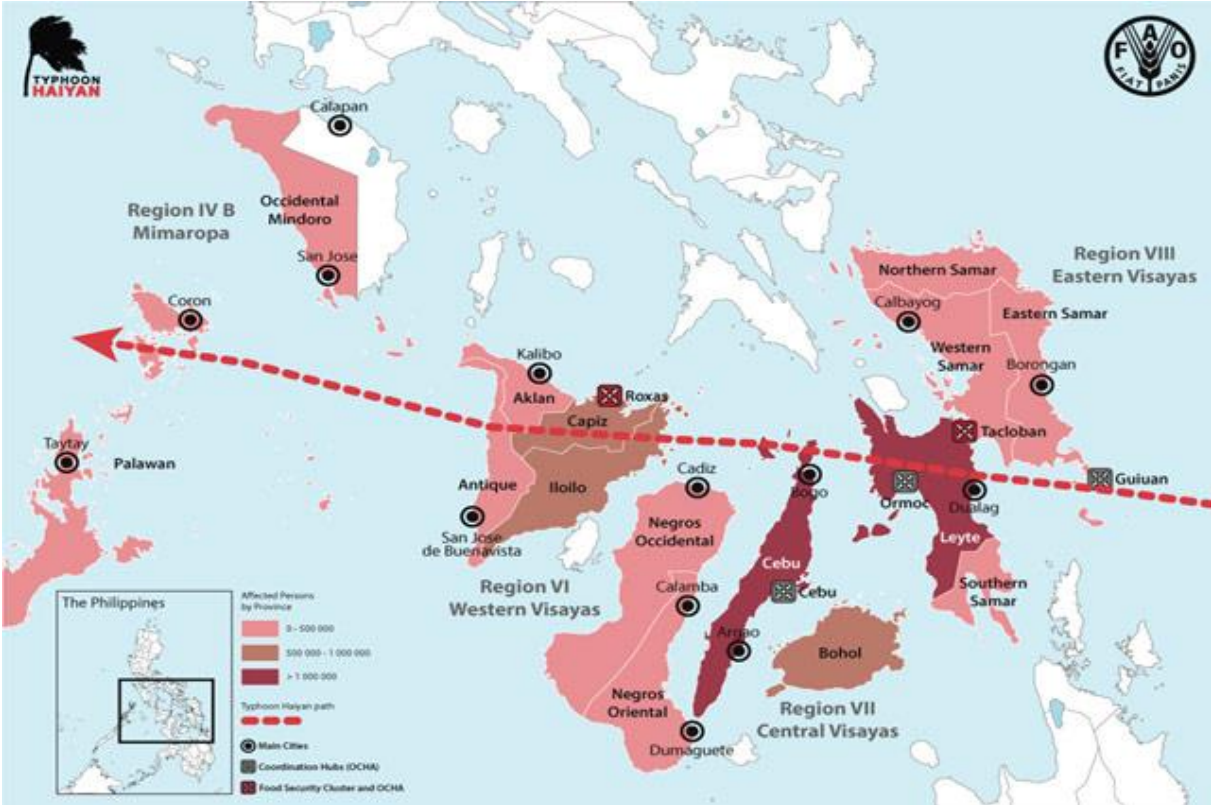


Figure 11: Trajectory of the Typhoon Haiyan and affected regions (www.CNN.com)

### 4.1.3 *ACTED Philippines*

Acted is a French NGO created in 1993 that has been committed to immediate humanitarian relief to support population victimized in providing solutions for their immediate needs, while co-creating longer-term opportunities to sustain the overall resilience of the country and population after a disaster. (Acted website; [www.Acted.org](http://www.Acted.org), accessed on the 12<sup>th</sup> January 2016). Acted is an independent, private and non-profit driven organization that endeavours to respond to humanitarian crisis and build resilience, it aims to promote sustainable growth, helps to build a civil society in the country. It is devoted to support affected population and to accompany them to be able to regain original status through the providing of adapted response to their specific needs; and it ensures the link between Emergency, Rehabilitation and Development and guaranty sustainability of their action on the long term in order to support population on the road for development (Country Director of Acted, personal communication January 11<sup>th</sup> 2016).

Associated with several French, European and international partners (Agence de l' Eau Seine Normandie AESN, Oxfam, Shelter Box, United Nations Development Programme UNDP, United Nations Children's Fund UNICEF, World Food Programme WFP), Acted promotes initiatives in convergence between public and private sector. It aims to cover themes such as transparency, collaboration, coordination and data sharing and risk prevention through humanitarian emergencies.

Acted's main activities are (Country Director of Acted, personal communication, January 11<sup>th</sup> 2016):

- Acted entered in the Philippines right after the typhoon Haiyan, and supported families through the deployment of a quick response plan, two days after the disaster. In the aftermath of the typhoon, Acted distributed shelter materials and non-food items. It also distributed emergency rice rations to 279 000 people.
- On a longer run, Acted has developed its initiative of Cash for Asset program, which ensures the return to normal life of all the population, affected in the Philippines. After Haiyan, Acted has bridged the gap in public service thanks to this initiative by ensuring the collection of infectious wastes from hospitals to prevent the spread of disease.
- In Eastern Samar, Acted has addressed emergency needs for safe water sanitation systems in rural areas. They distributed purification kits and emergency toilets construction kits that ensured the families' access to clean water and hygiene where the infrastructure was the most damaged. Acted also launched sanitation campaigns to

make sure that knowledge was spread among the population for better sustainable results.

- Finally, to ensure the population self-reliance, Acted has looked to support local communities through cash injections with cash-for-asset initiative, which supported affected households to re-establish their original livelihood.

#### **4.1.4 *France-Philippines United Action (FP-UA)***

FP-UA was created after typhoon Haiyan that struck the Visayas in the Philippines, killing more than 6,000 people. Many people lost their homes to the strong winds. At that time, many of the French companies in the Philippines wanted to help. The French Ambassador convened the French business community and suggested them for a consortium in order to channel their resources in the same projects in order to increase and augment the impact. That is how FP-UA was born. It is a coordination and communication platform for all the rehabilitation projects initiated by the French business community post-Haiyan. It was decided at that time that the French Chamber of Commerce and Industry in the Philippines would host and manage the structure as most of the companies involved (Lafarge, Total, Schneider, Sanofi etc) were members. (FP-UA's Executive Director, personal communication, November 20<sup>th</sup>, 2015). It has since then evolved in the Foundation of the French Chamber of Commerce in the Philippines. Its aim is to encourage French companies in the Philippines to get involved in Corporate and Social Responsibility (CSR) projects. The Foundation will link them up with NGOs that already have projects and that are searching for private backers. The FP-UA Foundation will assist and accompany the companies in creating "tailored-fit" CSR projects and activities depending on their resources (be they small or medium enterprises or multi-nationals).

In other words, it was created to give to the NGOs, the governments, the donors, and the private sector a common structure for coordination, collaboration and communication. It has developed short, medium and long-term missions for relief, rehabilitation and mitigation of the disasters. France-Philippines United Action is a task force that coordinates the relief effort from the French business community after the onset of the typhoon. It ensures that relief efforts have the most impact in a sustainable and organized way. Its main activity is to gather relevant information on the project of each NGO acting in the Philippines, provide update on those projects the general needs and share this data among the participants from the French business community (Country Director of Acted, personal communication, November 20<sup>th</sup> 2015),



The key activities of FP-UA are:

- *Coordinate and integrate* information from the projects of the NGOs, to identify them, communicate their objectives to the French business community for them to participate in key projects.
- *Communicate* through digital medias information about French led initiatives
- *Develop interactions* between donors, Assistance Beneficiaries, NGOs to improve relief objectives
- *Engage actively* with local governments and Private Sponsors to develop partnerships with local and international NGOs for rehabilitation projects.

#### 4.1.5 *The overall mobilisation after the Typhoon Haiyan*

The strategic objectives of the humanitarian intervention which followed the typhoon, was to meet immediate food needs, avoid hunger, attain shelter solutions, build food security through the development of nutrition service for families and communities, and through the boost of local markets that were not affected by the typhoon, regain self-sufficiency of livelihoods, re-set a sustaining access to water and hygiene. Undertaking these objectives was seen as the best way to enhance resilience (Lum, T. et al; 2014).

Table 5 resumes the common practice in humanitarian supply chain management thought the 3 different phases studied. These practices were reported by a report from Loquinte K et al (2015), however our local contacts have confirmed the process of the practices. This represents what was the state of humanitarian supply chain, which followed the onset of the typhoon.

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>			

Table 5: Humanitarian logistics framework in the Philippines (Loquinte K;, et al; 2015)

#### 4.1.5.1 *The different phases for relief intervention*

As seen, humanitarian action is divided in three main phases: The first phase corresponds to the ability of the humanitarian logistic to prepare the possibility for the onset of a disaster, the second phase highlights the quick answer that humanitarian provide to the victims right after the disaster, and the third phase mostly show the ability of the whole humanitarian action and supply chain to absorb the choc and regain its original or improved structure of the first phase (Van Wassenhove, 2005).

##### 4.1.5.1.1 Humanitarian intervention Phase 1: Preparation

During the preparation phase, the activities of the organizations were resumed in increasing and fulfilling local area knowledge that was provided by local meteorological entities and ground specialists. They maintained resources and information technology while providing education and training for local authorities on how to manage first relief and evacuation plans (Country Director of Acted, communication personal 11<sup>th</sup> January 2016).

The preparedness phase also included the work from specialists on creating a database on the typhoons' history and evaluating the risks. When meteorologists spot a typhoon, it is closely monitored, and all developments are updated on time. The objective is to be able to make a quick assessment for a response plan if needed (Relief Web Report; 2014, accessed on the 25<sup>th</sup> October 2015). Acted's Country Director has affirmed that investment before the onset of disasters has to be made to enhance the reduction of further vulnerabilities. He added that this phase is the most suitable to the setup of the DRR approach (Disasters Risks Reduction), which is the key to contributing to effective management of Mega trends, which influence socio-eco and political context (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). Further resilience capacities of the HSC strongly depend on the willingness from all actors to rethink development work "in order to alleviate effects of future disasters" (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). He goes further by saying that this first phase needs to witness of major investments at the smallest scale in terms of education and community involvement. He says that it is important to keep in mind that those investments need to be local in order to dress plans of relief that can take into account specific contexts for better response measures (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

At Acted's level, the Country Director of Acted emphasizes the fact that DRM approaches (Disasters Risk Management) have to be at the central of actions of humanitarian action. He

added that the National Disaster Response Plan implemented in 2014 by the government of Philippines need to be updated with those approaches. Acted's objectives is to make sure that its approaches will support the implementation of the NDRP and, vice-versa, to make sure that the NDRP will be efficiently implemented at local level. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

The Country Director of Acted goes further by affirming that Acted has found essential to massively invest in actions for prevention, mitigation and preparation in order to reduce the impact of future typhoons. He says that resilience capacity dwells on those investments, as for example invest in High-density polyethylene tubes instead of PVC that are less resistant to typhoons, rethink the localization of cultivation areas, invest in supporting the farmers to diversify their crops (in the Philippines, coconut production is really important, however a coconut tree needs 5 years before to be productive again after a typhoon); increase the number of evacuation centre and make them more proofing to disasters; or again, improve the robustness of shelters and house (Acted has implemented a pilot shelter reconstruction project in Leyte on the approach of "Build Back Safer", which takes into account the characteristics of a typhoon in this region before to build houses –position of the roof, localities, elevation of the house..- While keeping the prices affordable). He added that all shelters that were constructed with the support of Acted have withstood the heavy winds of the Typhoon Ruby and Amang and Seniang (Acted's country director, personal communication, 11<sup>th</sup> January 2016).

Acted's country director said that the preparation depends mostly on the type of disaster. For predictable disasters such as Typhoons, he says that the most important for any type of humanitarian organization to be able to protect the teams in order to, then, provide better assistance after the onset of the disaster. He said, "we have two scenarios for typhoons; the first is to deploy an assessment team before the landfall of the typhoon to be near the beneficiaries in the regions that will be most impacted, and for this they allocate the teams in safe places they have identified first." (Acted's country director, personal communication, 11<sup>th</sup> January 2016). Indeed, such strategy allows them to be on place right after the onset of the typhoon, without being impacted by transportation issues. "The second scenario is to deploy teams from Tacloban just after the disaster to assess quickly the damages." By doing so, Acted were able to provide relief less than 72h after the typhoon. (Acted's country director, personal communication, 11<sup>th</sup> January 2016). He added that Acted has developed a specific tool in partnership with the PAGASA (Philippines meteorological agencies) in order to receive update of the weather twice a day and every 6 hours in case of risks of typhoon. Such tool allows them to be better prepared.

The other organization interviewed, France-Philippines United Action, was created following the onset of the disaster, and therefore did not take part to the preparation phase before the onset of the typhoon Haiyan. However, as typhoons hit the Philippines every month, The Executive Director of the organization has explained to us what FP-UA is doing regarding future typhoons. First, as the structure became a real foundation (they managed to not be dismantled after Haiyan, as the local NGOs still need their support), they are more legitimate to collate funds from the French business sector in order to redistribute them to the NGOs. Indeed, their role is to investigate ongoing projects from NGOs in the Philippines that act toward reconstruction post-typhoons, and to communicate the needs of these NGOs to the donors (private and public) mainly from France. One might link this to the mitigation phase; however, when we look at disasters that happen often, the fine line between mitigation and preparation is therefore blurred. (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015)

To resume the humanitarian actions during the first phase of relief action in the Philippines, we draw a graphic (figure 11):

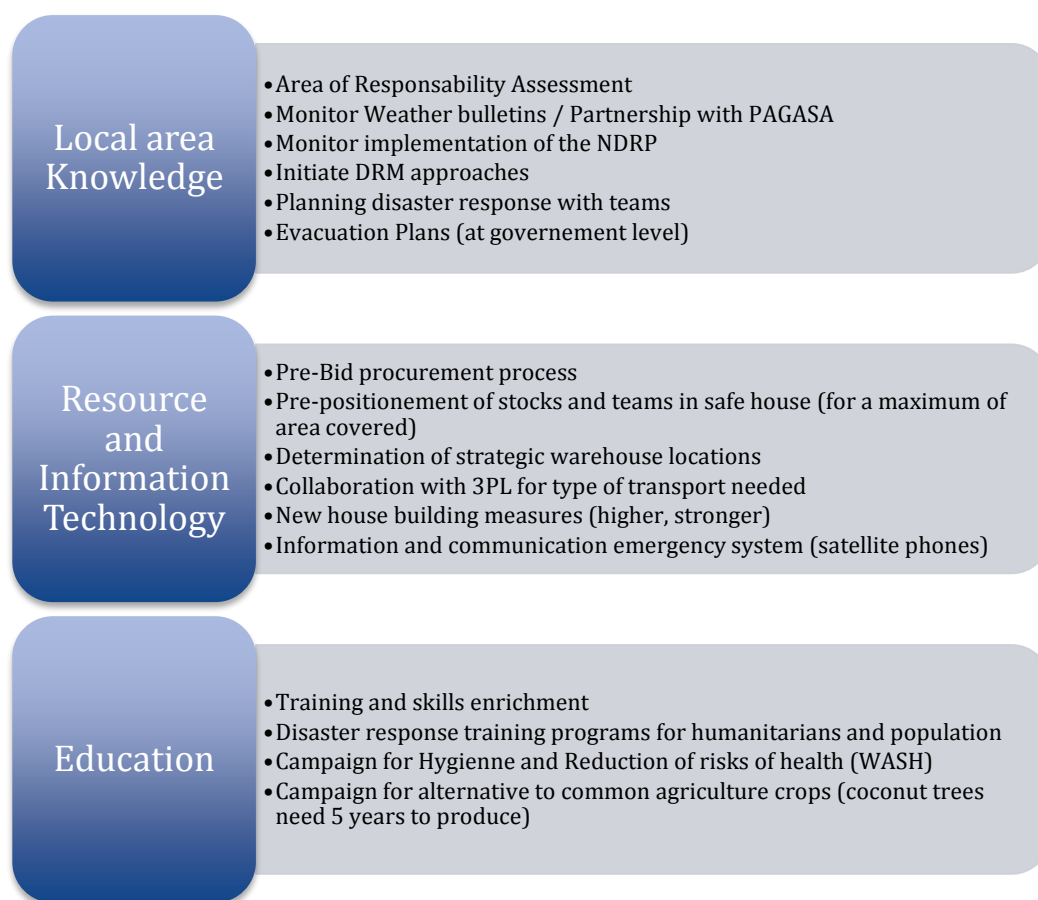


Figure 12: Humanitarian activities summarized in the preparation / Mitigation phase<sup>1</sup>

<sup>1</sup> As typhoons happen every month in the Philippines, we can associate the mitigation phase to the preparation one.

#### 4.1.5.1.2 Humanitarian intervention Phase 2: Relief intervention

During the Response phase, right after the event, humanitarian actors were responsible for the inventory and warehousing management, and fleet management for international and national relief. (IFRC Report, [www.ifrc.org](http://www.ifrc.org), accessed on the 25<sup>th</sup> October 2015).

The coordination of International response was done through the UN on Site Operations and Coordination Centre (OSOCC). However, for the Haiyan case; it started to run effectively one week after the event. The OSOCC was established in Tacloban, one of the 9 regions victims of the storm. Sub-OSSOCs were established in other regions in order to improve the coverage. Various humanitarian organisations worked together to alleviate the need of the victims. However, numerous obstacles such as blocked roads, damaged airstrips and port, insufficient supply of fuel and bad or destroyed infrastructure impeded further efficient relief intervention. (Report from European Commission prepared by ICF Consulting; 2014)

Beside the UN agencies, the actors that took part in the response phase of the mobilisation was local and regional NGOs, Private voluntary Agencies (PVOs) and bilateral or multilateral donors such as western governments. On the date of January 31, 2014, those international donors have contributed for more than \$662.9 million to the relief efforts. (Lum, T. et al; 2014)

#### *Challenges encountered during the response phase*

The first and main challenge that was recorded during relief operations after the onset of the disaster was the fact that the situation has shown an important lack of transportation, limited communication and damaged infrastructures (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015). Indeed, challenges in communication system emerged as governmental units experienced difficulties to reach satellite phones as they lacked. These phones don't need communication infrastructure to function. However as they lacked, coordinate immediate response has shown to be difficult during this critical phase of intervention (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015).

Furthermore, the poor transportation capacity has held back effective response. The Philippine army has stated that most of the lack of delivery of immediate relief goods on the localities resulted in poor transportation capacity. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). Communication was also seen as an important challenge after the onset of the typhoon: Acted's country director told us that it was difficult to have

feedbacks from the assessment of the teams on the field, as the network is out for weeks after the disaster. Finally, the lack of technology led the monitoring of goods to be done manually as it lacked of digital document of inventory. It was then difficult to track donations, as the information on the distribution of goods were not sent to the donors.

How to link resources and capabilities within humanitarian supply chain during the Philippine crisis was the second main challenge. It is closely linked to the lack of communication and infrastructure. Humanitarian organization depended on their suppliers that are various and that is formed through numerous partnerships with different actors. Maintaining coordination with these different actors can be seen as one of the main challenge of humanitarian logistic.

([www.facultyblog.nuimbusiness.ie](http://www.facultyblog.nuimbusiness.ie), accessed on the 3rd January 2016)

Then comes another challenge for humanitarian logistic, which is linked to communication and coordination: the assessment phase of the disaster. It also presents difficulties as local communication infrastructure was broken down. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). After the initial assessment, humanitarian organizations needed to set up areas destined for the reception of the displaced population. The survivors needed to be registered and first relief need to distribute. Initiating humanitarian actions in the region has shown to be difficult, as the place did not have any ports, airports, and road sufficient to receive relief services from the international community. Poor communication also hampered relief activities during the first days following the disaster. The whole mechanism of response was considered as inexistent as distribution and coordination were affected or even impossible because of the lack of infrastructure. (Humanitarian Response website; accessed on the 25 October 2015)

In 2013, Acted focused on immediate response and provided immediate relief to the typhoon Haiyan affected population in the eastern Visayas regions. Acted's teams were on the ground only two days after the typhoons landfall. According to its country director, "Acted was one of the first NGOs operational in Guiuan, Eastern Samar and contributed to the first Multi-Sector Initial Rapid Assessment (MIRA) which was crucial in mapping needs during the emergency" (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

Table 6 presents the key numbers, which represented Acted's action after the typhoon Yolanda.

Emergency Response	
# of people who received emergency rations	323, 366
# Hygiene kits distributed	43, 880
# Water kits distributed	82, 530
# Shelter repair kits distributed	17, 347
Tonnes of medical waste removed from hospitals	7, 000

Table 6: The figures and sectors about ACTED intervention in 2013 and early 2014 after Typhoon Yolanda (also named Haiyan) (built with data provided by Acted’s country director in the Philippines).

Table 6 shows quantitative results on the efficiency of the action of Acted as the organisation was one of the first operational organisation in the most damaged regions.

Below, the table 7 summarizes humanitarian activities during the 2<sup>nd</sup> phase of the Relief effort.

Initial Assessment	<ul style="list-style-type: none"> <li>• Work of the pre-positioned teams for assessment of</li> <li>• Extent of the damage</li> <li>• Number of affected</li> <li>• Status of infrastructure</li> <li>• List of priority beneficiaries</li> </ul>
Inventory Management	<ul style="list-style-type: none"> <li>• Monitoring inventory (use of manual forms)</li> <li>• Inventory Management System with standardized data</li> <li>• Collaboration, use of UN agencies stocks in case of inaccessible areas</li> <li>• Post-ponement of stocks: Build Back Safer kits assembled in one night</li> </ul>
Warehouse Management	<ul style="list-style-type: none"> <li>• Identify list of hubs, warehouses, repacking centers</li> <li>• Collaboration to divide warehouses and related costs</li> <li>• Use of mobile storage units in case of congestion</li> </ul>
Fleet Management	<ul style="list-style-type: none"> <li>• Collaboration with 3PL and locals for alternative to transport</li> <li>• Call for French companies located in the Philippines to use their transportation assets</li> <li>• Schedule delivery for better coordination between organization and related cost savings.</li> </ul>
Procurement Management	<ul style="list-style-type: none"> <li>• Bidding processes for prospective suppliers</li> <li>• In depth work from FP-UA on project analysis and relocation of resources and funds</li> <li>• Deontological study on the suppliers for socio-pol matters</li> <li>• Use of SPS (Standard Procurement System) / Systemic Process Models to ease the procurement process</li> </ul>

Table 7: Humanitarian activities summarized in the Response phase

#### 4.1.5.1.3 The development phase, or third phase

On the 10<sup>th</sup> of December of the same year, Humanitarian partners presented a Strategic Rehabilitation Plan for the Typhoon Haiyan and made the request, for the whole year or 2014, of 791 million of US\$ to complement the government ongoing response. ([www.oxfam.org](http://www.oxfam.org), accessed on the 28th October 2015).

More than two months after the disaster, humanitarian assistance was still needed in the most affected areas. The Philippine government has launched a four years reconstruction program of more than \$8.2 billion named Reconstruction Assistance Yolanda (RAY). This program aims to develop resilience to natural disasters for the years to come. The UN has helped to support this reconstruction plan by launching a Strategic Response Plan (SRP) that they have developed in coordination with the UN Humanitarian Country Team (HCT), international organisations and NGOs. (Lum, T. et al; 2014). During the recovery phase, they were responsible to assess the disaster and the response phase, to record and assess what was learnt



during the event for future improvement, and to start a plan for reconstruction and future development (social and economic) for the victimized regions. (Lum, T. et al; 2014)

The Philippine government had, also, as main objective to make sure that all allocations of donations remained transparent, thus to not upset international donors, but principally, to keep the financial sources of the missions important. Indeed, the Aquino administration had built a web portal for fund tracking named Foreign Aid Transparency Hub (FAITH), which allowed the government to show a certain transparency toward the public. (The Manila Times, September 5<sup>th</sup> 2014; Accessed on the 28<sup>th</sup> October 2015)

Acted's country director said that its organization have had witnessed of the strong resilience of the Filipinos. He said that because of the fact that typhoons are part of the day-to-day lives of the population; the Filipinos are more and more able to regain original states of life. However, the high level of inequality and poverty in the country tends to increase the vulnerability of the communities to disasters. He added that "population affected by recurring disasters are vulnerable to an accumulation of risks at the household and community level, negatively affecting coping strategies and undermining capacities to recover" (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). As this thesis has highlighted in its literature review, it is proven that developing and poor countries will have more difficulties to show capacities of resilience after an external shock. (UNDP Report; 2014)

However to increase those capacities of resilience, of the humanitarian supply chain and of the whole country, the actors of the HSC of the Philippines have focused on geographical areas where the needs were highest, and areas more easily accessible. Acted's director country affirmed that this strategy had, unfortunately, neglected other areas where the poorest part of the population inhabits (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

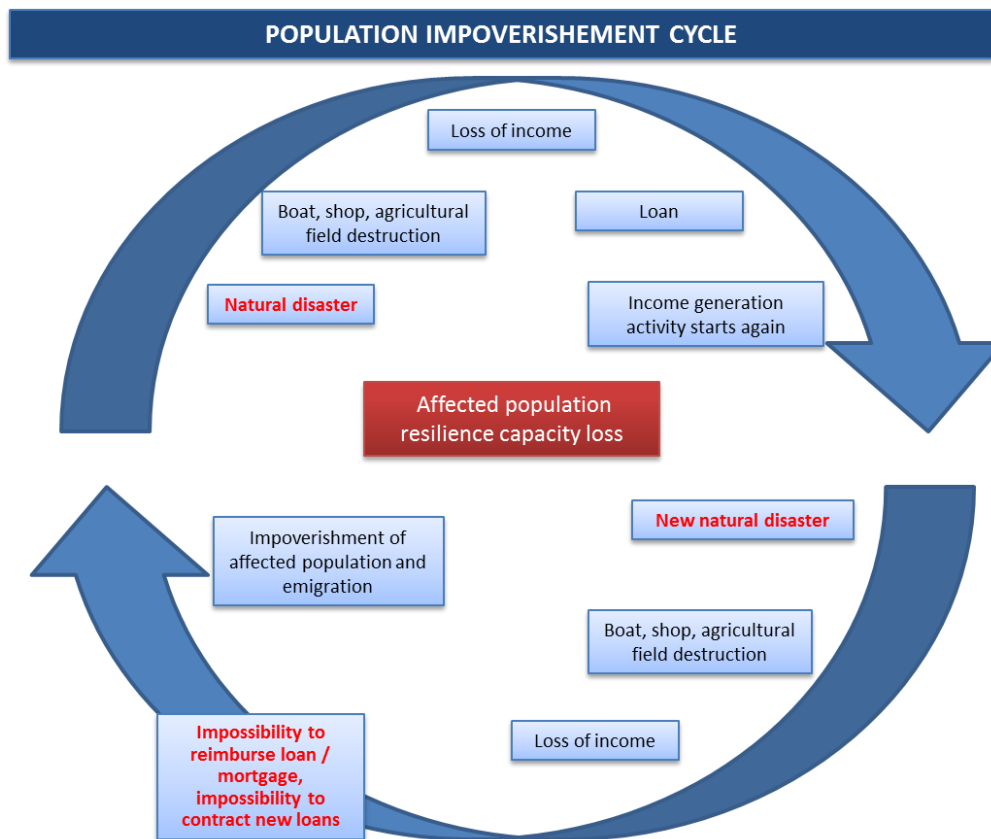


Figure 13: The impoverishment cycle of population affected by successive disasters. (source: Acted’s country Director Philippines.)

Acted’s country director has affirmed that on the third phase of intervention of humanitarian organizations after the onset of Yolanda, humanitarian supply chain had to focus on the impoverishment of the population caused by the typhoon. He affirmed that a greater focus on this issue would increase Resilience’s capacities of the country (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). Indeed, as we can see on the figure 12, populations affected by successive disasters are at risk of progressive impoverishment. The regions of Leyte and Samar of the Philippines regularly witness landfall of typhoons. Yolanda had deteriorated significantly the economic and social system of the area. (European Commission and German Cooperation Report; 2014). Acted’s country director affirmed, “The fact that the area is each year severely impacted by typhoons greatly reduces the resilience of local populations.” He added that Acted has observed a real impoverishment of the poorest part of the country as the households don’t have the mean to replace their assets (fishermen with their boats for example). . (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

Beside this important point that humanitarian organizations and other actors of the chain need to undermine, Acted’s re-establishing actions of 2014 (after Typhoon Yolanda) were to

address longer-term shelter, water, sanitation and hygiene (WASH) as well as livelihood restoration needs. Acted's country director said "particular focus was placed on supporting resilient shelter reconstruction, creating community driven water and sanitation solutions as well as developing and strengthening livelihoods to support increased income generation and sustainable local economies". (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). To do so, Acted had set up WASH committees, conducts hygiene promotion campaign, and improves access to clean toilets for the communities. Furthermore, Acted had supported 300 families in rebuilding their home by providing material. The organization had also offered training following the "build back safer" techniques we have developed further above. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016) Acted's development actions are a good example of how resilience capacities can be reached by the population of Philippines: Its current projects focus on longer-term development and took into consideration the need of the population of eastern Visayas region. Their coordinated DRR approach (WASH, resilient shelters, restoration of livelihoods and facilitation of linkages to markets to boost local economies) has allowed Acted to increase resilience capacities of the region. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

#### 4.1.5.1.4 The mitigation phase, fourth or first phase<sup>2</sup>

Even if this Thesis made clear that the mitigation phase was not counted as a whole phase in the humanitarian response to disasters, the mitigation phase can play a certain role in this case. Indeed, as the disasters happened few years back, some studies already have included some assessment as a way to better prepare the Philippine population in case of the onset of another disaster alike in the future. Furthermore, the foundation and NGO interviewed reached the country only once the typhoon Yolanda made landfall. The Philippines witness typhoons every months, therefore for this specific case, the mitigation phase could be also analysed as a preparedness phase for the other upcoming typhoon, as the strategy doesn't move much from one typhoon to another. (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015)

Indeed, Ann Campbell who is professor of management science at the University of Iowa's Tippie College of Business, worked on a model that could help humanitarian logistics to be more efficient through reduced time of intervention, and more effective ways of action. She decided to drive deeper researches on the Haiyan case to help the mitigation phase of the humanitarian intervention. She claims that road of access were already almost impracticable

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<sup>2</sup> The place of this phase in the humanitarian overall response to disaster depends on the reader's point of view and focus for studies

before the storm and affirms that two ways to facilitate relief action in the region was teaching drivers to use those roads, and how to best locate pre-positioned supply depots in advance of a storm. They have to be long enough to the coast for to avoid destruction by the storm, but close enough to communities that are at risks to reduce the time needed to provide supplies to the victims. (Campbell 2014).

Beside direct assessment needed for response, humanitarian organization need to include in their supply chain an overall assessment form: It provides documentation and uniformity on the type of data. Standard documentation issued from assessment allows the statement of current infrastructure and functions of the supply chain in order to improve if needed these logistical capabilities for more efficient humanitarian relief in the future, and thus a more resilient supply chain. (Blecken & Hellingrath; 2008). Indeed, ECHO staff (European Commission, Humanitarian Organisation) in cooperation with the ASEAN Emergency Response Assessment Team (ERAT) drove the assessment of those regions. They had confirmed that more than 90 % of public facilities were destroyed. All electric lines were down which did not facilitate communication on the ground. The report also gave details on the massive destruction of infrastructure of the region. (Lum, T. et al; 2014)

Following, Table 8 summarizes humanitarian actions during Rehabilitation/Mitigation phase

<p>Post-disaster assessment</p>	<ul style="list-style-type: none"> <li>• Assessment of the Build Back Safer Kits functioning (solidity of the roof, construction technics validated)</li> <li>• Update assessment forms on the beneficiaries for accounting purposes</li> <li>• Report to the French Chamber of Commerce and members</li> <li>• Create common data base to share assessment with other NGOs</li> <li>• Report to donors (Public and Private) for transparency</li> <li>• Multi sector initial rapid assessment (MIRA)</li> </ul>
<p>Knowledge Management</p>	<ul style="list-style-type: none"> <li>• Assign HR to consolidate and update data based on feedbacks and assessments</li> <li>• Post disaster campaign and improved trainings</li> </ul>
<p>Reconstruction Plan</p>	<ul style="list-style-type: none"> <li>• Assessment of the damages in infrastructure</li> <li>• In depth study of on going projects for better allocation of resources and funds</li> <li>• Work on population and country's own resilience: Keep the WASH campaign going, and the Build Back Safer kits delivery</li> <li>• Continuity of bidding processes</li> <li>• Cash for Assets campaign</li> <li>• Boost of local economy</li> </ul>
<p>Humanitarian Operation Evaluation</p>	<ul style="list-style-type: none"> <li>• Measure Performance via:             <ul style="list-style-type: none"> <li>• Customized Key Performance Metrics</li> <li>• SCOR Metrics</li> </ul> </li> <li>• Assessment for ECHO staff in cooperation with ASEAN ERAT</li> </ul>

Table 8: Humanitarian activities summarized for the Recovery and Mitigation phase<sup>3</sup>

<sup>3</sup> As Typhoons happen every month in the Philippines, the line between the recovery and mitigation phases is blurred

## **4.2 Concluding remarks: The relevance of the Capabilities for Resilience within organization's activities**

Following the qualitative research undertaken through the interviews done with Acted and FP-UA and the archival data, this part of the thesis will highlight each capabilities for resilience highlighted in the literature review (risk management, collaboration, visibility, flexibility and agility) through the analysed organization's activities and will, therefore, look at the supply chain resilience.

### **4.2.1 Risk Reduction Management**

As mentioned in the previous section, the Disaster Risk Reduction approach, used by Acted, is a practice of reducing risk related to disasters through systemic efforts to manage the cause of disasters, to reduce exposure to risks, to diminish vulnerability of a country, and improve preparedness for disasters. (European Commission Report; 2014) Acted country's director, who participated to the 6<sup>th</sup> Asian Ministerial Conference on Disaster Risk Reduction on the 22 of June 2014, has reaffirmed the need for this general framework (DRR) to focus on the underlying causes of disasters and, at local authority, to focus on the capacity building of the population and the recipient countries. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

He added that private sector and civil-society have also an important role to play in this approach as the DRR approach is mainly based on their data and knowledge. In Acted's Risk Management activities, the organization tries to make sure that all the elements of the DRR approach are applied. They promote a people and economy-centred approach to DRR, as typhoons in the Philippines tend to increase the impoverishment of the population. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). Indeed, Acted undertook campaign for alternative type of agriculture (beside coconut trees) as the trees need 5 years post typhoon to produce again. Furthermore, the delivery of build back safer house kits, and the acknowledgement of different techniques to build house helps create resilience as the risks related to house destruction are reduced. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). Acted's campaign *Cash for Assets* allow local population to put their skills to better preparedness and therefore to diminish the risks related to the typhoons. The Country Director of Acted also mentioned training of the humanitarians to improve skills for better preparedness and therefore reduction of risks. Finally the Acted's WASH campaign (Water Sanitation Hygiene) improve community access to water, by providing chemical toilets,

teaching basics about hygiene, and by helping the collect of hospital wastes, Acted manages to reduce all health related vulnerability in case of typhoon. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016). The Country Director of Acted affirmed that all of these undertaken procedures strengthen Acted preparedness to respond rapidly to upcoming crisis, as their overall efforts allow better resilience of the population, but also better resilience of their own humanitarian actions. Indeed, typhoons are the main risks of disasters in the Philippines; therefore as a capability for Resilience, Acted has managed to create a risk management culture since their arrival in the country. Acted has developed a specific tool follow up in term of typhoon tracking and thanks to their partnership with PAGASA (Philippines Meteorological Agencies) they received weather updates twice a day every six hours in case of typhoon warning. Therefore, once informed they can better prepare themselves for the disasters, they can pre-position teams in safe houses where the typhoon might strike, in order to reduce all time related risks in the future. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

Acted also follow a strategy of pre-positionement of stocks that also enable them to reduce all time related risks and therefore enhance better and faster decision-making. They also have some comparison in terms of tracking with NOA agencies (USA), Japanese and UK's agencies. As the Country Director of Acted said, typhoon has this good side that it is easily predictable, and therefore a good DRR approach can be set up in order to reduce casualties. It is an evidence of Risk Reduction culture from the moment that as the stocks are therefore pre-positionned the risks linked to the losse of time in the set up of supply chain is reduced. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

Acted's culture for Risk Reduction Management also passes through the funding level. Acted has an ethical and deontological department that will analyse, from a socio-eco and political approach, all the offers from the suppliers. The Country Director of Acted has given the example of Dassault Aviation, that also produce technology for weapons, wanted to fund their operation, but as the risk to lose the hand on the company, especially in a country, which is politically unstable (Rebels groups), Acted had to decline the offer. Furthermore, when selling a partnership with a supplier, Acted needs to follow strict rules for procurement in order to reduce all socio-eco and political risks linked to the procurement of funds and supplies. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

FP-UA, on the other hand, is located much more ion top of the supply chain, at the procurement level. The FP-UA's Executive Director has affirmed that by conducting in-depth study on each NGOs relief project and on the other side, the objective of the donors, FP-UA is

able to reduce all risk related to the allocation of funds, resources and budget for the whole French related humanitarian supply chain. (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015)

With specificities related to their proper relief activities, and role to play within the overall humanitarian supply chain, FP-UA and Acted have developed the Risk Reduction Capability, which allow better resilience of the chain. A common risk assessment framework can highlight the collective knowledge (from all actors, private and publics) on probability of risks and helps align these actor's agenda toward the management of those risks. (Sheffi and Rice, 2005)

#### **4.2.2 Collaboration**

The second capability for Resilience, which is the ability for collaboration of the humanitarian supply chain actors, is well present within the activities and undertaken processes of Acted. On the monitoring of typhoons, they engaged partnership with PAGASA, UK, USA and Japanese tracking agencies.

On the level of authorisation for action, Acted has engaged strong collaboration with the government Aquino. Indeed, the case of the Philippines is interesting, as the country's director said. After previous disasters, international organizations that started relief operations in the country, wanted to have the control on all political decisions regarding the rehabilitation of the Philippines. The government had, therefore, lost its power. the country's director affirmed that since then, the Aquino's administration does not want any international governmental agencies in the country. Therefore, all NGOs and multilateral agencies (such as the UN) need to work closely with the governmental programs, and need to try to influence top-level decision-making based on the organization's expertise and reliable experiences (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

On the supply level, Acted has developed close relationship and collaboration with local suppliers that are less costly (The country's director affirmed that they have good relation with suppliers in Tacloban and Guiuan). They also build collaboration with international and European donors, in order to facilitate the bidding process (which is time consuming in period of crisis). Thanks to this strong collaboration, Acted was able to sign some pre-order contract with the suppliers and pre-bidding processes with the donors. They also managed to enhance collaboration with bigger agencies such as the World Food Program (WFP) or United Nations (UN) in order to use their contingency stocks when they were unable to reach inaccessible areas

and use their warehouse location in case of Acted inability to cover some areas (differences of budget) (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

In the response phase, Acted collaborated with locals in order to use alternative way for transport such as Motorbikes and boats. After the typhoon Haiyan, in order to reach the region of Northern Samar, they had to leave trucks in the road, use boats because of the floods that followed the disasters, and then motorcycles, as the roads were impracticable. Partnership with 3PL also was used for cost-efficiency related matters, and with actors with whom they share warehouse in order to reduce costs and improve delivery rate (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

On the distribution level, Acted has developed strong collaboration with the mayors of the cities, in order to dress a list of most needy beneficiaries, before the arrivals of the supplies. This local collaboration also enabled Acted to set up its Cash for Assets campaign in the rehabilitation / mitigation phase (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016)

Furthermore, as Ergun et al (2010) emphasized in their study, Acted also had to set up emergency system of communication through the use of satellite phones and 4G devices to improve coordination and collaboration on the ground (Ergun et al, 2010). Finally, common standardized forms for inventory management was used to enhance better collaboration between the supply chain actors. (Rodman W., 2004).

Collaboration is also strongly noticeable in FP-UA activities. Indeed, the foundation aims is to create a bridge between the French business world that do not have any ground knowledge regarding to humanitarian relief and NGOs that undertook relief project after the typhoon Haiyan in the Philippines. (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015) In the response phase, FP-UA has emphasized collaboration between humanitarians and French companies whose business activities are based in the Philippines and neighbouring countries, for the use of alternative transportation. When mentioned Resilience with FP-UA's Executive Director, she had affirmed that such collaborative movement between the business and humanitarian sector (beside funds procurement) has increased the overall resilience capacities of the general humanitarian supply chain that followed the typhoon Haiyan (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015).

In the business world, the ability to compete is linked to the company's ability to collaborate (Lewis, 1990). Gunasekaran (2001), has recognised the importance of the establishment of relationship at various levels of the chain as the best way to enhance resilience and construct a more efficient and responsive supply chain. The results of this thesis has



contributed to this academic claim, highlighting that especially within the humanitarian sector; collaboration needs to be seriously considered, not for competitive advantage (which is not the objective of humanitarian operations), but for the own surviving of the humanitarian chain. In the case of the Typhoon Haiyan, Acted would not have demonstrated such efficiency in its response if it did not undertake collaborative processes with all the other actors of the chain. (Public and Private) (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

### **4.2.3 Visibility**

Acted has reinforced their continuous fight for visibility improvement along their chain. Concerning accounting procedures with the donors, Acted has strong rules and conditions to fulfil. The organization has to answer to all the exigencies of the Donors (Acted's country director said, that these exigencies are different depending of the donor). For example, once the delivery of supplies done, the beneficiaries need to sign a list, which will be communicated to the donors later on. Visibility is also done on the origin of the funds and supplies. As already mentioned, Acted does an in-depth work on ethics and deontology of the organization's donors. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

Concerning the logistic per se, tracking system on the logistic process associated to the delivery of Build Back Safer kits is done to 1) limit waste of time 2) ensure security as there is some rebel groups that control some of the areas. Visibility is also ensured at the assessment phase, indeed, assessing the operation allow better overall visibility on what can be improved. Communication about the improvement is then made through all actors of the chain, even the donors and suppliers to improve overall transparency. Furthermore, assessment of tracking performance used post disaster allow better visibility on the capacities such system could bring to the chain resilience. (Sheffi, 2005). Acted has, therefore, set up some assessment forms that helps, on one hand, faster decision making, but also an uniformity of the data across the different areas of the chain, which therefore enable better visibility of the overall relief intervention. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

At the inventory level, Acted offered manual inventory form to fulfil with standardized data, which facilitate coordination, but also improve the visibility on the real on-time stocks of the organization. Still at the inventory level, process of tracking quantities and qualities; enable better visibility on the available stocks for further efficient distribution, and re-location of supplies if needed. (Country Director of Acted, personal communication, 11<sup>th</sup> January 2016).

Finally, at the distribution level, Acted's country director has affirmed that there is no rule regarding the distribution points. "Usually, when we organize distribution, we first meet

the majors to receive official request in terms of assistance (...) then we choose the most affected barangays and communities for distribution”.. It is only then that they can conduct distribution with “transparency and compliance mechanism for the beneficiaries”. He said that Acted needs to be “the clearest possible on their selection process and which indicators they used to avoid further issues at the distribution level”. He added that Acted acted toward Resilience at this level by keeping the monitoring of the distribution even weeks after the onset of the typhoon in order to correctly measure the impact of their relief assistance (for further missions), identify the gaps and how beneficiaries made use of their distributed goods. (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016)

Visibility is also paramount in FP-UA activities. As the foundation’s work is based in upstream of the supply chain, at the procurement level, FP-UA enables better visibility on the distribution of the funds toward the NGOs, and therefore reinforces transparency requests from both sides. (FP-UA’s Executive Director, personal communication, 20<sup>th</sup> November 2015). Furthermore, she reaffirmed that in general, companies trust more a French based structure from the French Chamber of Commerce to allocate the funds. Indeed, by allowing better visibility on the use of the funds, FP-UA was able to collect more funds that a single NGO would have collected because it offers better traceability. The redistribution of the funds is then done in function of the needs of NGOs, which reduce overlaps, and therefore wasting of resources and time. (FP-UA’s Executive Director, personal communication, 20<sup>th</sup> November 2015). She reaffirmed that it played an important role in the resilience of the chain, regarding its resources and funds, as the organization has offered capacities for better accountability and therefore transparency.

Finally, FP-UA used Systemic Process Model (Lima et al; 2013) to facilitate all administrative procedures linked to procurement. FP-UA created a decision tool that allows modification of the one donor’s procurement structure and conditions during the disaster’s response phase. Decisions can be modified depending of the evolution of the demand. (Lima et al, 2013)

Increasing visibility is critical for humanitarian organizations that take part of the humanitarian supply chain. It enhances costs reduction, improves operational performance in a context made complex because of the numerous actors presented. (Sheffi, 2005). The organizations interviewed have managed to increase the overall awareness of specific information related to the supplies, the logistical strategy, the funding and the statuses of their activities (WASH Campaign, Build Back Safer Kits...).

#### 4.2.4 *Flexibility*

Acted has managed to set up a flexible supply chain in allocating teams in its different Head Quarters (Tacloban, Cebu and Manila) in order to be quickly responsive depending on the area where the typhoon happened. Flexibility of the chain of Acted also is emphasized through the local partnership they have for alternative way of transports. As bigger agencies stay on the principal roads, Acted has managed to increase flexibility toward the environmental casualties that followed the typhoon. (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016).

Pre-positionnement of Acted's stocks has enabled the organization to be better flexible when facing different intensity of the disaster. Acted Country's director said that the decentralization of their distribution points from the HQ of Tacloban and Manila has enabled them to be one of the first NGO distributing on the ground 72 hours after the typhoon. Tracking the quantity and quality of their stocks enable them to be flexible when facing alteration in the demands (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016). Facility locations in humanitarian relief relate to logistics speculation and logistics postponement, humanitarian organizations can postpone logistics by making agreements with suppliers or they can speculate with the occurrence of the disasters by decentralizing their distribution network. Indeed, according to Balcik and Beamon (2008), decisions on facility location directly affect the performance of relief operations, since the number and location of warehouses and the level of inventory held affect the response time and costs in the whole relief chain (Balcik and Beamon, 2008). Roussel (2008) recommends two different schemas for locating logistics facilities for two types of operations. If the operations are concentrated in the response to sudden disasters, the organizations should establish continental logistics facilities on hubs with great logistical capacities. If the organization's operations are focused on long-term activity and emergency operations are conducted on a regular basis, the organization should establish regional and local logistics facilities in order to promote the sourcing of goods as close as possible to the beneficiaries. (Roussel, 2008) For the Haiyan case, Acted's country director on the response phase, organizations have dwelled on international and continental logistic facilities based in South East Asia, and during the development phase, the chain was able to be more resilient as the organizations have dwelled on more local facilities. (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016). Choosing facility locations also means the ability to consider that disasters take part unequally around the globe. As the Philippine are close to seismic regions, warehouses were already situated in the region. Indeed central warehouse stocked different kind of goods that might be needed in case of the common type of disasters that occurs normally in the region. The challenge was to identify the predictability in

the geographical distribution and the scale of events and prepositioning inventory accordingly (Roh, Breseford and Pettit, 2008).

Finally, Acted's country director reaffirmed that during the mitigation/ preparation phase, skills enrichment of Acted staff allow also better flexibility of the organization's response as the humanitarian are more prepared for every type of casualties that could be associated to the disaster. For example, as the NPA (Nation People Army, group of rebels) has a strong control of some of the remote areas, especially in the Northern Samar, workshops with the Philippine's army and police have started to provide better security knowledge for the humanitarians. (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016)

FP-UA also acted for better flexibility of the humanitarian supply chain. They encouraged companies to make long-term investment for the economic and social development post typhoon Haiyan. Therefore, the donors were offered the flexibility to choose which type of project they would support. FP-UA's Executive Director reaffirmed that this possibility of choice in the allocation of the funds, was made possible only after FP-UA work of analysis of the NGO's projects.

By showing flexibility in their activities and operational strategies, the organizations have managed to respond, in their way, to demand volatility and uncertainty, which is one of the main characteristics of a humanitarian supply chain. (Sheffi and Rice, 2005).

#### **4.2.5 Agility**

Acted has enhanced the agility of its supply chain through postponement techniques with decoupling points close to the beneficiaries once the onset of the typhoon. Agile supply chain is made possible through the adoption of strategies of postponement within its process. (Jahre, Jensen and Listou, 2009). As seen, postponement is the principal building block for a more resilient supply chain. Postponement is based on the fact that final stocks are assembled at one of the last point of the chain (Villareal et al, 2000). It promotes agility by the fact that the stocks adapt themselves to the demand much faster thanks to the customization on which it dwells. In theory, organizations can postpone the differentiation of goods as close as possible to the distribution point in order to reduce uncertainty by speculating on the demand (Jahre, Jensen and Listou, 2009).

Indeed, as mentioned, the Build Back Safer kits have different suppliers; all the elements of the kits reach some strategically located warehousing where they will be finally assembled in one night. This process depends on the demand. As the demand is uncertain because of

difficulties encountered to assess the population needs right after the typhoon, Acted has managed to reinforce the agility by focusing on assembling the kits at the ultimate stage of the chain. This allowed them faster response once the initial assessment of the damages was done. (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016).

Acted also use safe stocks in different location. The use of safe stocks (which encompass all basics that a victim from a typhoon would need) allows them to show better agility when facing uncertainty of the demand and the damages that followed the typhoon.

Finally, as mentioned, the use of manual inventory forms with standardized procedures gave Acted the agility to continue its relief action even in serious infrastructure (electricity) damaged conditions (Country Director of Acted, personal communication, 11<sup>th</sup> of January 2016).

FP-UA has also acted toward the agility of the chain, as they developed direct contact with the CEOs of the companies' members of the foundation, it enable a facilitation of the decision making toward allocation of funds (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015). As humanitarian operations require speed, FP-UA has developed capacities to take quick decisions when procuring suppliers. This agility in the procurement results from the work done on amount, before the onset of the typhoon, on the companies willing to distribute funds. The use of pre-order system and pre-bidding contracts also allowed FP-UA to be agile during relocation of the funds and resources. (FP-UA's Executive Director, personal communication, 20<sup>th</sup> November 2015). FP-UA's Executive Director added that this is especially easier in the Philippines as only one type of disasters, typhoon, happens every month. Therefore, they are more able to provide pre-bidding contracts as they already have an idea on what amount of resources will be needed later on. Finally, as mentioned, FP-UA has enhanced the humanitarian actors to look for standard procurement systems (SPS), which are systems that facilitate the whole procurement procedure through a communication platform that can promote the modification of conditions for supplies depending on the nature of demand. This system allows the other actors of the chain (mainly NGOs) to have the agility to mould their supplies depending on what happens during the typhoon. (FP-UA's Executive Director personal communication, 20<sup>th</sup> November 2015).

The organizations have shown agile response to unforeseen events linked to the typhoon. They undertook various actions toward overall agility of the chain, for further resilience. The table 9 summarizes the organization's specific activities allocated to each of capability of Resilience.

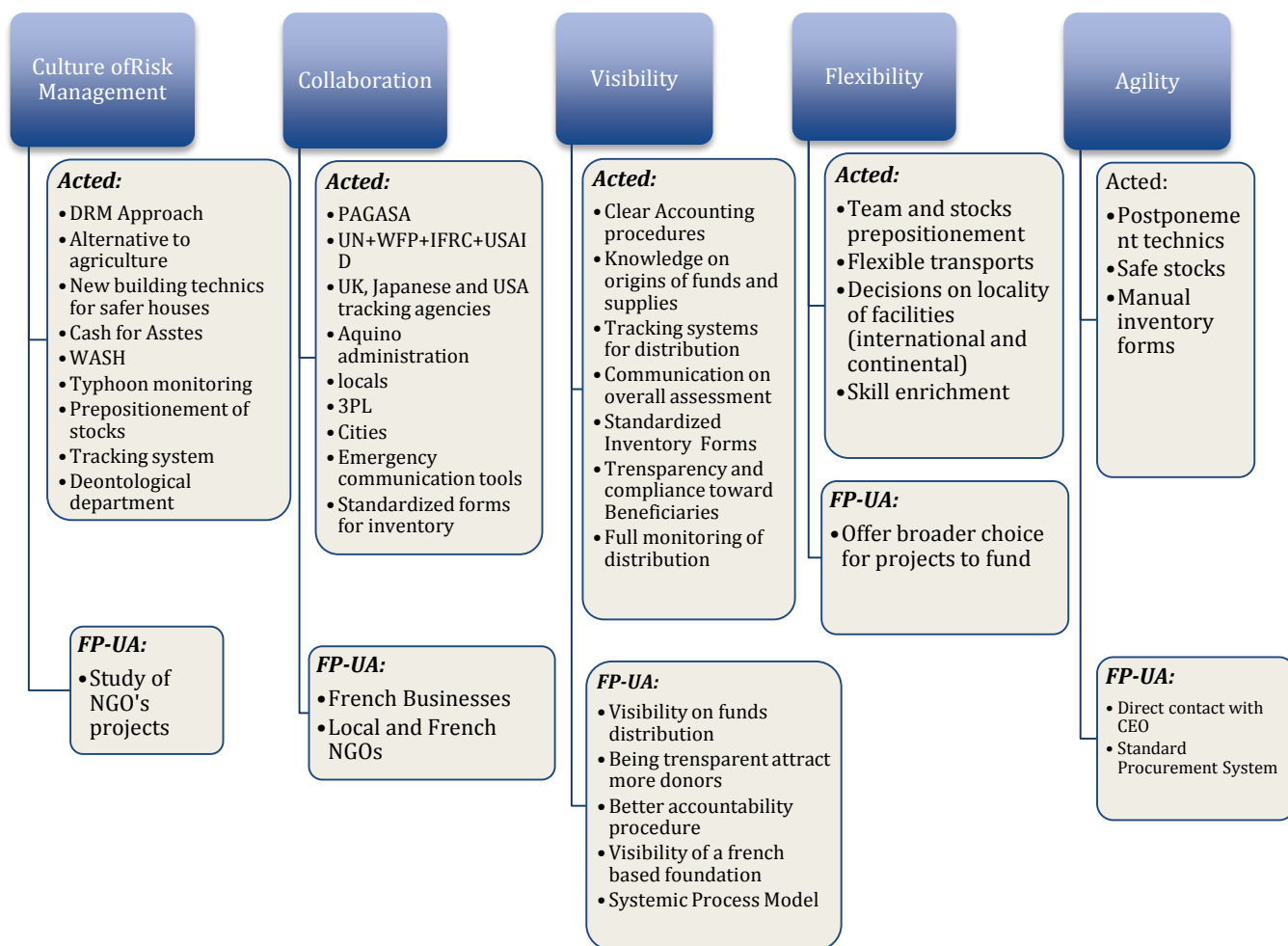


Table 9: Resilience's capabilities summarized in the organizations responses after the typhoon Haiyan.

## 5. Conclusion

Increasing pressure to respond quicker and more efficiently to a disaster have recently led humanitarian organizations to focus on their supply chain management in order to meet the donor's expectations. In contrary to the business world, humanitarians have to set up complex supply chains, which involve numerous actors, in few days to be able to save lives, while facing uncertainty of the demand before and after the disaster. Nobody would have foreseen the disastrous impact of the Typhoon Haiyan, to which humanitarians have had knowledge only few hours before. The whole structure of the humanitarian supply chain is therefore different from commercial counterparts. However, when looking at supply chain resilience, similarities between these two sectors exist (Wassenhove, 2005).

The research problem of this thesis was to establish the main capabilities of Resilience in an humanitarian supply chain. The prepositions was that, as *Risk Management Culture, Visibility, Collaboration, Flexibility and Agility* allow resilience of a commercial supply chain; it should also be the case for humanitarian supply chains (Christopher and Pecks, 2004; Kovacz & Tatham, 2010).

The thesis started with an overview of the theories and findings about disasters, humanitarian supply chain's structure and specific roles, and the capabilities for resilience of a supply chain. Research based on literature review and cases studies qualitative research suggests that the findings hold similar direction of other studies that have looked at the link between the capabilities for resilience and the efficiency and performance of humanitarian supply chain (Sheffi, 2005; Boin et al, 2010; Cadden et al, 2013). Indeed, as for commercial supply chains, humanitarians act toward those five capabilities within all the stages of the response to disasters, and therefore could be claimed as resilient (Christopher and Peck, 2004).

Through a case study of the Typhoon Haiyan, based on the post-Haiyan actions of FP-UA and Acted, the study has shown how humanitarians build capabilities for resilience in their relief action, all along the supply chain. and. By its mere nature, humanitarian supply chain is by definition resilient as it has to find a way to efficiency, after a crisis or a distortion (here natural disasters) (Dubey et al, 2014). The main results indicate that the studied organizations managed to build a culture for risk management through the DRR and mitigation approach to fight against the impoverishment of the Filipinos. They managed to improve visibility of the overall chain through alternative technologies, decisions strategies and knowledge improvement on assessment. They succeeded to position collaboration with other actors as the main objective of their actions through the inventory, supplies, distribution and assessment level. They presented high level of flexibility through decentralization and prepositionnement

of the stocks and the teams. Finally, they managed to undertake the important concept of agility through their ability to respond to unforeseen events through all the stages of the disaster response, such as the strategy of postponement of the BBS kits at the distribution level, or again through the implementation of alternative procurement systems.

This thesis may be seen as a prototype, which can be improved in many ways. Indeed, we limited our study to five capabilities of Resilience, and to one type of natural disaster (Typhoon), which could be seen as predictable as it happens every month in the Philippines. Additional discussions and studies could be made with other NGOs, and multilateral organisations that have taken part of relief response for other type of natural disasters (such as earthquakes). Another suggestion for future research would be to expand this discussion to man-made disasters would be needed.

On the theoretical level, other capabilities for Resilience such as *Stability* or *Robustness* could also be addressed for future researches. This two additional capabilities could provide valuable inputs to the overall research on Resilience. Furthermore, other ways of dealing with uncertainties of the demand within a model that addresses the analysis of these uncertainties on the capabilities of resilience of humanitarian supply chain could also complement this study.

Finally, *Agility*, which this paper has detailed the most, could be a concept to undertake as an *alternative* to Resilience, rather a *capability* for this latter. It could be a proposition to be verified in future studies. Indeed, agility is the ability of the chain to respond to unforeseen changes (Shaffi, 2005) to survive them and to take advantage of those changes for competitiveness (Christopher, 2000); while Resilient supply chain are holding the ability to return to its original state after disruption (Christopher and Peck, 2004). In other words, the driving force of agility is the change, while the driving force of resilience is the disruption (Sheffi, 2005). It could be interesting to build a comparative case study between a resilient humanitarian supply chain and an agile one to underline the main differences and overlaps and to participate to the establishment of a single integrated concept that could be implemented therefore within humanitarian supply chain management techniques.



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## 7. Annexes

### 1) *Interview Protocole (40-60 min, via skype, phone calls and emails)*

General Information about the NGO and the respondent.

Name of the NGO:

Name of the Respondent:

Position of the respondent:

Year of foundation of the NGO

Number of volunteers:

Relief specification:

General questions on disasters in the Philippines:

1. How would you evaluate the plausible environmental threats in the region of the Philippines? How populations are prepared to Typhoons?
2. How would you describe humanitarian relief in general in the Philippines?

Questions on the organization's activities

3. What was the main objective that drove your organisation's activities after the onset of the typhoon Yolanda?
4. How would you describe the activities of your organization toward the objective to help victimized population of the Philippines?
5. Would you think that your organization acts more toward direct response, or rehabilitation after the onset of a typhoon? Could you be more specific for each of the phase presented below?
  - a. 1<sup>st</sup> phase: Prevention (How plausible risks can be diminished before the onset of a disaster?)
  - b. 2<sup>nd</sup> phase: Immediate Response (How the operations for intervention were planed ? how did you use your resources ?)
  - c. 3<sup>rd</sup> phase: Reestablishment, or Rehabilitation (How your organization has managed to absorb the disturbances linked to the typhoon, and went back to initial functioning?)

Questions on humanitarian supply chain:



1. How could you explain the influence that had your organization on the whole humanitarian supply chain structure that acted in the Philippines? Meaning:
  - a. At the acquisition and procurement level?
  - b. Transports in general
  - c. Pre-positionment and postponement of stocks and warehousing in general?
  - d. Local point of distribution for the final beneficiaries
  
2. How today your organization is able to prevent such events that occur a lot in this region?  
How your organization works toward the detection of such disasters?
  
3. How would you evaluate the efficiency of your organization after the disaster? What do you think that could be improved in the overall management style?
  
4. What could you tell me about your organization activities when you had to deal with Collaboration, better visibility, flexibility and therefore agility, in depth culture of Risk management?
  
5. Here I will present the common challenges to which all humanitarian organizations hurt themselves when setting humanitarian response after a disaster. Could you please tell me how those challenges have affected your organization's response after Yolanda?
  - a. Uncertainty of the damages
  - b. Poor infrastructure
  - c. Communication
  - d. Human Resources
  - e. Funds
  - f. Environment (Physical and Cultural)
  - g. Security
  - h. Administration
  
6. Concerning your stocks, do you pre-position them in strategic areas ? Why ? how those areas are selected ?
  
7. Concerning the stocks, did your organization have ever used post-ponement techniques of manufacturing? Meaning that the products get to its final form the closest possible to the beneficiary? Could you give me an example?

8. How your organizations managed to keep following its initial objectives once the Typhoon Yolanda has made landfall?

- 2) *Authorizations from both of the organizations interviewed for the use of their name in this thesis.*



## Autorisation

A Tacloban,

Le 16 Mars 2016

Je soussigné Thibault Henry, Directeur pays d'ACTED aux Philippines depuis Novembre 2013, autorise Mademoiselle Emilie Peyroche d'Arnaud de Sarazignac à mentionner mon nom ainsi que celui de l'organisation pour laquelle je travaille dans sa thèse de fin d'étude.

Bien cordialement

Thibault Henry





*Manila, March 16, 2016*

**RE: Written Approval to use the name of France-Philippines United Action in Emilie Peyroche D'Arnaud de Sarazignac's thesis.**

I, Clementine Turgeon, Executive Director of France-Philippines United Action, allow Emilie Peyroche D'Arnaud de Sarazignac to use the name of our foundation France-Philippines United Action in her thesis.

Best regards,

Clementine Turgeon  
Executive Director