Communication, Collaboration and Coordination during humanitarian relief efforts.

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Abstract
This thesis will investigate the Communication, Collaboration and Coordination among humanitarian organization with the application of Information and Communication Technology, and commercial paradigms. Aims to involve the relief actors and the commercial companies involved throughout of their Corporate Social Responsibility programs. The methodology is chosen specifically to fit the qualitative nature of the research. The paper presents data collected for the sole purpose of this research and is later on analysed in order to draw theoretical conclusions. At the end, practical implications and suggestions for future research are included.
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# Table of Contents

Acknowledgements .................................................................................................................. iii  
Table of Contents ................................................................................................................... iv  
List of Figures .......................................................................................................................... vi  
List of Abbreviations ............................................................................................................... vii  
1 Introduction ............................................................................................................................. 1  
1.1 Background ......................................................................................................................... 1  
1.2 Problem Statement .............................................................................................................. 3  
1.3 Purpose and Research Questions ....................................................................................... 4  
1.4 Thesis outline ...................................................................................................................... 5  
1.5 Delimitations ....................................................................................................................... 5  
2 Frame of Reference ............................................................................................................... 6  
2.1 Humanitarian logistics ........................................................................................................ 6  
2.1.1 Definitions of disaster .................................................................................................... 6  
2.1.2 Definition of humanitarian logistics ............................................................................ 9  
2.2 The Clusters Approach ..................................................................................................... 10  
2.3 Collaboration, Communication and Information Technology Systems in humanitarian logistics .................................................................................................................. 12  
2.3.1 Collaboration and Communication ............................................................................. 12  
2.3.2 Information and Communication Technology in humanitarian logistics ................. 15  
2.4 Implications from the commercial literature ...................................................................... 18  
2.4.1 Information and Communication Technology in the business environment .......... 19  
2.4.2 4PLs and the Industry Innovator model ..................................................................... 21  
2.5 Chapter summary .............................................................................................................. 24  
3 Method .................................................................................................................................. 24  
3.1 Research design .................................................................................................................. 25  
3.2 Case study strategy ............................................................................................................ 26  
3.3 Time horizon ..................................................................................................................... 26  
3.4 Data collection ................................................................................................................... 27  
3.4.1 Data collection set up .................................................................................................... 27  
3.4.2 Data collection participants ......................................................................................... 28
3.4.3 Data evaluation ................................................................. 29
3.5 Trustworthiness of the research ........................................... 30
3.5.1 Credibility ................................................................. 30
3.5.2 Transferability .......................................................... 30
3.5.3 Dependability .......................................................... 31
4  Empirical Findings .............................................................. 31
4.1 UNICEF ................................................................. 32
4.1.1 Overview ................................................................. 32
4.1.2 Information, Communication and Collaboration .................. 32
4.2 UNICEF ................................................................. 33
4.2.1 Overview ................................................................. 33
4.2.2 Pre-disaster set up .................................................... 33
4.2.3 On-site collaboration and coordination ....................... 34
4.3 Norwegian Church Aid .................................................. 34
4.3.1 Overview ................................................................. 34
4.3.2 Pre-disaster set up .................................................... 35
4.3.3 On-site collaboration and coordination ....................... 35
4.4 Norwegian Refugee Council .......................................... 36
4.4.1 Overview ................................................................. 36
4.4.2 Pre-disaster set up .................................................... 37
4.4.3 On-site communication and collaboration .................. 37
4.5 Agility Logistics ........................................................... 38
4.5.1 Corporate Social Responsibility Program ..................... 38
4.5.2 On-site collaboration and communication .................. 38
4.6 Shelter box ................................................................. 39
4.6.1 Overview ................................................................. 39
4.6.2 On-site collaboration and communication .................. 39
5  Analysis ........................................................................ 40
5.1 Current state of information sharing, communication and collaboration among actors in the humanitarian logistics ........................................... 41
5.1.1 Pre-disaster set up and preparedness of humanitarian organizations ....................... 41
5.1.2 Information sharing, collaboration and coordination .................. 43
5.1.3 Summary of Research Question 1 .................................. 46
5.2 Future improvement of the current state of humanitarian logistics .................. 47
List of Figures

Figure 1: Trends in number of reported events.................................................................7
Figure 2: The Cluster Approach..........................................................................................11
Figure 3: Evolution of 4PLs..............................................................................................22
Figure 4: The Industry Innovator model ............................................................................23
Figure 5: Communication, collaboration and coordination in the Cluster System.............50
List of Abbreviations

In alphabetical order:

4PL- Forth Party Logistics provider
AIDS- Acquired Immune Deficiency Syndrome
CCCM- Camp Coordination and Camp Management
CSR- Corporate Social Responsibility
EM-DAT- Emergency Event Database, the International Disaster Database
ENN- Emergency Nutrition Network
ERP- Enterprise Resource Planning
FAO- Food and Agriculture Organization
GARD- Get Airports Ready for Disaster
GIS- Geographic Information System
GRID- Global Resource Information Database
HIV- Human Immunodeficiency Virus
IASC- Inter-Agency Standing Committee
ICT- Information and Communication technology
IFRD- International Federation of Red Cross and Red Crescent Societies
IHO- Independently working Humanitarian Organization
IOM- International Organization for Migration
IRT- Immediate Response Team
IT- Information Technology
JIBS- Jönköping International Business School
LET- Logistics Emergency Team
NADMO- National Disaster Management Organization
NCA- Norwegian Church Aid
NGO- Non-Government Organization
NRC- Norwegian Refugee Council
OCHA- Office for the Coordination of Humanitarian Affairs
UN - United Nations
UNEP- United Nations Environment Programme
UNHRD- United Nations Human Response Depot
UNICEF- United Nations Children’s Fund
UNISDR- United Nations Office for Disaster Risk Reduction
WASH- Water, Sanitation and Hygiene cluster
WFP- World Food Programme
WHO- World Health Organization
I Introduction

The first chapter introduces the reader to the importance of the research by explaining the background of the topic. Furthermore, the problem statement, as well as, the purpose that the study aims to address will be outlined. Next, the thesis outline is being illustrated and it ends with the research delimitations.

1.1 Background

The world in the 21st century has experienced a number of large scale humanitarian crises, and with that, a large scale need for humanitarian response and collaboration among relief organizations in order to provide aid to the affected (Bartell, Kemp, Lappenbush & Haselkorn, 2006). This is also confirmed by Kunz and Reiner(2012) in their statement: “In recent years, an increasing number of natural and man-made disasters have hit various regions in the world, killing thousands of people and causing millions of indirect victims”. (p.3) This calls for large humanitarian missions with focus on delivering quick relief to the affected areas, involving the host governments, local organizations and military, international aid organizations and private companies, all with their missions, competences and objectives(Balchik, Beamon, Krejci, Muramatsu & Ramirez, 2009).

With the growing need for humanitarian aid, the organizations themselves are growing and developing in fast pace, and their supply chains are subject of growing interest from practitioners and researchers. The advancements in the fields of commercial Supply Chain Management and Logistics are affecting positively the ability of humanitarian organizations to deliver effective response to the disasters they are facing (Leiras, de Brito, Queiroz Peres, Rejane Bertazzo & Tsugunobu Yoshida Yoshizaki, 2014). However, Van Wassenhove and Pedraza Martinez (2012) are pointing out that only limited amount of those practices apply fully to the context of humanitarian logistics.

“In business, manufacturers are required to produce products of a quality acceptable to customers and to deliver those products at competitive cost with highly reliable delivery times. Achieving high quality levels, timeliness of deliveries, and efficient processes along the supply chain cannot be reliant on a single organization, but should be ensured through collaboration and coordination with trading partners.” (Angkiriwang, Pujawan, & Santosa, 2014, p. 50). Humanitarian organizations have to keep track of the impact they have on the beneficiaries, be focused on quick results and transparency, because they rely heavily on donations. They are being kept to the highest of moral standards and required to be efficient. (Van Wassenhove, 2006).
International humanitarian organizations have to build large pool of knowledge and resources in order to remain agile and effective, while in the meantime have meticulous planning and execution of operations (Kunz & Reiner, 2012; Wassenhove, 2006). In order to do so, they constantly have to try and adapt theories and practices, to keep moving and continuously improving.

The business world is increasingly recognizing the supply chain collaboration as a fundamentally important source of competitive advantage and information technology (IT) has emerged as a crucial factor in firm’s ability to process and share vast amounts of data along the supply chain (DeGroote & Marx, 2013). Furthermore, IT carries knowledge upstream and downstream in the supply chain, allowing partners to collaborate in a synchronized manner and make coordinated decisions (Ngai, Chau & Chan, 2011; DeGroote & Marx, 2013). This way they are more sensitive to market changes, agile in their response to fluctuations (Swafford, Ghosh & Murthy, 2008) and oriented towards supporting the inter-organizational efficiency (Qrunfleh & Tarafdar, 2014).

Despite the raising awareness of the importance of information and communication technology (ICT), and its ability to assimilate data and transfer it in usable knowledge, this aspect of the relief operations has been managed poorly by the humanitarian organizations (Maiers, Reynolds & Haselkorn, 2005). The role of ICT and the extent of its use by actors in the humanitarian field is lower than in for-profit companies (Haselkorn & Walton, 2009), therefore it is crucial that humanitarian organization to “[…] recognize the value added of a coordinated approach and implement information and communication policies that support increased coordination” (Maiers et al., 2005, p. 85).

In order for humanitarian organizations to have joint operations ensuring coordinated actions, the United Nations (UN) formed the Cluster Approach (further referred also as the Cluster System) for UN organizations and Non-governmental Organizations (NGOs) to interact and “[…] address identified gaps in response and enhance the quality of humanitarian action” (IASC, 2006, p. 1)

Since this paper will investigate the application and usage of information and communication technology in connection to collaboration and coordination, it is important to be mentioned that the terms Information Technology, Information Systems (IS) and ICT are being used interchangeably. They do not refer to a specific physical/virtual technology, but rather means to process and share data among humanitarian organizations.
1.2 Problem Statement

During time of crises there are multiple organizations, such as United Nations´ bodies, NGOs, private companies, local authorities and military rushing to provide relief to the affected population. Organizations, present at the scene of the disaster, aim to provide solutions to a specific problem depending on their core competences, but the problem handling may differ from the governmental perspective and often from internationals community´s perspective. They might end up draining their resources when applying solutions to a specific issue, that could have been handled in a much more efficient manner, this is usually result from the failure to collaborate with each other (Tatham & Hugthon, 2011).

Having all the organizations on site, wanting to provide help and not being 100 per cent efficient on their own, raises the need for collaboration and coordination among them. Coordination of actions and common practices will deliver direction and leadership in a chaotic situation, but also raises the question who is going to provide leadership in an unbiased manner, without following their specific agenda (Akhtar, Marr & Garnevska, 2012). Despite the fact there are models and practices in place, “[…] little is known about what characteristics are required for an effective and efficient management of coordination” (Akhtar et al., 2012, p.87). This raises the questions to what is required to for the improvement of collaboration and coordination, the lack of knowledge is in this area is gap in the current operational status of relief operations.

Heasip and Barber (2014) in their paper point out the need for better communication and collaboration among parties during a disaster, Chandes and Paché (2010) also confirm that collective efforts from the organizations will improve their efficiency and deliver better services to the beneficiaries.

Despite the fact that there are mechanisms in place, such as the Cluster System, coordination and smooth collaboration between parties involved is still impeded. The United Nations Children´s Fund´s (UNICEF) report from November the 9th, 2013, the Evaluation of UNICEF’s Cluster Lead Agency Role in Humanitarian Action, identifies three key areas for improvements (CLARE, 2013):

- Insufficiet cross-cluster coordination
- Cluster coordinators’ abilities to identify gaps and solve them
- Clarity on coordination roles and responsibilities with partners
1.3 Purpose and Research Questions

The purpose of this paper is to investigate the inter-agency implementation of Information and Communication Technology, Collaboration and Coordination in order to combine organizational and network structures that would facilitate the execution of joint efforts. The research aims to collect and analyse data from humanitarian organizations and commercial entities involved in humanitarian logistics as part of their Corporate Social Responsibility programs, and provide insight to how the different parties work together. After that, a parallel connection will be drawn between the humanitarian and business literature to investigate the possible benefits of commercial paradigm implementation. In order to address the gaps in the current situation and propose future improvements, the author of this paper will answer the following questions:

Question 1: What is the current state of information sharing, collaboration and coordination among actors in humanitarian logistics?

Question 2: What could be transferred from the business concepts of Information and Communication Technology, Collaboration and Coordination for the future improvement of the current state of humanitarian logistics?
1.4 Thesis outline

Chapter 1
• This chapter introduces the reader to the topic of research, problem statement and delimitation of the study.

Chapter 2
• This chapter presents the academic frame of reference used in the paper.

Chapter 3
• Representation of the methodology used to conduct the research study.

Chapter 4
• This chapter outlines the findings of the conducted research and in-depth insights of the actions during disaster relief operations. Different points of view of actors differing in size, fields of operation and financial support are presented.

Chapter 5
• Here the collected information is being analysed in connection to the chosen academic theory and formulate a framework which depicts the common state of actions as well as proposed improvements.

Chapter 6
• Summarises to what extent the proposed framework is able to answer the research questions and propose suggestions for further research.

1.5 Delimitations

This paper will investigate only the ICT, Cooperation and Coordination between UN organizations, NGOs and private logistics providers’ efforts as part of their Corporate Social Responsibility programs within the Cluster System. Cooperation and coordination between these parties and host governments will not be investigated due to the specific nature of each separate host country regulations and level of cooperation. NGOs not participating in the Cluster Approach will considered and discussed to a certain extent, but are secondary to the main focus of the research.
2 Frame of Reference

This chapter provides the theoretical framework of the thesis by discussing four literature streams within the fields of humanitarian logistics and business literature.

2.1 Humanitarian logistics

This section describes the notions of disaster and humanitarian logistics, in order to introduce the relevant concepts and educate the reader.

2.1.1 Definitions of disaster

The world during the last decades have encountered an increased amount of disasters occurring worldwide. The Global Resource Information Database - GRID-Arendal, in collaboration with the United Nations Environment Programme (UNEP) provides a clear graphical representation of the growth in natural disasters, see (Figure 1). It is important to be noted that disaster numbers have amounted from less than 50 in the 1960s, more than 200 in 1980s to over 400 in last decades. The list of natural disasters include: Drought, earthquake, extreme temperatures, famine, flood, insect infestation, slides, volcanic eruptions, wave/ surge, wild fires, wind storm (Nellemann, Hain & Alder (Eds.), 2008). Scholars such as Van Wassenhove (2006), draw distinction among the aforementioned disasters like: Natural and Man-made disasters, and classify them in accordance with the pace of occurrence as Slow-onset: famine, drought, political and refugee crisis; and Sudden-onset: terrorist attacks, hurricanes, oil spills etc.

The International Federation of Red Cross (IFRC) goes even further into their classification and puts them into five different categories: Natural (e.g. volcanic eruptions), Technical (nuclear explosions like the one in Chernobyl), Hydro meteorological (floods), Human related (war crisis), and Geological (earthquakes). (IFRC, 2015a)
As we see there are different classifications, therefore it is important to look into the different definitions of disaster in order to grasp what is being defined as one and what are the characteristics of one.

The United Nations Office for Disaster Risk Reduction (UNISDR) and The International Federation of Red Cross and Red Crescent Societies (IFRC, 2015b) classify an event as disaster in case of “[…] a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources.”. Here it is mentioned that the impacts of a disaster may lead to loss of life and property, as well as the fact that the affected cannot overcome the effects and consequences of the disaster without external help.

A similar and also widely used definitions of disasters comes from the Emergency Event Database- EM-DAT (UNDP/CRED, 2006): “A situation or event which overwhelms local
capacity, necessitating a request to the national or international level for external assistance, or is recognised as such by a multilateral agency or by at least two sources, such as national, regional or international assistance groups and the media”. What this definition stresses more than the previous, is the need for international recognition and assistance. This is a crucial part for the further development of this paper, as the later discussed matter concerns the efforts, struggles and overall actions of the parties dedicated to alleviating the suffering of the affected.

When dealing with disasters, it is important to be mentioned that there are 3 defined emergency response levels:

- **Level 1** - Small scale – Localized disasters, where one or few areas are being affected, but they could be managed by the local government and in-country partners. Humanitarian organizations may provide specialized assistance at the request of the government. Example of level 1 response requiring disaster are the floods in Solomon Island in 2009 (OCHA Regional Office for the Pacific, 2013).

- **Level 2** – Medium scale- Requires external help from humanitarian organizations, due to complexity and scale of the disaster, but is still primary managed by the local government with the help of the regional offices of international organizations. Examples of level 2 response requiring disasters are the tropical cyclone Vania in 2011, the Fiji floods in 2009, the Santa Cruz Islands tsunami in 2013 (OCHA Regional Office for the Pacific, 2013).

- **Level 3**- Large scale- Defined by multiple locations affected, insufficient regional stockpiles and funding in the region, need for multi-sectorial response provided by international organizations. Large need for external help and assistance. Cluster approach is being rolled out and the cluster provide help in their respective areas. For instance, the Thailand tsunami in 2004, Samoa earthquake and tsunami in 2009 (OCHA Regional Office for the Pacific, 2013). This research will focus solely on level 3 emergencies.

Now that definitions and levels of disaster have been discussed, the paper will move on to defining the humanitarian logistics and actors dedicated to combating them.
2.1.2 Definition of humanitarian logistics

Once a disaster strikes and a call for help has been placed, the international community replies through number of National/ Governmental agencies, United Nations-agencies, such as UNICEF, IFRC, World Health Organization (WHO), World Food Programme (WFP), Food and Agriculture Organization (FAO), and Non-Governmental Organizations etc., in collaboration with the local agencies, governmental organizations and military to provide remedies for the affected population. All the efforts dedicated to improving the well-being of the suffering are called humanitarian logistics.

Thomas and Kopczak (2005, p.2) provide a more specific, down to the point definition of the term: “the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption, for the purpose of alleviating the suffering of vulnerable people”. This circumvents a wide range of activities, starting from the planning and deploying of personnel and goods, to clearing customs, warehousing, breaking bulk, and transportation of the emergency supplies through the different stages of the disaster.

A typical onset lifecycle can be divided into four stages: Mitigation, Preparedness, Response and Recovery (Altay & Green, 2006). The mitigation stage is being defined by the efforts to prevent or diminish the influence of the disaster by preparedness and identification on crucial measures. Preparedness teaches the endangered how to respond, what to do and how to react once/if a disaster occurs, and immediately after it struck the response phase kicks in. During this stage “[…] the coordination of the activities of all actors in the supply network of humanitarian aid is of extreme importance” (Kovács & Spens 2007, p.13), emergency responders are called into action to execute situation assessment, search and rescue, ensure the shipment of necessary personnel and equipment, emergency supplies (Holguín-Veras, Pérez, Jaller, Van Wassenhove & Aros-Vera, 2013), and prepare the situation for recovery. During this last stage of the disaster lifecycle, the community is being assisted into smoothing the transition between the after effects of the onset and carrying life as usual (Hoyos, Morales & Akhavan-Tabatabaei, 2014).

The efficiency and expediency of activities taking place during these stages of the disaster are not only essential for the relief process (Leiras et al., 2014), but also present the state of the humanitarian supply chain management and how it handles the need to put emphasis on the
value adding processes, make best use of the available resources in a limited amount of time while under pressure and having scarce funding at their disposal (Van Wassenhove, 2006).

Kunz and Reiner (2012) state that during and after a disaster of any kind has struck, the affected areas where state of emergency has been declared, there is a need for overall management of information, efficient flow of goods and services, and therefore a heed for humanitarian logistics, as essential base for all that. Moreover, in order to respond to the growing need for help and assistance, it is from utmost importance to determine the level of knowledge the humanitarian logistics are operating under and “[…] seeking to understand and guide the growth, development and dissemination of this scientific knowledge to better respond to humanitarian problems” (Zary, Bandeira & Campos, 2014, p. 538).

After the parameters of disasters and humanitarian logistics have been briefly outlined, it can be noted that there are many parties involved in the humanitarian logistics process in time of crisis, for instance, around 130 foreign relief organizations were present within two weeks of the 2004 tsunami in Thailand (Carballo, Daita & Hernandez, 2006). They all had to find ways to collaborate and share information and knowledge to be able to deliver maximum impact. The following section provides overview of the collaboration within the Cluster Approach introduced to ensure united front and separation of duties among organizations part of it.

### 2.2 The Clusters Approach

Introduced in the 2005, as part of major change in the humanitarian logistics sphere, the Clusters Approach is a game changer to how operations are conducted in a new way. Defined as “Clusters are groups of humanitarian organizations (UN and non-UN) working in the main sectors of humanitarian action, e.g. shelter and health. They are created when clear humanitarian needs exist within a sector, when there are numerous actors within sectors and when national authorities need coordination support” (OCHA, 2015). The approach is led by World Food Program (WFP) and there are currently 11 clusters responsible in their respective fields of exercise. Every cluster consists of cluster lead agency and global cluster participants-multiple big, small international and local NGOs, working in the same area of humanitarian aid, who follow the leader’s general direction (Hidalgo & López-Claros, 2007; Madry, 2015). For example Education cluster is led by UNICEF and Save the children and followed by NGOs such as Christian Children’s Fund, Norwegian Refugee Council, Catholic
Relief Services, etc.; Health-led by WHO and followed by Center for Disease Control, Merlin, World Vision International etc.; Agriculture–FAO, followed by Action Against Hunger, Asian NGO Coalition, etc.

Figure 2: The Cluster Approach

The clusters are formed with the purpose of improving the following 5 areas (OCHA, 2007):

1. Sufficient global capacity to meet current and future emergencies;
2. Predictable leadership at a global and local level;
3. Strengthened partnerships between UN bodies, NGOs and local authorities;
4. Accountability, both for the response and beneficiaries; and
5. Strategic field-level coordination and prioritisation.

In order for the five area listed above to be improved the whole approach is being formed around three important aspects to make it work (Jahre & Jensen, 2010).

In first place comes designing a global lead, i.e. defining the world leaders for the clusters that are going to be responsible for the specific need settings once the they are called into action. The final decision on what cluster is going to take the lead in a disaster situation is the Inter-Agency Standing Committee (IASC, 2006).
Next step is building *global and local capacity*. Here the aim is to create “[...] strengthen system-wide preparedness and technical capacity to respond to humanitarian emergencies by ensuring that there is predictable leadership and accountability in all the main sectors or areas of humanitarian response.” (IASC, 2006, p2). By doing so on a large scale, it can be demanded similar preparedness and settings on a local level in all sections of activity.

And third is being a *provider of last resort*, which means taking the responsibility and commitment of providing relief. They must pinpoint the most appropriate organizations to be called in to action and provide adequate response to the disaster specific needs. In case they fail to do so, they are taking upon themselves the obligation to fill the gap (IASC, 2006; UNOCHA, 2012; Jahre & Jensen, 2010).

A key element and value adding activity here is the effective management of information exchange among the clusters involved. The information collected will improve the knowledge about the vehicle routing, infrastructural status, and overall availability and allocation of resources (Jahre & Jensen, 2010). This could be a difficult task to achieve, therefore the United Nations Office for the Coordination of Human Affairs (UNOCHA/OCHA) is working with the global cluster leads and the collaborating agencies to develop common practices and policies, address inter-cluster issues, and organize needs assessments and joint planning (UNOCHA, 2014). OCHA took the role of single information system to facilitate the cooperation and coordination along the clusters supply chain and provides list of the clusters, their leads, collective information assessments and useful links for all the participants to see. However, it is not without criticism, the Water, Sanitation and Hygiene (WASH) and Nutrition clusters have expressed indignation with OCHA’s absence of support in developing cross-functional assessment tools (Stoddard, Harmer, Haver, Salomons & Wheeler, 2007)

The next chapter will go deeper in the information and communication technology, collaboration and coordination theories and their importance for the joint inter-agency efforts.

### 2.3 Collaboration, Communication and Information Technology Systems in humanitarian logistics

#### 2.3.1 Collaboration and Communication

As discoursed earlier, the humanitarian logistics consist of multiple processes with the sole purpose to lighten the suffering of the affected population, moreover they are operating with
limited resources and have to make the best use of them. Despite the unique circumstances of every disaster, the humanitarian organizations have to go through similar stages when providing help, therefore it is not surprising that they are looking into supply chain management and applying commercial principles and paradigms in order to find sustainable solutions. Especially, since it is calculated that logistics constitute 80 percent of the overall cost of conducting humanitarian operations (Van Wassenhove, Tomasini & Stapleton, 2008).

Many organizations with their dedicated personnel present at the scene of the disaster can also cause confusion and chaos, due to overlapping activities, targeting affected areas where other organizations are already delivering services and goods. This overlapping can create friction, ineffectiveness and delay the much needed help (Tatham & Spens, 2011).

When having so many organizations competing to deliver similar, if not the same services at the fastest possible way there is a need for collaboration among them, in order to keep the common goal in focus. Within commercial supply chains this has been realised and companies are constantly working to find new more efficient modes to work together and make the most of each interaction with each other. Supply chain management, performance, timeliness and overall quality are dependent on cooperation, what has been studied and focused on (Angkiriwang et al., 2014; Van Hoek, 1998), but coordination among relief chains, its practical implications on the efforts and results are still a developing matter (Balchik et al., 2009).

Organization strategies, manufacturing, logistics, retailing, marketing and their connection with the concept collaboration, coordination and cross functional integration among the links of a supply chain have long ties in the commercial business world (Jahre & Jensen, 2010), and their practical implications “mandate the continuing need for effective, timely, informed, and coordinated emergency risk assessment and response by multiple agencies and players” (Bartell et al., 2006, p. 1).

Joint efforts among humanitarian organizations are viewed as an effective way to improve the information flow along the supply chain where collaboration can be either vertical where NGOs collaborating with government institutions such as the army, and horizontal where NGOs are partnered together to achieve higher results, for example joint effort of Food For The Hungry, Hunger Plus Inc. and Emergency Nutrition Network (ENN) to provide food supplies (Overstreet, Hall, Hanna & Kelly Rainer Jr, 2011). If an organization is operating on its own, without common planning of efforts, the coordination is being decentralized,
when actors actively get involved in each other’s actions they are working in centralized manner and rely on umbrella organization to take the lead (Akhtar et al., 2012). Furthermore there are four main functions identified:

- **Planning** - the sum of strategic and coordinated actions to be taken such as delivery of supplies, allocation of specific purpose centres (medical, shelters, food distribution etc.) and joint coordination between UN agencies, NGOs and local authorities.
- **Organizing** - allocation of resources and duties, once the purpose built centres have been established.
- **Leading** - the management of daily activities, problem solving and overall supply chain management.
- **Controlling** - making sure that everyone follows the common guidelines and instructions, monitoring of supply usage and deliveries.

The Fritz Institute (2004) and Van Wassenhove (2006) confirm the importance of inter-organizational collaboration among humanitarian entities, but also name it as one of the most important challenges that organization will have to overcome in the humanitarian supply chain.

Based on the findings of a workshop in Ghana, Kovács and Spens (2009) name as most important prerequisite for successful collaboration, among humanitarian organizations and aid providing entities, the establishment of common knowledge. That will serve as a base line for any further operations, as it will possess the necessary information to make educated managerial decision. Zary et al., (2014) points out the necessity of accurate information about the regional infrastructure, still existing and destroyed links between affected areas that have to be taken into consideration when planning inventories and deliveries. Information flow is essential and “emphasis must be given to the use of computerized systems that may facilitate and ensure the data internal and external sharing and control of the organizations” (Leiras et al., 2014, p.110)

In order to for humanitarian organizations to work together and cooperate in an efficient, timely manner communication is vital. Moreover, cross-cluster communication is very important when it comes to delivering the same service or product, so there is no overlap of actions between the different clusters delivering the same items to the beneficiaries. Information and communication theory will be further presented in the following subchapter.
2.3.2 Information and Communication Technology in humanitarian logistics

With the development of humanitarian logistics and the growing awareness of now important collaboration among entities is, the notion information technology (IT) and the impact it has on the process is getting more and more obvious. There is a tendency in the recent years to study applied information solutions in different logistical models to serve as a backbone to the humanitarian processes, but the use of technology is not yet dominant (Özdamar & Ertem, 2014).

Margareta Wahlström, UNISDR chief and United Nations Special Representative of the Secretary-General for Disaster Risk points out the importance of IT solutions: "Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure." (UNISDR).

The effective management of information and its application in the relief supply chains is becoming more and more important, since it boosts the efficiency of the humanitarian operations. Better information flow means better holistic view of what is happening and better supply chain management (Howden, 2009). The possession of right knowledge enables actors to be proactive, it is not only a supporting tool used to share current data in emergency situation, but also empowers communities and calls for a preparedness in disaster prone areas (Bartell et al., 2006).

Information systems ameliorate the information flow of logistical entities, combine it with the efforts of on-site operations and improve the supply chain, while in the same time provide feedback of what has been done, what has been used from the inventory and how the donations have been allocated. Furthermore, it secures leaner, faster-moving activities (Howden, 2009).

“While information always comes at a cost, the price of poor information - or none - is higher” (Maxwell & Watkins, 2003, p. 72)

The possession of knowledge is probably one of, if not the most important things in any humanitarian or commercial supply chains. A very good example how the lack of information, can affect the usage of resources and allocation of personnel, comes from Kovács and Spens (2009) where they describe the case of the National Disaster Management Organ-
ization (NADMO) in Ghana. Their personnel, who were never trained to swim, were provided with life vest, while the navy, despite their vast water training, were left out, unequipped and unable to deliver to the affected population.

The application of information systems gives the humanitarian logistics the chance to avoid collaboration challenges. It requires conventional set ups to coordinate the inter-organizational situation assessments, vehicle routings, and transportation of personnel and injured from and to the aid centres. The whole process will be much more sufficient, if there was standardization of practices and processes among the entities (Özdamar & Ertem, 2014; Kovács & Spens, 2011).

Coordination of the actions of organizations present at the site of the disaster is crucial for the success of the relief operations, therefore there is a need for a broader look on the structure and coordination of the inter-organizational supply chain (Moore, Eng & Daniel, 2003). UN organizations and NGOs are finding new ways of expanding their usage of information and communication technology. Unlike the commercial sector, where ICT development is viewed as crucial for the future success, within the humanitarian sector information systems taking secondary position and are considered overhead, rather than a fundamental function of the process organization (Maiers et al., 2005; Haselkorn & Walton, 2009). This is due to the fact that providing relief to an affected population is the core competence of the organizations in the humanitarian sector, there they can have strong and visible impact by delivering items such as food, water, shelter, healthcare etc. On the other side, ICT is a back office function that facilitates the core competences and despite that it is secondary to the providing relief, it is of utmost importance. When well integrated in the actions, it can increase the overall organizational capacity, improve the planning and preparedness, tap into previously collected knowledge and give insights for challenging areas (Maiers et al. 2005).

A good example why ICT is crucial for humanitarian operations comes from a National Science Foundation workshop conducted in Kenya in 2006 and was addressing the rising attention of famine in the northeast districts of the country. Massive international response has been called into action to tackle the issue and the food program of the United States Agency for International Development alone has spent approximately 200 million US dollars for food supplies, for the people in those districts. While investigating the actions necessary to improve the situation and create contingencies, in case it occurs again, the re-
searchers have found from the local population that despite the fact the draughts in the region are natural disaster beyond their abilities to change it, the famine was man-made disaster. The road infrastructure has not been built in the area and as an effect of it, the deliveries of food supplies have not reached the affected areas, further aggravating the situation. After these discoveries, it was clear that there was a bigger need for investment in the transportation infrastructure, rather than in food items (Haselkorn & Walton, 2009).

From this example, it is clear that information and communication systems are central component when it comes to the development of common knowledge in order to address the disaster in hand. Moreover, it points out how important the people, practices and policies of the organizational environment are in the integration of ICT, in order to build common knowledge based on diverse set of skills that every organizations brings to the table (Maiers et al. 2005). Information and communication systems ”[…] are playing an increasingly important and more sophisticated role in humanitarian service activities involving logistics, organizational learning, health-care delivery systems, assessment, and education” (Haselkorn & Walton, 2009, p. 325).

In this context, great importance is being placed on the information technology to support and keep track of all the activities taken by the international organizations. In logistics, information is necessary to assess the road situation in order to best plan the deliveries of relief items, keep track of what is being shipped and what is available; in organizational learning- the knowledge pool that organizations can use to draw lessons learned from previous actions, what was effective and what was considered back draw; in the health care sector- the strategies being discussed and communicated among the multiple organizations in order to provide united front in helping the affected; and probably most importantly in the general assessment of the situation where information and communication technology supports the overall transfer of knowledge and information among the parties involved (Haselkorn & Walton, 2009).

The vast number of challenges, that humanitarian organizations face, burden further the establishment of efficient information and communication system when considering the vital communication and collaboration necessity in the field of the disaster. Sharing and coordinating responsibilities, might hinder the independence of the organizations, while they seek independence and autonomy in the process of achieving common goal. This is especially an issue when dealing with reluctance to share information that is being considered essential for the competition of funds (Maiers et al. 2005).
The lack of communication and common planning in the organizing phase could have both short and long term effect, and cause disarray all the way till the end of the relief activities (Murray, 2005). A specific issue is the choice of deferent software systems that might further worsen the sharing of information among parties (Maiers et al. 2005). Another very important player is the Office for the Coordination of Humanitarian Affairs (OCHA) that is leading in the Cluster approach to humanitarian aid delivery discussed previously.

All that is going on in the field of humanitarian logistics is a subject of a constant change and development. The following section, investigates commercial theories in connection to the relief environment, in order to improve the status quo.

2.4 Implications from the commercial literature

According to Van Wassenhove (2006) the humanitarian and commercial supply chains, despite having different goals and aspects can benefit from each other. A big part of the learning process lies in the application of the research and models used to improve the private sector practices into refining the operational management of the aid agencies. What for-profit sector can learn is the ability to be agile in your action, being proactive and able to adapt to a crisis situation, while the humanitarian can benefit from adapting practices for efficient supply chain management (Natarajarathinam, Capar & Narayanan 2009), since they also rely on core principles, such as flow of finances, information and goods (Kovács & Spens 2007).

The private sector, might struggle to find the best supplier/s for a certain product or service, but the humanitarian logistics have to find which organizations are getting involved, what they are doing, and try to find a common ground to work together (Kovács & Spens 2009). Therefore they have to be open to new strategies and technologies aimed at delivering supreme operational knowledge and management (Heasip, 2013), especially if they are being provider of last resort. Decisions aiming to fill the service/product gap, impact the general strategy in order to meet the necessities of the end beneficiaries. Infrastructural environment affects the performance and has to be taken into consideration in order for the operations to run as smooth as the situation allows it. (Kunz & Reiner, 2012).

Overstreet at al. (2011) in their literature review describe 6 key elements of humanitarian logistics that are crucial in disaster situations: organization personnel, equipment/infrastructure, transportation, information technology/communication, planning/policies/procedures, and inventory management. All those elements mentioned have to be considered
when making strategic, tactical or operational decision to ensure best use of resources (Leiras et al., 2014).

In the business world, those 6 elements are included in one way or another in a company’s structure and code of operations, but revolve around the flow of information to make efficient decisions as a whole. The key aspect that has changed the commercial industry is the development and use of information technology (Tatham & Spens, 2011). Therefore, it can be assumed that information technology is the cornerstone of any successful relief operation.

Özdamar and Ertem (2014) sums up the challenges that the humanitarian logistics are facing as “[…]lack of real-time data, fragmented nature of humanitarian organizations, lack of commonly accepted interoperability standards among different humanitarian organizations, and not realizing the importance to balance good bookkeeping practices and to act fast in emergency relief operations.” (p. 9). They go further by pointing out that although the Cluster Approach is an example of successful cooperation, the integration models are either too complicated or oversimplified to have practical implications. One model that has the capacity of integrating the 6 elements of humanitarian logistics and enable the cluster leader to focus on its core competences, by facilitating the supply chain can be found in the business literature. Namely the Industry Innovator model in the emerging Forth Party Logistics providers (4PLs) industry. Before that, it is important to have an overview how ITC is being employed in the commercial supply chains and what advantages it brings to the table in order to understand the companies’ desire for further cross-company integration.

2.4.1 Information and Communication Technology in the business environment

When it comes to the usage of information and communication technology in the business world, it is vital for the success of a company to be able to monitor, measure and then communicate the key operational and performance parameters with its suppliers and customers (Qrunfleh & Tarafdar, 2014. This opens the channels for improvements in cooperation and sharing of information among the links of the supply chain. Moreover, these improvements in the information flow among companies are only possible due to the advancement of IT and are one of the main drivers for the improvement and further development of IT (DeGroote & Marx, 2013), forming a mutually dependent “relationship”. Swafford et al. (2008) state that only throughout the integration of information and resources, companies in the supply chain can adjust the fluctuations in the demand curve and respond accordingly to the market changes. Al-Mudimigh, Zairi & Ahmed, (2004) find two
pillars supporting the value chain management, aside from the process management, company’s vision and partnership agreements, namely: (1) an integrated information technology and (2) agility and speed. IT enables entities to access, gather, analyze and share data in a fast and efficient manner, furthermore, it contains in itself three elements: information flow integration, physical flow and financial flow integration (Rai, Pathayakuni & Seth, 2006). These three elements support the speed and agility of operations by maintaining a steady stream of information and supplies along the links of the supply chain, activate operational resources and facilitate the knowledge base that contains all knowledge of the improvements achieved in efficiency. Simply put, IT integration is the corner stone of coordination and information integration within company’s operations and effectiveness, as well as in their supply chain (Swafford et al. 2008).

As an effect of the integration of information systems, companies are able to have their hand on the pulse of the market, monitor the needs, anticipate changes and act accordingly, so they can keep their competitive advantage (Ngai et al., 2011). Studies done in the recent years define a clear pattern between the supply chain integration and coordination among parties facilitated by the usage of integrated information systems (Vickery, Jayaram, Droge & Calantone, 2003) and have led to superior company performance (Qrunfleh & Tarafdar, 2014). This is a clear indication that when a company is able to put into use its integrated information system and through its vital role of supporting operation in the supply chain activities, IT integration enables the supply chain flexibility, agility and ultimately business performance. (Swafford et al. 2008; Ngai et al., 2011)

Information technology provides companies with the ability to keep close eye on the activities performed by all parties in the supply chain and sustain a constant coordination activities’ information. This means that all parties can define the partnership relation parameters, supplemented according to their resources and complementary core competences, by developing common knowledge, information sharing routines, anticipate and jointly manage market changes and fluctuations (Liu, Ke, Wei & Hua, 2013). “IT can be especially effective when deployed to identify, collect, analyse, and communicate market information, and to coordinate responses to this information with firms throughout the supply chain” (DeGroote & Marx, 2013, p. 910). Information systems have the capability to support the requirements necessary for the decision making process (Qrunfleh & Tarafdar, 2014) and by doing so, it enables firm’s agility (DeGroote & Marx, 2013). Consequently, supply chain
agility empowers a company to coordinate actions with its suppliers and customers, decreasing potential opportunistic behavior and conflicts, while in the same time enhances their efficiency and productivity (Liu et al., 2013).

Companies place great the emphasis on the integration of supply chain activities increasing the customer value and technology accommodates them to tap into a wider network of resources and capabilities in order to provide superior product or services (Al- Mudimigh et al., 2004). This would be very hard for a single company to achieve, especially in the present business world where competition is no longer between separate companies, but rather supply chains (Christopher, 2000). The ability of a company to sense the market changes and react to them in an expedient and efficient manner is strongly embedded in the ability to leverage the resources and capabilities of their supply chain. The level of information technology integration facilitating collaboration is the base line for coordinated actions and agility of the supply chain (DeGroote & Marx, 2013).

The development of relationships between firms is being conditioned by the information and real life communication, which is necessary for the application of the value chain management of activities (Al- Mudimigh et al., 2004). For supply chain communication to be conducted, there are 2 essential elements, IT and human resources. Without proper training and management of employees to support information systems, the flow of information and becomes slower, which in its turn slows down the market changes response time (Ngai et al., 2011).

One business operation model dedicated to implementation of information and communication technology, in order to enhance a company’s ability to act in a coordinated manner within their supply chain can be found in the emerging 4PL industry. The literature devoted to investigating it is further discussed below.

### 2.4.2 4PLs and the Industry Innovator model

In order to relate the potential usage of the Industry Innovator model and its implication in humanitarian logistics, it is firstly important to have an overview what 4PLs is and what they do in the business world.

The term Forth-Party Logistics was coined by the Andersen Consulting, now known as Accenture, and used to describe “a supply chain integrator that assembles and manages the resources, capabilities, and technology of its own organization with those of complementary
service providers to deliver a comprehensive supply chain solution” (scmo.com cited in Jenses, 2012).

4PL has emerged as the ideal solution that allows companies around the globe, from a diverse range of industries, to have a single point of accountability across both supply and demand chains (Win, 2008). Based on the findings of Hingley, Lindgreen, Grant and Kane, (2011), it is visible that 4PLs improve the profitability of their customers by improving the overall effectiveness. Win (2008) and Yao (2013) point out that through integration, optimization and development of the entire supply chain, the 4PLs are delivering value to their customers by resource allocation and integration. Coyle, Bardi & Langley (2003, cited in Win, 2008), affirm that 4PLs play even more strategic role, where they are being integrators of the supply chain, where they find custom tailored match to their customers’ needs.

The 4th Party Logistics provider serves as facilitator and aims for agility through comprehensive integrated supply chain through hybrid organizational structure (Büyüközkan, Feyzioğlu & Şakir Ersoy (2009). A 4PL acts like a knowledge and coordination hub between the parties involved, combines their complementary capabilities to achieve maximum efficiency. While in its commercial use 4PLs strive for agility, they can bring the Lean principles in the humanitarian logistics. Figure 3 illustrates the processes and partner capabilities 4PL embodies as a facilitator of the supply chain (Evolution of 4PLs Gattorna 1998, cited in Büyüközkan et al, 2008)

![Figure 3: Evolution of 4PLs](image-url)
The broad concept of 4PL used as “intermediary” throughout the prism of humanitarian logistics has been already discoursed by Jensen (2012), so the commercial theory can be taken step further and applied to the relief sector.

The Industry Innovator model, shown in Figure 4, deals in the complicated commercial environment, where the “4PL provider develops and manages a supply chain solution for multiple industry participants. 4PL organization will focus on synchronization and collaboration between the participants in order to provide efficiency through technology, operational strategies and implementations across the supply chain” (Büyüközkan et al., 2008, p. 117).

![Industry Innovator Model](image)

**Figure 4: The Industry Innovator model**

The centre 4PL Organization will facilitate all the needs of the Lead cluster; Service providers in the case of humanitarian logistics can be all the parties involved in a disaster, while Clients are the separate clusters.

The first level of the model deal with all the organizations involved in a relief campaign, where 2 sets of actors can be defied: the host government, its military and country aid agencies, and the international organizations such as United nations, NGOs, logistics providers and aid agencies Kovács & Spens, (2007).

The 4PL in the middle circumvents the Cluster Leader and facilitates all the interactions between the clusters, negotiates with local government and commercial companies on behalf...
of all the humanitarian parties involved. By doing so, it empowers the cluster leader to focus on its core competences. It focuses on strategic, tactical, and operational analysis, where those decisions can be related to applying goals and targets, and translated into actions (Leiras et al., 2014) for the “Industry group”. However, just taking the model and applying it in the humanitarian logistics’ environment strengthens Özdamar and Ertem’s (2014) point of oversimplification of models in their application, therefore there is a need for the development of new model, based on the Industry innovator, but taking into consideration the specific parameters of humanitarian logistics. This will done in the analysis part of this paper.

2.5 Chapter summary

The theory discussed in this chapter has the purpose of introducing the reader in the field of humanitarian logistics. It starts by describing the definitions of disaster and humanitarian logistics, after that it continues by presenting the current state of joint efforts to provide united front, i. e. the Cluster approach, the use of information and communication theory in connection to collaboration and coordination. Later on, it provides overview of the business literature in the areas of ICT and collaboration of commercial supply chains, and proposes coordination model, the Industry Innovator that can serve as a base line for the future development of coordinated humanitarian logistics’ actions.

3 Method

In this chapter the methodology of the conducted research is being presented. It starts by presenting the research design and strategy, followed by the data collection and participants. At the end the credibility aspects of this paper are discussed.

In order to fulfil the purpose of the study it is very important for the right research strategy to be chosen. This chapter describes the structure of the executed research and its different approaches and paradigms. The paper is based on the clear research structure developed by Saunders, Lewis and Thornhill (2012) in the form of research “onion” and presented as a coherent match between the purpose of the study and the research framework, covering the choice of approach and its purpose, followed by the research strategy; time horizon and end
up with the core of the “onion” with techniques and procedures for data collection and analysis.

3.1 Research design

In their book Saunders et al. (2012) describe three different approaches of conducting studies. The first one is Deductive, where the researchers start with general investigation in a field and the move down to specific findings to form a theory. The second one is Inductive, takes the opposite path and goes from specific theory to general application. The last one, Abductive approach, is a combination of both approaches.

For this study, an inductive approach was chosen, due to its freedom when conducting the research. With this approach when investigating, the findings are unfolding one after other another. Since the field of humanitarian logistics is still developing there are many theories to be investigated in order to form best practices and models, it gives a lot of freedom to collect data compare, match it and find common denominators. This way the research takes unbiased route and focuses on its own findings, rather than former studies conducted in the field. However, in the end of this study, existing commercial theory and one specific model are being broken down through the prism of humanitarian logistics, in order to be applied to the specific context of relief operations. This structuring of the analysis of the second research question makes is deductive in nature, allowing the author to combine both inductive and deductive approach to further develop the understanding and outcomes of the research topic (Dubois & Gadde, 2002).

Based on the characteristics of the purpose of this paper it has been chosen that the study should be exploratory, because it makes connections between different areas. It has the ability to collect broad spectrum of data, establish connections between the different information collected and gain insights that can shed new light on the matter (Saunders et al., 2012). This is considered to be the best fit for this research, due to the fact that the area of research, despite being previously investigated in different aspects, still has not set benchmark for the “market” and it is open for new suggestions. Moreover, humanitarian organizations are constantly working to improve the current settings in order to be more adaptive to the specifics of each disaster.

Based on the previous two aspects of the research, it was decided the study to be qualitative, because it has flexible parameters, it does not follow strict predetermined path and leaves room for suppositions. Unlike quantitative researches, where there is need for vast amount
of data to have a solid base for forming theory or proving/disproving hypotheses, qualitative studies remain malleable to change throughout the project (Maxwell, 2012). Also, being focused on humanitarian logistics, the research aims to have positive effect on the efforts of the aid organizations and consequently the beneficiaries of their efforts. So, focusing on the qualitative applications of the findings would give better understanding on the problem and how the usage of ICT and collaboration among parties will improve the overall situation. A quantitative study will give numerical representation of the issues being encountered, but due to the highly diverse nature of activities performed by the humanitarian organizations this approach was deemed unfitting.

3.2 Case study strategy

Case study is being defined as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Robson, 2002, p. 178, cited in Saunders et al., 2012). The study aims to gain deeper inside knowledge of the field of humanitarian logistics in order to reach conclusions. It investigates the actions of the players in hand and seek to answer questions such as “why”, “how” and “what” to explain the environmental and procedural factors affecting their decisions (Yin, 2013; Wilson, 2014). The general focus in hand is to gain holistic knowledge on the communication and collaboration in the field of humanitarian logistics and how information technology can improve, maintain and facilitate it. In order to provide the best analysis of the situation Embedded case study strategy has been chosen, where multiple units are going to be analysed all in the same context. The reason Embedded case study was chosen over Holistic is the fact that a Holistic case study analyses the data as a single unit of analysis, while Embedded case study divides it into subunits and data can be viewed from different perspective in the same context. (Yin, 2013) This is important for this paper, due to the fact that the organisations interviewed differ in size, nature and capabilities, and should provide different aspects of the collaboration and coordination aspect of relief actions. By doing so real life knowledge is being gained, in order to be able to make assumptions and contribute to the field.

3.3 Time horizon

Due to the academic time constrains of this paper, it is practically impossible to conduct longitudinal study and fit into the time frame of the thesis. Therefore, the time horizon is cross-sectional. This means that the study is being conducted in the specific time frame of
the master’s thesis writing period and investigate the status quo of the field of humanitarian logistics. Cross-sectional time study will give clear picture of the collaboration and communication among the humanitarian organizations and outline best practices in this specific time window.

3.4 Data collection

3.4.1 Data collection set up

The data collection will be done throughout the use of semi-structured interview. This way the interviewer will only guide the general direction of the conversation while the interviewee will have the full ability to explain their organization’s stand point on the matter. They will determine which information is relevant and important, while in the same time it leaves the door open for the interviewer to have follow up questions, if found necessary to elaborate further. The interview questions used when this study has been conducted can be found in Appendix 1.

The interview questions are divided in four general sections. The first one deals with introduction of the people being interviewed, what is their general position and responsibility in the organization; and what is the organization’s main focus in the field of humanitarian logistics. The second set of questions investigates the organization’s pre-disaster collaboration with other parties. They provide overview of their operations’ set up, how do they prepare themselves for major disasters and how do they deploy themselves in case of emergency. The third part deals with onsite disaster supply chain coordination and communication. Here the questions are aiming on getting broader knowledge on how operations are conducted. It investigates the current level of communication and the information flow among organization. It draws conclusions on the collaboration parameters and consequently how important information systems are for the provision of coordinated response to the beneficiaries’ needs. The last three questions aim for the interviewee’s personal reflection and opinion on the matter of collaboration and coordination among the relief organization.

Due to the busy schedules of the people involved in humanitarian relief actions, some of them agreed to take part in this research, but were unable to find the time to be interviewed. They preferred answering limited number of open questions in a written form (see Appendix 2). Despite the fact that this data collection method differs from the main one, it still provides insights into issues in information and communication sharing that affects the collaboration and coordination.
3.4.2 Data collection participants

As previously described the paper aims to explore the implementation of ICT, communication and collaboration in order to improve the status quo of humanitarian logistics, and find what the possible improvements are.

The data sampling employed in the research is Non-probability, purposive sampling, because it is best suitable for qualitative research and it is conducive to in-depth study of small sample with particular purpose. Being purposive, allows the author to make judgements to who is best to be contacted and be able to provide information that can be analyzed with the intended purpose of answering the research questions (Sunders et al., 2008). Since this paper is focusing on the participants in the Cluster System, the sample was chosen among organization who are Cluster leaders, global cluster participants or private companies with CSR programs assisting the clusters.

The best people to be interview in order to gain fullest information are practitioners who are actively involved in relief actions, but due to time, location, financial and environmental constrains it is deemed practically impossible and unviable to get in touch with them. Skype and phone calls will not only be hard to be set up, but will also take them away from their efforts to deliver aid to those in need. Therefore managerial staff located in their headquarters or local offices were contacted to participate in the research.

Since most of the people on managerial positions, usually have broad knowledge and field experience, they are perfectly fit to give the necessary information. The potential participants first to be contacted were the cluster leaders and OCHA, while the rest were chosen from the list of humanitarian organizations in Reliefweb.com and cross-checked with lists of global cluster participants. Over 50 UN organizations, NGOs and commercial organizations who deal with humanitarian logistics as part of their Corporate Social Responsibility (CSR) programs, were contacted several times and invited via email or/and phone to take part of this study, but due to their busy schedules most of them respectfully denied. The fact that there was a current crisis at the island of Vanuatu, made the collection of information even more difficult, since most humanitarian organizations have their focus on delivering aid there. Representatives of four organizations and one retired logistician currently working as a part time advisor for various organizations agreed to be interviewed, while 1 organization agreed to take part by answering questions in written form. Below is the full list of all participants:
Mr. Jean-Cedric Meeus- Senior Emergency Supply Manager in the UNICEF Supply Division, overseeing the logistics activities of the Logistics Cluster under the general lead of WFP.

Mr. Frank Clary- Director, Corporate Social Responsibility for Agility Logistics. Private logistics company providing assistance to the humanitarian organizations in time of crisis, with his personal assurance that the people and resources devoted to humanitarian actions, despite being employed and paid by Agility are in no way connected to the commercial part of the company.

Mrs. Corinna Schüttler-Kvarme, Head of Global Logistics and Mr. Kristofer Stålhammar, WASH Advisor for the Norwegian Church Aid. Mrs. Schüttler-Kvarme provided overview to what are the general activities of the organization, as well as the pre-disaster set up, while Mr. Stålhammar, in his role of acting lead field logistician provided insights to the on-site information sharing, collaboration and coordination.

Mr. Sospeter Baitwa- Logistics manager for the Norwegian Refugee Council in the Democratic Republic of Congo.

Mr. Rolf Bohlin- retired head of Supply section, dealing with the humanitarian logistics within the UNICEF from 1981 until 2010 and during this time involved in 4 major disasters relief actions. Despite that he is no longer full time employed, he is still active advisor for UNICEF and other humanitarian organizations, as well as guest lecturer at Jönköping International Business School (JIBS), Sweden.

Shelterbox- part of the Shelter cluster, a partner in the Logistics and the Camp Coordination and Camp Management (CCCM) Clusters. Information collected via written form.

3.4.3 Data evaluation

After the interviews have been conducted with the organizations willing to take part in the research, they are being transcribed in order to structure the collected data and make it more approachable for representation and analysis. The information about their pre-disaster set up is being presented to show their readiness to respond to a disaster and show the relationship they have with other organizations, prior to a major crisis. After that the communication and collaboration between organizations is being evaluated, by representing their work protocols and the way they handle the incoming and outgoing information.
This allows the making of a comparison between organizations and show what importance they place on information flow and collaboration with other parties. Moreover, due to different size and focus of the organizations, it can be shown the different aspects and issues they encounter when working with others.

3.5 Trustworthiness of the research

The quality of the conducted research is going to be evaluated by criteria formulated by Lincoln and Guba (1985).

3.5.1 Credibility

This part of the trustworthiness of the research is concerned with both validity and reliability of the collected information. The data collected about their protocols and actions during time of crisis is a representation of the organizations’ own strategy and code of conduct. Since the information is primary data, collected through interviews about the specific case of each organization, its credibility would not be questioned. The information is strictly personal to the specific organization and does not need to match any other organization’s data. The data credibility is being enhanced by the interviewees’ own experience as practitioner and participant in the organization’s humanitarian expertise (Gope, 2014). Furthermore this is an exploratory study, meaning that it is open and unbiased to set rules or restrictions.

3.5.2 Transferability

Since there is vast number of humanitarian organizations it is practically impossible to interview all of them and generalize the findings. But the organizations interviewed are active players and practitioners in the field, and could be considered representative sample, as they each represent the different kind of player in the field. UNICEF, lead or co-lead in 4 separate clusters, is one of the key entities active during and after time of crisis, dedicating their resources to aiding communities in time of need. Norwegian Church Aid, Norwegian Refugee Council and ShelterBox, represent the smaller organizations that work independently, but are influenced by and dependent to the main actors. Agility Logistics is part of the commercial companies present during time of disaster as part of their Corporate Social Responsibility. And last but not least Rolf Bohlin, despite being retired, is still active in its role of consultant has a vast experience and knowledge about the humanitarian operations conducted, so he can provide valuable knowledge about the different aspects of collaboration between
organizations. Based on the findings of this sample, certain level of generalization is aimed to be achieved.

### 3.5.3 Dependability

Since the study is cross-sectional, conducted in a certain time frame and investigates field that experience rapid change, it is prone to certain bias. All in-person interviews have been conducted in the same manner, over the phone or voice call via Skype, the time and duration of the interviews was left to the interviews to decide, due to their schedules. Same predetermined questions have been asked; all the participants have received copy of the questionnaire in forehand so they can prepare to give full and educated answers. Very important for the consistency of the answers is the fact that the questions are directed towards specific purpose and none of them are misleading.

### 4 Empirical Findings

This chapter represents the findings from the conducted interviews. The first subchapter is an interview with Rolf Bohlin, a retired logistician with a long and fruitful carrier in the field of humanitarian logistics. Formerly employed by UNICEF, he is now guest lecturer at Jönköping International Business School, Sweden and advisor for various humanitarian organizations. Subchapters 2, 3 and 4 cover the interviews with the inter-organizational agency UNICEF, the NGOs Norwegian Church Aid and Norwegian Refugee Council. The subchapter 5 is dedicated to Agility Logistics, logistics provider with strong ties to the humanitarian sector as part of its Social Corporate Responsibility programs. The last chapter is depicting the written information collected from ShelterBox.
4.1 UNICEF

4.1.1 Overview

Mr. Rolf Bohlin, as mentioned earlier, is a retired head of the country Supply Chain departments within UNICEF for nearly 30 years. He has been involved in emergencies in Somalia, Afghanistan, South Sudan and East Timor, currently he is part time advisor for UNICEF and other humanitarian organization, as well as a guest lecturer at JIBS, provided overview of the information, communication and collaboration activities taking place in the field of humanitarian logistics.

4.1.2 Information, Communication and Collaboration

Information is of utmost importance, because it provides not only overview of what is happening and what needs to be done, but also it have to be communicated properly between the local/country office and the program officer. For example, if it is a health emergency, the UNICEF logistics officer has to work with the health officer in charge of the actions, if dealing with kids who have to be put in school, has to be dealt with the education officer. And there you are part of a big international team, consisted of the local authorities, the country office, program officer and the people operating in the field, here is where all the information, communication and collaboration happens. Usually in the field office information and collaboration is working well, but once you are out of the UN family to deal with all the NGOs working present on the field the information sharing and collaboration gets extremely though. This could be further worsen by the geographical spread of the disaster, where the affected areas are and also how the organizations are positioning themselves. In order for communication and collaboration to happen on the field, the UN family and the NGOs involved within the cluster system have to put emphasis on the emergency preparedness, share information in advance and discuss the action plans. Other issue with the communication and collaboration is the human resources, due to the fact that there is high personnel turnover. Building relationships with people in responsible positions is hard and when those people are being replaced, organization have to start basically from zero. Another issue with personnel is that the amounts of information that has to be assessed, processed and shared is quite vast, while there is a need for more experienced logisticians to do it.
4.2 UNICEF

4.2.1 Overview

UNICEF is a United Nations program that was created in December 1946 to provide food, clothing and health care for children suffering the aftermath of World War II. Ever since their creation, they strive to deliver long-term humanitarian and developmental aid to children and their mothers in the developing countries, as well as much needed intervention during major disaster crises. UNICEF is working tirelessly to give the best start in life to kids, by helping them overcome violence, deceases and poverty. They promote girls education to give fair chance to all kids regardless of gender and religion; raise awareness about HIV/AIDS, how to prevent the spread of the decease as well as helping the affected to manage their lives with their heads held high. (UNICEF, 2015)

The main activities include nutrition, health, water, sanitation and hygiene, child protection and education. Solely for the last year 1.8 million children were treated for severe malnutrition, 16 million children vaccinated against measles, 13 million people were provided with clean water, 1.8 million children were provided with psycho-social help and 2 million children were provided access to education. (UNICEF, 2015)

UNICEF is present in more than 190 countries and has its headquarter in New York to provide with overall direction and strategy, while the logistical and emergency functions are navigated by the Copenhagen office and supported by 3 hubs. (UNICEF, 2015)

4.2.2 Pre-disaster set up

UNICEF is mainly involved in the areas of nutrition, health and sanitation, education as well as providing supply chain and logistics support activities for the smooth and expedient aid delivery in those areas. The supply division situated in Copenhagen is in charge of overseeing 3 hubs located in Panama, Dubai and Denmark where physical aid is being separated into commodities for prior to, during and after an emergency. Those commodities are vaccinations, tents, house kits, school kits etc. On local/ country level the UNICEF office manages its own supply and warehousing throughout different hubs or warehouses belonging to other companies, but made available for UNICEF to use. The country office has long term agreements with local supplier and depending on the situation may have contingency stock for emergencies. The entire warehouse availability is being covered by ERP system that covers the whole world and visible to the Supply division.
4.2.3 On-site collaboration and coordination

Since UNICEF is present in 198 countries, they would have already representatives of the country office during time of crisis. In case of level 3- large scale emergency, an emergency coordinator is being assigned by the UNICEF’s executive director and within the first 72 hours Mr. Jean-Cedric Meeus, emergency supply manager, overseeing and coordinating supply logistics for UNICEF or his deputy together with the director or deputy director will be deployed to meet with the country office and discuss the situation, and all the logistical activities to make it possible for the aid to reaches the beneficiaries. In the next 48 hours after that the Immediate Response Team (IRT) will be deployed to help the country office. UNICEF also has a fast track deployment mechanisms and operate on “No Regrets” policy, meaning that they consider it better to have too much staff than too little, so there will be team representing all UNICEF functionalities. According to Mr. Meeus communication and cooperation among the organizations at the moment is good and has improved drastically since the 90s. Despite the fact that organizations such as the IRCF are working more independently they are still sharing information.

When it comes to coordination, there is one central system, operated by OCHA, to keep track of the actions of all the organizations present at the site of the disaster. Every cluster is being managed individually and WFP has created cluster for maps, links and relevant information, but UNICEF relies mostly on their internal operation system. They of course share information with the participants, but work independently and have contracts with local freight forwarder. They prefer to establish their own working system coordinated by themselves, due the fact, that after the emergency has been lifted the cluster system will pull out and they will have to establish new system during the time when the bulk of activities are performed by UNICEF. When it comes to one of the key areas for improvements pointed by UNICEF, namely the cross cluster cooperation, Mr. Jean-Cedric Meeus sees it as a permanent activity where they need to coordinate better and can vary from sector to sector. He states that UNICEF has established strong ties with WFP and this cooperation has grown into their operation.

4.3 Norwegian Church Aid

4.3.1 Overview

NCA, Kirkens Nødhjelp in Norwegian, is an independent humanitarian organization situated in Oslo, Norway that provide long-term developmental assistance as well as an emergency
help in time of crisis. They are working to provide help amongst the poorest, improve their lives and advocate for equality between people regardless of their race, political and religious affiliations (NCA/Act Alliance, 2011). Norwegian Church Aid is dedicated to assist communities to live sustainable life with dignity, through their integrated approach that combines Advocacy for justice, equal rights and security, Long-term development of communities and Emergency preparedness and response. (NCA, 2015)

They are a part of the Act Alliance, coalition of more than 140 churches working in over 140 countries to provide humanitarian aid. Their primary objectives during time of crisis are water, sanitation and hygiene and are active member of the WASH cluster. (Corinna Schüttler-Kvarme, 15.04.2015, personal communication)

### 4.3.2 Pre-disaster set up

As mentioned above NCA’s core competences during time of crisis are water, sanitation and hygiene and they are active member of the WASH cluster, plus they are also part of Act Alliance and cooperate with local, faith based organizations working in the area. They have their so called WASH kit containing equipment for 5000 people in each kit, stored in Frogner with Freja Logistics and also in Dubai and Malaysia with UNHRD, but currently have no to centralized system to keep track on their warehouse inventory.

### 4.3.3 On-site collaboration and coordination

Kristofer Stålhammar, WASH Advisor, says that it takes them approximately 72 hours to be present at the site of the disaster, where firstly it will arrive team of representatives from the Oslo headquarters and later on logisticians from their emergency roster group.

Once arrived there, NCA are usually positioning themselves with the WASH cluster that they are member of, read the information provided by OCHA and study the terrain. They are focused on gap identification and position themselves where there is no other organization present. In order to insure that there is no overlap and confusion they combine the information shared by others together with their own assessment, their findings are also being shared.

Since NCA is a small organization compared to UNICEF and WFP that coordinate on a global level, they are seconding to them and follow their lead and coordination. According to Mr. Stålhammar being coordinated is hard and time consuming task, where they get stuck waiting until a decision is made. All information is being collected by OCHA where everyone
has access, but a big issue here is that there are different formats of information spreading that varies from standard excel sheets to hectic information being resent from email to email. On top of that organizations are not consistent with following up the information, so it is not unusual occurrence to identify a gap area that no one is working, inform the others that NCA are going to cover it, only to find out that someone already is there or has delivered aid without announcing it.

It is Mr. Kristofer Stålhammar’s personal opinion that people should be trained on the matter of why preparation is being done and how important it is. There is consensus among logisticians that the current communication and coordination system is not the most efficient, but the best they have at the moment. A big issue is also the fact that organizations such as the IRCF and Doctors Without Borders, are working too independently and despite being present at some meeting they disregard the information and often smaller organizations have to talk to the local people to find out whether or not someone has delivered aid to them. “The first month is chaos and everyone wants to do a lot, so we have to discuss how do we do that.” (Kristofer Stålhammar, 20.04.2015, personal communication).

On the matter of cross cluster coordination, NCA stumbles on to the situation where mosquito nets are being delivered by 2 separate clusters, WASH and Shelter, as art of their kits. The problem arises from the fact that the cluster coordinators of each cluster do not sit in each other’s meetings. So WASH delivers mosquito nets for their malaria prevention efforts, while the Shelter cluster delivers it as a standard non-food shelter item.

### 4.4 Norwegian Refugee Council

#### 4.4.1 Overview

Norwegian Refugee Council (NRC, in Norwegian: Flyktninghjelpen) is Norway’s largest humanitarian, non-governmental organization protecting the rights of refugees and internally displaced people due to human rights violations, climate change and natural disasters. Established in 1946 under the name Aid to Europe, to assist victims of the World War II, nowadays NRC employees approximately 5000 people devoted to programs in around 25 countries, all under the supervision of the headquarters in Oslo, Norway. Their main programme core competences are Shelter, Food Security, Water, Sanitation and Hygiene, Education, and Information, Counselling and Legal Assistance. (NRC, 2015)
4.4.2 Pre-disaster set up

NRC has emergency response teams on stand by and can be deployed at any time. Preliminary meeting is being called in the first 24 hours to discuss the situation and the magnitude of the disaster, and in the following 72 hours to 1 week, depending on where in the world the disaster has struck, they have the troops on the ground. Norwegian Refugee Council is making its own assessment, but it is highly reliant on information from OCHA to clarify the overall situation and plan for future action. Based on the information from the Geographic Information System (GIS), they are able to locate their specific clusters and locate themselves. Since they are part of 3 separate clusters this very important for them.

4.4.3 On-site communication and collaboration

Once present at the site of the disaster, most of the communication is conducted via phone, but NRC is present at inter-cluster and the sub-cluster meetings where they share what they have done and what kind of challenges they stumble upon. Furthermore, they can contact the cluster they are part of at any time if they have any issue, so the information channels can be formal and informal.

Since OCHA is the only information collecting body, Norwegian Refugee Council are following their lead and tailor their procedures and actions to what is expected of them. In their cluster they decide what to do, then on the inter-cluster meeting every cluster shares what actions they are performing and then OCHA collects all the information and coordinates it. Due to the fact that NRC is reliant on funding from the UN, they have to follow their lead and guidance, but there is big issue with bureaucracy and lack of personnel to process all the information. The actual field interventions being are slowed down until OCHA has checked and validated all the information, and made public for everyone to see. This is the root of the biggest problem they have in collaboration, coordination between clusters comes after everyone has started to work in their own field and coordination always comes after. This makes the coordination very difficult and challenging. Another issue is that the local NGOs are being somehow neglected and left as the last link in the supply chain, despite that they are the ones who know best what the local situation, population and customs are.
4.5 Agility Logistics

4.5.1 Corporate Social Responsibility Program

Agility is an international logistics company with their headquarters located in Kuwait that provides transportation, warehousing and supply chain management services to their clients, as well as humanitarian organizations world-wide. As a business company they take their responsibility seriously and are devoted to act with integrity and give back to the communities. As part of their Corporate Social Responsibility program they are investing in communities: 950 community projects in 75 countries, for instance- support paralyzed veterans in the USA, provide water access to children in Egypt, support night school to help young people graduate in India and built six preschools for kids in Cambodia; by being environmentally aware- reducing CO2 emissions, mapping carbon footprint in 70 per cent in their operations, and donated humanitarian logisticians to support relief operations in 30 natural disasters. They have bilateral partnership to support the International Medical Corp. and an active member of the Logistics Emergency Teams (LETs) initiative among partners such as UPS, TNT and Maersk to support the humanitarian organizations with logistics during time of major crisis operations. In the 2013 typhoon that hit the Philippines, Ability deployed 10 logistics experts, devoted 10,000 square meters of warehouse space, donated 50 shipping containers and trucking services, and was loaded and unloaded 100 tons of humanitarian donations per day (Agility, 2015)

4.5.2 On-site collaboration and communication

During time of major crisis they provide logisticians, logistics services, assets and anything related to logistics to support the International Medical Corp and the logistics cluster they are involved in and the Logistics Cluster headed by the WFP, because it provides services to all other clusters. If Agility is not present in the country affected by the disaster, it takes them approximately a week to be present, after their help has been requested. Since they are assisting the Logistics Cluster they are participation in the central briefings only if invited and/or have a relevant information about the stricken area.

Despite the fact that Agility has a supportive function to the Logistics Cluster, they are able to provide unique overview of the communication and collaboration that is going on in a humanitarian operation. Collaboration in general is good, but highly affected by the communication going on between the organizations. One of the big factors affecting it is the large number of international and local players present, and the amount of information that has
to be processed and spread around. Despite the fact that information sharing has improved significantly from the past years and organizations are constantly looking for new ways to spreading it, via social media and individual pages, the communications resources and personnel devoted are limited. Having more than one channel of information could be confusing for the organizations and have hard time following it. Mr. Clary says that “Information is super critical and vital for the success” of the humanitarian, but hindered due to insufficient funds and staffing. He expressed Agility Logistics’ willingness to devote communication experts to assist communications body within the cluster system (Frank Clary, 20.05.2015, personal communication).

4.6 Shelter box

4.6.1 Overview

ShelterBox is an international organization, founded in 2000 in the United Kingdom, providing temporary shelter and boxes containing living essentials helping victims of disaster (ShelterBox, 2015a). The boxes sent are typically tailored according to the specific disaster, but in general containing family tents, groundsheets and thermal blankets, mosquito nets, water storages, solar lamps, cooking kits and children’s kits (ShelterBox, 2015b).

4.6.2 On-site collaboration and communication

After disaster has struck, ShelterBox is joining the Shelter Cluster, but also take part in the Logistics Cluster. International Organization for Migration (IOM), in its quality of a leader for the Camp Coordination and Camp Management Cluster, advises them on camp situations as part of the cross-cluster cooperation.

When it comes to information sharing, they are heavily dependent on OCHA reports and initial need assessments, and the central briefings for information and local knowledge of the affected area. While phone calls, e-mails being sent among the organizations and personal meetings are being used to communicate with NGOs mostly on a field level to coordinate their actions. ShelterBox claims that they aim to share information as often as possible to avoid duplication and support a coordinated, single approach amongst responding agencies. When it comes to situating themselves, they rely on GIS mapping to see where their cluster is being located and hey can set up camp (ShelterBox, date, personal communication).
5 Analysis

In this chapter the findings from the conducted interviews are going to be analysed and conclusions in connection to the theory described. To ease the readers understanding of the analysed theory and collected information the chapter is structured in two parts. Subchapter 1 addresses research question 1 and subchapter 2 is dedicated to research question 2.
5.1 Current state of information sharing, communication and collaboration among actors in the humanitarian logistics

This section of the findings provides detailed information on what is happening in the field of humanitarian logistics, what are the common practices and the issues organizations stumble upon. This is going to be used as a base line for analysis of what are the possible implementations and actions that could be taken in order to further improve the status quo, discussed in research question 2.

5.1.1 Pre-disaster set up and preparedness of humanitarian organizations

The state of pre-disaster set up of different organizations varies depending on their scale and coverage in the world. On one hand, there are organizations such as UNICEF which present practically in every country in the world and they have established network of local offices that are heavily present. They rely on three main hubs situated in Dubai, Panama and Copenhagen where commodities are being separated into different sections and ready to packed and send if need be. All this is being operated and monitored by the Supply Chain Division situated in Copenhagen with its 350 people staff, coordination unit of 6 staff members, supported by 16 people in shipping and 46 warehouse workers. Furthermore, the local offices might also have their own contingency stock present and they have they have established contacts with local goods and service providers ready to distribute. Having set up this chain of warehouses and practices for operating them is an example of proper Supply Chain Management, which is ready to respond timely to a sudden demand (Angkiriwang et al, 2014; Van Hoek, 1998). All the information is available to the employees of the organization and they can have clear overview of what is available for them to use in case of need. This level of preparedness concurs with Zary et al., (2014) ’s theory that knowledge and information about the regional structure is necessary and prerequisite for the successful execution of operations. Within the first 72 hours of the emergency the situation on the ground will be assessed and discussed between the local office and representatives of the international body and within the following 48 hours the Immediate Response Teams will be deployed with representatives of all functionalities and 13 member communication unit in charge of all incoming and outgoing communication and information. Having all set up all these facilities, functions, protocols and “No Regrets” policy that allows them to send on site as many people as they see fit allows them to have a very good overview of the situation, what is necessary and could be the best course of action. UNICEF represents one of the biggest
actors present and active in the field of humanitarian logistics and is fully capable of operating on their own without being dependent on other organisations.

On the other hand there are number of other organizations that such as Norwegian Church Aid that has sufficiently smaller capabilities and resources to rely on. They deploy their field logisticians and emergency roaster group within approximately a week of the disaster, but due to their limited resources they have to learn on the fly. They rely on information published by OCHA to educate themselves about the scale of the disaster and what is being currently done to help the affected areas.

Another organization in a similar situation is the Norwegian Refugee Council, which is also present on the site of the disaster in the first 72 hours to 1 week following the call for international help. What they do differently from the NCA is that they meet within the first 24 hours prior to deployment of the “ground troops” and assess the information available from other organizations and published by OCHA.

NCA and NRC are examples of how the application of information systems dedicated to providing common information can improve the coordination between inter-organizational cooperation (Özdamar & Ertem, 2014). Being able to tap into OCHA’s system these 2 organizations gain knowledge on the information that is being exchanged and passed around, confirming Leiras et al., (2014)’s theory that computerized system improve the information sharing.

Agility Logistics is a representative of the private sector companies assisting the humanitarian sector as part of their Corporate Social Responsibility programs. They are fully independent and in no way connected with the commercial functions of the company. They serve and assist at the pleasure of the UN organizations are present within a week after their help has been requested. Since humanitarian actions are not part of their core competences, they provide their services in the area of their expertise, namely logistics and the organization of transportation. In case the business part of the organization is present in the country affected by the disaster they are able to provide useful information concerning the state of the local infrastructure, local road information which is very important during time of disaster (Zary et al., 2014), as well as warehouses and means of transportation. Since they are not a humanitarian organization in general, their involvement and assigning of responsibilities are assigned to them by the organizations they work with.
Having all these different parties present at the site of the disaster with the different levels of involvement, capabilities, resources and core competences aimed at providing relief outlines the need for sharing of information, collaboration and coordination. It is clear that only by working together they can provide united front that puts the needs of the effected in first place. Some organization such as UNICEF are able to be independent due to their size and reach, but all other smaller organizations seconding them are reliant on them. If not coordinated they are going to be overstepping on each other and slowing down the process of delivering aid (Tatham & Spens, 2011).

5.1.2 Information sharing, collaboration and coordination

The current state of information sharing defines the levels of collaboration and communication among the different parties present of during time of crisis. Despite the fact that information and communication technology being viewed as “overhead” by the literature (Maiers et al. 2005; Haselkorn & Walton, 2009), it is vital for the success of the relief actions. All the participants interviewed agree that having on hand information is very important, especially in the beginning. Currently there are different kinds of sharing the information.

UNICEF is primarily assessing information collected by the local office and information published by OCHA, they are combining the two sources, evaluate it and draw conclusions. Furthermore, they are calling the cluster lead to see what their set is up and then coordinating it with the local office. Being one of the leading agencies active on the ground they only need to coordinate actions with the leader to set up their activities. They rely on their own system to facilitate all the actions, accounting and monitoring of resources. This due to the fact they that the cluster system is only temporary present and after the emergency has been lifted, the bulk of their activities start. According to Jean-Cedric Meeus, being dependent on external system would mean that they would have to start from the beginning with setting up from scratch once the cluster approach is being deactivated. UNICEF’s overall assessment of the level of information sharing, communication and cooperation between parties is on a good level.

When looking at the smaller NGOs, the situation is quite different and contradicting of this one collected from UNICEF. NCA, NRC, ShelterBox and Agility, who are there in their capacity as supportive function to the clusters they are attached to, agree that information is essential in their effort to work together. There are different kinds of way to collect information, information published by OCHA, central briefings, within cluster briefings, spread
sheet being sent from one organization to the other, emails, calls etc. Depending on where
the information comes from its quality and reliability can vary a lot. OCHA relies on standard-
erised spread sheets with questions, filled by the NGOs, evaluated and then published on
their website, but often informal information is being forwarded between organizations and
they have to appraise it themselves if it is useful. The fact that large number of organizations
are feeding information to OCHA further delays the process of verifying it and publishing
it. Even UNICEF confirms that they lack the man power to assimilate all the information,
due to the fact their resources are primary to aiding the affected population.

As an effect of insufficient staffing necessary for the appraisal of information is affecting
directly the cooperation and collaboration between the NGOs. Strategy firstly has to be or-
ganized at by the UN body and the cluster system, then passed down to the organizations
seconding them and they have to process it through their internal systems. This is time con-
suming and they end up waiting at the site of the disaster, not doing anything. During this
time some NGOs decide to take action because some action better than no action and de-
spite their good intentions, they sometimes end up hindering the processes by creating fric-
tion and ineffectiveness, once the strategy is being communicated (Tatham & Spens, 2011).
This is shown in the areas, where NGOs go to provide goods and servi-
ces only to find out
that someone has already been there and they have to relocate in new area.

Another big issue are the organizations working independently and outside of the cluster
system. Since they are not involved in the collective information collection and communica-
tion, they might not be present in the central briefings, kept in the loop of what is planned
to be done and where. They operate wherever they seem fit and feel that they are needed,
y they are creating setbacks for the organizations part of the cluster system. As Murray (2005)
discusses the lack of communication and common planning could have short and long-term
effects on the humanitarian efforts, NGOs find themselves delivering goods and services to
areas that are being serviced previously or are being served at the time they are present. This
could lead to overserving the beneficiaries, goods are being delivered in amounts far larger
than what is necessary or even worse they are being underserved. Seeing that NGO outside
of the cluster system is present at a certain area, the one which intended to take actions might
chooses to find another gap to be filled. This leaves the possibility for the population of the
affected area to be underserved, because the organization providing humanitarian aid did not
have the capability or resources to serve them fully and the need for further intervention
from is not being communicated. The data spreading is being interrupted or insufficient,
which affects the overall view of what is being done and in contrast with the need for improved information flow to have better holistic view of the situation (Howden, 2009).

One party that is being neglected in the chaos of the humanitarian actions are the local humanitarian organizations. They are collaborating with a lot of the NGOs, but are taking “very back seat” (NRC, 2014, personal communication) due to issues with trust, experience and knowledge when it comes to dealing with major disaster. Never the less, they are the people with the best knowledge of the local area, they live there, know the population needs and are aware of the local culture and issues that might arise in connection with it. If employed and coordinated properly they can be a huge asset to the international organizations, as Zary et al. (2014) and Bartell et al., (2006) discuss, accurate information and specific knowledge are huge asset to the expedient humanitarian actions and enable reactivité.

All this confusion, impeded information and miscommunication leads to the conclusion that the cross-cluster communication and collaboration is recognised as key issue in the cluster system (CLARE, 2013). Despite that UNICEF does not consider it an issue, because they are in very good communication with all the clusters and the people in charge of them, this issue is best viewed when going down the supply chain where all smaller organizations are seconding the main actors. One specific example comes from the Norwegian Church Aid, which stumble to this problem when the WASH cluster, that they are part of, and the Shelter cluster are operating in the same areas. Among water, sanitation and hygiene, one of the main areas of activities for NCA is Malaria prevention, which is executed throughout the delivery of mosquito nets as part of their WASH kit. Shelter cluster is delivering shelter items (tents) and non-food item kits, which also include mosquito nets. Similar issue has been previously discussed by Stoddard et al., (2007), when the WASH cluster had difficulties coordinating with the Nutrition cluster. Another perspective on the problem is being provided by the Norwegian Refugee Council, which happens to take part in three separate clusters- Education cluster: education in emergencies and education in development, Early recovery cluster and Logistics clusters. They are participation in a lot of cluster meetings, where the clusters discuss how they can help each other. The problem here arise that coordination begins after they have started working in their areas. The level of communication prior to going on the field being evaluated as weak and challenging. This is effect of the vast amounts of information and details that are very hard to communicate through the proper channels in order to harmonize their efforts, confirming that coordination is still developing matter (Balchik et al., 2009).
Looking the communication and cooperation between organizations, the vertical and horizontal integrations discussed by Overstreet et al., (2011) are quite visible and also reveal the issues in them. At the vertical integration, among the lead humanitarian actors and the NGOs seconding them, an issue is the fact that the local organizations might be left outside of the coordination loop. On a horizontal level, it can be seen that cluster leads fail to coordinate the distribution on common items, which ultimately affects the smaller NGOs which meet the same problem on their level. This affects the ICT integration that is essential for enhancing organizational capacity, planning and execution of actions (Maiers et al., 2005).

One thing that is going well is the use of Geographic Information System mapping, where the humanitarian organization can see the map of the affected areas and where their specific cluster is being situated, so they can get settled there. This helps the clusters to be grouped in a quick and efficient manner, the NGOs are closer to each other which could be helpful for the informal communication and information sharing.

5.1.3 Summary of Research Question 1

All being said above the information can be summed up into the four main function areas of coordination and collaboration between international organizations described by Thomas and Kopczak (2005), and Akhtar et al.,(2012):

- Planning- this is the main area recognized to be the root of all further troubles that organisations stumble upon. In order for the planning to be efficient all the information collected has to be verified and published for everyone to see. This particularly is a heavy task considering all different kinds and quality of information being sent around and the fact that the communications departments which perform this task are being understaffed.

- Organizing- can be categorized as chaotic, as an effect from the planning. Despite that everybody claims that the system is working better than before, most of them agree that there is a number of issues that they stumble upon. One thing that is working very efficiently is the use of GIS mapping when locating themselves in the affected areas.

- Leading- despite the issues in the planning and organizing, this function is working well. The cluster leaders are taking charge in their respected fields and all the other organization seconding them are following their general direction.
• Controlling- this area is subject to ongoing discussion between the humanitarian organization. They share what has been done and is currently being done at the cluster meeting, but since they are independent entities, mostly self-controlling is being performed. If a NGO requests funding or resources from the UN body, they go through a gruelling bureaucratic process that makes sure that the resources will be spent in the best possible way.

5.2 Future improvement of the current state of humanitarian logistics

5.2.1 Information and communication systems

On one hand, in the business world companies employ Information and Communication Systems in order to be able to share information about the changing demand, their lean times and deadlines (Qrunfleh & Tarafdar, 2014). They are able to receive live time data from their customers and suppliers, so they can plan their production better. They could even get further in improving their long term relationships by getting involved in cross-company teams, where representatives from company A are working in the production site of company B. This way they help each other by bringing specific knowledge about a process or a function and perform it, so their partnering company can focus on their core competences where they can add most value to the product/service. All this is being facilitated by the ICT systems and the advancements of the IT capabilities of a commercial company are considered crucial and prerequisite for the improvement of speed and agility. The response time is shortened and production becomes more flexible and agile to market and demand fluctuations. Integrated information technology is essential for the success of a company (Qrunfleh & Tarafdar, 2014) and is one of the 2 pillars of supply chain management (Al-Mudimigh et al., 2004)

On the other hand, the humanitarian organizations consider ICT a back office function that is important for the sharing of information and keeping track to their resources, but is not essential. As described by Maiers et al., (2005), Haselkorn and Walton, (2009) ICT is being overhead, rather than a fundamental fiction, which is direct contradiction to the business literature and use of the technology. However what they can benefit from it, is the speed that comes with IT. The faster they are with processing information and communicating it through the channels, the earlier they are going to be able to focus on their core capabilities and start delivering aid. Considering DeGroote and Marks’s article from 2013,
that links IT with sensing market changes and the ability to respond to them as essential the firm’s performance and agility (Natarajarathinam et al., 2009), a parallel can be made with the humanitarian logistics, where the improvements in the use of IT can be linked to the better planning and organization of activities (Van Wassenhove, 2006). Since humanitarian logistics are considered as the most agile, they might not notice improvements in this area.

5.2.2 Coordination improving collaboration

Deriving from improvement of information sharing, humanitarian organization can improve the coordination and collaboration in their supply chains, by having faster data current that would monitor the needs of the beneficiaries, anticipate changes and enable them to act accordingly (Ngai et al., 2011). The issue with integrating ICT within the parties is that the big players such as UNICEF rely on their own system to support their activities, while OCHA is the only central collective body for everyone present at the disaster. There every organisation can see information about the country and the disaster, links to all the clusters and to WFP that creates and operates the Global Logistics Cluster for maps, links and general information. And from there on the NGOs are working within their cluster, but still heavily reliant on OCHA for information and guidance to what is to be done. Since OCHA is central system that can collect information from the non-cluster participants, it is the main platform of communication for what everybody is doing, so the humanitarian organizations do not step on each other’s toes. This is a confirmation of the importance of information systems ability to collect and communicate data throughout the supply chain (DeGroote & Mars, 2013).

UNICEF on the other side, despite that they are working with OCHA, has chosen to operate under their own system due the fact that the cluster system is only temporarily there, depending on the magnitude of the disaster. Once lifted, the bulk of activities for rehabilitation of the region and making sure everything is going back to normal begins. This could create tension and confusion among other parties, when it comes to whom they have to contact to coordinate actions and what is being currently done. Furthermore, it raises questions to the validation of information and who is doing it. External parties, such as logistics officers from Agility are being at humanitarian organizations’ service and help in the areas they are required to. This gives them the unique opportunity to see how work is being executed in various areas and what are the possible setbacks or issues. What they consider big problem is the staff, more precisely to correlation between the number of people processing information
and dealing with communication in connection to the amount of data that has to be processed. According to Mr. Clary they are all very smart people, but just too little in numbers to be able to validate and process all the data, while the management of people and information is essential (Ngai et al., 2011). So the present situation is working, but there is room for improvements, therefore this paper suggests looking into commercial literature and looking into possible solutions.

One of them could be Industry Innovator model, from the 4PL literature presented by Büyüközkan et al., (2008), modified specifically for the unique nature of humanitarian logistics. It serves as an information hub (Jensen, 2012) for all parties involved and offers only integrated solutions based on the needs and specific activities of each player, while in the same time they get to keep their independence. Figure 5 shows the proposed model bellow that is the modified version of the Industry Innovator model, where Independently working Humanitarian Organizations (IHO), the Cluster system and NGOs are sharing information through one collective body-OCHA. Private companies, present at the field of the disaster as part of their CSR programs, can assist on every level, depending on where they are needed and what kind of expertise they can contribute with.

Without being overly simplified (Özdamar & Ertem, 2014), the model presents the complicated state of implementing information and communication technology to synchronize and coordinate the collaboration of humanitarian organizations (Swafford et al., 2008; Büyüközkan et al., 2008). The collective efforts in improving the gathering, analysing and sharing of data (Rai et al., 2006), will save money to the humanitarian organization, by not duplicating the items that are being sent (Hingley, 2011), decrease opportunistic behaviour (Liu et al. 2013) and improve the overall efficiency (Chandes and Paché, 2010), by enhancing decision making (Qrunfleh & Tarafdar, 2014) and creating a single point of accountability Win (2008). The establishment of common knowledge ground (Kovács and Spens, 2009), better information flow (Howden, 2009) and standardization of policies (Özdamar & Ertem, 2014), will potentially have short and long term effect (Murray, 2005) on the value adding of the coordination approach (Maiers et al., 2005), but relies on the organizations’ openness to new strategies (Heasip, 2013).
The way the model works is by having layers of co-dependent players, who all work together on a communication level, but operate independently. As described earlier, one big issue are the independently working humanitarian organizations (IHOs) that do not take part in the cluster system. Since OCHA is the only information collective system, they could feed it information concerning what they are doing, where they are operating and very importantly what have they done. This way all the other organizations within the cluster system will have a holistic overview (Howden, 2009) know whether or not they are overstepping some-body’s area of actions and by doing so, potentially create ineffectiveness (Tatham & Spens, 2011).

The cluster system, on the other hand, could devote a cluster communications officer from each cluster that works in a team with all the others. OCHA is still the sole information collective system, but within there is a team of logisticians answering to WFP and the Global Logistics Cluster. The team of communications officers will have the task of coordination information from their respective clusters in connection with the others and the IHOs. This way strategies and courses of actions are going to be known by all the parties involved from the very beginning. All the information from the smaller NGOs and local NGOs about the gaps and the needs identified will be processed by the individual clusters they are attached to and then discussed on the all cluster level. This will provide clarity on who is doing what, who takes charge in a specific area. The roles will be more easily defined and there will be no
confusion over who is supposed to solve a particular problem. Having information going uphill, from the local NGOs, will integrate them better in the Cluster System and allow them to bring region specific data for the establishment of common knowledge (Kovác & Spens, 2009). Moreover it will empower them to take more active role in the whole process and escape from being the last link in the supply chain to be dealt with. As presented by Swafford et al. (2008), the better integration of information, the better organizations will be in meeting the demand fluctuation.

On a cross-cluster level, the coordinators will have better overview who is delivering what and the others have available. Lesson could be learned from the GIS mapping protocols described earlier, when dealing with items being distributed from different cluster participants. Standardization of policies and forms (Özdamar & Ertem, 2014) for all the cross-cluster items to be delivered into specific regions can be distributer among the NGOs. Taking example from the deliveries of mosquito nets, with the use of standard forms NCA will be able to see where the Shelter cluster is delivering them, so they exclude them from the water, sanitation and disease prevention kits and vice versa. This is limits the excess usage of inventory, save money on replenishment of goods and eventually improve the overall information sharing and collaboration. As and effect of this way of sharing information, the overall control over the situation will improve as well. The monitoring of what has been done and delivered in a specific area will be visible to everyone and accountability could be kept.

Structuring the coordination in this manner, information is moving upwards from all parties to the information hub-OCHA (Jensen, 2012), which is the present central system, gets analyzed there, the cross-cluster communications team has overview on the big picture and can delegate responsibilities and information downwards, making a full circle. The organizations remain independent, but the smaller NGOs are dependent on information and general direction to support the big players. Accountability at the last stage will be more visible and controlling the outcomes of the delivery of aid more clear. The communications team can operate even after the cluster system has been lifted, so all the organization can still rely on it and have uninterrupted line of communication and cooperation with each other. This fits well with Howden (2009), who stresses the need for broader look of the overall, inter-organizational structure.
Another party present in humanitarian logistics, are the private companies invited to assist as part of their CSR programs. They provide logisticians, and if the situation allows it, warehousing and transportation services pro bono. The experts sent to assist can be located where the humanitarian organizations need them, but they can contribute even more by providing their expertise with collaboration and coordination of multiple partners in a supply chain. Agility director of Corporate Social Responsibility, Mr. Frank Clary, expressed the company’s readiness to provide communication experts to help with the data assessment and communicating it.

5.2.3 Summary of Research Question 2

Stressing the importance of the ICT systems to support the general cooperation and coordination among humanitarian organization is the first step towards having more organized front when dealing with disaster. All the parties that took part in this research agree that the collaboration and coordination is work in progress that is subject to a constant development. With the application of commercial theory literature, conclusions can be drawn how possibly improve the overall situation in the 6 key elements of humanitarian logistics (Overstreet at al., 2011). Once the information technology/ communication is being supported by the organizational personnel, ideally cross-organizational, common planning can be developed, protocols and procedures discussed and put in to action. Being able to communicate in a more organized manner the Cluster participants will also have better knowledge on the country situation, infrastructure and what they can rely on from the others. Having a collective team of communication officers from each cluster and personnel, dedicated from private companies, will make the delegation of roles and duties easier. The clusters will be working more closely together, take better informed strategic, tactical and/or operation decision, and have the opportunity of improving the cross-cluster cooperation (Leiras et al., 2014).

6 Conclusion
Humanitarian logistics operate in one of the most unpredictable and volatile environments in nowadays. Depending on the specific disaster and the affected area, there are many unknowns that have to address, in order to provide aid and reduce the suffering of the affected population. Despite having all the mechanisms, practices and policies aiming to ensure joint efforts and providing unified front, humanitarian organizations are still struggling to work together in the Cluster System.

The most common statement during the interviews conducted with the participants was that the current state of communication and cooperation is better than before and that it is constant work in progress. It would be very ambitious to try and solve all the issues humanitarian originations face and in combination with the unpredictability of what the specific disasters require it is nearly impossible to have a system that is 100 per cent efficient in every case. What could be done, is to develop framework of cooperation to ensure the best possible united response.

This research considers the implementation of information and communication technology techniques as the root of coordination issues and the key to solving problems with collaboration. With the improvement of information flow, humanitarian entities would be able to have better and timely overall picture to what is happening, what needs to be done, and what are the capabilities and competences of the organizations present. From there on they can move to having more efficient collaboration and overall coordination in their actions.

### 6.1 Practical implications

One of the most applicable implications from this research is the implementation of standardized forms items that could be delivered by different clusters. As seen in the GIS mapping practices, having system that shows where the separate clusters are being located, improves the general placement of organizations and the coordination of setting up in the disaster areas. If similar forms are being introduced, humanitarian actors can report, for everyone to see, what they are able to deliver and where. So, for example if member of the WASH Cluster, such as NCA states that they will deliver mosquito nets to areas A, B and C, organizations in other clusters such as Shelter, can exclude them from the items they have planned to deliver. This would potentially save money to the actors and improve the overall communication and cooperation among clusters. Furthermore, such system is being coordination and monitoring tool simultaneously.
6.2 Future research

Since the paper does not consider the involvement of the local governments in the ICT loop, this could be further investigated, in order to get a better overview they can be more involved in the process. OCHA is partially responsible for the communication and cooperation with the host government, so by taking more active role to coordinate and spread information to the clusters can be enhanced the centralization of the humanitarian actions. One company that took part in the research, but had sent over the information way too late to be included in the general discussion is DHL. They have 2 programs, GoHelp and “Get Airports Ready for Disaster” (GARD), part of their CSR and are partnering with OCHA in their Disaster Response Team Program. This kind of cooperation involving OCHA and developing programs and trainings for airport personnel, which would include the local government as well, in disaster prone areas is something that deserves further research as well.
7 References


Appendix I

Interview questions

Personal questions

1. Do you mind if the interview is being recorded?
2. What is your position and responsibility in the organization?
3. What are the organization’s core competences during a disaster crisis?
4. How much money, personnel and resources do you devote during a disaster crisis?

Pre-disaster settings

5. What is your pre-disaster set up? How do you organize your resources, warehousing? Locally or worldwide?
6. Do you have centralized information technology system to keep track of your inventory and purchasing practices worldwide?
7. How would you evaluate the level of communication and cooperation between you and the other organizations involved in relief operations?
8. Do you get involved in collaborative purchases with other organizations? If yes, which?

Onsite supply chain coordination and communication

9. How long does it take you to be present at the site of the disaster after the call for international help has been placed?
10. After disaster has struck how do you deploy your personnel and resources? Do you outsource logistic services yourselves or in collaboration with other organizations?
11. How do you organize/settle yourselves after you have arrived? Do you pre-discuss where to locate yourselves?
12. Who takes charge for your actions and how much communication there is between you and the other organizations on site?
13. Do you participate in the Cluster System? If yes, which cluster?
14. What kind of issues you see in the cluster system?
15. How is communication conducted between you and the other parties? Central briefings? Division of labour setting?
16. How dependent are you on Information technology? Is there a central system for keeping track on your and others’ actions?
17. How independent are you in the disaster relief operations? Is there a central decision taking body coordinating the actions of the different organizations?

Personal questions

18. In your opinion, how can collaboration be improved and more efficient?
19. Do you think a central organizational IT system will improve the collaboration and communication among parties? If yes/no, why?
20. What kind of issues do you see in such global IT system?
Appendix II

1. Are you part of the cluster system? If yes which cluster?
2. Do you communicate with other organizations outside of your cluster? If yes, how often? (in case you are part of the cluster system)
3. How do you communicate with others? Phone calls, emails, personal meetings/briefings, uploading information in a central information system.
4. With who do you communicate most often?
5. How often you share information?
6. How reliant are you on information from other organizations?
7. How often do you discuss actions?
8. Suggestions for improvements of communication and coordination.