Mapping Logistical Challenges in a Conflict Zone

Mimmi Pöysti

Department of Marketing
Supply Chain Management and Social Responsibility
Hanken School of Economics
Helsinki
2019
Mapping Logistical Challenges in a Conflict Zone

The purpose of the study is to identify the challenges that supply chains face delivering into and within a conflict zone. To learn about this subject, the impacts of an ongoing conflict in the North West and South West regions of Cameroon on the downstream supply chains of health commodities and humanitarian aid in the two regions were studied. Furthermore, adaptation strategies that have been adopted by logisticians and health care professionals to conquer these challenges were discussed.

Because there is little prior theoretical knowledge of logistical challenges in complex emergencies or conflict, an abductive case study method was chosen to bring forth new ideas about this phenomenon. Within the frame of the case study, qualitative methods that allowed tapping into the knowledge and experience of people involved in a particular supply chain in the regions affected by conflict were used. These methods are semi-structured interviews, participant observation and analysis of Logistics Cluster reports. The study is supported by a conceptual framework, developed through a literature review within the topic of humanitarian logistics.

The findings of the study show that supply chains in the North West and South West regions are facing challenges relating to destruction of infrastructure, transportation difficulties, access to the local population, last mile distribution, safety and access to reliable information. Actors in the supply chain of health commodities have adapted their transportation strategies, formal procedures, cooperation with locals and between health districts and use of military convoys for transportation.

Svenskt sammandrag:

Avhandlingens syfte är att identifiera utmaningar som försörjningskedjor stöter på då de levererar i konfliktområden. För att bilda en uppfattning om detta ämne har inverkningarna av en pågående konflikt i Kameruns Nordvästra och Sydvästra regioner på försörjningskedjor för hälsoförnödenheter och humanitär hjälp undersöks. Vidare diskuteras de anpassningsstrategier som logistiker och hälsovårdspersonal tillämpat för att övervinna utmaningarna som uppkommit på grund av konflikten.
Eftersom det finns knappt med tidigare teoretisk kunskap om logistiska utmaningar i konflikter och komplexa katastrofer, valdes en abduktiv fallstudie som metod för att frambringa nya idéer kring fenomenet. Inom ramen av denna fallstudie användes kvalitativa metoder som gav tillgång till kunskap och erfarenhet hos människor som är involverade i en viss leveranskedja i de konfliktdrabbade regionerna. Dessa metoder är semistrukturerade intervjuer, deltagande observation och analys av Logistics Cluster:s rapporter. Studien stöds av ett konceptuellt ramverk som bygges med hjälp av en litteraturgenomgång inom ämnet humanitär logistik.

Avhandlingens resultat visar att försörjningskedjorna i Nordvästra och Sydvästra Kamerun står inför utmaningar i form av förstörd infrastruktur, transporteringssvårigheter, begränsad tillgång till den lokala befolkningen, försvårad distribution till den sista kilometern, minskad säkerhet och försämrad tillgång till pålitlig information. Aktörer i försörjningskedjan för hälsoförnödenheter har anpassat sina transporteringsstrategier och formella procedurer, sitt samarbete med lokala och hälsodistrikt emellan samt sin användning av militära konvojer för transportering.

**Key words:** Humanitarian logistics, supply chain, conflict, complex emergency, last mile distribution, adaptation
## TABLE OF CONTENTS

1 INTRODUCTION .............................................................................................................. 1  
1.1 Context and problem statement ........................................................................... 1  
1.2 Methods .................................................................................................................. 2  
1.3 Delimitations ......................................................................................................... 3  
1.4 Structure ................................................................................................................ 3  
2 Logistics Management in Complex Emergencies .................................................... 5  
2.1 Humanitarian logistics ......................................................................................... 6  
2.2 Defining the disaster environment ....................................................................... 12  
2.3 Humanitarian logistics in a conflict setting ....................................................... 14  
2.4 Last mile distribution ......................................................................................... 19  
2.5 Adapting humanitarian supply chains ............................................................. 20  
2.6 Conclusion ............................................................................................................ 23  
3 Research Methods .................................................................................................. 25  
3.1 Research approach ............................................................................................. 25  
3.2 Methodology ......................................................................................................... 27  
3.3 Data collection ..................................................................................................... 30  
3.4 Data analysis ........................................................................................................ 33  
3.5 Sample and Context ............................................................................................ 34  
3.6 Quality of the study ............................................................................................. 36  
4 LOGISTICAL CHALLENGES AND SOLUTIONS IN A COMPLEX EMERGENCY IN CAMEROON ................................................................. 38  
4.1 Challenges ............................................................................................................ 38  
4.1.1 Infrastructure .................................................................................................. 41  
4.1.2 Access ............................................................................................................. 43  
4.1.3 Safety .............................................................................................................. 47  
4.2 Adapting to the challenges ................................................................................ 49  
4.2.1 Adapting in terms of infrastructure ............................................................. 49  
4.2.2 Adapting in terms of methods to access the population ......................... 50
1 INTRODUCTION

1.1 Context and problem statement

The anglophone North West and South West regions of the predominantly francophone Cameroon have since 2016 been in a state of crisis over the question of a marginalized language minority, affecting more than four million people (UN OCHA, 2019). Since late 2017, the crisis has escalated into an armed conflict between non-state armed groups from the two regions on one side and the governmental security forces on the other side (UN OCHA, 2019).

The crisis started with peaceful protests over the marginalization of anglophone Cameroonians in 2016, escalated in late 2017 following a government crackdown on the protests and later developed into a violent conflict. Separatist groups, sometimes called Ambazonians, want to separate the Anglophone regions from the rest of the country and form a new country by the name of Ambazonia. By the fall of 2019, the crisis has killed 1,800 people and displaced more than 500,000. There has been reports of war crimes being committed by both parties of the conflict. (Reuters, 2018; Thomson Reuters Foundation, 2019)

The insecurity posed by the crisis has caused wide displacement within and outside of the North West and South West regions. Villages have been burned and infrastructure destroyed, affecting livelihoods and living conditions for locals and making it difficult to access the population (Reuters, 2018; UN OCHA, 2019). An increasing risk of new HIV infections due to non-availability of medicines is one example of the consequences that this decreased access has led to (UN OCHA, 2019). Security concerns such as fake checkpoints, kidnappings, carjackings, violence and killings by armed groups have been reported by people working in the regions (personal communication, September-December 2018).

Through my work as a supply chain intern at the United Nations Fund for Population Activities (UNFPA) in Cameroon September-December 2018 and as a participant in Logistic Cluster coordination meetings, I learned about dangers on the roads and logistical challenges that different organizations are facing, which inspired me to write my master’s thesis on this topic.

A search on humanitarian logistics and conflict or humanitarian logistics and crisis shows that there is a research gap that this thesis can contribute to fill. Existing
humanitarian logistics literature almost exclusively focuses on natural disasters as opposed to man-made crises, and barely any of it focuses on the conflict environment. Some of the few studies that touch upon this topic include the effects of armed conflicts on humanitarian operations (Jola-Sanchez et al., 2016), the effects of conflict on vehicle replacement (Pedraza-Martinez and Van Wassenhove, 2013) and the impact of conflict on last-mile fleet management (Eftekar and Van Wassenhove, 2016). However, the challenges faced by humanitarian supply chains are seldom studied in the literature. Furthermore, a number of articles in humanitarian logistics point out that more empirical research should be done, which is where the primary contribution of this thesis lies. Because of my role as a supply chain intern at UNFPA Cameroon, I have had a rather unique opportunity to gain access to data from the field affected by conflict.

The purpose of the study is to map the different logistical challenges posed by armed conflict on the downstream supply chain and identify how supply chains can be adapted to these challenges.

This brings forth two research questions:

1. What logistical challenges can be identified in a region affected by conflict?

2. How have actors in the public health commodity supply chain in Cameroon adapted to the challenges?

1.2 Methods

Because there was little prior theoretical knowledge of logistical challenges in complex emergencies or conflict, an abductive case study was used to bring forth new ideas about this phenomenon. Because of its revelatory nature (Yin, 2009) a single case was deemed to be a better choice than a multiple case study. The case study was conducted in a current armed conflict in the North West and South West regions of Cameroon and the downstream supply chains of health commodities and humanitarian aid.

Within the frame of the case study, qualitative methods that allowed tapping into the knowledge and experience of people that are involved in a particular supply chain in the regions affected by conflict were used. These methods were semi-structured interviews, participant observation and analysis of Logistics Cluster reports. Eight interviewees including logisticians, transporters, health care professionals and a humanitarian aid coordinator were chosen through snowball sampling. All data was analysed through thematic analysis.
The study is supported by a conceptual framework developed through a literature review in Chapter 2 from concepts in relation to the topic of humanitarian logistics.

1.3 Delimitations

The location for the study is Cameroon, more precisely the North West and South West regions, and the time-span that is studied is 2016-2019, starting from the commencement of the crisis and ending at the time of writing. Data collection was conducted between late December and early January 2018 in Yaoundé, Cameroon, after which I returned to Finland and had no possibility to continue collection data. The short amount of time allocated for the interviews limited the number of conducted interviews to eight. Although field visits and participant observation in the North West and South West regions would have been useful for the purpose of the study, travel restrictions due to security prevented me from doing this. Varying internet connection and common power cuts occasionally affected interviewing, and therefore some interviews had to be done during several sessions.

The study focuses specifically on downstream supply chains, beginning at the level of central warehouses in the capital of Cameroon and ending at the point of consumption in the South West and North West regions. In other words, the logistics activities considered in the thesis are any logistics activities needed to get relief items from the central warehouses in the capital, Yaoundé, to the affected population. The possible effects the crisis has had on the design of the upstream supply chain, donors, procurement of health commodities, or suppliers outside the country are therefore not looked at.

1.4 Structure

This first chapter introduced the context and the topic of the thesis as well as argued for the research gap that this thesis aims to fill. Chapter 2 presents previous research in the field of humanitarian logistics and humanitarian supply chain management that is relevant for the context of the thesis. Chapter 3 discusses the methods, design and execution of the empirical study, as well as introduces the context of the case study more closely. Chapter 4 presents and the findings of this study, starting by addressing the first research question by presenting the challenges identified in the study before responding to the second research question by showing the ways in which the supply chain has adapted to the aforementioned challenges. In Chapter 5, these findings are discussed and compared to previous literature. Finally, Chapter 6 discusses the contribution to research
and practical implications for the field of humanitarian logistics, assesses the quality of the thesis, summarizes the conclusions of the study and gives recommendations for future research.
2 LOGISTICS MANAGEMENT IN COMPLEX EMERGENCIES

This chapter begins with a presentation of the conceptual framework of the thesis. Next, humanitarian logistics as a field of research is defined and discussed, starting with the broader definition and later focusing more on the specifics of humanitarian logistics in a man-made crisis and in continuous logistics support in a developing country setting. Trends and gaps in this area of research are also identified. Healthcare supply chains are discussed separately to exemplify the complexity of managing the supply chains of a typical relief item. They also form a part of the units of analysis in the empirical study. Later, definitions for the type of disaster that is studied in this paper are discussed. The concept of complex emergency is also introduced. Next, a review of what previous humanitarian logistic literature says about logistical challenges in a crisis is conducted. This part relates to the first research question, “What logistical challenges can be identified in a region affected by conflict?” and will be further discussed in relation to the empirical findings in chapter 5. Last mile distribution in humanitarian supply chains forms its own subchapter because of its importance in the case study presented in chapter four. The case study reveals several challenges related to last mile distribution. The final theme of this chapter concerns adapting supply chains in times of crisis or conflict, and contributes to the discussion of the second research question, “How have actors in the public health commodity supply chain in Cameroon adapted to the challenges?” The chapter ends with a conclusion.
Figure 1: Conceptual framework of the thesis

Figure 1 portrays the Conceptual framework of this study, illustrating the concepts as well as the levels and the relationships between the concepts discussed in this chapter. The two levels closest to the core of the figure portray the framework’s relation to the research questions. The area of research that the thesis fits into is *humanitarian logistics and supply chain management (SCM)*. Humanitarian logistics in a nutshell entails logistics in natural and man-made disasters. Within man-made disasters, this thesis focuses on conflicts or complex emergencies. The topic is further narrowed down to *logistical challenges in a conflict* and *adapting to logistical challenges in a conflict*, bearing in mind that these issues are studied within the frame of *humanitarian logistics and SCM*.

### 2.1 Humanitarian logistics

Pedraza-Martinez and Van Wassenhove (2016:1) say that “humanitarian operations are about logistics and politics”, the logistics relating to the operations that bring aid to beneficiaries and politics relating to the international community’s willingness to provide fund and access to humanitarian organisations.

Reaching people affected by crisis depends much on how effective the supply chains and their management systems are (Beresford and Pettit, 2009). Logistics is a central part of relief operations because it connects disaster preparedness and response, it determines
how fast the response reaches the beneficiaries and the data gathered by logisticians at
different stages of the response can later be used for learning (Thomas, 2003; VanVactor,
2011).

Humanitarian logistics as a field of research originates from the early 2000s, spurring
from the idea of applying private sector logistics into to a humanitarian context to
improve the disaster relief and humanitarian aid supply chains (Van Wassenhove,
2006). The Asian tsunamis in 2004 were a wake-up call for the international
humanitarian community to put more emphasis on logistics, and after this humanitarian
logistics has also gotten much more attention from academics (Thomas and Kopczak,
the systems and processes involved in the mobilization of people, resources and
knowledge with the goal of helping people affected by natural disasters and emergencies.
Thomas and Mizuhima (2005:60) give the following, widely quoted definition for
humanitarian logistics: “the process of planning, implementing and controlling the
efficient, cost-effective flow of and storage of goods and materials as well as related
information, from point of origin to point of consumption for the purpose of meeting
the end beneficiary’s requirements”.

While the bigger portion of humanitarian logistics literature talks about logistics in
disaster relief, Kovács & Spens (2007) point out that humanitarian logistics is an
umbrella term that encompasses both continuous aid work in developing nations and
disaster relief. Pedraza-Martinez and Van Wassenhove (2016) also state that
humanitarian operations are usually divided into disaster response and development
programs. The former typically involves “short duration, high urgency and large
uncertainty” and the latter “long duration, moderate urgency, and relatively low
uncertainty” (Pedraza-Martinez and Van Wassenhove, 2016:1). Disaster response by
definition is about responding to disasters, development programs are about “the
improvement of the quality of life of the poorest of the poor worldwide” (Pedraza-
Martinez and Van Wassenhove, 2016:1).

Humanitarian organizations tend to work with both kinds of humanitarian operations
according to Martinez and Van Wassenhove (2016). However, Oloruntoba and Gray
(2006) say that there seems to be a poor link between emergency aid and long-term
development aid. The empirical research presented in this study covers both of these
areas, as experts from both continuous development support supply chains and
emergency response supply chains have been included.
As mentioned above, humanitarian logistics is the equivalent of private sector logistics in a humanitarian or a disaster setting. In both sectors, logistics encompasses “planning, preparedness, design, procurement, transportation, inventory, warehousing, distribution and recipient satisfaction”, with the purpose of getting the right products in the right quantities to the right place and the right people in the right time (Van Wassenhove, 2006:476-477). A key characteristic of humanitarian logistics is always dealing with the unknown (Van Wassenhove, 2006).

The actors in the supply network of humanitarian aid differ from those in a commercial supply chains. Kovács and Spens (2007:106) include the following actors in their framework: donors, aid agencies, other NGOs, governments, military and logistics providers. They further point out that the motivating factors in humanitarian logistics differ greatly from those in commercial logistics: supply and demand are of a different nature: demand is only generated because the customers (beneficiaries) have no other option and profit maximization is not the ultimate goal.

Balcik & Beamon (2008:102) identify traits that differentiate humanitarian relief chains from commercial supply chains:

- unpredictability of demand, in terms of timing, location, type, and size
- suddenly-occurring demand in very large amounts and short lead times for a wide variety of supplies
- high stakes associated with adequate and timely delivery
- lack of resources (supply, people, technology, transportation capacity, and money).

Jahre et al. (2011) question some of the characteristics that are often assumed to differentiate humanitarian logistics from commercial logistics. Particularly the unpredictability of demand is challenged, as there is little empirical evidence to support it. Jahre et al. (2011) further argue for a change from an order/pull-based approach to a forecast/push-based one, using traditional methods from commercial logistics, in immediate disaster response.

Humanitarian organizations must follow certain humanitarian principles, namely humanity, impartiality and neutrality. These circumstances call for a set of strengths from the humanitarian logisticians: flexibility, adaptability, capability of setting up and changing supply chains under tough circumstances and the ability to align various needs and actors. (Van Wassenhove, 2006)
Majewski et al. (2010) identify future challenges for the field of humanitarian logistics. Their study in 2010 concludes that organizations must improve their efficiency, professionalism and quality, and makes three recommendations for actors in the field:

1. **Humanitarian actors should increase efficiency and cost effectiveness through investment in key technologies and human resources.**

2. **Humanitarian actors should increase their capacity and reach individually or through partnerships in order to meet the growing needs caused by national and international disasters.**

3. **Humanitarian actors must design performance measurement systems to monitor, manage, and account for the efficiency and effectiveness of their logistical systems. Institutional and private donors should increasingly make funding decisions based on proven effectiveness and cost efficiency and should make targeted investments in logistics platforms and systems that increase reach, coordination, efficiency, and effect.**

(Majewski et al., 2010:15-16)

As for future research in humanitarian logistics, Pedraza-Martinez and Van Wassenhove (2016:5) recognize a need to increase understanding of “…context, data context, data, multiple methods and triangulation, collaboration, closing the loop, donor pressure, technology, and disaster cycle management”.

In a literature review of challenges and trends in humanitarian logistics research, Leiras et al. (2014) conclude with there being a need for more studies on the disaster recovery phase and for closer collaboration between academia and humanitarian organizations. More specifically, they say that existing research focuses more on “the proactive and the immediate-reaction stages of the disaster lifecycle, such as mitigation, preparation, and response” while there is a need for “studies that enroll humanitarian logistics in long-term development programs” (Leiras et al. 2014:108). On man-made disasters, the authors note that the high complexity and difficult access to affected areas may be the reason why man-made disasters are rarely explored in literature. They also identify a gap in research focusing on other decision levels than the strategic one, i.e. the tactical and the operational decision levels.
The most recent literature review in humanitarian logistics and supply chain management, by Jabbour et al. (2017), identifies six research gaps:

1. Which lessons would be learnt from non-mature economies in order to foresee, and be prepared for natural disasters?
2. How are public and private sectors supply chains involved and organized to support the preparation and prevention of situations like natural and man-made disasters?
3. Which barriers exist to make quantitative studies feasible in the field? How is big data being used in the context?
4. Which resources and capabilities could be developed by organizations in order to deal with the different kinds, and pace of, disasters?
5. Which initiatives or plans of prevention to natural and man-made disasters are developed in countries devastated by these disasters? Which kind of approach has been adopted after facing such disasters?
6. How can humanitarian organizations coordinate with each other in order to support the preparation/prevention, immediate response, and reconstruction phases of disaster relief?

(Jabbour et al., 2017:15)

In order to illustrate the complexity of humanitarian supply chain management, the remainder of this section focuses on healthcare supply chain. These are an interesting example because medicines and medical supplies are one of the most critical groups of relief items in a disaster, and because of their sensitivity in terms of transport and storage condition requirements. According to Spiegel et al. (2001:281): “To ensure appropriate humanitarian assistance is effectively and competently provided to populations affected by complex emergencies (CEs), it is necessary to hold public health professionals and humanitarian organizations accountable for the provision of such services”.

Healthcare logistics management is a specific field of expertise in that healthcare “cannot be (so) easily distributed as much of the foundation for healthcare support is based on
contingency and reactive posturing” (VanVactor, 2011:253), and its role in whether a healthcare provider is resilient during a crisis or not is crucial.

Hospitals are among the first actors responding to humanitarian needs in a conflict. Recent armed conflicts in developing countries have affected rural areas especially, and therefore the rural hospital plays an important role in the first response. Due to conflicts, rural hospitals face big changes in demand, destruction of resources and labour, violence, fear, and unrest towards the staff as well as challenges related to transportation and supply. (Jola-Sanchez et al., 2016)

Ibegbunam and McGill (2012) study priorities and challenges in the system managing health commodities in Abuja, Nigeria, in a setting that apart from the element of conflict is similar to the one studied in this thesis. They find that there is a need to for a more coordinated health commodity management system as well as more financial support from the government to ensure the financial sustainability of the supply chain. Just like in Cameroon, the systems that manage products for family planning, HIV/AIDS, tuberculosis and malaria in Nigeria are integrated to a great extent, as are the downstream supply chains. Because of high prevalence of these diseases, a big part of the population living in remote areas that are difficult to access and staff that previously has been ill-equipped and lacking training, many public-private initiatives today work on developing logistics solutions for improved management of these supply chains in Sub-Saharan Africa (Tomasini and Van Wassenhove, 2009).

Jahre et al. (2012) study how reducing complexity in a supply chain can improve health in developing countries. They conducted their study in Uganda and conclude that simplifying the structure of the supply chain leads to less stock shortages and reduced costs. The concrete actions that they found to improve the supply chain was reducing lead times and uncertainty, more frequent orders and the movement of safety stocks.

VanVactor (2011:245-246) argues that healthcare logistics is “a specific genre of skill sets within healthcare operations”, and that getting the necessary goods to health care personnel and health facilities in a crisis situation requires networking, flexibility and creativity. He also mentions the importance of building resilience in healthcare disaster planning. Further, healthcare logisticians need to know and monitor the needs of their client base, which in a crisis or conflict situation can be challenging, as the community may be scattered and difficult to access. According to VanVactor (2011:251), healthcare
logisticians have to concern themselves with four types of inventory: cyclic, seasonal, safety and contingency stocks.

In their case study on how armed conflict affects hospital operations, Jola-Sanchez et al. (2016) conclude that conflicts increase the total factor productivity of hospitals while decreasing their efficiency, but that both productivity and efficiency of hospitals tend to increase post conflict. Specifically, they say: “The conflict causes supply chain disruptions and increases the relative prices of medical goods and services as well as the maintenance of medical equipment and assets like ambulances. More expensive inputs result in lower relative efficiency for hospitals that are located in municipalities that face severe conflict” (Jola-Sanchez et al., 2016:83). Theirs is one of very few papers that explicitly address the effects of conflict on any humanitarian operations.

2.2 Defining the disaster environment

Humanitarian logistics literature uses a few different definitions for the humanitarian setting that it is responding to. Crisis, disaster and emergency are perhaps the most common ones. According to Van Wassenhove (2006:476), a disaster is “a disruption that physically affects a system as a whole and threatens its priorities and goals”, either natural or man-made and can be either slow-onset or sudden-onset. Armed conflict is a man-made disaster, and compared to an earthquake or a flood it is a slow-onset disaster. Unlike natural disasters, man-made disasters often have a “lead-up period”, which may help in preparing for the response (Beresford and Pettit, 2009). Other slow-onset, man-made disasters are according to Van Wassenhove (2006) political crisis and refugee crisis, while wars are in a category of their own because humanitarian organizations are rarely involved in these. The situation in Cameroon that is studied in this paper has been called both a political crisis and a refugee crisis, while according to UN OCHA (2019), it has over the past year developed the characteristics of an armed conflict. Regardless of which of the above is most accurate to describe it, the current situation in Cameroon has disrupted the system of health commodities management and threatened its priorities in the affected regions, therefore making it a disaster per Van Wassenhove’s (2006) definition.

Roughly, about 250 million people are affected by disasters every year (IFRC, 2019), and the number of people affected by man-made disasters, such as conflicts and wars, is even higher (Pedraza-Martinez and Van Wassenhove, 2016). Wars and conflicts significantly increase the number of refugees and internally displaced people (Pedraza-Martinez and
Van Wassenhove, 2016). A conflict environment is one where people or groups find their needs, goals or interests contradicted by those of another party (Cohen and Arieli, 2011).

Many similarities can be found between operating in a war zone versus a natural disaster. The environment is destabilised and infrastructure and communications are impacted; reliable and realistic information about the current situation is difficult to secure immediately (Ferrer et al., 2018); the operations can receive a lot of media attention; casualties and displaced or otherwise vulnerable people are often also present in the area of operations (Kovács and Tatham, 2009).

Hallam (1998) uses the term complex emergency. This term emerged as a way to differentiate between an emergency caused primarily by natural events and one caused by armed conflict or political instability, while avoiding the use of sensitive words such as civil war and conflict. Kovács and Tatham (2009:216) give a somewhat different definition of complex emergency: “situations in which a natural disaster strikes in a warzone” when talking about how military and humanitarian organizations work close to one another. Per Hallam, the following is typical for complex emergencies (Hallam, 1998:21)

- A collapse of state functions
- Intra-state rather than inter-state conflict
- Difficulty in differentiating between combatants and civilians
- Violence directed towards civilians and civil structures
- Fluidity of the situation on the ground
- A lack of absence of normal accountability mechanisms
- The potential and actual development of war economies
- The potential for humanitarian assistance to prolong the conflict
- A multiplicity of actors

Pedraza-Martínez and Van Wassenhove (2016) talk about complex disasters, with the example of climate change causing forced migration, which in turn leads to conflict,
while the environment is already troubled by poverty, weak government and corruption. In such a situation, a small disaster can escalate into a serious crisis in a short time span.

Another term used to describe a multifaceted crisis such as the one described in the case study is protracted crisis. In a protracted crisis, there is a high risk of death, disease and breakdown of livelihoods for a large part of a population (Humanitarian Coalition, 2019). A protracted crisis is often characterized by: long duration, conflict, weak governance or public administration, unsustainable livelihood systems and poor food security outcomes as well as breakdown of local institutions (Humanitarian Coalition, 2019). This term has not been studied much as of yet. According to WHO (2016): “Protracted crises disrupt people’s lives, economies and societies for prolonged periods of time”.

Henceforth, the term complex emergency, as defined by Hallam (1998), will be used in this thesis, as it best describes the empirical setting that is studied and unlike the term protracted crisis, it has been discussed in previous literature.

2.3 Humanitarian logistics in a conflict setting


Ferrer et al. (2018) point out that many humanitarian organizations today operate in conditions of conflict and social unrest. Decision-making concerning distribution involves taking into account time, cost, equity and security. However, security has been neglected in previous humanitarian logistics literature. The authors recommend that further research be conducted in this area. Pedraza-Martinez and Van Wassenhove (2016) even state that, as of late, security has become the primary concern of humanitarian organizations.

Pedraza-Martinez and Van Wassenhove (2016) have in a special issue on “Empirically grounded research in humanitarian operations management” assembled papers that look into new problems in humanitarian operations management, and present new theory within the subject. Among these papers, Jola-Sanchez et al. (2016) talk about the effects of armed conflicts on humanitarian operations. They conduct a case study on a
conflict in Colombia, where they identify how conflict affects the total factor productivity, efficiency and efficiency variability of public hospitals.

While there is a need for extensive research about conflict, the conflict environment is a challenging one to do research in. Cohen and Arieli (2011) propose that researchers should discuss openly about the difficulties they face and the adaptations they sometimes must do to their research strategies when conducting research in conflict environments. They claim that this would improve transparency and validity as well as help developing research methodologies for conflict environments.

According to Pedraza-Martinez and Van Wassenhove (2016), one of the main challenges in humanitarian operations management research is finding data. This is because humanitarians often lack sophisticated information and communications systems as well as competences for data analytics, and on top of this they are limited by budget and resources much more than commercial companies are. For researchers, this means gathering and sanitizing data requires considerable effort. Not to mention, data sources can in this context be inaccurate or unreliable. This has an impact on researchers wanting to study this important field. (Pedraza-Martinez and Van Wassenhove, 2016)

Also when studying the impacts of conflict, Jola-Sanchez et al. (2016) note that data availability is a difficult challenge. They recommend working with practitioners and using field data to improve access to data. Conflict is a man-made disaster, and Leiras et al. (2014) note that the high complexity and difficult access to areas affected by man-made disasters may be the reason why these are rarely explored in literature. Jahre et al. (2011) critically point out that humanitarian logistics papers tend to fall into one of three categories: either they are purely conceptual and based on literature reviews; too theoretical and modelling on problems that practitioners do not really recognize or they are too narrative and lacking rigor.

Jahre et al. (2011) note that the success of a relief supply chain often depends on the skills of individual logisticians, as they are forced to use their own experience and “guesstimates” when doing a needs assessment in a crisis, rather than using accumulated historical data from a number of humanitarian crises. While recognizing the fact that it is difficult to make accurate assessments of needs during an emergency situation, they argue that it is in fact possible to foresee future needs and estimate what the demand might be when a disaster occurs. Other challenges they mention are tracking the
changing needs and the effects of the assistance delivered to the local population in a disaster environment.

Jola-Sanchez et al. (2016) talk about how armed conflict affects hospitals in particular. They mention shooting and bombing affecting physical resources and attacks on ambulance and medical transports. Human resources are also subject to attacks, arrests, kidnappings, detentions and intimidation. Hospitals' physical capital is sometimes used for military purposes and in some cases, personnel and patients are used as human shields. Deprivation of infrastructure, water and electricity is also a challenge posed by conflict on hospitals or any kind of organizations. As for supplies, the presence of armed conflict may increase market prices. This is the result of robbery, improper use of medical supplies as well as illegal groups sometimes imposing unofficial taxes on goods and using extortion or kidnappings to get access to products. (Jola-Sanchez et al., 2016)

Looking closer at the work of humanitarian logisticians, some of the challenges that can also apply in a political crisis setting are operating in a politically volatile climate; high uncertainties; time pressure; high staff turnover because of the stressful work environment; diverse stakeholders such as governments, media, donors, beneficiaries and military and physical obstacles for the movement of people and goods. Competing against other organizations and disasters for media and donor attention is an example of the challenges that humanitarians have dealing with their stakeholders. (Van Wassenhove, 2006)

Coordination of logistics activities between humanitarian organizations have however improved over time. Resource sharing and use of organizations and individuals with local knowledge and contacts are examples of this improved coordination. (Oloruntoba and Gray, 2006)

Different types of disasters pose different challenges for humanitarian logisticians. Some disasters affect the quality of infrastructure; others have an impact of safety and security for the logistics operations. Physical disruptions in the supply chain can occur in a crisis when road networks are blocked, storage facilities destroyed or communication methods made unavailable (VanVactor, 2011). Armed conflict and political crises tend to pose safety and security risks for humanitarian staff and in complex emergencies, abductions and even killings of staff can occur. Other factors affecting the types of challenges are the phases of disaster relief and the different types of humanitarian organizations.
Coordination of logistical activities is one of the most significant challenges in humanitarian logistics. (Kovács and Spens, 2009)

The uncertainty posed by a crisis situation contributes to difficult decision making (Boin et al., 2010; Ferrer et al., 2018). In a political conflict with violent traits, for instance, it can be difficult to know what has happened, what will happen in the future and how long the current situation will last (Boin et al., 2010). In a constantly evolving crisis lacking clear, common instructions, the responding actors have to find their own ways to manage (Boin et al., 2010). Transportation planning for last mile distribution is very much affected by the availability of information (Ferrer et al., 2018).

Kovács and Tatham (2009) also mention access to the disaster site when there are physical or political barriers as an important factor and it affects how humanitarian supply chains can be structured, for example when determining which activities should be regional and what extra-regional. The local presence of a humanitarian organization, in turn, affects how fast the organization can respond to a disaster or an event, as well as how much local knowledge they have (Kovács and Tatham, 2009). Knowing the specific needs and culture of the affected population can be very important when delivering aid. Being located in the same country as the beneficiaries also means that the organization does not necessarily have to wait for a state of emergency to be declared before they can start delivering aid (Kovács and Tatham, 2009).

VanVactor (2011) also brings up logistical difficulties in emergency situations related to the following factors: lack of predictability in operations; limited knowledge about the emergency event; the speed, duration and intensity of the event and future events. For health care supply chains, he also points out that it is important to supply products rather than putting too much emphasis on moving professionals to the crisis zone, as the former more often becomes the bottleneck. Without the products, there is little that the staff can do to help the patients and medical treatment can be abruptly interrupted, causing human suffering and deaths (VanVactor, 2011). Figure 1 below shows his model for emergency management, including a preparation, a response, a recovery and a mitigation phase.
Carter (1999:52) presents two different disaster management cycles. In the first one, which he calls Basic format of the Disaster Management Cycle, he includes the following phases of disaster management: prevention, mitigation, preparedness, disaster impact, response, recovery and development. When describing these phases, Carter refers to natural disasters, such as earthquakes and cyclones, not mentioning conflicts or complex emergencies at all. In the second one, Alternative format of the Disaster Management Cycle, he has selected three main elements: preparedness, response and recovery, and within these divided the cycle further into inter-linked phases: preparedness, warning, threat, impact, emergency phase, restoration, review, reconstruction, national development, prevention and mitigation.

The physical movement of aid in a disaster setting means high risk and uncertainty, affected by the availability and quality of infrastructure as well as political and physical
conditions (Beresford and Pettit, 2009). Last-mile transportation can be particularly difficult in an unsecure environment, roads might be damaged or otherwise unsafe and prices for transportation services tend to rise. If there is hostility in the region, vehicle convoys may have to be organized to improve safety for the transportations. Getting current and accurate information about road conditions and safety can also be difficult. (Balcik et al., 2010)

2.4 Last mile distribution

Balcik et al. (2008) study a last mile distribution system that encompasses local distribution centres, transport vehicles and people in the disaster affected areas, or demand locations. They present a model for resource allocation and routing decision optimization to enable efficient and effective decisions with regards to last mile distribution. According to Balcik et al. (2008), the most prominent logistical problems in the last mile are limited transportation resources and emergency supplies, damaged transportation infrastructure and insufficient coordination between different actors. Making distribution plans that are efficient and effective in a challenging environment is also difficult. Per Balcik et al. (2008), relief supply allocation, vehicle delivery scheduling and vehicle routing are the primary operational decisions that need to be taken when it comes to last mile distribution. Cost-efficiency is of high importance here because the budget allocated for last mile distribution tends to be limited. The authors do not discuss safety or security as a component in the decision-making.

A study by Battini et al. (2014) introduces an analytical routing model based on the one by Balcik et al. (2008) to address the last mile distribution problem in humanitarian logistics. Battini et al. (2014) add two constrains in their model that are not considered in the model by Balcik et al. (2008): accepting zero shortage and having limited resource capacity. Battini et al. (2014) suggest using co-transportation in last mile distribution. The authors point out that both social and economic factors are to be considered with regards to the last mile distribution problems, as minimizing human suffering and casualties is one of the main goals. The model is applied to a real case, the earthquake that hit Haiti in 2010, and it is used to optimize resource allocation and routing decisions.

Ferrer et al. (2018) develop a multi-criteria transportation model for last mile distribution. Unlike Balcik et al. (2008) and Battini et al. (2014), they do include security as a performance criterion. They note that previous literature does not include security in transportation models for humanitarian aid. They further state “security is an
Increasingly important criterion to optimize in operations that are carried out in environments of armed conflict and social unrest” (Ferrer et al., 2018:501). For example, attacks on official UN vehicles more than tripled from 2014 to 2015, and “more armed conflicts may increase security issues in the future” (Ferrer et al., 2018:502). The authors say that while using safer routes and vehicle convoys can improve transportation security, this affects other criteria, such as time and cost.

Eftekhar and Van Wassenhove (2016) study management of vehicle fleets for humanitarian operations. They emphasize the important role that four-wheel drive vehicles play in last mile distribution of food, items and personnel in humanitarian development programs. While fleet management policies are most often made at the level of the headquarters, they are implemented by local sub-delegations. As stated by Pedraza-Martinez and Van Wassenhove (2013:375): “Field workers tend to be independent and creative, which can of course be good in some difficult situations they may face. However, these loose interpretations of rules make it difficult to assess whether data are reliable”.

One of the key findings by Eftekhar and Van Wassenhove (2016) is that information asymmetries and incentive misalignment often leads to a considerable gap between what is decided at the headquarters and what is actually done in the field. The authors point out that local sub-delegation can be faced with conflict, poor infrastructure and difficult terrain that have not been considered by headquarters when fleet management policies are set up.

### 2.5 Adapting humanitarian supply chains

Peck (2004) talks about supply chain vulnerability and risk, meaning the probability of an event occurring times the impact of that event on the supply chain, and how companies woke up to this risk in the aftermath of 9/11. Disruptions in supply chains can have considerable effects on companies and entire economies. Increased visibility over the supply chain, multiple sourcing and outsourcing can help build more resilient supply chains. (Peck, 2004)

Christopher and Peck (2004:2) discuss resilient supply chains, defining resilience as “the ability of a system to return to its original state or mode to a new, more desirable state after being disturbed”. They find flexibility and adaptability to be key to resilience in supply chains. Non-resilient supply chains are vulnerable, in other words, at risk. They
divide risk into internal risks, risks internal to the network but internal to the organization and risks external to the organization. (Christopher and Peck, 2004)

The last category of risk is environmental risk, and this is the type of risk that is most interesting for this study. Environmental risk can result from socio-political, economic or technological events that may happen close to or far from the focal organization (Christopher and Peck, 2004). Christopher and Peck (2004:7) identify four principles to building resilient supply chains: supply chain re-engineering, supply chain collaboration, agility and creating a supply chain risk management culture.


When facing a crisis, the actors involved in the supply chain often have to adapt and improvise, and sometimes even break current rules because of the changed circumstances. Public organizations tend to be bureaucratic and routined, making adaptation to new challenges difficult. (Boin et al., 2010)

According to Boin et al. (2010), the first supply chain management task to be done when a crisis strikes is to save existing supply chains that were in place before the disruption. These are critical supply chains for the affected populations, such as the ones for food, medicines and energy. The second task is building additional supply chains to compensate for what was lost or disrupted due to the crisis. The third task, often a particularly challenging one, is ensuring last mile distribution, meaning getting the goods to the point of consumption and ready to be consumed by the final users. The fourth task, according to Boin et al. (2010) the most difficult one, is coordinating different actors and the flows of materials, information and funds.

Jahre and Fabbe-Costes (2005) discuss adaptation and adaptability of supply chains, the trade-offs between these and the difficulty of introducing change that occurs on a network level to the level of a supply chain that is integrated within that network. They come to the conclusion that adaptation leads to more efficient logistics, and adaptability facilitates adaption to future changes. Too much adaptation can result in less adaptability, because as elements are very adapted to current circumstances, changing them becomes more difficult and they become more vulnerable to change. In a supply chain, the different elements or resources can be either adapted and tightly coupled to
each other or adaptable and loosely coupled. This trade-off must be taken into account when managing changes in logistics. Ideally, it would be possible to “plug, play and unplug” (Jahre and Fabbe-Costes, 2005:155-156) these couplings, and further research might show how adaptation and adaptability could be maintained at the same time. (Jahre and Fabbe-Costes, 2005)

Bask and Juga (2001) talk about semi-integrated supply chains, and like Jahre and Fabbe-Costes (2005), they, too, talk about the need for both tight and loose control simultaneously. They point to the challenge of combining integration and innovation as well as responsiveness and flexibility. They conclude by saying that: “Quality, rather than quantity, should also be a key issue when it comes to supply chain integration” (Bask and Juga, 2001:150). Jola-Sanchez et al. (2016), in turn, raise the question whether building flexibility into the supply chain and workforce would improve operating in a conflict setting.

Oloruntoba and Gray (2006) discuss addressing some of the challenging aspects of humanitarian supply chain designs by improving agility in humanitarian supply chains. Agility in manufacturing and logistics means being able to thrive in a constantly changing environment. In business logistics, this is very much linked to responding to changing customer wants and needs. In a humanitarian supply chain, marketing is not directed at the end consumer, but rather the “customer” is in this case the donor. Thus, agility here means addressing the unstable funding of humanitarian aid. (Oloruntoba and Gray, 2006)

Kovács and Tatham (2009) mention agility in the context of supply chain disruptions. Unlike in businesses generally, humanitarian and military organizations see disruptions in their supply chains as unavoidable. Responding to these disruptions “require the speedy mobilization of resources and capabilities from a ‘dormant’ efficient preparation state to an ‘active’ agile state” (Kovács and Tatham, 2009:216), which is often the core capability of humanitarian organizations. There is a trade-off between the dormant and the active state, more precisely cost-efficiency versus agility.

Oloruntoba and Gray (2006) also propose using postponement, meaning “postponement of commitment of inventory to final delivery” (Oloruntoba and Gray, 2006:118) in the field level of humanitarian supply chains. They suggest that this allows for the use of more accurate field data, helps overcome security risks, including potential for violence, and improves supply chain agility in that the changing needs of end users can be better
responded to. Kovács and Tatham (2009) also mention the use of postponement strategies as one of the core competence of the humanitarian model. They particularly talk about postponement of resource ownership, which requires managing good relationships with other actors, so that the resources can be quickly tapped into when needed. Balcik and Beamon (2008), in turn, have developed a model for determining the number and locations of distribution centres and pre-positioned inventory, as they point out that a facility location problem exists in humanitarian networks.

2.6 Conclusion

This chapter has presented humanitarian logistics as a field of research. Previous literature tells that the field originates from business logistics, borrowing theories and models as well as modifying them to the humanitarian context. At the core of humanitarian logistics is the activities that bring aid to beneficiaries.

Before the emergence of the research field, logistics was rather neglected in humanitarian operations, meaning lacking personnel trained in logistics, scarce resources for logistics activities and poor coordination between humanitarian actors. This has since improved, but many challenges remain.

The humanitarian environment as such poses specific challenges to logistics operations. Disasters are often characterized by damaged infrastructure, poor access to beneficiaries, lack of reliable information and realistic data and security concerns. The presence of displaced and vulnerable populations and the high time pressure to ease suffering and save lives make the job a difficult one. The last mile distribution is particularly challenging. Security concerns in humanitarian logistics are mentioned in some of the existing literature but there is clearly a need for more research in this area.

While many terms are used interchangeably when referring to the humanitarian environment, *complex emergency* best describes a situation where health crises, poverty, armed intra-state conflict, high numbers of displaced people and multiple actors are present.

When operating in a complex emergency environment and in humanitarian settings in general, supply chains need to be adaptable and flexible. Building agile supply chains, using postponement strategies and improving collaboration are ways to improve efficiency and resilience of humanitarian supply chains.
While this chapter has discussed the definitions, characteristics and challenges of humanitarian logistics, little has been said about the specific challenges that conflict or complex emergencies poses on logistical operations in a region, and particularly for those supply chains that were already in place prior to the conflict. The empirical part of this study will shine a light on this question and contribute to filling the apparent gap in existing humanitarian logistics literature.
3 RESEARCH METHODS

This chapter starts by discussing the abductive research approach, in particular when used in logistics research and case studies. This is followed by a methodological discussion, arguing for the choice of case study research. Next, the methods used to collect data about the case are presented. This section includes data collection methods, sampling, development of the research instrument, piloting this instrument and ethical considerations. Further, the thematic data analysis process is described, followed by a description of the studied sample and the context of the case study. Finally, the quality of the research is addressed.

3.1 Research approach

Though quantitative research has been a tradition in the field of logistics research, the use of qualitative methods has increased (Halldórsson and Aastrup, 2003). To understand the logistical impacts of conflict on the supply chain, qualitative methods that allow tapping into the knowledge and experience of people that are involved in downstream supply chains in the regions affected by conflict, i.e. North West and South West, were used in this study.

In logistics research, the deductive approach is more commonly used than the inductive and abductive ones, although the chosen approach is not always discussed unless the focus of the research is theory building or case study methods (Kovács and Spens, 2005). The research approach of this study is a combination of inductive and deductive, in other words, abductive. In a truly inductive study, there is no theoretical framework at all, but theory is built as a result of empirical research (Kovács and Spens, 2005). Fully deductive research, on the other hand, implies testing existing theories in an empirical setting. This study has deductive elements in that a literature review, presented in chapter 2, was conducted. It also includes inductive elements in the sense that observations about the study subject had already been made prior to any literature review or theory scan, and thus the empirical study was planned based on both real-life observations and literature. The abductive approach, being a combination of the two, is therefore suitable for this study. Another argument for using this approach is that it is well suited for studies that aim to discover something new rather than confirming existing theories, and this study seeks to do just that (Dubois and Gadde, 2002). In abductive research, concepts constitute both input and output to the study and the researcher should avoid being too tied to previous theory, since the need for theory is developed over time, as the research is ongoing (Dubois and Gadde, 2002).
Dubois and Gadde (2002) call the abductive approach *systemic combining*, characterized by the researcher moving back and forth between the empirical world and a model world and the combination of a theoretical framework, an empirical framework and case analysis. When conducting a case study, they argue that the support of theory provides some structure and control to the empirical research that may otherwise become too descriptive, and the abductive (or systematic combining) approach allows for better understanding of both theory and empirical observations. Figure 3 shows the ingredients of systemic combining according to Dubois and Gadde (2002), and how these continuously confront each other. The researcher moves between theory and empirical findings, while both the case and the framework evolve throughout the entire research process. Concepts should be used to guide the empirical research (Dubois and Gadde, 2002:558).

![Figure 3 Systemic combining (Dubois and Gadde, 2002:555)](image)

In Figure 3, *matching* happens when the researcher goes back and forth between framework, data sources and analysis, and *direction and redirection* refers to the constant evolving of the framework and the case (Dubois and Gadde, 2002:555-557).

Dubois and Gadde (2002) point out that in this type of research, both *passive* and *active* data is important. Passive data is the kind that the researcher sets out to find, whereas
active data is discovered more accidentally, for example through participant observation or meetings, and it is such data that the researcher did not know to look for. In this particular study, active data played an important role particularly in the beginning of the research process. Researchers do not start the research process with an empty mind, but have some pre-perceptions or theoretical knowledge, and the abductive reasoning starts when observations are made that do not match these pre-perceptions (Kovács and Spens, 2005). Here, observations about logistical challenges in the humanitarian setting were made and interpreted based on prior knowledge of humanitarian logistics before a literature review was conducted or research questions were formulated. According to Dubois and Gadde (2014:1280), the case sometimes selects the researcher, which is not far from what happened in this study.

### 3.2 Methodology

A framework for research design by Ellram (1996:96) facilitates the choice of method based on the type of data and the types of analysis. If the type of data that is gathered is empirical, rather than modelling, and the types of analysis are primarily qualitative, then the proposed methods are case studies, participant observation and ethnography (Ellram, 1996). The author explains how research questions guide the method choice. Depending on the objective of the study and the type of questioning, a range of appropriate methods is proposed.

In this study, the question words in the research questions are what and how. The first question: *What logistical challenges can be identified in a region affected by conflict?*, begs a description of the challenges identified. According to Ellram (1996), the qualitative methods that can answer this type of question are case study, experiment, grounded theory, participant observation, ethnography and case survey. The second question: *How have actors in the public health commodity supply chain in Cameroon adapted to the challenges?* is more exploratory, as it looks to answer how something is being done. To answer this type of question, Ellram (1996) recommends case study research, as it gives depth and insight. Case studies are, according to Ellram (1996:115), “…excellent for theory building, for providing detailed explanations of ‘best practices’, and providing more understanding of data gathered”. Voss et al. (2002) also points to several reasons for conducting a case study: it can lead to new and creative insights and develop new theory, enrich theory as well as the researcher and have high validity with practitioners. Leiras et al. (2014) find that in the field of humanitarian logistics research, case studies account for a relatively small proportion of the literature. Ellram (1996)
points out that conducting a good case study requires careful planning, systematic gathering of data and rigor.

Simply put, a case study is: “an exploration of a ‘bounded system’ or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context” (Patton, 2015:259). The case is bounded by time and place. In this study, the place is North West and South West Cameroon, and the timeframe ranges from the beginning of the crisis in 2016 to January 2019, when the data was collected. The weakness of case study research is the lack of generalizability, while the strength is that case studies allow for deep understanding of a phenomenon and its context (Dubois and Gadde, 2002).

As for the number of cases to be studied, given a set of limited available resources, a single case provides more depth than multiple cases (Voss et al., 2002). For this study, time was the most limiting resource, and a single case was selected in order to gain as much depth as possible during the available time. Yin (2009:52) gives five different conditions, during which a single case is the right choice: “where the case represents (a) a critical test of existing theory, (b) a rare or unique circumstance, or (c) a representative or typical case, or where the case serves a (d) revelatory or (e) longitudinal purpose”. Condition (d) applies to the case of logistical challenges the conflict in Cameroon, because a revelatory case exists when there is a rare opportunity to observe and analyse something that has previously been difficult to access or even inaccessible (Yin, 2009). Areas with ongoing armed conflict and people working in those areas are difficult to access for many reasons.

Vega (2018) proposes a framework for crafting case studies in humanitarian logistics research, shown here as Figure 3. It consists of four boxes: What, Why, How conceptually and How practically. When designing a case study, all four boxes must be covered but the order is up to the researcher. (Vega, 2018)
The **Why** defines the purpose of the case study. There are many different motivations for choosing a case study method in humanitarian logistics research: motivating a research question, inspiring for new ideas and theories and illustrating (Vega, 2018). In this study, a case study is suitable because there is little prior theoretical knowledge of logistical challenges in complex emergencies or conflict, and thus an abductive case study can bring forth new ideas about this phenomenon.

The **What** is for the context of the case study and the units of analysis: “What, where and type of disaster” (Vega, 2018:17). Here, the what is defined as the downstream supply chains for health commodities and humanitarian aid in North West and South West Cameroon in a complex emergency.

The **How practically** concerns the data source and analysis, meaning by what techniques the case and data are selected and analysed (Vega, 2018). In humanitarian logistics research, difficulty to access the humanitarian site can affect the choice of data collection method, and qualitative content analysis of situation reports or experience feedback from trainings can be a good alternative (Vega, 2018). In this study, snowball sampling
was used to select respondents, and reports from coordination meetings with the Logistics Cluster were also analysed. All data was analysed using thematic analysis.

Finally, the *How conceptually* refers to how the case is discussed in relation to theory both in how existing frameworks support the case and how new frameworks may emerge from it (Vega, 2018). This study is supported by a conceptual framework, developed in Chapter 2 from concepts in relation to the topic of humanitarian logistics.

### 3.3 Data collection

Data for this study was collected with three different methods: Interviews, participant observation and analysis of Logistics Cluster reports.

Semi-structured interviews with experts and professionals that have knowledge of the situation in the two regions were conducted. The respondents include logisticians, a humanitarian aid coordinator, transporters and health care professionals. The respondents were chosen using a purposeful sampling strategy, defined by Patton (2005:265) as: “Strategically selecting information-rich cases to study, cases that by their nature and substance will illuminate the inquiry question being investigated”.

Out of the many different purposeful sampling strategies, snowball sampling was best suited for this study. Snowball sampling or chain sampling means starting with one or several relevant respondents with rich information and then asking them for more relevant contacts (Patton, 2015). Cohen and Arieli (2011) argument for the use of snowball sampling in conflict environments. According to their study, the sampling method “directly addresses the fears and mistrust common to the conflict environment and increases the likelihood of trusting the researcher by introduction through a trusted social network” (Cohen and Arieli, 2011:423), and sometimes applying this method can make the difference between conducting research and not doing so at all when it comes to conflict environments.

Because of security reasons, there was no possibility to visit the crisis-affected regions. Therefore, the chosen interviewees had to be ones who had rich information based on their own experience working in the two regions, and thanks to their professional networks, a chain of interviewees was created, as suggested by Patton (2015).

An interview guide based on prior knowledge about and observations from the supply chain in question was prepared. The 10 open-ended questions left room for the respondents to talk about things that it would have been difficult to know to ask about
and were kept on a rather general level, allowing for as broad information as possible to 
be shared by the respondents. Depending on the organization and role in the supply 
chain, the guides used for different interviews varied slightly. To test the interview guide, 
a piloting was conducted with a colleague. The pilot led to a few specifications in the 
interview questions and gave an idea of how long the interviews could be expected to last. 
Four interviews were conducted in person, four via WhatsApp. All interviews were 
recorded and transcribed. Six interviews were conducted in English and two in French.

No ethical approval was required at the time of the data collection, but all respondents 
gave their consent to be interviewed. Because there is no need to publish the identities 
of the respondents, they are referred to by title or role in the supply chain. The 
interviewees were not paid or otherwise compensated for their answers, but each of them 
was happy to take part in the research. They were promised a copy of the finished thesis. 
Recordings and transcripts were stored on a personal password-protected laptop.

The Logistics Cluster was put in place in Cameroon to answer the very same questions 
that the thesis aims to give answers to. At the time of the empirical study, the Cluster was 
arguably the best placed entity in the country to have information to the logistical 
situation for humanitarian organizations in the regions as a whole, which is why it was 
chosen as a source of information for the study.

Participant observation from working with the supply chain of health commodities in 
Cameroon was used to complement the interviews, and Logistics Cluster coordination 
reports provided both support for the data that emerged from the interviews and brought 
new information that helped answer the research questions.

Voss et al. (2002) recommend documentation throughout the research process, 
including typing up notes, gathering together documents and transcribing recordings, to 
produce a case narrative. One way to help the analysis of collected material and the 
development of thought processes during different stages of the research is to keep a 
research diary (Fisher, 2010:197). Such a diary was kept during the entire research 
process and a new entry was written for each day that any kind of observation, analysis, 
reading, researching or contacting interviewees took place. Data gathered through 
participant observation was also included in this research diary.

To facilitate reading, the information sources used in the empirical study are listed in 
Table 1 and Table 2 and each given a code by which they will be referred to in Chapter 4.
<table>
<thead>
<tr>
<th>Respondents</th>
<th>Role</th>
<th>Code</th>
<th>Type of organization</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 1</td>
<td>Humanitarian Aid coordinator</td>
<td>HAC</td>
<td>UNFPA</td>
<td>18.12.2018</td>
<td>18 min</td>
</tr>
<tr>
<td>Respondent 2</td>
<td>Information Management Officer</td>
<td>LCO</td>
<td>Logistics Cluster</td>
<td>19.12.2018</td>
<td>19 min</td>
</tr>
<tr>
<td>Respondent 3</td>
<td>Logistician</td>
<td>LSP1</td>
<td>Logistics service provider MTA</td>
<td>20.12.2019</td>
<td>17 min</td>
</tr>
<tr>
<td>Respondent 4</td>
<td>Commercial officer</td>
<td>LSP2</td>
<td>Logistics service provider MTA</td>
<td>20.12.2019</td>
<td>17 min</td>
</tr>
<tr>
<td>Respondent 5</td>
<td>Pharmacist and focal point for purchasing and stocks in the North West region</td>
<td>P1</td>
<td>Regional Drug Fund in the NW region</td>
<td>24 and 26.12.2018</td>
<td>48 min</td>
</tr>
<tr>
<td>Respondent 6</td>
<td>Pharmacist</td>
<td>P2</td>
<td>A district hospital in the SW region</td>
<td>31.12.2019</td>
<td>33 min</td>
</tr>
<tr>
<td>Respondent 7</td>
<td>Pharmacist and focal point for purchasing and stocks in the North West region</td>
<td>P3</td>
<td>A district hospital in the NW region</td>
<td>1.1.2019</td>
<td>17 min</td>
</tr>
<tr>
<td>Respondent 8</td>
<td>Logistician and focal point for purchasing and stocks in the South West region</td>
<td>L1</td>
<td>The Regional Health Delegation in the SW region</td>
<td>7.1.2019</td>
<td>35 min</td>
</tr>
</tbody>
</table>

**Table 1 Interview respondents**

<table>
<thead>
<tr>
<th>Source</th>
<th>Code</th>
<th>Number of reports / observations</th>
<th>Dates</th>
</tr>
</thead>
</table>

**Table 2 Other sources**
3.4 Data analysis

Data gathered through interviews, observation and reports was analysed through thematic analysis. Thematic analysis is a relevant qualitative method well suited for analysing large data sets, allowing the researcher to identify, organize and describe themes within it (Nowell et al. 2017). The interviews were transcribed and coded following a six-phased process laid out by Nowell et al. (2017) and presented below. Though presented as a six-phased method, thematic analysis involves moving back and forth between the phases and the different steps can be interrelated and occur simultaneously (Nowell et al., 2017), as was the case in this study.

Phase 1: Familiarizing oneself with the data

In this stage, the researcher is to immerse themselves with all the collected data, prior to coding, allowing for ideas and patterns to be shaped (Nowell et al., 2017). Here, the interview transcripts, notes from participant observation and Logistics Cluster reports were read through.

Phase 2: Generating initial codes

During the second phase, initial codes were produced. Codes are used for data labelling and -retrieval, allowing the researcher to differentiate and combine the data they have gathered (Miles and Hubermann (1994). The codes arose as sections of text in the data were labelled according to their content. All three data sources were coded in the same manner. The initial codes that were generated in this phase were: planning and information management; transportation; delays and product expiry; safety; storage; last mile distribution; products; costs; access to customers and beneficiaries; impact on customers and beneficiaries; coordination and collaboration; adaptation.

Phase 3: Searching for themes

When the entire data set was coded and a list of all the different codes found in the data had been made, these codes were sorted and collated into themes. The abductive research approach allowed these themes to emerge from the data itself while keeping in mind the theoretical framework of the study. Thus, this phase involved a lot of movement back and forth between theory and the data. Some initial codes formed main themes, others were merged or formed subthemes. Products was removed as a code of its own and merged into storage and safety.
Phase 4: Reviewing themes

This phase involved refinement of themes, as the coded text was reviewed and the coherence of each of the themes was assessed, so that the distinction between themes became clear (Nowell et al., 2017). As is typical in thematic analysis, even after Phase 6: Producing the report had begun, Phase 4 had to be repeated as the 11 small topics that had formed the themes at first were assembled under three main themes: Infrastructure, access and safety.

Phase 5: Defining and naming themes

In the fifth phase, a detailed analysis of each theme was conducted, and the story of the themes, the data set and the themes’ relation to the research questions was produced (Nowell et al., 2017). Again, even after the writing process had begun, themes had to be redefined and regrouped. Challenges and solutions became the two overriding themes, and under these two, infrastructure, access and safety are presented.

Phase 6: Producing the report

In the sixth and final phase of the thematic analysis, the report was written. This happened in several takes, as new ideas and presentation angles emerged after a first draft had been written.

3.5 Sample and Context

The North West (NW) and South West (SW) regions of Cameroon are situated in the Western part of the country, bordering with Nigeria. The map in Figure 4 shows the location of the two regions involved in the conflict as well as the location of the capital, Yaoundé and the financial capital, Douala.
Cameroon’s Ministry of Public Health manages the supply chain of health commodities, including the district hospitals and health facilities. The products are stored at a centre for medicines and health commodities, CENAME (Centre National des Medicaments), in the capital, Yaoundé. Visits to the CENAME’s warehouse facilities were conducted during the early stages of the research process. The objectives of these visits were inspection of facilities, reception of shipments and quantification of products. From the CENAME, the products are transported to regional drug funds in the ten regions of Cameroon, after which they are distributed directly to the health facility pharmacies.

In their study about priorities and challenges in the system that manages health commodities in Abuja, Nigeria, Ibegbunam and McGill (2012) interview 12 people whom they have chosen through purposeful sampling. The interviewees are pharmacists,
laboratory scientists and logisticians involved in HIV/AIDS commodity management. These sources are similar to the ones chosen for this study in the health commodity supply chain in Cameroon.

The public health care system in Cameroon relies a lot on pharmacists for logistical tasks in the downstream supply chain. Therefore, pharmacists were a natural choice of informants when it came to this particular supply chain. A logistician and a commercial officer, both of whom work for a transport service provider that transports goods all over the country, including health commodities into the South West and North West regions, were also chosen as respondents. An information management officer at the Logistics Cluster put in place to respond to the crisis was interviewed, because they had broad knowledge of the logistics of delivering humanitarian relief items to the two regions. A humanitarian aid coordinator at UNFPA who worked in the two regions was included for the same reason. All respondents were chosen due to their first-hand expertise of logistics in the crisis affected regions.

3.6 Quality of the study

When assessing the quality of a case study, the conventional way is to address external validity or generalizability, reliability or repeatability, construct validity and internal validity (Ellram, 1996; Yin, 2009). For reliability in case studies, using a case study protocol, in this case the interview guide and piloting, and developing a case study data base, are key (Ellram, 1996; Yin, 2009). Construct validity requires three elements: multiple sources of evidence or triangulation, establishing a chain of events that the reader can follow and understand and reviewing by key informants (Ellram, 1996; Voss et al., 2002; Yin, 2009). Internal validity only applies to case studies where the researcher wants to prove that an independent variable caused an outcome, which is not the case in this study (Ellram, 1996; Yin, 2009). To improve the quality and validity of the findings in a case study, the emerging ideas and theories should be reviewed against existing theory and literature, even if this literature is in conflict with the findings (Voss et al., 2002).

Halldórsson and Aastrup (2003) present an alternative way to assess the quality of qualitative logistics research. Instead of the conventional validity and reliability criteria, as described above, they propose the use of trustworthiness criteria, based on criteria used in naturalistic research: credibility, transferability, dependability and confirmability. According to Halldórsson and Aastrup (2003:331), trustworthiness is
better suited for evaluating qualitative logistics research because it takes into account “the issues of ‘truth value’, ‘transferability and contextualism’ and ‘trackability and explicity’.

In this study, credibility, meaning matching the constructed realities of respondents and the researcher (Halldórsson and Aastrup, 2003), is addressed through the selection of interviewees who have had training and/or practical expertise in logistics and the studied phenomenon and thus a similar understanding of that world as the researcher has. Transferability, i.e. how possible it is to make general claims based on this study (Halldórsson and Aastrup, 2003), is achieved in that the logistical challenges in this conflict, though they may vary depending on geographic factors for example, could probably be found in other conflicts as well. Dependability, or trackability, is achieved through the careful documentation of the research process, including interview transcripts, research diary and notes, all of which are available for review upon request. Finally, confirmability is somewhat related to dependability, as it also requires the confirmation of findings based on the data (Halldórsson and Aastrup, 2003). Confirmability also includes the integrity of the findings, meaning that the findings truly are a result of the study. In this study, confirmability is ensured through a transparent description of the research methods and process.

Triangulation is the combining of several methods to study the same phenomenon, each method revealing different aspects or strengthening the conclusions that are drawn (Patton, 2015). When using the more conventional quality assessment criteria, triangulation is a way of providing validity to a case study by combining different methods to study the same question (Ellram, 1996). In this study, triangulation has been made through the use of interviews, observation and the review of reports to identify logistical challenges and adaptation methods.
4 LOGISTICAL CHALLENGES AND SOLUTIONS IN A COMPLEX EMERGENCY IN CAMEROON

Sections 4.1-4.2 present the empirical findings of this study, with the aim of answering the two research questions: “What logistical challenges can be identified in a region affected by conflict?” and “How have actors in the public health commodity supply chain in Cameroon adapted to the challenges?”

To answer the first one of these questions, the challenges and their impacts are presented in general terms. Next, challenges related to infrastructure, access and safety are identified. The last section of this chapter refers to the second research question as it presents the different solutions that actors in the supply chain have found in order to adapt to the challenges, in terms of infrastructure, access and safety.

4.1 Challenges

As a consequence of disruptions in the public health commodity supply chain, it is evident that drug availability for people in the NW and SW has been impacted. In fact, non-availability of drugs for the local population was named as one of the main impacts that the conflict has had on the supply chain of health commodities (HAC, P3).

Lack of reliable information is one of the factors complicates supply chain management in the two regions (HAC, LCO). This is a problem for example when logisticians are trying to track security and other obstacles on the roads (LCO), or quantify the needs of the beneficiaries, as the following quote describes:

> It’s now difficult also to quantify the actual needs of those hospitals. Because you don’t have reliable information. So to get the correct information, that you base your planning and eventual procurement on is also affected. So you find that you are relying on estimates, and sometimes you underestimate on things that are needed, and overestimate on things that are not necessarily needed. (HAC)

In some cases, delays in transportation lead to complete stockouts of certain medicines at the health facility pharmacies (P1, P2):

> We have missed out deliveries, like, three times. Yes. We’re not getting delivered, and then we’re actually completely out of medicines, especially the medicines for HIV retroviral therapy. (P1)

> And for how long have you been out of it? (Follow-up question)

> We are out of that kind of, it has been gone like up to a month. (P1)

The programs delivering HIV retroviral therapy have in some cases been momentarily disrupted because of lack of access and displacement of target populations (P2).
Medicines and medical commodities expire when they are delivered to locations that have been abandoned by the patients (P2). Shelf life is also wasted in storage because products have to wait to be picked up as they cannot be delivered all the way to some of the health facilities (HAC).

HAC brings up the fact that since the beginning of the conflict, several actors have come into the regions to help the populations. This has led to some duplication of relief efforts, several supply chains being set up and many parties supplying the same target populations and hospitals (HAC). There is also reluctance to receive assistance from the government in the NW and SW regions (PO). For example, the Logistics Cluster has experienced that the level of governmental involvement in Cluster’s response to the emergency has been debated (PO). The biggest concern expressed by the World Food Program (WFP) in Cameroon is that it cannot work with government or police in the SW for security reasons. The WFP has therefore called for collaboration between agencies and organizations in order to fill the logistics gaps together. There has also been some reluctance from the Logistics Cluster’s partners to be identified, for example when asked to sign papers upon receiving deliveries (PO). During a Logistics Cluster coordination meeting, it was also mentioned that the Cameroonian government has requested any non-UN or non-NGO actors to use armed escorts when transporting in the regions and that non-compliance will be fined (PO). While military convoys can potentially make the transportation more secure, negotiating and organizing military convoys take time and cause delays and expiry of medicines (P2).

The conflict situation further entails that humanitarian organizations have had to choose where they operate from based on access and security (LCO). Buea, which is the capital of the SW region, has been used as a starting point for humanitarian operations (LCO). Sometimes the products cannot be transported to the last mile, and not being able to share this information with clients or beneficiaries poses a challenge in itself (HAC).

It was pointed out by one of the respondents that while the districts in the NW and SW regions had planned ahead in response to the escalating conflict, the central level (Yaoundé) did not respond to the product orders that had been placed to avoid future stockouts due to the crisis (P1).

Tracking the local populations is another challenge. Due to the crisis, people are much more mobile and many are displaced, and when information about their whereabouts is unavailable, it becomes difficult to distribute supplies to the right locations (P2).
Hospitals within the affected regions have experienced a large number of their clients being displaced and difficult to locate (P3). One respondent describes this as follows:

...there is massive exodus from Mamfe through to the [inaudible] side of Cameroon. Many many people from the South West region has left. Let me talk of Mamfe in particular. They have left for other areas like Douala, Yaoundé. (P2)

Mamfe is a city in the SW region. Douala is the economic capital of Cameroon, situated on the coast outside of the conflict-ridden regions. Yaoundé is the official capital, situated inland.

Because of the emergency, beneficiaries sometimes have to go pick up their medicines at different locations than they usually would (HAC). This means longer distances, more risks and potential difficulties for the beneficiaries to get the drugs they need (HAC, P3). As described by one respondent:

...because on non-availability, they also encounter high costs in terms of time, in terms of risks and in terms of their own money, to be able to access these services in the supply chain. (HAC)

Concern over personal safety sometimes prevents clients from coming to the hospitals to collect their products, and thus, people who are on a longer treatment plan, such as a description for a contraceptive method or an ongoing HIV treatment, can miss out on a part of their treatment (P1, P2, PO). In some cases, clients then resort to sending someone else to pick up their products (P1). When it comes to the kind of risk-taking that the beneficiaries are forced to resort to, one respondent gives an illustrative example:

You’re question just reminded me, I would just like to share with you what happened recently. There was a lady. There was a lady who came to the hospital. With a bullet. She had a bullet, she had received a bullet in her knee. Can you believe me, she stayed in the bush for close to two weeks with that bullet in her knee? Before she could come to the hospital. Just because, the fear and everything. It was not easy. (P2)

The conflict also seems to have had an effect on behaviour and attitudes among the population, which in turn calls for the healthcare professionals to do more counselling than before (L1). In the following quote, one respondent is referring to people’s sexual needs and implies that there are consequences when contraceptive supply chains do not deliver products:

And with the situation, where we don’t anymore have the facilities, with commodity storage and so on, people don’t have access to those contraceptive methods. And we cannot stop somebody from... It’s feelings. The person who does not have these contraceptive methods, will still have his need. You see? And the person will not say “I’m not going for my need because I don’t have a contraceptive”. (L1)

Like everyone else in the supply chain, beneficiaries are required to be flexible (L1).
4.1.1 Infrastructure

Road transportation was identified as one of the most severely impacted logistics activities (LCO, P3). HAC mentions specifically that transportation between Cameroon’s capital, Yaoundé, and the NW and SW regions, as well as between the regional capitals and the districts within these regions has been affected. Poor road conditions in the NW and SW also affect transportation, and some road sections can only be crossed on foot (PO). Yet, a preliminary assessment by the Global Logistics Cluster in November 2018 concluded that the emergency has not affected the private sector, transporters are present and warehouses are available (LC Report).

Since the conflict began, protestors from the area have erected road blocks, hindering vehicles from passing and sometimes demanding bribes (LSP1, P1, L1). P3 describes the situation as follows:

Yes, obviously the transportation of drugs is very difficult because within the conflict area roads are very blocked. The roads are no more passing and there is no driver who can really bring the drugs. (P3)

HAC, in contrast with the previous quote, says that road access varies from day to day, and that one has to take advantage of whatever route is passable at a given time.

The efficiency of the humanitarian response has been reduced due to the conflict, for example because checkpoints between cities have been slowing down transportation (LCO). Checkpoints are not necessarily the same as road blocks, and they are set up by different actors: gendarmerie (special police department), army and rapid intervention battalion (LCO). Nevertheless, an increased number of checkpoints on the roads make traffic run slower, especially since all checkpoints ask for different paperwork (LCO, PO). The checkpoints have caused a variety of issues for transporters, particularly local ones but not as much UN trucks (LCO). LCO gives an example of the type of questioning one can face at a checkpoint:

Did you get approval from the government? Oh, did you get an approval from the chief of the division or the village? Or are you carrying a waiver? Are you carrying this? (LCO)

Drivers are also intimidated and questioned at military checkpoints, sometimes for half an hour at a time (P2). LCO mentions there having been requests at checkpoints for beneficiaries lists, which a UN agency cannot provide under any circumstances, and challenges of making sure contractors are not paying bribes when passing checkpoints or roadblocks. They also mention unofficial checkpoints, commonly referred to as road blocks:
There's the other issue of the non-state armed groups, kind of like making their own sort of checkpoints. Requesting money from not only commercial transporters but from passenger vehicles. (LCO)

Delayed deliveries is a problem particularly in medical supply chains, as they can actually lead to medicines expiring before they reach the end users (P1, P2). Transportations from Yaoundé to the regional capitals have been delayed a lot because of the conflict (HAC, LSP1). The next two quotes show examples of this:

We are no longer able to deliver on time, because we may have to wait until the situation is a little calmer. (LSP1)

...we are sometimes obliged to make the deadlines a little longer. (LSP2)

In terms of storage, as a consequence of the ongoing conflict, firstly, the amount of space available for storage has been affected, and secondly, the point of storage is increasingly distant from the point of use (HAC, P2). When roads have been cut off, products have had to be stored at the regional capitals and wait for redistribution (HAC). Health facilities have experienced stockouts due to suppliers leaving the regions (P2)

Storage conditions in some locations have worsened due to destruction of property and lack of available space (HAC). Poorer storage conditions and use of space not ideal for keeping medicines can affect the quality of the products, as they are sensitive to temperature, moisture and exposure to sunlight (HAC). In addition, there is no “proper functional system” in the areas to ensure that storage and warehousing are meeting certain standards, leading to lapses in warehousing quality (HAC).

LCO describes the location of warehouses in the NW and SW:

Several of the bigger warehouses or more proper warehouses were not inside the towns, more like in the suburbs, or along the main roads. And basically those are the areas that have been quite strongly affected by the conflict, and it’s not very secure to use these facilities. (LCO)

...as well as the conditions of those facilities:

Most of the places that we’ve visited are not actual warehouses but more like shops or classrooms that they turned into storage rooms. For a big scale operation it would be complicated to find a big warehouse. (LCO)

The Logistics Cluster coordination meeting reports mention storage conditions in the two regions as follows:

Based on a preliminary assessment by the Global Logistics Cluster, the emergency has not affected the private sector; transporters are present and warehouses are available.

Participants commented that storage facilities are available in the North-West. Not many are warehouses, but rather small storage spaces. Organisations expressed concern about the security of the available facilities.
“It was reported that storage capacity is available in the affected areas, but status, availability and suitability is to be further assessed. (LC)

4.1.2 Access

Problems regarding reaching the last mile became apparent in the very beginning of the research process, and last mile distribution was therefore included in the interview guide. LCO and P2 sum up this problem:

A lot of the affected populations are in rural settings, “in the bush”. Accessing these people is complicated because of security, lack of roads and lack of information on how they’re moving. (LCO)

Even when we have drugs, it is difficult to reach out to the patients. Many people are in the bushes. Military has burnt down so many houses, and many people are in the bushes. Sometimes for them to leave the bush, to come to the hospital is a whole lot of issue. (P2)

Some of the locations that the regional drug fund in the NW distribute to have become completely inaccessible, and others can be reached via new routes discovered by the fund (P1). In the SW region, there are 18 health districts, and at the time of data collection (fall 2018), only 3-4 of these were fully accessible for the regional drug fund in the SW (PO). Distribution plans for health commodities have simply become impossible to follow, as health facilities cannot be accessed on the foreseen days (P1). A LC Report notes the following about access issues and distribution:

The unpredictable security situation and reported damage to infrastructure has created access issues, hampering movements of humanitarian personnel and cargo as well as distribution efforts. (LC Report)

While L1 talks about the challenge of reaching people who are more mobile than prior to the crisis:

At the last mile, that’s where we have a lot of problems. And the problem is from different reasons. First, before the crisis, people were stable. It was easier for us to reach those people and to satisfy them. And because of the crisis [...] they move from one area to another. (L1)

P1 says that sometimes last mile distribution to the health facilities is done on foot, as some distribution routes are no longer passable by car. P3 tells that the last mile distribution to the hospital they work in is done with the help of the army:

The products are reaching me by the help of the army forces. The forces are the ones who bring the drugs for me. For the clients, most of them are still coming to the hospital to get their drugs. (P3)

LCO talks of last mile access problems specifically for international staff, meaning high dependence on locals:
So you depend on several links in between to see where the beneficiaries are. You depend on the implementing partners, or the implementing partner of the implementing partner who actually has access to that remote village. Because he or she is from there. (LCO)

At times, the roads may be passable but the hospitals are closed. Ideally, in these cases, products are kept at a more central level and redistributed to functioning hospitals. However, sometimes information about hospitals and health centres closing down has not reached out so products are transported to the closed locations anyway. Further, redistribution to functioning hospitals is challenging because getting the information about where the medicines are to the beneficiaries is difficult. (HAC).

LSP1 mentions that decisions on whether to send transportation to an area or not are made based on the current security situation. When gunshots are heard during a transportation, for example, vehicles must be held back and wait (P1). According to L1 in the SW, half the destinations are inaccessible. P2’s experience is even more severe:

The crisis has paralyzed even 80% of drug transportation to my facility. (P2)

According to LCO, commercial transport has been greatly affected since the conflict because transporters have to look for more secure routes and are unwilling to drive through certain areas. Personal observations from Logistics Cluster coordination meetings show that since the beginning of the crisis in NW and SW, it has been difficult to get contracts with private providers to get goods and services to the region, and that partners have been reluctant to be identified and to sign papers when receiving deliveries. As for which organizations and actors have agency to deliver aid in the affected regions, perceived image and political neutrality are paramount (PO). As an example, the Cameroonian Red Cross is not perceived as neutral in the country (PO).

There have also been changes in transport schedules because of incidents on planned routes (LCO), and transporters have had to hold back vehicles because of the presence of armed groups on the roads (LSP1). P1 and L1 tell that roads being blocked, inaccessible or unsafe has required for transport strategies to be changed and supply plans not being followed, and sometimes stock does not get delivered at all. An increased use of more complicated and less accessible routes in lieu of the direct ones means not all vehicles can pass through (P1, L1). L1 gives two examples of this:

For example, one of the alternative routes includes crossing a river, and not all vehicles can do that. (L1)

Large vehicles can sometimes not pass through the alternative routes, and so deliveries have to be smaller. (L1)
L1 describes the way the crisis has affected transportation in that before the crisis, the drug fund faced problems to reach remote areas due to the nature of the roads, but since the crisis these problems have been “multiplied by 5 or 6” (L1).

LCO brings up the fact that licence plates have to be taken into consideration when transporting from other regions into NW and SW:

There’s been very specific issues for example of vehicles with licence plates from other regions that are not SW or NW being target of violence or attacks. (LCO)

During a Logistics Cluster meeting, organizations brought up reports of security issues when driving vehicles with licence plates from regions outside the NW-SW regions (PO). LSP1, on the other hand, says that licence plates do not play a role at all. Driving with Central or Littoral plates, for example, does not cause problems (LSP1). Littoral and Central are the names of two of Cameroon’s ten regions (PO).

When asked about the main impact that the crisis in the NW and SW has had on supply chains, “skyrocketing” distribution costs was mentioned several times by the respondents (HAC, LCO, and P3). This is a consequence of the difficulty in accessing the target destinations, as this means having to use longer and more complicated routes (HAC, P1). The proportion of funds put into logistics activities, as opposed to the product itself, has increased in general (HAC). Transporters hike the distribution costs to cover the risk they are taking when delivering in the unsafe areas, and not all transporters are willing to distribute to these locations (HAC, LCO, and PO). When a new organization or actor becomes involved in the aid process, they are often asked to pay a higher price for transport services than the previous one did, which in turn leads to prices rising for all (HAC). In addition, it is possible that contractors will factor in bribes for road blocks in their prices:

Yes, the contractors, they may pay some money. They pay some money to make sure that they pass, they’re protected, but they would not formally report that to you. (HAC)

Some health centres also raise the drug prices:

And also, there are some health centres where they have to increase the price of some drugs because they cannot go directly to the source to buy it. That’s also a problem that we have within the community. (P3)

One of the interview questions regarded whether there had been a need to negotiate with the conflict parties to get access to beneficiaries. To this, HAC replied as follows:
Not directly as UNFPA but I’m sure most of the people we work with do negotiate access. But of course they would not give you reports that they negotiated access, but you would be very sure that they negotiated access, yes. (HAC)

Whereas LSP2 replied:

Yes, maybe to go to deliver, but other than that, no. (LSP2)

L1’s response was that they had not negotiated with the conflict parties:

No, most of the time we don’t, we don’t have access to, we are a public structure, so we cannot go in for negotiation. We don’t even know with whom to negotiate. So when we want to work we work with the public sector on the field, public actors on the field. They’re the ones giving solutions. (L1)

L1 further explained that the Regional Health Delegation in the SW was not in any contact with the separatists. LCO’s response to the same question was the following:

Like in any sort of conflict related emergency, as humanitarians being impartial and independent, we need to be able to negotiate our humanitarian access with whoever is blocking that access. (LCO)

…and further:

At least for now, I don’t think any UN agency has had direct contact with non-state armed groups. Not at this stage. Not that we know of. (LCO)

While UN agencies have, according to LCO, not been negotiating with the separatists, local non-governmental organizations have been able to negotiate their way through check points on the grounds of having local knowledge and agency (LCO). In the quote below, they mention hesitance of locals to receive humanitarian aid, and how access has been negotiated:

Even the affected populations are quite hesitant of receiving humanitarian aid. Because they don’t know if it’s linked to the government or if it’s linked to someone else. Because of what’s happening, they have a lot of trust issues. A bit weird to say it, but there’s trust issues. And the way people have negotiated access is by knowing someone inside these villages. (LCO)

Lastly, P2 tells that while the district hospital that they work in in the SW has not been in direct contact with the separatists, NGOs in Mamfe have tried to do so on their behalf:

They tried to negotiate with them, you know, to talk with them, if they could at least meet the populations. You know, the people who are in the bushes. If they could at least let them treat them. And let them even try to meet their needs. (P2)

Because the secessionist treat them, most of them, as agents from the government. Like maybe they have come with poisoned drugs and foods that have been poisoned because they wanted to kill them. (P2)
4.1.3 Safety

The conflict has had a major impact on safety in the two regions (P2). For one, it is clear that the safety of physical property, such as vehicles, medical equipment and aid items has been compromised due to the conflict (HAC, LSP1, and P2). One respondent mentions items being stolen, destroyed or misused after delivery, rather than reaching the intended end users or beneficiaries (HAC). Another one brings up theft and demanding relief items as bribes at road blocks during transport (LSP1). Hospital ambulances and drug delivery vehicles have been seized and even set on fire (P2). Threats of setting the delivery vehicle on fire are also used as a form of intimidation (P2). The following quote describes such an occasion:

The driver of the hospital, last time he went to transport, to carry drugs from Buea, on his way he met the secessionist and they even seized the ambulance. They seized the ambulance and they even threatened to burn the ambulance. The secessionists. They threatened to burn the ambulance and they threatened to kill them. So it was after hours of begging, because the secessionists were angry, because they know that we are on our way to transport drugs to treat the military. So it was after hours of begging that they were able to let them go. And they gave back the car. (P2)

The incident described in the quote took place between Buea, capital of the SW region, and Mamfe District Hospital in the SW. The next quote describes another incident in the SW:

Let me just give a case of a hospital not very far from us, Kumba. Kumba is before Mamfe. Just early last month, my colleague, the pharmacist of the Kumba district hospital, he called me that the ambulance was burnt. They went to Buea to transport drugs, and on their way to Kumba District Hospital, the ambulance was burnt. Burned down? You know, like, burned down. To ashes, yes. (P2)

A follow-up question clarified that no people were hurt during the last mentioned incident, as no one was inside the ambulance at the time, but that such events had happened more than once in the respondent’s district (P2).

Within the NW and SW regions, the roads are unsafe to travel because of the conflict. LSP1 and P1 mention having heard of gunshots on the roads. For drivers transporting commodities in the regions, this means that they have to react to events on the road. Sometimes this entails pulling the vehicle over and waiting for an unsafe situation to pass, and sometimes turning the vehicle around and returning back without finishing the delivery (LSP1). One respondent talks about drivers having to adapt to unsafe situations on the roads:

Sometimes we hear there are gun shots in a particular location. They have to stop somewhere, and then when they think that things are better there, they can now proceed. (P1)
The aforementioned roadblocks strongly contribute to making roads unsafe for transporters (LSP1). Sometimes, the people blocking the road demand for bribes before they allow vehicles to pass, and in some cases, contractors agree to pay in order to pass through and to secure their own safety (LSP1).

As previously stated, the conflict’s impacts on road safety have called for the use of military convoys to secure a safe passing (LSP1). One respondent also brought up the fact that at times, using a military convoy can provoke more attacks (LSP1). Using a convoy still improves preparedness for eventual road blocks (LSP1).

The conflict has further increased insecurity for drivers and staff accompanying the deliveries (P1). P2 talks about threats to kill drivers, while P1 tells that drivers and staff of the regional drug fund have been held hostage against ransom. HAC even mentions drivers having been killed on their way to deliver products. According to P2, drug delivery vehicles have been attacked by both parties of the conflict.

Threats from both military and armed separatist groups have been made, as both parties are critical about drugs being taken to treat the other conflict party (P2). The next quote describes how the military uses threats and intimidation to make the staff confess that they are delivering drugs to the separatists (here referred to as secessionists):

> The military always disturbs, you know, on their way. They threaten. And you know, they throw slangs. They intimidate because they feel that maybe by intimidating, you could confess. And maybe you’re carrying drugs to the secessionist camps or something. (P2)

Hospital staff, such as pharmacists and doctors, also face threats by the separatists:

> They said they have told us government workers to quit and go home, because this fight is for everybody, but we insist on working and making our money while they’re in the bush, dying. That’s what they told us. (P2)

The insecurity in the NW and SW has led to a lot of displacement, as the local population are forced to flee the dangerous areas (LSP1, P2). Health facility staff have also been forced to leave because they have not been safe (P1, P2), and many health facilities have been temporarily shut down due to insecurity (P1).

According to LCO, there have not been any reports of storage facilities being attacked or destroyed. P1, P3 and L1 have not experienced their storage facilities being affected by the crisis in any way. P1 describes the conflict’s impact on storage and warehousing:

> The warehousing and storage facilities are moving on normally, even though we’re not able to conduct our, the end of month inventory, for some products. (P1)
However, P1 had received reports of problems regarding storage, such as things being broken, storage destroyed and medicine being taken away. P2 tells of such events, where a health facility pharmacy was attacked by armed men who did not steal products but threatened the staff:

As of this year, it is the fifth theft incident. Well, theft attempt, so far. I don’t really think it’s a theft attempt because the fifth time, this was just recently, they got into the pharmacy but they didn’t take anything along. So maybe it’s like a warning. Maybe they just have a message to pass across. (P2)

4.2 Adapting to the challenges

4.2.1 Adapting in terms of infrastructure

While the challenges relating to infrastructure presented in the previous sections seem to be extensive, little adaptation mentioned by respondents have to do with infrastructure. Discovering new routes to reach the clients was one of the solutions that were mentioned, and means of transportation have had to be adapted to the realities of the field: sometimes cars cannot pass the difficult routes that have to be taken to avoid danger, and so motorbikes and even transport by foot is used to bring products to the health facilities (P1). Another way of adapting to the circumstances is simply closing the health centres for periods of time (L1).

Yes, they can close for one week, they reopen, then the next week they can close for two weeks, then reopen. At times even one month, and after that they reopen. (L1)

Using windows of opportunity to preposition supplies is another means of adaptation that has been taken (HAC), as well as inviting stakeholders to come to the regional capitals to collect products and support (PO). The latter, however, is not an effective way to reach all districts (PO). Further, increased cooperation between health districts in the form of stock being moved between health facilities was mentioned (L1, P1). One respondent describes the cooperation as follows:

There is a solidarity: one health area can support activities of another health area. Many times we can put the commodities in one health area and they will support the activities or the other health area. (L1)

The Logistics Cluster, in turn, facilitates organizations to share information on available storage facilities and transport companies operating in the two regions, expected humanitarian pipelines and updates on the status of transport infrastructure (LC).
4.2.2 Adapting in terms of methods to access the population

There has been an increased use of more unconventional methods of guaranteeing that the supplies reach the end user (HAC).

Like using for example local organizations made up of local people, who have access and knowledge or probably who are known by the sides in the conflict, especially the side that is non-state actors. So those are some of the groups we use. And the churches, because of a certain level of neutrality, though even churches and people in churches have been targeted in this conflict.

(HAC)

Because of the political sensitivity due the ongoing armed conflict in the two regions, actors in the supply chain work with people local to a district or a village to gain access to beneficiaries (HAC, P1). Using contractors that are anglophone rather than francophone has also been done to facilitate access (PO). Sometimes locals even accompany shipments of products, because they speak a local language or simply because they are trusted by their community (P1). Gaining trust is important in the context, as the next quote shows:

...they believe them more when they say they are coming to supply medicines and not to cause trouble or to get information, to cause harm. (P1)

Supplying health centres with enough products to last for longer periods of time is also done (HAC), as well as giving clients a larger supply of products so that it will last them longer (L1). This is not without risk, as HAC points out. At times, the health workers distribute commodities outside of the health centre, directly into people’s homes, as the following quote explains:

They may not be in the health facility, but they are in the community. Because most of the time they are living in the community and they know exactly their patients and their clients. So, there’s no more the health facility waiting for the client but they will go to the community to satisfy the client. Those are the type of adaptability that we have to do. Most of our health workers are just like community health workers. Seeing they know all their clients, and their clients know them, they will now move from one house to another. (L1)

Other unconventional means of getting the products out to the end users are agreeing on a pick-up spot where clients can come and collect their product and giving them to the head of the community for distribution, even though they are not official health workers (L1). The respondent adds:

And I think what I really would like to add is how creative the health personnel can be. (L1)

Pharmacists have had to do more community outreach to calm people who are afraid of visiting the hospital (P2). As for informing clients about how and when to come and pick up their medicines from the hospital, messages on local radio channels have been sent out (P2).
At the level of the public health system, adaptation can be seen in the form of more information sharing between health districts in the two regions. Needs data from different districts is shared so that any need to adapt the distribution of products can be identified. Displacement and increased mobility induced by the war makes this difficult, however. (L1)

The public health work is directly linked to local government and so on, so we work together. We have meetings, we do meetings with them and so on. But it has changed the physiology of what we had before. The type of reporting has changed. The type of management has changed and so on. Now we use, we can see the request through a WhatsApp. That's the flexibility. It makes us to be more flexible, more proactive. (L1)

The quote above mentions increased flexibility and proactivity in the supply chain as a consequence of the conflict. WhatsApp group chats are used a lot as a means of information sharing, coordination and even reporting within the supply chain of public health commodities in Cameroon (PO). The drug fund in the NW region also started accepting requests for supplies via WhatsApp because of the conflict (P1). Increased creativity in filling gaps in the supply chain is also mentioned, and one respondent even claims that the supply chain has hence become more effective (L1). Adapting formal procedures to the realities of the situation also occurs (L1):

I’ll take an example. In a report form, they can tell you that before you send your report, the chief of the centre must sign the report. The chief of centre is not around, what do you do? It becomes an informal [report], it’s no more a formal report. So we will tell the person: “Send us a copy. You keep the original. And once your director will come, let him sign, and when you send [it] we’ll replace [it]”. You see there are such little things. (L1)

It is important to mention here that official reports in some parts of Cameroon are sent by public transportation, as rural areas often lack electricity and the means of sending reports electronically. Therefore, sending reports back and forth relying on public transportation in a conflict setting can be very slow. (PO)

One respondent mentions that the regional drug fund has become more relaxed when it comes to validation of product requests, for example by not demanding certain certificates to validate an order (P1). They explain this in the following quote:

What I say is that before we validate a request for supply of medicines to be done, we usually require a certain number of things to be met. A request has to be let’s say three copies, they must be signed by the head of [inaudible], […] or certain information must all be available for medicine to be supplied. Since we notice that most people are not very steady in their health facilities, sometimes the communication is done on phone. (P1)

As for the hospitals’ or pharmacies’ clients, flexibility is required from them as well. Because it is difficult to refill one’s medical prescription monthly, clients may have to take home their medical products for three months at once, which in turn means that they have to take measures in their homes to store the products for a longer time (L1).
Some of them have adapted by starting to keep a first aid box at home, something that was not a custom before the crisis (P3).

This quote shows the sentiments of one hospital pharmacist:

> Just, it is a really difficult, stressful situation. We are just praying that things will ameliorate and we should all together have many proposals, many solutions. (P3)

### 4.2.3 Adapting in terms of safety

As has become clear in the previous sections, security risks have an effect on the decision whether to send a shipment or not. To get information on road safety, logisticians are using informants in different parts of the regions (LSP1). If the situation is calm, vehicles can be put on the road. If not, they are held back (LSP1). To a follow-up question on whether the company has had to hold back vehicles due to security risks, the answer is:

> Yes. It's already happened. Especially in the NW and SW it has already happened. Perhaps a kilometre in front, the situation is serious, and [the driver] cannot continue. He has to wait. Or to return, even. (LSP1)

The drug funds have also taken up this measure of keeping in contact with someone located in a risky area during product delivery:

> Before going to those areas that have challenges, they actually inform the people, like the pharmacy attendants, the person who is in charge of managing the medicines, that they are going to supply, they are on their way. So with that, the person keeps updating them at every point in time. Yes because everything could be ok, still now as we are talking, but maybe in two hours’ time things can change. (P1)

One perhaps surprising way of adapting to the circumstances is adding excess products in the shipments, so that the driver can give these away at road blocks (LSP1). Sometimes, passage at a road barrier is not allowed unless something is given. Two or three boxes of soap was given as an example (LSP1). In other words, bribes are prepared. To a follow-up question on whether money was paid at these road blocks, the answer was:

> Well, money, not always. If it happens that they demand money, if the driver has money, he gives it to them and then when he comes back, we do accounts, you see. But most of the time it is much more the product that we transport that they require. Well, it’s much more like this. So if it’s rice, or it’s soap or buckets, they demand that they be given some, too. A small part. And well, we, before departure, we foresee this. (LSP1)

It is noteworthy that this point was only mentioned by the logistician at a logistics service provider, whereas the officer from the Logistics Cluster stated very clearly that UN agencies cannot and will not pay bribes, not even in a case where passage was prevented.
One adaptation method that came up a few times was the use of army support and military convoys for transportation (P2, P3, and L1). Military convoys or simply convoys with government officials are used according to what a particular situation requires (L1). For example, when the gendarmerie is going on a mission to the same location as a drug delivery, the hospitals may ask them to deliver or pick up their shipment (P3). The following quote explains how this can be arranged:

What I do is I arrange with the driver of the region [so that] he will pick the drugs. He will meet the army at a safe area. So the driver will bring the drugs [to] a certain area. [The army] will go there and pick it with army cars. So with the army we do all the transportation to the hospital. (P3)
5 DISCUSSION

In this chapter, the empirical findings are compared and discussed in relation to previous humanitarian logistics and supply chain management literature presented in Chapter 2. The chapter follows the structure that was established in Chapter 4: discussing challenges first and adaptation methods second.

5.1 Challenges

The challenges faced by the field of humanitarian logistics as identified by Thomas and Kopczak (2005:5-6), i.e.: “Lack of recognition of the importance of logistics, lack of professional staff, inadequate use of technology, lack of institutional learning and limited collaboration”, do not seem to apply to the case studied in this thesis. This may be because the field of humanitarian logistics was only emerging at the time when their study was written, and as the field has developed, the challenges have changed.

In the case of Cameroon, humanitarian supply chains are facing challenges that stem from the presence of an armed conflict. As can be expected in such a situation, safety and security in the regions are heavily impacted. Furthermore, infrastructure has been damaged, transportation has been made more difficult, and accessing the final point of consumption is particularly challenging. According to Boin et al. (2010), the first supply chain management task to be done when a crisis strikes is to save existing supply chains, such as medical ones, that were in place before the disruption.

In this case, the final point of consumption is the health facilities or hospitals. In some cases, it was moved closer the clients or beneficiaries, as these could not access their local health facilities. The findings of the study agree with Jola-Sanchez et al. (2016), who state that due to conflict, rural hospitals face big changes in demand, destruction of resources and labour and violence towards the staff as well as challenges related to transportation and supply. They also say that hospitals located in conflict areas become less efficient due to increased relative prices of medical goods, services and maintenance of equipment and assets.

The conflict has caused extensive displacement within and outside the affected regions, meaning that both beneficiaries and health facilities have had to relocate. Beneficiaries are then difficult to reach and vice versa, it is challenging for them to get access to health products and services. Related to this is the lack of reliable information, which affects all actors in the downstream supply chain. For example, logisticians trying to track security
and other obstacles on the road lack accurate information to do so. This is in accordance with what is said about last-mile transportation by Balcik et al. (2010): It can be difficult to get current and accurate information about road conditions and safety.

VanVactor (2011) points out that physical disruptions in the supply chain can occur in a crisis when road networks are blocked, and similarly, road transportation was identified as one of the most severely impacted logistics activities in the conflict regions in Cameroon. The respondents agree on the roads in the NW and SW regions being unsafe to travel, and for drivers transporting commodities in the regions, this means that they have to react to events on the road.

Unofficial road blocks and official checkpoints set up by different actors slow down transportation in the two regions considerably. At these stops on the road, transporters face questioning, intimidation, threats, demands for bribes as well as demands for various paperwork. The interviews show that while military convoys can potentially make transportation more secure, negotiating and organizing military convoys take time and cause delays and expiry of medicines. Likewise, Ferrer et al. (2018) say that while using safer routes and vehicle convoys can improve transportation security, this affects other criteria, such as time and cost. Inefficient transportation in turn has led to stockouts of certain medicines as well as medical commodities becoming expired. Some of the literature brings up destruction and deprivation of physical infrastructure in disasters and conflicts (VanVactor, 2011; Jola-Sanchez et al., 2016), which was also mentioned by interview respondents.

Last mile distribution and access to beneficiaries came up both in the literature and in the case study. Boin et al. (2010) emphasize that ensuring last mile distribution is among the first supply chain tasks that need to be done when a crisis strikes, and Balcik et al. (2010) say that last mile transportation can be difficult in an unsecure environment as roads might be damaged or unsafe and prices for transportation rise. Interview respondents, in turn, mentioned “skyrocketing” distribution costs. One respondent mentions last mile distribution sometimes being done by foot, which is naturally not as efficient as distribution by car.

Per Ferrer et al. (2018), transportation planning for last mile distribution is very much affected by the availability of information, and one of the interview respondents stated that distribution plans for health commodities have simply become impossible to follow, as health facilities cannot be accessed on the foreseen days. The question whether and
how humanitarians have been negotiating access to the beneficiaries did not get a unanimous answer, and the respondents seemed to be unsure about how this was dealt with. Responses varied between organizations not engaging in negotiations and transporters and local NGOs having to negotiate with the conflict parties in order to pass through.

The findings show that for determining which organizations and actors have agency to deliver aid in the affected regions, perceived image and political neutrality are important. Kovács and Tatham (2009) talk about the how the local presence and knowledge of the local needs and culture affect how fast a humanitarian organization can respond to an event. The case study shows that this does not only apply to national presence, but getting agency to deliver sometimes requires cooperation with someone local to a particular region within a country or even a village. The question of language also came up, and speaking a local language helps with gaining trust when interacting with people from a particular area. It is worth mentioning that Cameroon has more than 200 spoken languages. Furthermore, VanVactor (2011) points out that healthcare logisticians need to know and monitor the needs of their client base, which in a crisis or conflict situation can be challenging as the community, may be scattered and difficult to access.

According to Kovács and Spens (2009), coordination of logistical activities is one of the most significant challenges in humanitarian logistics. Coordination challenges also came up in the empirical findings, as several supply chains have been set up, there is a multiplicity of actors and relief efforts are duplicated.

As Chapter 2 shows, the notions of safety and security have not been central in previous humanitarian logistics literature. Meanwhile, Ferrer et al. (2018) identify security as an increasingly important factor in operations that take place in a conflict environment. For example, Balcik et al. (2008) do not discuss safety or security as a component in the decision making when it comes to last mile distribution, whereas this empirical study shows that these factors play a central role in last mile distribution.

The empirical findings regarding the effects of conflict on human and physical resources agree with what has been mentioned in previous literature. Jola-Sanchez et al. (2016) mention attacks, kidnappings, arrests, detentions and intimidation; Kovács and Spens (2009) say that armed conflict and political crises tend to pose safety and security risks for humanitarian staff; VanVactor (2011) brings up the impact on safety and security for logistics operations and Beresford and Pettit (2009) say that the physical movement of
aid in a disaster setting means high risk and uncertainty. Interview respondents explicitly talk about attacks, kidnappings and intimidation of both hospital staff and drivers of medical transports and ambulances. They also bring up items being stolen, destroyed and misused as well as drug delivery vehicles being seized and set on fire. Improper use of medical supplies came up both in the empirical findings and the literature (Jola-Sanchez et al., 2016).

### 5.2 Adaptation

Among the strengths of humanitarian logisticians, listed by Van Wassenhove (2006), are flexibility, adaptability and capability of setting up and changing supply chains under tough circumstances. These can be seen in the findings of this study.

Examples of logisticians having to adapt in the NW and SW are changing transportation strategies, using different routes and different means of transportation, dropping products at one location to be picked up by an intermediate party and taken to the next location and the use of vehicle convoys. Taking advantage of windows of opportunity to preposition supplies is yet another adapted strategy.

Pharmacists, who tend to be in charge of logistics activities at Cameroon’s public health facilities, have gone out into their local communities both to encourage clients who are afraid of visiting the health facilities and to deliver medicines. Using local radio channels has also been a way to reach clients. More frequent information sharing and other forms of cooperation between health districts are another way the sector has adapted to the challenges they face.

Boin et al. (2010) interestingly mention that when facing a crisis, the actors involved in the supply chain often have to adapt and improvise, and sometimes even break current rules because of the changed circumstances. This can be seen in how actors in the public health commodity supply chain in Cameroon have become less strict and more flexible with formal procedures. An example is the use of WhatsApp groups for sharing official documents rather than sending them via public transport.

Finally, the local population consuming the health commodities have adapted in terms of storing more products at home, making a first aid kit and helping others with picking up medicines.
6 CONCLUSIONS

This final chapter further narrows down what was discussed in the previous chapter by presenting the most important conclusions of this study and relating them to the aim and research questions.

The aim of this study was to map the different logistical challenges posed by armed conflict on the downstream supply chain and identify how supply chains can be adapted to these challenges by answering the following research questions:

1. What logistical challenges can be identified in a region affected by conflict?

2. How have actors in the public health commodity supply chain in Cameroon adapted to the challenges?

By studying a case in Cameroon and relating its findings to previous humanitarian logistics literature, this thesis is the first study to map out challenges that supply chains face in a conflict setting, particularly in the rural areas of a lower-middle-income country. Further, it has discovered how actors in a local supply chain have been able to adapt to their changed and conflict-affected circumstances to keep meeting the needs of their target population.

This study is assessed using the trustworthiness criteria, i.e. credibility, transferability, dependability and confirmability, as recommended by Halldórsson and Aastrup (2003). Credibility was addressed through interviewing professionals and experts who have received training or have practical expertise in logistics and the downstream supply chain of health commodities in Cameroon, as have I as an intern in supply chain management at UNFPA Cameroon. In order for transferability to be achieved, the logistical challenges found in the empirical study should be ones that could be found in other similar contexts. This is difficult to assess without repeating the study in another country or context, which is a potential area for further research. Dependability was achieved through the careful documentation of the research process, including interview transcripts, research diary and notes. Finally, confirmability was addressed through the transparent and thorough description of the entire research process.

Existing humanitarian logistics literature almost exclusively focuses on natural disasters as opposed to man-made crises, and barely any of it focuses on the conflict environment. This thesis has studied supply chains that operate in regions affected by armed conflict.
While previous literature shows that the conflict environment has been unpopular to conduct research in because of reasons such as security concerns and poor access to data, this thesis includes an empirical study with three different kinds of data from the field. Research from similar contexts has been criticized for lacking methodological rigor, but this study was conducted following a systematic and transparent research process.

The findings show that the health commodity supply chains face a number of logistical challenges in the North West and South West regions of Cameroon. Previous humanitarian logistics literature has thus far focused on challenges faced by disaster relief supply chains in natural disasters, whereas this study has been able to shine light on those faced by continuous supply chains in a complex or protracted emergency characterized by armed conflict in a lower-middle-income country.

According to VanVactor (2011), it is crucial that healthcare supply chains remain resilient during a crisis, as hospitals are among the first actors responding to humanitarian needs in a conflict (Jola-Sanchez et al., 2016). As is the case in the conflict studied here, recent armed conflicts in developing countries have affected rural areas especially, making the role of rural hospitals especially important (Jola-Sanchez et al., 2016).

The case study presented in this thesis shows that roads in the North West and South West regions have become unsafe to travel due to the crisis. Actors in the supply chain have faced attacks, kidnappings and intimidation, items have been stolen, destroyed and misused and drug delivery vehicles being seized and set on fire. Transportation is also hampered by road blocks and checkpoints, and particularly the last mile has become difficult to access. Distribution costs have risen substantially. Inefficient transportation has in turn caused stockouts and expiry of health commodities.

The conflict has caused a lot of displacement, and as a result, the local population faces difficulty in accessing health products and services while health facilities struggle to track their clients. Lack of reliable information affects all actors in the downstream supply chain.

The supply chain for health commodities has adapted to the challenges above by changing transportation strategies, taking different routes and different means of transportation, working with locals to gain access to certain locations, prepositioning supplies and using vehicle convoys.
Different actors throughout the supply chain have also adapted by being more flexible with formal procedures and using alternative means of communication and transportation. Health districts have increased coordination and collaboration to share stocks from overstocked facilities to understocked ones. Finally, local populations have adapted for example by storing more products at home when getting new products has proven difficult.

Based on the findings summarized above, it is clear that the involvement of local communities in the last mile distribution is important when dealing with a conflict or a complex emergency, and that organizations delivering into such an environment need to find ways to ensure the flow of reliable information throughout the supply chain and between stakeholders. This is not limited to international humanitarian organizations, as even actors from the local government in this study have been seen to struggle to gain local trust and access to remote areas. Any outside entity wanting to access a remote community affected by conflict should prioritize building a local connection or relationship, and this in turn can help with reaching out to a potentially scared and distrusting community. Building links and establishing a network of key informants could further enable the flow of accurate, timely and reliable information, which the case study proves has been severely affected by the conflict. Furthermore, as shown in the empirical study and in some of the literature presented, a conflict setting calls for flexibility in formal procedures and adaptations of pre-conflict processes.

Information flow, information systems, use of alternative means of communication and information sharing in humanitarian logistics have been widely studied in the context of natural disasters. Further research should be conducted into how these apply to conflict and complex emergencies specifically, as the elements of political crisis, violence, fear and distrust are likely to affect the flow of reliable information.

Another topic that humanitarian logistics research could help shine more light on is localization of last mile distribution in a conflict zone, meaning further involvement of locals in working out how to reach the last mile in a supply chain. In order for increased local involvement in humanitarian supply chains to become effective, there is a need for local capacity assessment in terms of people's skills and in terms of infrastructure. This capacity assessment would not only benefit those involved in the last mile distribution of humanitarian and development aid, but also the wider humanitarian community as a whole.
SOURCES


APPENDIX 1

Interview Guide 1

1. Point of view: Logician

  1.1 A general question: Can you shortly describe the supply chain(s) you are working with in the NW/SW?
  
  - What are the products?
  
  - Who are the customers or beneficiaries?
  
  - Which are the parties involved between your organization and the final user and what is your role in the SC?
  
  1.2 How has the conflict affected transportation of products into and within the NW/SW?
  
  1.3 How has the conflict affected warehousing and storage of your products in the NW/SW?
  
  1.4 How has the conflict affected access to last mile?
  
  1.5 How has the supply chain adapted to the changed environment?
  
  1.6 Has there been a need to negotiate with the parties involved the conflict in order to get access to the last mile? If so, can you tell me about it?

2. Point of view: beneficiaries/customers

  2.1 Has there been a change in product availability for the end users in NW/SW?
  
  2.2 Apart of availability, can you tell what other ways the problems mentioned above have impacted the customers/beneficiaries?

3. Is there something that you think I should have asked that you would like to tell me about?

4. Wrap up: What are the 3 main impacts of the conflict on this supply chain?
APPENDIX 2

Interview Guide 2

1. Point of view: logistician/ MTA focal point

1.1 A general question: Can you shortly describe the supply chain(s) you are working with in the NW/SW?
- What are the products?
- Who are the customers or beneficiaries?
- What are the parties involved between your organization and the final user and what is your role in the SC?

1.2 How has the conflict affected transportation of goods into and within the NW/SW?

1.3 How has the conflict affected warehousing and storage in NW/SW?

1.4 How has the conflict affected access to last mile?

1.5 How have the supply chains that were already in place prior to the conflict adapted to the changed environment?

1.6 Has there been a need to negotiate with the parties involved the conflict in order to get access to the last mile? If so, can you tell me about it?

2. Point of view: beneficiaries/customers

2.1 Has there been a change in product availability for the end users in NW/SW?

2.2 Apart of availability, can you tell what other ways the problems mentioned above have impacted the customers/beneficiaries?

3. Is there something that you think I should have asked that you would like to tell me about?

4. Wrap up: What are the 3 main impacts of the conflict on the logistics activities in the NW/SW?
APPENDIX 3

Interview Guide 3

1. Point of view: Logistician/Pharmacist

1.1 Background

1.1.1 Where do you work and what is your job title?

1.1.2 What is your role in the supply chain of health commodity supply chain?

1.1.3 Can you describe your clientele?

1.2 How has the conflict affected transportation of products to your health facility?

1.3 How has the conflict affected warehousing and storage of your products?

1.4 How has the conflict affected access to last mile: how are the products reaching you and how are they reaching the clients?

1.5 How has the health facility/hospital adapted to the changed environment?

1.6 Has there been a need to negotiate with the parties involved the conflict in order to get access to the products or the clients?

2. Point of view: beneficiaries/customers

2.1 Has there been a change in product availability for the clients in NW/SW?

2.2 Has the crisis has affected your clients’ use of health commodities?

2.3 How have the clients adapted to the changed environment in order to get their products?

3. Is there something that you think I should have asked that you would like to tell me about?

4. Wrap up: What are the 3 main impacts of the conflict on this supply chain?