



ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DEPARTEMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Perception survey of Supply Chain Management challenges and Effects on performance in Humanitarian Relief Organizations in Ethiopia

A Thesis submitted to the Addis Ababa University School of Commerce, Department of Logistics and Supply chain management in partial fulfillment of the requirements for the Degree of Master of Art in Logistics and Supply Chain Management

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Approved by Board of Examiners

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DECLARATION

I declare that this research project ‘Perception Survey of Supply Chain Management Challenges in Humanitarian Relief Organizations and Effect on Performance’ is my original work and has never been submitted to any other university for assessment or award of a degree.

Signature.....

Date.....

Solyana Moges

This research project has been submitted with my authority as the University Supervisor.

Signature

Date.....

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Acronyms

CHSA	Charities and societies agency
CRS	Christian Relief Service
CCRDA	Consortium of Christian Relief and Development Association
DPPC	Disaster preparedness and prevention centre
NDRRMC	National disaster risk reduction and management commission
NGOs	Non-governmental organizations
SC	Supply Chain
SCM	Supply Chain Management
UN	United Nations
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WFP	United Nations World Food Program

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To my husband, thank you for your support, without which, any of this wouldn't have been possible.

Abstract

Supply Chain Management is critical to Disaster Response and Management, as it deals with getting the food and non food items needed from the source to the beneficiaries at the right time. The challenges of SCM deter the humanitarian relief organizations from meeting the objectives.

Ethiopia is one of the highly disaster impacted countries. Natural and man-made disasters are common: drought, floods, and disease epidemics affect millions of people each year.

This Study is carried out to identify the challenges facing humanitarian relief organizations in Ethiopia, see the effects on performance and find ways to reduce the impacts. It has mainly two major objectives: to determine the supply chain management challenges facing the humanitarian relief organizations and to determine the relationship between supply chain management challenges and performance.

This research is focused on Ethiopian relief organizations. Challenges of SCM were identified from different literatures. Then, respondents consisting of 48 NGOs were asked to evaluate the severity and impact of each challenge.

Findings of the research revealed that out of the selected 21 challenges lack of coordination affects the most, followed by lack of proper planning, and inadequate information sharing. Analysis was made using SPSS. Results showed that the challenges selected explain only 69.7 percent of the performance. In view of that, the researcher performed a semi structured interview with government and international relief organization managements to identify the other challenges. The analyzed new challenges are explained.

Chapter One: Introduction

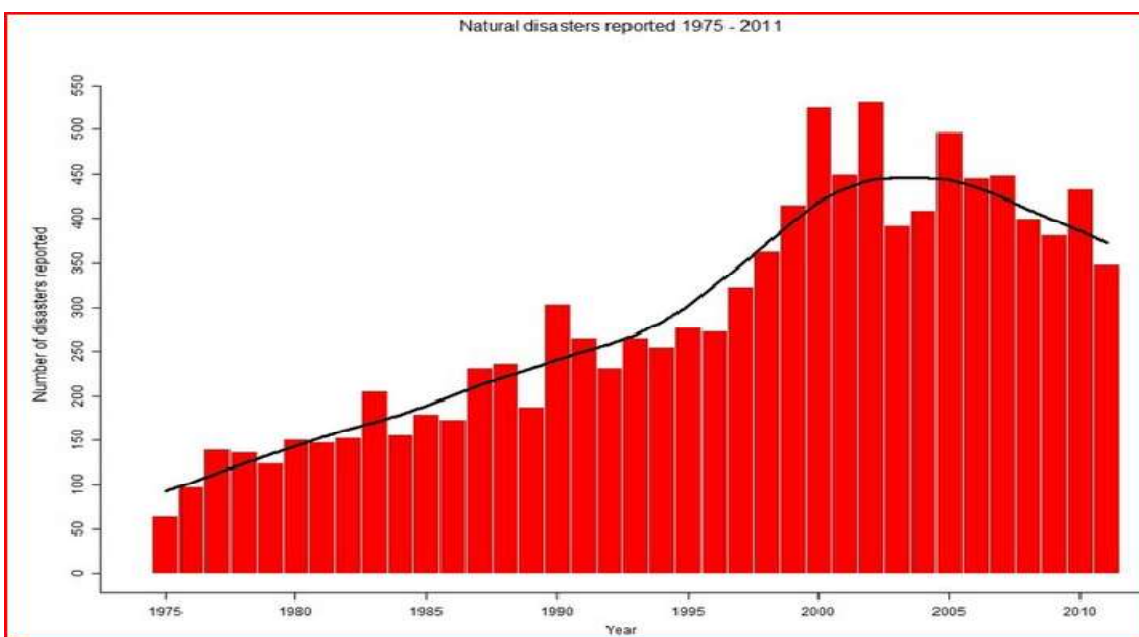
1.1 Background of the study

Natural events can be characterized as natural disasters when they occur in populated areas, causing the destruction of local infrastructure and population leading to a state of deprivation and suffering. In the last three decades, the occurrence of natural disasters has increased significantly. (Danish refugee council (DRC), 2006). Humanitarian operations are initiated immediately after the occurrence of disasters, with the intent to provide rapid assistance to victims in different ways, such as salvaging those who are wounded, collecting and disposing corpses, resource allocation, provision of food aid, shelter and medical care, and restoring access to remote locations. (Beamon, 2004 as cited in Kamau, 2013). Delays in delivery or relief in humanitarian actions can cost lives. Efficiency in logistics is therefore a key success factor, because it ensures the smooth flow of goods and services in a complex supply chain. Logistics plays a key role in disaster response operations and serves as a link between disaster preparedness and response, procurement and distribution, and between headquarters and the field. Logistics is crucial to the effectiveness and responsiveness to major humanitarian programs such as health, food, shelter, water and sanitation.(Thomas and Kopczak 2005)

According to United Nations office for disaster risk reduction, each year there are about 500 tragedies killing around 75,000 people and affecting around 200 million people. In 2013, Three hundred thirty seven disasters related to natural hazards and one hundred ninety two related to technological hazards were reported worldwide. Among the ten deadliest natural disasters since 1900, the most serious one (in terms of human mortality) was the 1931 China flood that caused estimated 1,000,000 to 4,000,000 deaths (Hough, 2008). Although Asia is the continent that is most affected by natural disasters in terms of mortality and occurrence, 63 percent of total economic losses happened in the Americas due to the significant impact of Hurricane Sandy hitting the Eastern seaboard of the United States, and the drought impacting 62 percent of the adjacent United States (CRED, 2013). In the past few years, tsunamis in South Asia (2004), Hurricane Katrina in the United States (2005), earthquakes in Pakistan (2005), Java (2006),

China (2008), and Haiti (2010), as well as Super storm Sandy (2012) were recent examples of deadly disasters. All of the above disasters are only a sign of what we can expect in the future. As Michel Kerjan and Slovic (2010) states, over half of the world's twenty costliest catastrophes since 1970 have happened since 2001. These disasters are attributed to the increasing population, the larger focus of assets in high-risk areas, as well as the growing social and economic interdependency. In addition, environmental degradation and rapid urbanization are another two reasons for recent costly disasters (Thomas and Kopczak, 2005). These trends combine to create an environment where disasters are expected to grow in both frequency and intensity.(Mingli,2014).

Figure1: Number of natural disasters reported from 1975 to 2011



Source: international Disaster Database, www.emdat.be universite catolique de Louvain-Brussels-Belgium as dated in February, 2017

Humanitarian parties play a big role in meeting the basic needs of millions of people in need of humanitarian aid. Aid and relief is offered to deal with emergency and immediate response to local areas, and to shelter affected people and refugees impacted by sudden traumatic events. In spite of the fact, that natural disasters keep increasing in number, only in recent years that is

beginning in 2005 has management of the supply chain of possessions and materials for humanitarian aid and disaster relief been a topic of interest for researchers.(Robinson,2015)

In both man-made and natural disaster relief processes, humanitarian logistics and supply chain operations have been hindered by a lack of information and coordination between actors. Especially in sudden-onset disasters, humanitarian logistics and relief supply chain teams have to be deployed in situations with destabilized infrastructure and with very limited knowledge about the situation at hand (Beamon 2004, Long and Wood 1995, Tomasini and Van Wassenhove 2004).

As noted by Thomas and Kopczak (2005), supply chain management(SCM) is central to humanitarian aid and disaster relief for three reasons:

- i. Supply chain management is one of the most expensive parts of a relief effort due to inventory and transportation
- ii. Supply chain management plays a critical role in response for major humanitarian programs, such as food, water, shelter, and sanitation, and
- iii. Supply chain management is the repository of data that can be analyzed to provide post-event learning in that the logistics department is responsible for tracking goods through the chain.

Thus, supply chain management is important to the performance of both current and future operations and programs.

An efficient and flexible humanitarian relief supply chains is the key subject in disaster relief, discussed from academics as well as practitioners (Kovacs& Spens, 2007). In order to reach this, humanitarian supply chain is one of the most important disciplines within disaster management (Nikbakhsh & Farahani, 2011; UNDRO, 1992 as noted in Agwata2014). One of the biggest hurdles to overcome in humanitarian relief supply chains is the huge uncertainty in demand, supplies and assessment accompanied by high time pressure. Hence, humanitarian logistics and supply chain is determined by a high level of complexity, which makes this field the most

expensive part during disaster relief (about 80 % of total expenditures) (Van Wassenhove, 2006).

Natural and man-made disasters and public health emergencies are quite common in Ethiopia due to drought, flood, earthquake, volcanic-eruptions, epidemics of communicable diseases, dry and wet mass movement (Ethiopian health and nutrition institute, 2012). Among the natural disasters, drought is the most devastating one since it has been historically common in the northern part of Ethiopia and recently affecting central, eastern, southern parts of the country as well. It has been documented that drought occurred from 1969 to 2011 in different annual intervals affecting millions of people in each event (Prevention web Ethiopia, 2016)). Since 1974, the occurrence of drought has become more frequent, severe in magnitude, and has been causing loss of human lives and property damage. The most severe events were in the year 1974, 1983, 1987, 1989, 2003, 2005, 2008, 2009,2016 (Disaster preparedness and prevention center,2016) The population in drought areas are vulnerable because of their reliance on seasonal rain-fall for their livelihood and hence affecting them in myriad ways-ranging from severe malnutrition to deaths and loss of livestock and agricultural related properties.

The famine of 1970s and 1980s has largely contributed for the influx and emergence of NGOs in Ethiopia (CRDA, 2004). Ethiopia has made important development gains over the past two decades, reducing poverty and expanding investments in basic social services. However, food insecurity and under-nutrition still hinder economic growth. In 2015 it ranked 174 out of 188 in the UNDP Human Development Report. The country is also home to the largest refugee population on the continent it currently hosts 730,000 registered refugees from South Sudan, Somalia, Sudan, Eritrea and Kenya.(WFP, 2017)

2016 was a challenging year for Ethiopia as it suffered from the worst El Niño impact in the last 50 years. The onset of El Niño combined with failed Belg (spring harvest) and Meher (main harvest) rains in 2015 left 10.2 million people in need of emergency food and nutrition assistance.(Humanitarian requirement document,2017)

According to the World Food Program (2017), while the Government and partners averted a major humanitarian catastrophe, the drought has left a negative legacy on many families,

who lost livestock and other productive assets. The residual needs from the past year have been compounded by a new and devastating drought which hit Ethiopia and other parts of the Horn of Africa in early 2017. In the same year, the Government of Ethiopia released the Humanitarian Requirements Document which outlined the need to support 5.6 million people with emergency food, nutrition, health, water and education programs.

The modern understanding of NGOs is new to Ethiopia with a history not extending more than four decades (Desalegn, 2008). The first indigenous organizations that were functioning apparently similar to the present NGOs, were traditional self-help groups that existed for generations before they were developed into organized entities. Those traditional self-help groups, which have been registered as proper organizations, are today known as community based organizations. NGOs emerged in Ethiopia in 1930s as a result of urbanization and economic development (World Bank, 2000). The early pioneers were missionaries or Faith-Based Organizations that had started operating in 1930s (CRDA, 2006). Ethiopian context, as defined by German technical Cooperation (GTZ) (2001), the term is broadly used to denote an organization that meets the following requirements:

- NGOs are voluntary in their genesis
- NGOs engage in relief, service delivery, advocacy or development activities
- NGOs are non-profit or self-serving organizations working to serve the disadvantaged groups of the society
- NGOs are non-political
- NGOs have no permanent program interest or geographical context
- Legal status

Table1: Number of disaster affected people in East Africa

Country	Disaster	Date	Total affected
Kenya	Drought	1999	23,000,000
South Africa	Drought	2004	15,000,000
Ethiopia	Drought	2003	12,600,000
Ghana	Drought	1983	12,500,000
Sudan	Drought	1991	8,600,000
Sudan	Drought	1983	8,400,000
Ethiopia	Drought	1983	7,750,000
Ethiopia	Drought	1987	7,000,000
Malawi	Drought	1992	7,000,000
Ethiopia	Drought	1989	6,500,000

Source of data : "EM-DAT: The OFDA/CRED International Disaster Database, University catholique de Louvain, Brussels "

Table2: No of deaths by disaster in East Africa

Country	Disaster	Date	Killed
Ethiopia	Drought	1983	300,000
Sudan	Drought	1983	150,000
Mozambique	Drought	1981	100,000
Ethiopia	Epidemic	1988	7,385
Nigeria	Epidemic	1991	7,289
Nigeria	Epidemic	1996	4,346
Burkina Faso	Epidemic	1996	4,071
Niger	Epidemic	1995	3,022
Sudan	Epidemic	1988	2,770
Algeria	Earthquake	1980	2,63

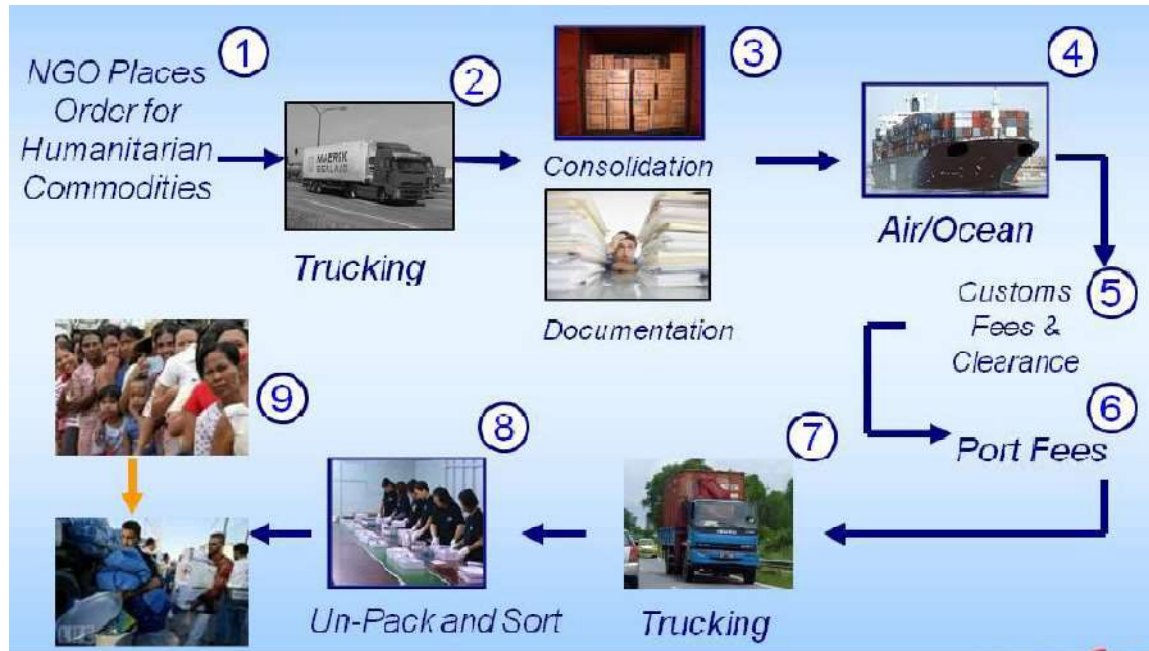
Source of data : "EM-DAT: The OFDA/CRED International Disaster Database, University catholique de Louvain, Brussels "

1.1.1 Supply Chain in Humanitarian Organizations

In humanitarian organizations, the terms supply chain is basically used to describe the process of getting relief items from the source to the beneficiaries in a timely manner. The source could be suppliers as well as donors. And in some organizations, they used the terms supply chain and logistics both together to describe above mentioned process. Usually logistics also used to describe the function or division who is responsible for managing the process.(Mingli,2014) Basically, the nature of supply chain and logistics in business or commercial are essentially the same with humanitarian supply chain and logistics, According to Blacik and Beaamon(2008) the following are the significant differences.

- Unpredictable demand in terms of timing, geographic location, type of commodity, quantity of commodity.
- Short lead time and suddenness of demand for large amounts of a wide variety of products and services.
- High humanitarian stakes regarding timelines in the face of sophisticated global media and the high anticipatory attention of the donors.
- Lack of initial resources in terms of supply, human resource, technology, capacity and funding.

Figure 2: Supply chain in humanitarian aid



Source: Emergency Relief Logistics (ERL), A.-J. Morrison, B. Forbes, and R. McPherson as dated in April, 2017

The main components of the humanitarian relief supply chain are:

- i. Procurement:
- ii. Transport
- iii. Warehousing and inventory

i. Procurement

Procurement is a key activity in the supply chain. The procurement involves the sourcing, purchasing and covers all activities from identifying potential suppliers of relief items and services that are needed to meet the needs of the beneficiaries. There are three important principles of humanitarian procurement:

Transparency: all phases in the procurement process are fair and accurately documented.

Accountability: accountability to donors who may require certain rules to be followed when using the fund/money that they have provided.

Efficiency and cost effectiveness: meeting the six rights of supply: right price, right time, right quantity, right quality, delivery to the required places and from the most cost effective source.

The procurement function must guard against risk, understand the market, build a trust relationship with suppliers, meet the needs in a timely manner, and constantly monitor performance to improve service provision.

ii. Transport

In the humanitarian context, transport can be defined as the physical movement of relief items/goods from suppliers or point of origin to internal customers (in this case mainly is warehouse of humanitarian organization) or directly to the beneficiaries. The transport component in the supply chain therefore is critical in connecting supply to demand. The aim of transport in humanitarian context is to physically move the relief items/goods in a reliable and safe manner, on time, cost effectively and efficiently to its destination.

Transport mode will depend on several factors including:

- The type and volume of items/goods to be transported.
- The urgency that items/goods are required.
- The availability of different transport routes as well as different types of transport.
- The destination to which the items/goods to be transported.
- The cost of transportation.
- The terrain through which the items/goods need to be transported.

iii. Warehousing and Inventory

The third main component is warehousing and inventory. Recently, some of the experts said that in the perfect supply chain we do not need warehouses in order to reduce costs. In the humanitarian context, clearly there are reasons why items/goods have to be stored and why we need warehouses. In the humanitarian supply chain, there are types of responsibility to manage warehouses, e.g. supplier warehouses, donor warehouses, humanitarian organizations warehouses.

Types of warehouse space:

- Commercial
- Government
- Transit warehouse
- Bonded warehouses
- Open storage
- Pre-fabricated warehouses – non permanent structure

The role of inventory management in humanitarian context is to ensure that stock is available to meet the needs of beneficiaries when required. In addition to those three main components, there are several subsidiary activities in the humanitarian supply chain, e.g. assessment and planning, fleet management, customs etc.

1.1.2 Supply Chain Management of Ethiopian relief organizations

National Disaster Risk Reduction and Management Council, World Food Program (WFP) and Catholic relief service (CRS) are the major three organizations along with their partners working on emergency response and relief.

Each year a team from CRS and WFP lead by Ethiopian government make a joint multi agency seasonal assessment (from November to December, the belg assessment and June to July, the Meher assessment). During each session, harvest conditions, livestock deaths and water shortage

is recorded and is used to predict the coming years food security of each woreda in each region of Ethiopia. The report produced is then reviewed and prepared by the Disaster relief and preparedness centre (DPPC) which is now known as the National Disaster Risk reduction and Management Commission (NDRRM).The final report which is known as the humanitarian requirement document is then disseminated to all the donors by United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

The humanitarian requirement document includes the country strategy and operational response plans.

World food program receives all kinds of donations and works foremost in Somali region, where the government of Ethiopia couldn't reach because of security issues.

The Catholic relief service allocates its donations to the seven partners joint emergency operations (JOEP) funded purely from USAID.

1-Save the children working in Amhara Region

2-Food for the hungry Ethiopia working in Amara and Oromia regions

3. World Vision Ethiopia in southern Ethiopia

4. Harrarghe Christian Secreteriat in Harrarghe

5-Meki Catholic Church secretariat

6-Care Ethiopia working in Oromia

7-Relief society of Tigray in Tigray region.

And the government of Ethiopia (National disaster risk reduction and management commission) works in all the affected regions along with other NGOs except some part of the Somali region.(JEOP management, personal communication,May3,2017)

According to DPPC, there are humanitarian organizations that mainly focus on development works but involve in emergency relief duties when their project regions are affected. Usually such relief operations last for a duration of 2 months to maximum 6 months.

1.2 Statement of the Problem

The humanitarian environment is becoming increasingly complex, given the amount and diversity of the different stakeholders involved and the environment in which they operate. There is the public sector with the government agencies, emergency relief mechanism and local authorities. There is the private sector, service providers, goods suppliers and individuals. In between, there is the international community and the large and small aid agencies. Lastly, there is the society at large, which, regardless of their condition after the disaster, is exposed to unexpected changes (Tomasini & Wassenhove, 2004). All these stakeholders have different expectations that need to be coordinated for an effective outcome. Failure to do so would be at the expense of optimal performance of the humanitarian organization and ultimately the wellbeing of those in critical need of assistance. To coordinate all these stakeholders needs, some level of accountability need to be present at every stage of the organization's operations especially supply chain.

In implementing SCM process in a relief situation, humanitarian organizations are directed by donor requirement, the organization's procurement policies and national laws. However, these guidelines are rarely followed during disasters. (Nyamu, 2012) This is because managers coordinating logistic, during relief efforts, are often dazed to deliver goods and services needed at the shortest time possible. Failure to do so can result in the loss of life and resources. By doing this, organization in most cases, do not achieve their objectives of ensuring value for money, achieving efficiency and effectiveness, ensuring fair competition among suppliers, and ensuring accountability, transparency and ethics. This creates problems in the organization especially with donors who at time may disallow some expenses incurred or withdraw funding completely. Until recently, humanitarian SCM has not been given the proper attention needed and logistic skills remain underdeveloped (Wanssenhove, 2006). This is however changing as logistics starts to be recognized as an integral part of any relief operation.

Disasters in Ethiopia have been increasing and have left devastating effects to the human population. The supply chains of majority of the humanitarian organizations are not well developed as reflected by the slow response to disasters (Danish Refugee council, 2011). A number of supply chain challenges face the humanitarian organizations and lender them limited in responding to disasters. Amongst the many key players in the process disaster response are international humanitarian organizations. Just like the business world, humanitarian organizations are required to adopt various supply chain concepts, to help in making informed decisions, and more importantly, to help them undertake their operations in more profound manner (Munguti, 2013). It was useful to investigate on the supply chain challenges facing humanitarian organizations in order to inform the best strategies that could be implemented to enhance the SC performance of humanitarian aid organizations in Ethiopia.

Jones (2000) revealed that humanitarian staff often has to confront with many stakeholders, including large number of donors, the media government, the military and the final beneficiaries. This study was conducted in Great Britain Usa and Kenya respectively. Therefore a similar study in Ethiopia was important to validate the findings due to several differences that exist between Ethiopia and the three countries.

1.3 Research Questions

1. What are the supply chain management challenges faced by the humanitarian relief organizations in Ethiopia?
2. How do these challenges affect the humanitarian organizations in Ethiopia?

1.4 Research Objectives

1.4.1 General Objective

Identifying the challenges of Supply Chain and Management and its effects on the performance of Humanitarian Organizations in Ethiopia

1.4.2 Specific Objectives

1. To determine the supply chain management challenges facing the humanitarian relief organizations in Ethiopia
2. To determine the relationship between supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

1.5 Significance of the Study

The study aims to benefit future researchers and academicians as the findings in this study may act as a source of reference material for their future research.

The findings of this study may also be valuable to the management team in humanitarian organizations and other organizations. Through the findings of this study, managers in different organizations may understand the various SCM challenges facing supply chain management and ways of dealing with them during disasters. The study will enable them to gain a better understanding of the relief operations and the challenges faced.

1.6 Scope of the study

- This study does not try to identify all the challenges of Ethiopian humanitarian organizations rather it attempts to identify the main challenges of the organizations.
- This study does not include all the humanitarian organizations in Ethiopia .This study concentrates only on the relief humanitarian organizations.

- This Research does not include the relief organizations working in specific woredas rather the international humanitarian organizations.

1.7 Organization of the study

The rest four chapters are organized as follows.

Chapter two is a literature review .Both theoretical and empirical related to the topic is gathered and discussed in detail. In particular the literature review is concerned in the identification and formulation of list of major challenges among the different challenges that are found on various studies the researcher selected the most appropriate for the subject matter .The conceptual framework of the study is also included in this chapter.

Chapter three is concerned with the research design and methodology and discusses the population, design, data, Variables, the mechanism of data collection and data analysis.

Chapter four deals with statically analyzing of data gathered using the required statistical packages. The results of analysis is presented, interpreted and discussed.

Chapter five includes the summary, conclusion and recommendation of the researcher.

1.8 Limitation of the study

1-Lack of available data: Collecting the number of relief organizations was difficult as there is no updated list at the concerned government office

2-International relief organizations law and procedures: Especially at the UN offices it took a lot of time to convince the respondents as it's forbidden to fill questionnaire by the organizations

3-Time constraint: the researcher wanted to further study the identified new challenges but time limitation dint allow.

Chapter Two: Literature Review

2.1 Introduction

This chapter describes the major concepts and challenges of Supply chain management based on other research works done on the challenges faced in the humanitarian SCM and the possible impacts. The chapter focuses on the works done by other scholars. The purpose of this chapter is to document critical knowledge around the challenges facing humanitarian SCM.

2.2 Supply Chain Management

Essentials of supply chain management define SCM as coordination of production, inventory, location and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served.

SCM ensures that organizations get the right things to the right places at the right time thereby creating time and place utility. It contributes to business performance by finding out ways to get goods to the customer better, faster and in a cheaper way.

Increased globalization and competition has made SCM a very important and critical issue for any company if they have to deliver quality and timely services and products to their customers (Simchi-Levi, Kaminsky & Simchi-Levi, 2000).

The humanitarian organizations need ways to identify and adapt to emerging supply chain trends. To proactively manage the overall performance of their supply chain, organizations need to know more than inventory positions, delivery dates, and fill rates. They must understand the impact of supply chain changes on total cost or cash flow and optimize supply chain effectiveness for better corporate results. This requires end-to-end visibility into factors that drive performance—such as cash-to-cash cycle time, overall supply chain cost, or perfect order fulfillment (Oloruntoba and Gray, 2005).

The management of the supply chain can become very complex with the presence of different stakeholders and large quantity of materials to be distributed. Because transportation infrastructure are degraded or destroyed, the distribution of the materials could be quite difficult. Furthermore, there are severe time constraints as people may die if goods are not distributed in time. In humanitarian supply chain environment, humanitarian staff often has to confront with many stakeholders, including large number of donors, the media, government, the military and the final beneficiaries (Thomas, 2003).

Lack of coordination among humanitarian organizations at the scene of a disaster is ordinary, as there can be as many as several hundred humanitarian organizations at the scene to carry out relief operations, all with different political agenda, ideologies and religious beliefs and all fighting for media and donor attention. The ultimate effective humanitarian supply chain management has to be able to respond to multiple interventions, often on a global scale, as quickly as possible and within a short time frame. Therefore supply chains need to be multiple, global, dynamic and temporary (Wassenhove, 2004).

The greatest SCM challenge lies in aligning them and the coordination of the logistical activities without compromising their mandates or belief. The humanitarian supply chain often entails high level of uncertainty in terms of demands, supplies and assessments. This makes them clearly unpredictable, turbulent and requiring flexibility. This irregularity presents unique challenges to relief fulfillment system as the number; magnitude and complexity of global emergencies continue to increase (Oloruntoba & Gray, 2005). Another challenge to the humanitarian supply chain field is the extent to which logistician can be equipped with the tools they require to perform optimally. There is a high turnover of logisticians in the field, in part due to the high pressure environment but also perhaps due to the absence of clear career paths, associated training and experience transfer (Harrison and van Hoek, 2008).

Logisticians are often frustrated by the need to operate in volatile environment. (Rodman, 2004) indicates that organization may experience as high as 80% annual turnover in field of supply chain personnel. Performance management particularly the performance of supply chain is equally a challenge for humanitarian organization. Performance management in the humanitarian

supply chain system is not simple. Critical issues regarding which measures are the most appropriate indicators of performance and how these factors influence the flow of information for decision making (Rickard, 2003). According to Beamon (2004) performance measurement is vital to humanitarian organizations. This translates directly to an increased focus on supply chain for improved transparency of operations and measurement of supply chain performance.

Handfield & Nichols (2010) indicated that no standard model exists for using supply chain management techniques to provide relief to populations affected by disasters. For managers within the humanitarian sector, coordinating SCM during a relief effort is often an intimidating task that can result in the loss of life and resources if not done quickly and effectively. Thomas (2003) states that humanitarian SCM has much in common with corporate SCM, yet the best practices from the corporate world, or from other humanitarian organizations in many cases, have not crossed over. And yet, humanitarian SCM offers challenges rarely faced in commercial operations. Jones, (2000) states that highly globalized and competitive companies, rapid changes in technology, characterize the modern market environment and more complex customer demands. Achieving cost-efficient international distribution of goods to exactly the time, place, and quantity of customer demand constituted an additional challenge to modern companies (Kovacs and Spens, 2009). Consequently, the predominant SCM activity, namely the transportation of products from point A to point B, has changed over time towards more complex processes in order to benefit from inter- and intra- organizational resources and efficient global distribution networks. These circumstances occasioned the emergence of modern supply chain management , which can be defined as the task of integrating organizational units along a supply chain and coordinating material, information and financial flows in order to fulfill ultimate customer demands with the aim of improving the competitiveness of a supply chain as a whole (Stadtler & Kilger, 2005).

Maspero & Ittman (2008) asserts that humanitarian supply chain has the opportunity to increase its contribution to disaster relief and to be recognized for that contribution by implementing initiatives in the areas of knowledge management, technology, measurement, community and positioning. While moving relief items to disaster is important role for humanitarian supply

chain, the strategic focus must therefore be on providing timely information, analyzing that information to gather insight as to how to improve operations and learning internally with others. This can be achieved by incorporating IT in the management of activities in the entire humanitarian supply chain. Disaster and crisis situations demand effective communication. Intranet and extranet, electronic data interchange, video conferencing, global positioning system, and even private radio. IT has long been recognized as being important for the support of humanitarian efforts (Rickard, 2003).

Long & Wood (2005) suggest that management of information during a crisis is the single greatest determinant of success. It assists in integrating activity and providing information to allow the supply chain to operate more effectively. Specific decision support systems and communication and information systems are vital in controlling relief operations. Such systems can assist in crisis, disaster and emergency planning, response and management. It is through the mechanisms of information and community that humanitarian supply chain can find its voice and create its future, rather than limit itself to responding to the present.

2.3 Challenges of supply chain management

Since disaster relief efforts are characterized by considerable uncertainty and complexity they face several challenges and need to be properly managed in order to address and implement better response.

According to the Cambridge dictionary ‘challenge’ can be defined as ‘something that needs great mental or physical effort in order to be done successfully and therefore tests a person’s ability’.

The authors Kovács and Spens (2007) distinguish between two main streams of humanitarian logistics: ‘aid work’ and ‘disaster relief’. ‘Aid work’ mostly focuses on the continuous support of people in need (e.g. development aid). The term ‘disaster relief’ is usually used for operations that cope with sudden catastrophes (natural or manmade disasters).

In humanitarian supply chain environment humanitarian staff often has to confront with many stakeholders, including large number of donors, the media, government, the military and the final beneficiaries (Tomasini and van Wassenhove, 2009). Lack of coordination among humanitarian organizations at the scene of a disaster is ordinary, as there can be as many as several hundred humanitarian organizations at the scene to carry out relief operations, all with different political agenda, ideologies and religious beliefs and all fighting for media and donor attention (Wassenhove, 2006). Oloruntoba and Gray, (2005) posits that the humanitarian supply chain often entails high level of uncertainty in terms of demands, supplies and assessments. The performance management particularly the performance of supply chain is equally a challenge for humanitarian organizations (Thomas and Kopczak, 2007).

The humanitarian SC is often characterized by high logistician turn over as high as 80% annual turnover. In addition, performance management remains a major challenge to the humanitarian SC. The key performance indicators are not standardized as opposed to the commercial sector creating confusion and reduced donor support due to accountability issues which are highly emphasized by the donors and other key stakeholders (Beamon, 2004).

a) Uncertainty: the most challenging obstacle in humanitarian logistics is uncertainty. Usually, there will be no indication as to when a disaster will strike, how many people will be affected, what infrastructure will be left intact, which suppliers will donate, or what other obstacles may arise. Uncertainty can stem from many elements relating to the mission, the organization itself, or nature of the demand. For example, uncertainty may arise from inherent characteristics such as what and how much material is demanded, product traits, process fluctuations, and supply problems (Van der Vorst and Beulens, 2002:424)

b) Degraded Infrastructure: Inadequate transportation and communications infrastructure is another barrier to effective delivery of aid. In the Disaster management training program(DMTP) logistics handbook, it states “the overall effectiveness of relief logistics often depends on the level of prior investment in both the transport and communications infrastructure and how far relief requirements have been considered in the planning” (DMTP, 1993:12). Rapid onset of a disaster may degrade the country’s existing infrastructure to the point where delivery

of aid is severely hampered. “Often...transportation infrastructure is in poor condition and cannot handle the huge numbers of refugees, military vehicles, and relief shipments that pour into these areas in times of disaster. (Gooley, 1999:82)

c) Communications: Poor communication is a major barrier to delivery of aid. Not only are there obvious difficulties associated with speaking to someone using a different language, but the communications infrastructure may be crippled by a disaster (if it ever existed in the first place). Teams at a disaster site may not be able to communicate upstream with headquarters or donors. The relief agency may not be able to effectively communicate needs to donors. Long and Wood explain that organizational language and terminology may hamper the aid process.

d) Human Resources: Poor or nonexistent training ultimately affects the quality of any logistics operation. Field managers are faced with an onslaught of requirements during the relief effort, including demands from the affected population and local government, pressure from international media, monitoring agency attention, and restrictions imposed by donors on how aid is administered. In the midst of this confusion, field operations managers are also faced with recording progress and passing information back to their headquarters and media partners as well as providing a record of events for future managers. (Rodman,2004)

Other challenges

-Inadequacy in planning, which is failure to pre plan emergency stocks and blockage caused by unplanned deliveries and

-Lack of long term strategic perspective.

2.4 Performance of humanitarian organizations

When disasters strike, relief organizations respond by delivering aid to those in need. Their supply chains must be both fast and agile, responding to sudden-onset disasters that may occur in

any city. Disasters of great magnitude cause donors, beneficiaries, and the media to closely monitor how quickly and efficiently relief organizations are able to respond.

A disaster response operation involves trade-offs of speed, cost, and accuracy with regard to the type of goods that are delivered and their quantities. Balancing these trade-offs requires a means of measuring supply chain performance however, the inability to centrally capture time and cost data related to the procurement and distribution of goods has prevented a systematic process of performance measurement from being implemented. Today in the logistics department of the International Federation of Red Cross and Red Crescent Societies (IFRC), software that was co-developed with the Fritz Institute makes it possible to capture the necessary data, which will inform the IFRC of their supply chain's performance. (Davidson, 2006)

According to the chartered institute of logistics, Three performance indicators are developed

1. Donation-to-Delivery Time: This indicator is a measure of how long it takes for an item to be delivered to the destination country after a donor has pledged to donate it. Both the mean and median number of days are reported on the scorecard, which is a practice used in the U.S. Army's performance measurement system (Dumond, 2000). These two metrics help gauge both the average and the consistency of the delivery lead times.

2. Financial Efficiency: Three metrics comprise the indicator of financial efficiency. The first two metrics use two methods (one relative and one absolute) to compare the budgeted prices to the actual prices paid for items delivered in the operation. The third financial efficiency metric incorporates the transportation cost of delivering the goods to the beneficiaries. This metric is expressed as a ratio of the total transportation costs incurred over the total costs for delivered items at a point in time. The value of this ratio should decrease over time, as less expensive transport methods are used after the initial delivery phase and as more items are delivered on-site.

3. Assessment Accuracy: How quickly donations are pledged and goods are delivered to beneficiaries relies on how accurately the field personnel assessed the needs of the population

affected after a disaster. Assessment accuracy therefore indicates how much the operation's final budget changed over time from the original budget. This metric contextualizes the values of the other metrics on the scorecard. For example, if it appears on the scorecard that the delivery lead time of a specific type of item was longer than average in an operation, the assessment accuracy metric will indicate if the long lead time of that item was caused by an initially low estimation of the quantity needed.

2.5 Critical Success Factors

The critical success factors (CSF) of humanitarian aid are the characteristics and conditions that impact the improved performance and disaster relief efforts. Despite the complexity of the environment where humanitarian aid and disaster relief supply chain operates, the basic activities in this kind of supply chain is not fundamentally different from those in commercial supply chain (Pettit and Beresford, 2009). The major CSFs for commercial supply chain management are all relevant to humanitarian aid and disaster relief supply chain management. These CSFs are discussed in the relief context below.

1) Strategic Planning

Strategic planning dealing with long-term decision needs to be addressed at the highest level of an organization (Pettit and Beresford, 2009). Different from logistics operations in commercial supply chain (which can be planned regularly in advance of demand), logistics decisions in humanitarian aid and disaster relief supply chain have to be made within short time frames (Balcik and Beamon, 2008). The assessment and planning for the Asian Tsunami was insufficient in many organizations, causing problems in the performance of an effective response (Fritz Institute, 2005). Thus, long-term scheduling plays an important role in realizing a high-performance disaster response. Below the organizational level, strategic planning deals with critical attributes related to various stages of disaster planning (Pettit and Beresford, 2009). Resources and capacities vary in three phases: (i) preparation, (ii) immediate response, and (iii)

reconstruction (Kovacs and Spens, 2007). Hence, strategic planning requirements are also different in each phase. Overall, without strategic planning, it is improbable that individual aspects of a humanitarian aid and disaster relief business, such as supply chain management, can be fully achieved (Pettit and Beresford, 2009).

2) Inventory Management

There are two kinds of systems in a supply chain: the push system and the pull system. A push system means that suppliers produce products according to the prediction of customers' demands (Zhang, 2013). In contrast, a pull system begins with customers' real orders and suppliers only make enough products to fulfill customers' orders (Zhang, 2013). A commercial supply chain is controlled by a pull system to decrease inventory (Whybark, 2007). However, a humanitarian aid and disaster relief supply chain pushes inventory into strategic storage locations before a pull system is implemented to reach the precise area of need (Whybark, 2007). A variety of methods have been used in commercial organizations to optimize resource utilization. Some methods may be proper for humanitarian aid and disaster relief, such as just-in-time and vendor-managed inventory. Time is one of the most important factors in any humanitarian aid and disaster relief operation. In order to offer humanitarian aid and disaster relief rapidly, we need logistics capabilities to deploy inventory as soon as possible (Whybark, 2007). Therefore, pre-positioning the storage of inventory at or near the disaster location for seamless delivery of critical goods – plays a critical role in the inventory process (Ukkusuri and Yushimoto, 2008). Developing a collaborative warehouse network (FritzInstitute, 2005), which is supported by transportation capacity, can also save time.

3) Transportation Planning

Instead of primary infrastructure and a stable vehicle fleet as in commercial supply chain management, the infrastructure for relief is often destabilized and the fleet has to be organized at the disaster location from available resources in humanitarian aid and disaster relief circumstances (Kovacs and Spens, 2007). In the disaster area, physical infrastructures including bridges, roads, railways, and airports are often destroyed. Transportation capacity becomes

limited or even non-existent (Thomas and Kopczak, 2005). A full range of delivery choices is needed including sea, road, and air. Hence, the planning of transportation and the delivery in the preparedness phase is important in humanitarian aid and disaster relief.

4) Participative Management

The effectiveness and the capacity of distributing relief aid is impacted by how an organization organizes its staff (Pettit and Beresford, 2009; Thomas and Kopczak, 2005). However, the personnel in humanitarian organizations come from diverse backgrounds and most staff with logistics responsibilities does not have training in logistics (Thomas and Kopczak, 2005). A survey following the Asian Tsunami shows that 88% of organizations had to reallocate the most experienced logisticians from other assignments to staff the relief efforts (Fritz Institute, 2005). The professionalization of logistics is not smooth because field experience may be more meaningful than formal training (Thomas and Kopczak, 2005). Since the availability of trained logistics professionals to promote effective humanitarian aid response is important, there is a need to create a pool of trained and experienced logistics professionals who share common processes, standardization, and vocabulary at international, national, and local levels to be deployed on short notice (Fritz Institute, 2005; Thomas and Kopczak, 2005).

5) Supply Chain Strategy

In commercial supply chain, researchers pay attention to lean logistics and agile logistics. Leanness entails establishing a value stream to remove waste including time and to enable a level schedule (Naylor et al., 1999). Agility means using market knowledge and virtual companies to develop profitable chances in an unstable marketplace (Naylor et al., 1999). It is important to identify the most proper concepts from established commercial supply chain frameworks (Pettit and Beresford, 2009) and then use those concepts to improve the performance of humanitarian aid and disaster relief. The lean thinking paradigm suggests doing more with less. This concept is suitable for situations with stable demand, low variety, and high volume (Christopher, 2000). It is difficult to apply the lean concept to humanitarian aid and disaster relief environment. In contrast, the key to agility is the flexibility in responding quickly to changes in demand in terms

of variety and volume (Christopher, 2000). It is helpful to improve the demand satisfaction in humanitarian aid and disaster relief supply chain performance. Nevertheless, an agile supply chain is less cost-effective than a lean one. Therefore, some researchers also try to combine these two concepts into 'le-agility' (Naylor, 1999), aiming to bring the advantages of lean and agile supply chain together. In addition, outsourcing non-core activities like just in time may also be a useful strategy (Razzaque and Sheng, 1998).

6) Information Management and Technology Utilization

In the general supply chain context, information management and technology utilization are often regarded as enablers for knowledge management in an organization (Wong, 2005). Similarly, information technology plays an important role in the humanitarian aid and disaster relief environment. The use of information systems to track and trace relief items helps improve the effectiveness of aid delivery and waste minimization (Pettit and Beresford, 2009). In addition, specific communication systems and decision support systems are critical in handling relief operations (Pettit and Beresford, 2009). For example, geographical information systems can help analyze transportation lifelines, map resources, and identify highly damaged areas (Friedrich, 2000). The Humanitarian Supply Management System can assist in classification of available resources (World health organization (WHO), 2001). However, supply chain management in humanitarian aid and disaster relief sector is still largely manual (Lee and Zbinden, 2003; Thomas and Kopczak, 2005). Only 26% of organizations have access to track (Fritz Institute, 2005). Therefore, there is a common need for developing flexible technology solutions to support procurement, tracking and tracing inventory, distribution through a pipeline, robust reporting and connectivity in the field (Fritz Institute, 2005). Moreover, advanced information systems can form a foundation for knowledge management, performance measurement, and organization learning (Thomas and Kopczak, 2005). Overall, four major functions must be included in humanitarian logistics software: (i) mobilization, (ii) procurement, (iii) transportation and tracking, as well as (iv) reports (Lee and Zbinden, 2003).

7) Relationship Development

In the immediate response to the Asian Tsunami, a considerable inter-organization conflict existed and it was not until this was addressed that improved collaboration was achieved (Pettit and Beresford, 2009). This is an example revealing the fact that poor collaboration can affect many other success factors such as inventory management, transportation planning, and capacity planning. Thus, building relationships by collaboration is a key factor in best supply chain practice and in logistics network integration (Power et al., 2001). According to the Fritz Institute (2005), the result is overall positive once collaboration happens. For example, collaborative warehousing strategy can make relief provision more effective and therefore save more people. In a sudden onset natural disaster, relationships on the basis of trust have to be established quickly. Therefore, the development of swift trust, “the willingness to rely upon team members to perform their formal and informal roles in a hastily formed temporary team” (Zolin, 2002, p.4), is a significant enabler.

8) Capacity Planning

Capacity planning is influenced by demand and has an effect on decisions about numbers of warehouses, distribution centers, vehicles, employees, and other equipment (Pettit and Beresford, 2009). Four key activities, which can affect capacity, are warehousing, transportation, material handling, and personnel resources (Gunasekaran and Ngai, 2003). Maximizing the use of capacity is a key to humanitarian aid and disaster relief supply chain management (Gunasekaran and Ngai, 2003). Generally speaking, capacity planning of the aid and relief network can be enhanced by collaboration. Also, capacity planning can involve the ability of ports and airports to hold relief items under different scenarios (Pettit and Beresford, 2009).

9) Continuous Improvement

In supply chain management, organizations need to concentrate on having a continuous and holistic improvement method to meet the demands of customers (Power et al., 2001). Performance measurement is useful in this process, tracking key factors in supply chain

performance and benchmarking activities against key performance indicators (Koeprla and Tuominen, 1996). Humanitarian aid and disaster relief supply chain can learn from this process to improve itself and achieve greater success. Continuous improvement such as transformational or incremental change is an essential part of disaster management practices at all levels to minimize the recurrence of problems. After a disaster happens, a systematic method can be used to learn lessons from the experience, to increase effectiveness, and to improve disaster management practices and processes (Power et al., 2001). For instance, using information technology, the performance measurement system can evaluate the overall effectiveness of the supply chain (Fritz Institute, 2005).

2.6 Humanitarian Organizations

A humanitarian organization is a not-for-profit body dedicated to providing aid or assistance to the vulnerable members of society. These institutions operate in areas of emergency and areas where people are affected by conflict, disease and poverty. Humanitarian organizations depend fully on donor funds from development partners, governments and volunteers.(Addis,2013) Humanitarian organizations are also referred to as Non Governmental Organizations (NGOs) or relief organizations.

The main objective of humanitarian organizations include value for money, achieving efficiency and effectiveness, ensuring fair competition among suppliers, ensuring accountability, transparency and ethics. This is different from private sector companies who are profit oriented.

In recent years, humanitarians have come under immense pressure from the donors, pledging millions in aid and goods, to prove that they are meeting their objectives in the most efficient and effective way. Since donors are becoming more involved when it comes to expenses, humanitarian organizations are under greater analysis to monitor the impact of aid, not just the input and output but the whole operation (Wassenhove, 2006). As a result, humanitarian organizations are forced to be more result oriented, accountable and transparent in their operations.

In disaster relief, 80 percent of the operations are spent on logistics. Therefore, efficiency and effectiveness in logistics and in particular SCM is very important in the operation of humanitarian organizations. Therefore, just as the science of logistics and SCM has become important for private sector logisticians, so too is it becoming more important for humanitarians (Wassenhove, 2006).

2.7 NGOs in Ethiopia

Ethiopia was hit with two devastating famines in almost a decade. The first famine occurred in 1973/74 and the second more devastating occurred in 1984/85 causing in voluntary mass migration and huge loss of lives and properties. These two famines resulted in dramatic increase in the number of NGOs operating in the country. During the first famine 1973/74 various groups engaged in relief operations formed a network that became known as Christian Relief and Development Association (CRDA) (World Bank, 2000). CRDA is an umbrella organization for more than 336 both international and indigenous non-governmental organizations in Ethiopia. Out of the total members 73% (245) are Ethiopian resident charities and 27% (91) are foreign charities. (CCRDA,2010) The significance contribution of NGOs has increased since these devastating famines. The role of NGOs during these famines was very essential in saving the lives of famine victims when the government's capacities were completely eroded. These famines compelled the then governments to allow a large influx of western NGOs into the country. During the first famine, the total number of NGOs mostly operating on relief in the country was not more than twenty-five; of which the vast majority were church based and very few of local Origin. This number increased to 70 at the later part of 1980s (Zewdie and Pausewang2002).

According to the Ethiopian charities and society's agency, there are over 3000 NGOs currently registered and working in Ethiopia.

Table 3: NGOs in Ethiopia

Charities and Societies	Number
Adoption	45
Charitable Endowment	18
Foreign charities	369
Charitable Society	2207
Ethiopian and Foreign charities consortium	10
Charitable trust	1
Ethiopian residents charitable consortium	36
Ethiopian residents society Consortium	2
professional	422
Total	3115

Source:CHSA,2017

2.7.1 International NGOs

What it really means for any organization to be considered as an international NGO is mainly its presence on the landscape of international development. According to common wealth network, International non-governmental organizations (INGOs) have expanded their influence rapidly since the 1980s in many Commonwealth countries and beyond. Throughout history, there have been a number of internationalized non-governmental bodies with altruistically aligned goals towards various worthy causes.

INGOs have responded rapidly to humanitarian crises throughout the Commonwealth and the rest of the world at the same time, mobilizing governments and the public in the developed world to support these responses. In addition, lessons from previous humanitarian crises have led to the development of global normative standards for humanitarian action which have notably being led by INGOs. Traditionally, local versions of the International Red Cross and Red Crescent Movement are renowned worldwide for their rapid response to international humanitarian crises.

Today they share many of their humanitarian operations with other INGOs like Oxfam, World Vision and CARE. (Common wealtheducation,2017).

As listed in the above table, there are 369 international humanitarian organizations in Ethiopia(CHS,2017)working on different sectors like health, Relief, Agriculture, Development, Water, Education and so on .

2.7.2 Local NGOs in Ethiopia

After the Derg regime came to power in 1975 till it's down fall in 1991 there had been no charities or societies of both endogenous and foreign registered.(charities and societies agency,2016) This was due to the ban for freedom of association. As of 1985, however, because of the famine, some foreign aid organizations like, Oxfam Uk, Care---- etc. were given recognition after their request to the Ethiopian Relief and Rehabilitation Commission and children's commission. They were also required to sign a general agreement and to present authenticated certificate of registration showing its establishment together with constitutive act from its country of origin. However the commission was not entitled to register societies by law. Since 1991, however, both the Charter of the Transition Government and the FDRE Constitution, which has been ratified by the people of Ethiopia, and its provision on article 31, a Lot of charities and societies were registered and licensed to carry out their activities. Following that, many Ethiopians organized Charities and societies. In the past 50 years around 3822 charities and societies are established in Ethiopia.(Charities and Societiesagency,2016)

Table: 4 Growth of Local and International NGOs 1994-2000

NGOs	1994	1996	1998	2000
LNGOs	24	96	160	246
INGOs	46	96	119	122
Total	70	192	270	368

Source: Angelo,2008

The increase in the number of NGOs is not a unique phenomenon to Ethiopia. An increase of 525% was recorded from 1994 to 2000. The increase in indigenous NGOs was 1025% while international NGOs increased by 265%. In a similar way tremendous increase has also been observed in different parts of the world. For example globally, the number of international NGOs increased by 345% in the last 20 years, from 13,232 in 1981 to 45,674 in 2000 (International Labor Organization, 2001). A tremendous increase (1025%) in the number of indigenous NGOs was observed from 1994 to 2000 in the Ethiopia, however; the increase has not been matched with institutional and human capacity. (Angelo, 2008)

2.7.3 Role of NGOs

It is impossible to list what NGOs have accomplished in the course of their involvements, however; some highlights on major achievements can indicate program successes, one of the major achievement is Food security especially in Ethiopia, drought has affected millions of people through the years. Following is the achievements recorded by the NGO sector from 1984-1996 as an indication of NGOs contribution in the area of food security in Ethiopia. Figures of disaster prevention and preparedness commission (DPPC and CRDA, as cited in Zewdie and Pausewang 2002) show that in twelve years (1984-1996) NGOs provided relief assistance on the average to 6.5 million beneficiaries every year which was about 14% of the then total rural population. In 1990 alone 13 million beneficiaries have received assistance from NGOs. The volume of the food assistance distributed by them ranged from 1.5 million quintals in 1984 to 5.1 million quintals in 1992. The development project undertaken by NGOs in 1990s was estimated to have cost 2.3 billion Birr and was believed to have benefited 26 million people both rural and urban and created 14,000 employment opportunities (DPPC and CRDA, cited in Angelo, 2008).

2.8 Review of related studies

Different researchers have studied the challenges of humanitarian logistics and supply chain management around the world.

Kamau(2013) in her research Humanitarian supply chain management in Kenya, identified the challenges facing humanitarian supply chain during disaster situation, the effect of the challenges and practices that can be adopted to overcome the challenges. The study had three objectives to identify supply chain practices adopted by humanitarian organizations, identify supply chain challenges facing humanitarian organizations in emergencies and identify SCM practices that can be adopted to overcome the challenges. The study adopted a case study approach with a focus on three organizations namely Kenya Red Cross Society (KRCS), United Nations Children Fund (UNICEF) and United Nations High Commissioner for Refugees (UNHCR). From the findings, challenges facing humanitarian organizations were grouped into management related challenges, financial related challenges and operating environment related challenges. The effects of supply chain challenges on performance were identified as delay in delivery, uncertainty in demand, poor quality and quantity of goods and services delivered. Strategies recommended to be adopted to overcome these challenges were improved tendering process, adoption of technology, training of staff and demand analysis.

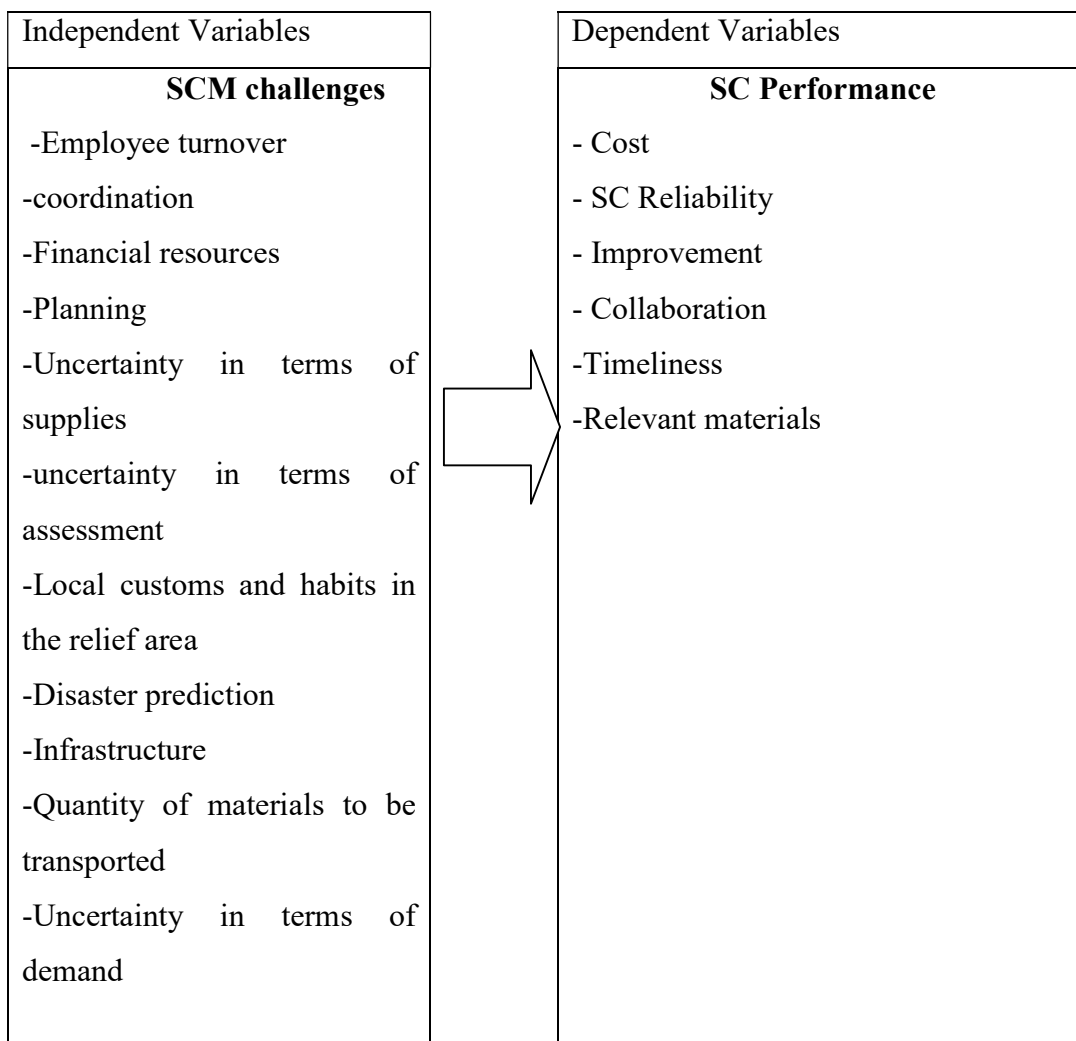
Liu Mingli,(2014) in his research titled ‘ Supply chain management in humanitarian aid and disaster relief, ’ focused on quantitative modeling of two specific aspects during preparedness phase for emergency management.1-inventory positioning 2-transportation planning and proposes and analyses the characteristics of effective supply chain management framework in practice to assist Canadian coastal communities in improving their preparation and performance in disaster relief efforts. In his result, the researcher the charlotte town system effectiveness and decreased time to assist affected people are improved by distributing central emergency supply among more than one base station.

Hailegabriel(2016) in his research ‘Assessment of humanitarian supply chain performance of selected humanitarian organizations in Ethiopia’, explored the possible relationships among Humanitarian Supply Chain Agility, Adaptability, Alignment and HSC performance of selected Humanitarian organizations in Ethiopia. From the result of the analysis it is concluded that there is positive and statistically very strong relationship between humanitarian supply chain agility and humanitarian supply chain performances. It is also concluded that Humanitarian supply chain adaptability has also positive and strong relationship with humanitarian supply chain performance. On the other hand, Humanitarian supply chain alignment has also positive and

statistically strong relationship with HSC performance. Therefore, In order to become competitive and achieve sustainable performance in disaster relief chain operations, humanitarian organizations should give due attention to the constructs Humanitarian supply chain agility, adaptability and alignment.

2.9 Conceptual Framework

Figure 3: Conceptual framework



Chapter 3: Methodology

3.1 Introduction

This chapter presents the methods and modalities used to collect and analyze the data on supply chain management challenges among humanitarian organizations in Ethiopia. This chapter includes the research design, target population, data collection and data analysis techniques to be used.

3.2 Research design

Designing a study helps the researcher to plan and implement the study in a way that will help the researcher to obtain intended results, thus increasing the chances of obtaining information that could be associated with the real situation (Burns & Grove 2001).

The three methods that are commonly implemented in a research are quantitative, qualitative and mixed, where one of them is not better than the others, all of this depends on how the researcher want to do a research of study (Creswell, 2005).

Quantitative research method is a kind of research that involves the use of organized questions where the response options are predictable and a large number of respondents are involved. According to Creswell (2005), quantitative research is a type of educational research in which the researcher decides what to study, asks specific, narrow questions, collects numeric (numbered) data from participants, analyzes these numbers using statistics, and conducts the inquiry in an unbiased, objective manner. Quantitative method is a study involving analysis of data and information that are descriptive in nature and qualified (Sekaran, 2003). Quantitative approach is one in which the investigator primarily uses postpositive claims for developing knowledge (Creswell, 2009). Qualitative Research is primarily exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Therefore, in terms of methods, this research employed quantitative method while conducting the

study.

This Study uses a mixed methods research which is a methodology for conducting research that involves collecting, analyzing and integrating quantitative (e.g., questionnaires, surveys) and qualitative (e.g., focus groups, interviews) research. And respondents will be asked at one point in time only. Thus this research is cross-sectional.

It will be descriptive as it sought to describe data and characteristics about the population or phenomenon being studied, that is, answers the questions who, what, where, when and how of the phenomenon management of supply chain challenges (Kothari, 2004).

3.3 Population

The target population in this research is the Ethiopian humanitarian relief organizations. According to the DPPC there are 48 organizations involved in humanitarian disaster relief works in Ethiopia. The questionnaire was distributed to all the 48 organizations. 39 respondents filled the questionnaires. That is 81.25 percent of the target population.

3.4 Data Collection

Primary data is used for this paper. This study used questionnaires as the instrument of data collection from the target population and semi structured Interview; consisting of both open and close-ended questions. The close ended or structured questions to conserve time and money as well as to facilitate easier analysis and the unstructured questions to encourage the respondent to give an in-depth and felt response without feeling held back in revealing any information (Schindler, 2003).

To verify the content validity of the questions, the questionnaire was tested on three respondents; alterations were carried out based on their feedback. Special attention was made not to have leading and loading questions. Test retest reliability was checked by distributing the questionnaire two week apart for three individuals. results was satisfactory. . The questionnaire is divided into sections; A (background information), B (questions on SCM challenges facing

humanitarian organizations and Section C (questions on relationship between SCM challenges and SC performance of humanitarian organizations).

3.5 Data Analysis

The study used primary data consisting of both quantitative and qualitative data. In analyzing the quantitative data, the study used descriptive statistics using Statistical Package for Social Sciences (SPSS V 18.0). Measures of central tendency (mean), Measures of dispersion (standard deviation), frequencies and percentage were applied for quantitative variables (Kothari, 2004). Tables and other graphs were used as needed to present the data findings. Qualitative data was analyzed using content analysis, through developing a thematic framework from the key issues, concepts and themes emanating from the open ended questions (Nsubuga, 2000). The SCM challenges facing humanitarian organizations were determined through descriptive statistics while the relationship between SCM challenges and SC performance of humanitarian organizations in Ethiopia will be determined using regression.

Chapter Four: Data Analysis, Results and Discussion

4.1 Introduction

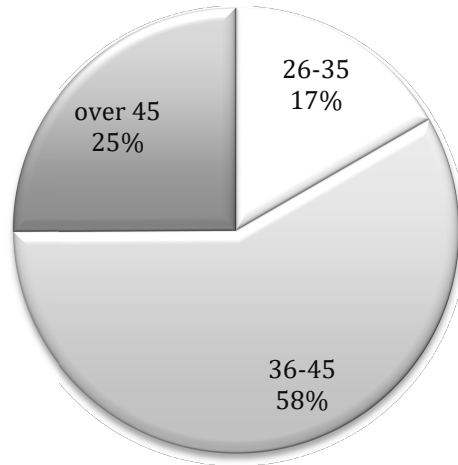
This chapter presents analysis, results and discussion of the study on the supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia. The study was based on the following research objectives: to determine the supply chain management challenges facing relief organizations in Ethiopia; and to determine the relationship between supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

4.2 General Characteristics of respondents

The study initially sought to ascertain the general information on the supply Chain/logistics managers involved in the study with regards to the age, highest level of education and duration of working in the respective humanitarian organization. The general information points at the respondents' suitability in answering the questions on supply chain management challenges and supply chain performance of humanitarian relief organizations in Ethiopia.

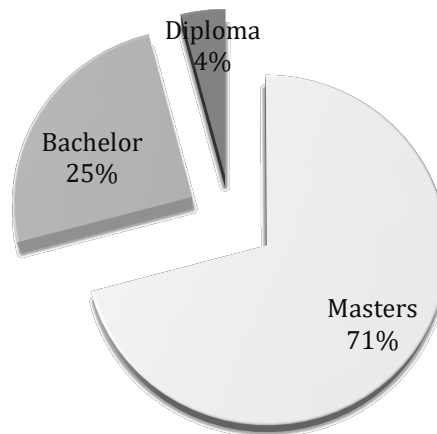
58% of the total age of respondents lies in 36-45, 25% of the respondents are over 45 and 16.6 % are in the range of 26-35.

Figure 4: Age distribution of respondents



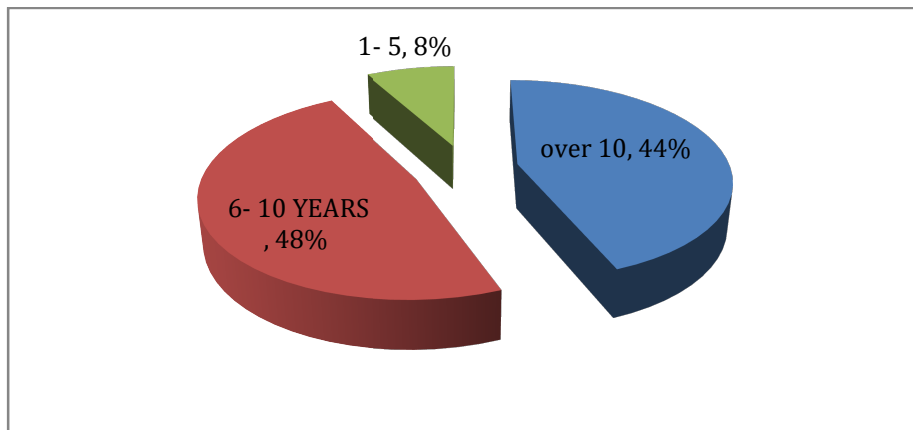
70.8 % of the respondents have a Masters degree while 25.1% have bachelors' degree and the rest 4.1% have a diploma.

Figure 5: Level of Education of respondents



44% of the respondents have over 10 years experience, 48 % of the respondents have 6 to 10 years experience and the rest 8% have 1 to 5 years experience.

Figure 6: Experience of respondents



4.3 Supply chain management challenges

The first objective of the study was to determine the supply chain management challenges facing humanitarian organizations in Ethiopia. Number of challenges facing relief organizations was identified from different literatures and 21 challenges were selected through a preliminary study.

The supply chain/logistics managers were requested to indicate their level of agreement on the extent to which various SCM challenges were experienced in their humanitarian organizations. Their responses were rated on a five point Likert scale where: 5-To a very great extent, 4-To a great extent, 3-To a moderate extent, 2-To a little extent, and 1-To no extent. The findings are as stipulated on Table below

Table 5: Supply Chain Management challenges

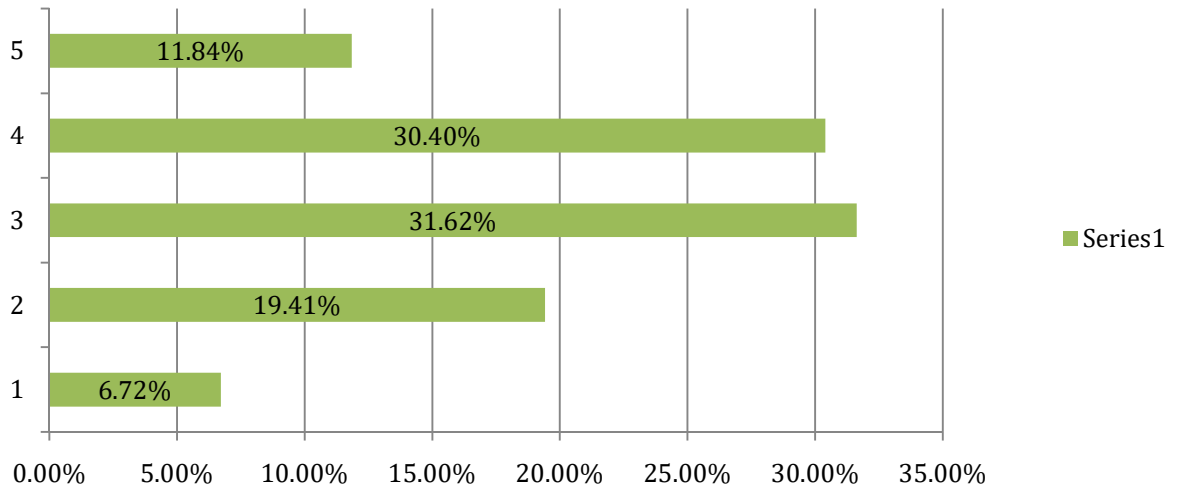
Supply chain management challenges in Ethiopian relief organizations	Mean	Stand.Dev.
High turnover	3.462	0.71
Lack of coordination	4.385	0.62
Lack of financial resources	3.205	0.88
Lack of proper planning	4.205	0.65
Inadequate information sharing.	4.051	0.78
Uncertainty in terms of supplies	3.103	0.90
Uncertainty in terms of assessment	2.513	0.64
Local customs and habits in the relief area	3.897	0.71
Inability to predict disaster	3.718	0.71
Poor infrastructure	4.000	0.82
Bulky materials to be transported	2.897	0.93
Uncertainty in terms of demand	2.897	0.96
Lack of competent human capital	2.641	0.92
lack of open and honest collaboration between the parties in the supply chain	3.487	0.67
poor management of relationships with the partners in the supply chains	2.949	1.08
inconsistent operating goals	2.462	1.08
organizational culture and structure and resistance to change	2.769	1.29
Lack of trust among supply chain partners	2.692	1.11
Poor alliance management practices	2.667	1.02
Lack of vision and managerial commitment	2.487	1.17
Constrained recourses and lack of employee empowerment	2.974	1.10

Source: Field data

From the above table we can see that the top Five challenges that affect the humanitarian relief organizations the most are:

- | | |
|--|--------------|
| 1- Lack of coordination | (Mean= 4.38) |
| 2- Lack of Proper Planning | (Mean= 4.2) |
| 3- Inadequate information sharing | (Mean= 4.05) |
| 4- Poor Infrastructure | (Mean= 4.0) |
| 5- Local custom and habit in the relief area | (Mean= 3.89) |
| 6- Inability to predict disaster | (Mean= 3.71) |

Fig.7: SCM challenges effect on Ethiopian relief organizations



Source: field data

4.4 SCM challenges and Effects on performance

The second objective of the study was to determine the relationship between supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

Identifying the relationship between SCMs challenges and SC performance of humanitarian organizations is critical in enhancing the adoption of the best practices towards reducing the negative effect of SCMs challenges on SC performance. With minimal SCMs challenges humanitarian, humanitarian SC is enabled to operate at its optimal performance hence enabling the humanitarian organizations meet their strategic goals effectively.

The respondents were requested to indicate the extent to which various SCM challenges affected their organization's SC performance. Their responses were rated on a five point Likert scale where: 5-To a very great extent, 4-To a great extent, 3-To a moderate extent, 2-To a little extent, and 1-To no extent. The findings are as shown in Table below.

Table 6: Effects of challenges of SCM on performance

Effects	Mean	Stand.Dev
Leads to SC cost increment	4.74	0.44
Deter the humanitarian organization to achieve timeliness in humanitarian aid	4.82	0.38
Leads to failure to deliver relevant humanitarian aid materials	4.41	0.49
Creates disharmony in the humanitarian organization	4.03	0.86
Leads to lack of reliability in the humanitarian SC	4.28	0.75
Decreases efficiency in the humanitarian SC	4.13	0.56
Some SC management challenges increases the risk of the firm's ability to match demand and supply	3.90	0.84
SC challenges may lead to unfair competition among humanitarian organization	3.87	0.76

Source: field data

As per the above table, the Effects are ranked as below

1. Deter humanitarian organizations timelines	Mean= 4.82
2. Leads to SC cost increment	Mean=4.74
3. Leads to failure to deliver relevant humanitarian aid	Mean=4.41
4. Leads to lack of reliability	Mean=4.28
5. Decreases efficiency in humanitarian supply chain	Mean=4.13
6. Creates disharmony	Mean=4.03
7. Increase risk of firms ability to match demand and supply	Mean=3.9
8. Leads to Unfair competition	Mean=3.87

4.5 Relative importance index

$RII = \text{Sum of weights } (W1 + W2 + W3 + \dots + Wn) / A \times N$

where W = weights given to each factor by the respondents and will ranges from 1 to 5 where '1' is less significant and '5' is extremely significant. A = highest weight (i.e. 5 in this case), and N = total number of respondents.

Table 7: Relative importance index of the challenges

Supply chain management challenges in Ethiopian relief organizations	Relative Index
High turnover	0.69
Lack of coordination	0.88
Lack of financial resources	0.64
Lack of proper planning	0.84
Inadequate information sharing.	0.81
Uncertainty in terms of supplies	0.62

Uncertainty in terms of assessment	0.50
Local customs and habits in the relief area	0.78
Inability to predict disaster	0.74
Poor infrastructure	0.80
Bulky materials to be transported	0.58
Uncertainty in terms of demand	0.58
Lack of competent human capital	0.53
lack of open and honest collaboration between the parties in the supply chain	0.70
poor management of relationships with the partners in the supply chains	0.59
inconsistent operating goals	0.49
organizational culture and structure and resistance to change	0.55
Lack of trust among supply chain partners	0.54
Poor alliance management practices	0.53
Lack of vision and managerial commitment	0.50
Constrained recourses and lack of employee empowerment	0.59

Source: Field data

Implication

The relative importance index shows the same rankings with the mean results. Accordingly lack of coordination relatively affects the highest among the listed challenges with RI of 0.88. Lack of proper planning follows with RI of 0.84. Third, inadequate information sharing with RI of 0.81. Then, poor infrastructure with RI of

0.8. Local custom and habit with RI of 0.78 and ranking 6th is inability to predict disaster with RI of 0.74.

4.6 Inferential statistics

The study also conducted a multiple regression analysis to test the relationship between supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

4.6.1 Regression Analysis

The study applied the statistical package for social sciences (SPSS V 20) to code, enter and compute the measurements of the multiple regressions for the study. Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables (c-14, c-5, c-4, c-2, c-9, c-8 & c-10 which are rated by the respondents that they will impact the operation performance to a very great extent or to great extent) or the percentage of variation in the dependent variable (SC performance of humanitarian organizations in Ethiopia) that is explained by all the independent variables.

4.6.2 Model Summary

The independent variables that were studied, explain that only 69.7% of the supply chain performance of relief organizations in Ethiopia as represented by the R^2 . This therefore means that other SCM challenges not studied in this research contribute 30.3% of the SC performance of humanitarian organizations. Therefore, further research should be conducted to investigate the other SCM challenges (30.3%) that affect SC performance of relief organizations in Ethiopia.

Table 8 :Selected Variables

Model	Variables Entered	Variables Removed	Method
1	c-14, c-5, c-4, c-2, c-9, c-8, c-10 ^b		. Enter

a. Dependent Variable: P

b. All requested variables entered.

Table 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.835 ^a	.697	.630	.358959	.697	10.495	7	32	.000

a. Predictors: (Constant), c-14, c-5, c-4, c-2, c-9, c-8, c-10

4.6.3 ANOVA Results

The significance value is 0.000 which is less than 0.05 thus the model is statistically significance in predicting SCM challenges affect the SC performance of humanitarian organizations in Ethiopia. The F critical at 5% level of significance was 1.87.

Since F calculated is greater than the F critical (value = 10.495), this shows that the overall model was significant.

Table10:ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.466	7	1.352	10.495	.000 ^b
	Residual	4.123	32	.129		
	Total	13.590	39			

a. Dependent Variable: P

b. Predictors: (Constant), c-14, c-5, c-4, c-2, c-9, c-8, c-10

4.6.4 Coefficient of Determination

Multiple regression analysis was conducted as to determine the relationship between supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

As per the SPSS generated in table 4.8 below, the equation;

$$(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon)$$

$$(Y = -.413 + 0.091X_1 + .282X_2 + .146X_3 + 0.132X_4 + 0.132X_5 + 0.250X_6 + 0.037X_7 + \varepsilon).$$

Table 11: Coefficients of determination

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.413	.600		-.689	.496	-1.636	.809
C-2	.091	.103	.096	.879	.386	-.119	.301
c-4	.282	.104	.310	2.724	.010	.071	.493
c-5	.146	.091	.194	1.606	.118	-.039	.332
c-8	.132	.100	.158	1.325	.195	-.071	.335
c-9	.132	.090	.159	1.461	.154	-.052	.315
c-10	.250	.087	.346	2.881	.007	.073	.427
c-14	.037	.097	.042	.379	.707	-.161	.235

a. Dependent Variable: P

Implication:

According to the findings, the regression equation established that, taking all SCM challenges to be constant at zero, supply chain performance of relief organizations will be -.413. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in lack of coordination will lead to a 0.091 increase in impact of SC performance of relief organizations; a unit increase in lack of proper planning will lead to a 0.282 increase in impact of SC performance of relief organizations. a unit

increase in inadequate information sharing will lead to 0.146 increase in impact of SC performance of relief organizations, a unit increase in local custom and habit of affected area will lead to 0.132 increase in impact of SC performance of relief organizations, a unit increase in inability to predict disaster will lead to 0.132 increase in impact of SC performance of relief organizations, a unit increase in poor infrastructure will lead to 0.25 increase in impact of SC performance of relief organizations. A unit increase in lack of open and honest collaboration between sc parties, will lead to 0.37 increases in impact of SC performance of relief organizations.

As the Challenge factors are selected from International literatures it has affected the outcome of some variables on the regression table.

4.7 Analysis of Interview

Interview was conducted with the NDRRMC, CRS and one of the UN agency managements so as to identify further challenges affecting the organizations day to day performance..

- Capacity of Suppliers: Local Suppliers lack the needed capacity for the required items and availability of items especially medical stuff.
- Transport availability and capacity: unavailability of vehicles with huge capacity to deliver the items to the disaster regions is also a challenge.
- Tax policy of government on donated supplies: Regions have to pay tax to receive the donations. And at times due to lack of financial resource the donated supplies never reaches to the beneficiaries.
- Lack of warehouses in regions and high rate of private warehouses: Regions lack warehouses to receive the donated items and also rent of private warehouse rate is very high.

- Availability of currency: Foreign currency is a big current issue in Ethiopia that also affects the performance of Humanitarian aid
- Delivery time: Reduced punctuality of suppliers is another challenge.
- Unreliable information concerning number of affected people.

Chapter Five: Summary, Conclusion and Recommendations

5.1 Introduction

This chapter presents summary, conclusion and recommendations of the study on supply chain management challenges and supply chain performance of humanitarian organizations in Ethiopia.

5.2 Summary

The study revealed that, among the selected 21 challenges, lack of coordination within the organization, and among the SC partners, lack of proper planning, inadequate information sharing, poor infrastructure, local custom and habits in the affected area and inability to predict disaster affects the performance of the Ethiopian relief organizations to a very great extent.

In addition, according to the interview held with Catholic relief service, National disaster risk reduction and management commission and one of the United nations organization managements there are other factors affecting the organizations performance which include lack of Supplier with the required capacity, unavailability of vehicles, governments tax policy, private warehouse rent rates ,foreign currency and unreliable information about the exact nuber of affected people results in impeding their supply chain efficiency towards delivering of the relief supplies as well as limiting achievement of their mandate.

5.3 Conclusion

This study concludes that there are numerous SCM challenges facing the humanitarian relief organizations in Ethiopia. The SCM challenges highly contribute to supply chain inefficiency in delivery of the relief supplies. The SCM challenges have a negative impact on the humanitarian SC performance as it; lead to SC cost increment, deterred the humanitarian organization to achieve timeliness in humanitarian aid delivery, lead to failure to deliver relevant humanitarian aid materials, created disharmony in the humanitarian organization, lead to lack of reliability in the humanitarian SC, decreased efficiency in the humanitarian SC, increased the risk of the firm's ability to match demand and supply, lead to decrease in function specific costs, lead to unfair competition among humanitarian organizations.

According to the SPSS result, the selected challenges explained only 69.7% of the performance. The other 30.3% should be further studied.

5.4 Recommendations

1. It is recommended that humanitarian relief organizations should be better coordinated within the organization and among other organizations to reduce cost and increase effectiveness.
Having a well prepared and managed plan for unpredicted disasters is also very crucial.
2. Regional administrations and Ethiopian government should share the exact number of affected people and amount of required items to the donors as it cost lives.
3. Ethiopian government has to focus on building infrastructures on areas that are prone to disaster.
4. Ethiopian government has to improve the tax policy on donated items.
5. Ethiopian government has to set a standard rate on private warehouses.

5.5 Further research

Since the study adopted the challenges from international literatures, it might be possible that the findings may not reflect the particular challenges faced only by the Ethiopian relief organization that is why the researcher conducted a semi structured interview. It is, therefore important that further study be carried out on the challenges identified from the interview.

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Annex

Questionnaire