ASSESSMENT OF HUMANITARIAN SUPPLY CHAIN PERFORMANCE OF SELECTED HUMANITARIAN ORGANIZATIONS IN ETHIOPIA

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ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

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School of Commerce
Department of Logistics and Supply Chain Management

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DECLARATION

I declare that this research project "Assessment of Humanitarian Supply Chain Performance of Selected Humanitarian Organizations in Ethiopia" is my original work and has never been submitted to any other University for assessment or award of a degree, and that all sources of materials used for the study have been duly acknowledged.

Signature: …….. Date: ……..

Endale Hailegebriel Tuffa

This research project has been submitted with my authority as the university Advisor;

Signature: …….. Date: ……..

Ayele Abebe (Ph.D.)

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I further wish to express my gratitude to all of my respondents and respective humanitarian organizations for their cooperation.

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Abbreviations

CRS	Catholic Relief Service
DPPA	Disaster prevention and preparedness agency
DRMFSS	Disaster Risk Management & Food Security Sector
FDRE	Federal Democratic Republic of Ethiopia
FHE	Food for the Hungry Ethiopia
HA	Humanitarian Aid
HSC	Humanitarian Supply Chain
HSCM	Humanitarian Supply Chain Management
HSCAg	Humanitarian Supply Chain Agility
HSCAd	Humanitarian Supply Chain Adaptability
HSCAl	Humanitarian Supply Chain Alignment
HSCP	Humanitarian Supply Chain Performance
JEOP	Joint Emergency Operational Program
NDRMCC	National Disaster Risk Management Coordination Commission
NGOs	Non-government organizations
NRS	National Regional States
REST	Relief Society of Tigray
RRC	Relief & Rehabilitation Commission
SCI	save the Children International
SCM	Supply Chain Management
UN	United Nations
USAID	United Sates Agency for International Development
WFP	World Food Program
WVE	World Vision Ethiopia

Abstract

The objective of the study was to assess the HSC performance of selected humanitarian organizations in Ethiopia based on Triple-A framework proposed by Lee, 2004. Specifically, this study was also intended to explore and empirically test the possible relationships among Humanitarian Supply Chain Agility, Adaptability, Alignment and HSC performance of selected Humanitarian organizations in Ethiopia. The researcher carried out a systematic literature review (SLR) to identify variables and their items to design a structured questionnaire. Accordingly the researcher identifies three important variables of humanitarian supply chain network: agility, adaptability and alignment. The researcher conducted an empirical study on a sample 58 respondents (experts in the humanitarian supply chain) that were collected by the researcher from Six humanitarian emergency food aid organizations in Ethiopia, namely CARE Ethiopia, Save the children international (SCI), Catholic Relief service Ethiopia (CRS), Relief society of Tigray (REST) World Vision Ethiopia (WVE), Food for the hunger international in Ethiopia (FHE). The relationships proposed in the framework were tested using Pearson correlation and the hypotheses proposed in the research were also tested using regression analysis. 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 conclude 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. A unique contribution of the present study is an attempt to outline humanitarian supply chain management from commercial supply chain management and further explore the possible relationships among supply chain agility, supply chain adaptability, supply chain alignment and humanitarian supply chain performance in Ethiopian context.

Key Words: *Humanitarian supply chain, supply chain agility, supply chain adaptability, supply chain alignment and humanitarian supply chain Performance.*

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

The humanitarian supply-chain management (HSCM) involves managing the different interrelated factors important for the effectiveness of the humanitarian operation system such as goods and materials, information, manpower, political authorities, available infrastructure & etc. to reduce the impact of a disaster for the people who are affected (Torre, L.de.la, Dolinskaya, I. and Smilowitz, K., 2011). In the same document they underlined the fact that the HSCM and the commercial supply-chain management are different in their motives and the realms at which they operate. While the driving force behind commercial supply chain management is basically profit maximization, efficiency & business long term growth that of HSCM is mainly reducing human suffering & rehabilitation of disaster affecting people in timely manner. As a result disaster relief operations requires the activities in many dimensions, such as, rescue efforts, health and medical assistance, food, shelter and long-term relief activities in coordinated & effective manner. The success of any relief activity depends heavily on the effectiveness of the logistics operations of the supply delivery. However, despite the fact that the logistics operation is the heart of the entire relief activities, it was not until recent times the importance of the logistics was identified (Torre et al, 2011).

Thomas and Kopczak, (2005) confirmed that there is evidence that a growing number of natural and man-made disasters happen all around the world, affecting hundreds of millions of people every year. In spite of this fact, only in these years starting from 2005 has supply chain management for humanitarian aid and disaster relief been a topic of interest for researchers. Consequently, the academic literature in this field is comparatively new and still sparing, indicating a requirement for more academic studies in this field.

On the other hand, The humanitarian supply chain (HSC) network is very similar to business supply chain network but the objective and parameters to measure HSC network performance are different (Kovacs & Spens, 2007). A business supply chain network aims to maximize *supply chain surplus,* whereas a HSC network aims to provide maximum relief to the victims of an

undesirable and unpredictable event (Petti & Beresford, 2006; Trunick, 2005). The real challenge of any HSC network is heavily purposed and human life driven. However, the complexity of the network depends upon the nature of materials that is needed to be supplied to disaster-hit areas, which is almost uncertain from both the demand and supply end. In humanitarian aid activities, delays in delivery or relief can cost lives. Therefore, efficiency in logistics is a key factor as it ensures the smooth flow of goods and services in a complex supply chain system.

Performance measurement is critical to NGO accountability (Beamon, 2004) and (Van Wassenhove, 2006). Lindenberg and Bryant (2001) state: "As resources become tighter, NGOs face new pressures for greater accountability for program impact and quality. The increased frequency and scale of disasters, scarce resources, funding competition, and the need for accountability require more efficient, effective and transparent relief operations. Since logistics is central to relief operations and the most expensive part of any relief operation (Van Wassenhove, 2006), measuring the performance of relief chains has become vital for all organizations involved in disaster management.

Given the stakes and size of the relief industry (the largest relief organizations engage in billions of dollars' worth of relief and development activities per year), the study of humanitarian relief chains is an important domain for supply chain management that has received little attention. Moreover, despite its significance, performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain. Various factors make performance measurement a challenging task for NGOs. Some of the difficulties are associated with common complications observed in organizations operating in the nonprofit sector (O'Neill and Young, 1988).

1.1.1 Overview of Humanitarian Supply Chain Management in Ethiopia

Concerning the HSCM in Ethiopian, the emergence & development of HSCM is related with the occurrence of the major food crises happened in 1950's which claimed the life of many Ethiopians affected due to drought. Since then, Ethiopia has been facing recurring drought and famine due to environmental, social and political factors which subject the large segment of the rural population to vulnerability and food insecurity to the country. This intern, necessitate the

establishment & functioning of a centralized relief logistics operation system under the then Relief & Rehabilitation Commission (RRC) in June 1974.

In order to address both chronic & acute food insecurity the country has been receiving donations of food commodities from different organizations/ nations located in different parts of the world. Currently, the logistics unit under disaster prevention and preparedness agency (DPPA) is responsible to coordinate the timely delivery of relief resources obtained from different multi-lateral, bi-lateral donor agencies & international & local NGOs to disaster affected localities in different part of the country.

Concerning the source from which DPPA obtained the humanitarian resources required for relief operations official government sources implied that different Western Governments, Non-government International organizations, UN (United Nations agencies & USAID (United Sates Agency for International Development are major ones. Currently USAID has been becoming the leading contributor of Emergency & Non-emergency (development) food requirements of the country.

1.1.2 The current humanitarian situation of Ethiopia

A widespread drought is severely impacting Ethiopia, leaving millions of people without enough to eat. Ethiopia's worst drought in 30 years is fueled by the El Niño weather pattern that has contributed to two failed seasonal rains last year – dangerous for a country where more than 80 percent of its population is farmers. In December 2015, the Government of Ethiopia announced that the number of people in need of food assistance had increased to 10.2 million. This year, 435,000 children under five and 1.7 million children, pregnant and lactating women will need specialized nutritional support.

Currently, NDRMCC, UN-WFP, and CRS led Joint-NGOs have been implementing Emergency food assistance programs in Ethiopia. According to government's official report (2015), the 2015 Meher assessment has concluded that 10.2 million people will require food assistance in 2016. The humanitarian response in 2016 will be led by the Government's National Disaster Risk Management Coordination Commission (NDRMCC), who, together with WFP, will assist a projected 7.6 million people in close to 200 woredas, while the CRS-led Joint Emergency

Operation program (JEOP) will provide support to 2.6 million people in 76 priority woredas of all national regional states of Ethiopia but Afar, Gamblella, Harari & Benishangul Gumuz NRS.

Joint Emergency Operation program (JEOP) is a consortium led by Catholic Relief Services (CRS) and includes CARE, Save the Children International (Save the Children), World Vision Ethiopia (WVE), Food for the Hungry Ethiopia (FHE) and the Relief Society of Tigray (REST). CRS works through its local implementing partners - Ethiopian Catholic Church Social and Development Coordination office of Harar (ECC-SDCOH) and Meki (ECC-SDCOM). Both Save the Children and FHE partly implement through the Organization for Relief and Development in Amhara (ORDA). These organizations will be the target of this study.

1.1.3 Humanitarian Organizations in Ethiopia under Joint Emergency food aid programs (JEOP)

1. **Catholic relief service in Ethiopia /CRS**

A Catholic relief services has worked in Ethiopia since 1958. For more than 50 years, CRS has taken the lead in responding to natural and man-made disasters affecting Ethiopia's most vulnerable communities. Moving beyond emergency response, CRS' disaster mitigation and recovery projects in drought and flood-prone areas have rebuilt individual and community assets through non-food aid in the form of agriculture, livestock, health, nutrition, and water and sanitation assistance. CRS also provides livelihoods support to farmers and entrepreneurs, promotes gender equality, mobilizes for immunization and mitigates the impact of HIV. CRS led Joint Emergency Operation program (JEOP) in Ethiopia. CRS works through its local implementing partners - Ethiopian Catholic Church Social and Development Coordination office of Harar (ECC-SDCOH) and Meki (ECC-SDCOM). Currently, CRS has been providing around 10,373 metric tons of emergency food supplies for 392,944 in beneficiaries in Dire dawa administration and Oromia regional states, monthly bases.

2. Save the Children International /SCI

Save the Children international (SCI) first worked in Ethiopia in the 1930s and set up its first formal office here during the 1984 famine. Our earliest work in Ethiopia focused on humanitarian and emergency relief, and has evolved into a range of longer-term development initiatives for the most vulnerable children. On 1 October 2012, seven Save the Children Member organizations which had all been working in Ethiopia (Canada, Denmark, Finland, Norway, Sweden, UK and USA) came together to form a single organization. SCI works with more than 50 partners. These include International Organizations, Government Agencies, local non-governmental and community-based organizations that work with SCI on issues affecting children and their families. SCI works in all regional states: Amhara, Tigray, Oromia, SNNPR, Benishangul-Gumuz, Somali, Gambela & Afar and in two administrative cities of Ethiopia. As well as its head office in Addis Ababa, he has 38 other offices across the country. Currently, SCI has been providing around 7,283 metric tons of emergency food supplies for 429,700 beneficiaries in Amhara, Somali and Oromia national regional states, monthly bases.

3. Food for the hunger international in Ethiopia/FHE

In 1984, Food for the Hungry (FH) began working in Ethiopia in response to a famine. Up to the present day, Ethiopia is a country challenged by harsh environmental factors and droughts. FH continues to work in northern and southern Ethiopia, training communities in farming techniques to yield crops during droughts. Its twenty years (1984-2006) of operation in several intervention areas throughout Ethiopia has given FH/E a wealth of knowledge to formulate and implement sustainable grassroots development projects. FH/E is currently working in the Amhara, Benishangul Gumuz, Oromiya, SNNPR, and Somali regional states of Ethiopia. Currently, FHE has been providing around 6,660 metric tons of emergency food supplies for 392,944 beneficiaries in Amhara regional state, monthly bases.

4. World Vision International in Ethiopia

World Vision began its ministry in Ethiopia in the early 1970s and opened a national office in Addis Ababa in 1975. World Vision operated emergency response programs during the 1984 famine, followed by a period of rehabilitation (1986-87) and a self-review that came up with the concept of Area Development Programs (ADPs) as a model. World Vision's work in Ethiopia contributes to the well-being of vulnerable children in partnership with the church, civil society and the government. Initiatives include education, food security, health, HIV and AIDS, water, sanitation, and hygiene, as well as sponsorship management. Currently, WVE has been providing around 4,110 metric tons of emergency food supplies for 242,481 beneficiaries in SNNP and Oromia regional states, monthly bases.

5. Care International in Ethiopia

CARE started working in Ethiopia in 1984 in response to severe drought and famine that devastated the population and claimed the lives of nearly one million people. Since then, the organization's activities have expanded to address the root causes of poverty and vulnerability. Currently, CARE has been providing 8,516 Metric tons emergency foods supplies for 502,406 beneficiaries in Oromia regional state.

6 Relief society of Tigray /REST/

The Relief Society of Tigray (REST) has been in existence in Ethiopia for over 30 years, starting out as a relatively small organization in 1978 in response to the needs of Tigrayan's displaced because of drought and food insecurity to neighboring Sudan. In 1991, REST was registered as an indigenous non-governmental organization (NGO) and since this time, has focused on longer term development programs whilst maintaining capacity in emergency response. Today, REST is one of the largest indigenous NGO's in Ethiopia, with the head office in Tigray's capital, Mekelle. Currently, REST has been providing around 10,737 metric tons of emergency food supplies for 633,450 beneficiaries in Tigray regional state, monthly bases.

All these facts lie at the foundation of the present research. It is undertaken with the basic notion that understanding the nature of humanitarian supply chain management and its performance within the growing importance of the sector in Ethiopian disaster risk management and other development programs will be paramount importance for Humanitarian Aid Agencies, donors, government, stakeholders', humanitarian practitioners and researchers.

In this paper, the researcher will focus on assessing HSC performance of the above selected Humanitarian non-government organizations (NGOs) currently implementing emergency food assistance programs in Ethiopia.

1.2 Statement of the problem

With the established fact that the study of supply chain performance for humanitarian aid and disaster relief sector is the most significant issue for developing and implementing a successful humanitarian supply chain strategy. Furthermore, as logistics and supply chain is central to relief operations and the most expensive part of any relief operation, measuring the performance of relief chains has become vital for all organizations involved in disaster management. Thus, the researcher is now present the theoretical and observational gaps to clearly establish the necessity and importance of the proposed study.

According to Thomas and Kopczak, (2005) there is evidence that a growing number of natural and man-made disasters happen all around the world, affecting hundreds of millions of people every year. In spite of this fact, only in these years starting from 2005 has supply chain management for humanitarian aid and disaster relief been a topic of interest for researchers. Consequently, the academic literature in this field is comparatively new and still sparing, indicating a requirement for more academic studies in this field.

There is also evidence that a growing number of natural disaster and/or drought in Ethiopia, affecting millions of people every year. Despite of this fact, the study of humanitarian supply

chain management has not widely developed and there is little published work increasing understanding about the nature of supply chain management for humanitarian aid organizations operational in Ethiopia.

Performance measurement is critical to NGO accountability (Beamon, 2004) and (Van Wassenhove, 2006). Lindenberg and Bryant (2001) state: "As resources become tighter, NGOs face new pressures for greater accountability for program impact and quality. The increased frequency and scale of disasters, scarce resources, funding competition, and the need for accountability require more efficient, effective and transparent relief operations. Since logistics is central to relief operations and the most expensive part of any relief operation (Van Wassenhove, 2006), measuring the performance of relief chains has become vital for all organizations involved in disaster management.

On the other hand, Balcik and Beamon (2008) stated that given the stakes and size of the relief industry, the study of humanitarian relief chains is an important domain for supply chain management that has received little attention. Moreover, despite its significance, performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain due to the uniqueness and complexity of disaster relief environment.

Performance measurements for the humanitarian sector have been developed where most frameworks (de Leeuw, 2010; Schulz and Heigh, 2009; Moe et al., 2007) are based on the balance score card introduced by Kaplan& Norton (1992). However, Davidson (2006) saw the balance score card unfit for the humanitarian sector due to the rigidness of the framework and the complexity of the humanitarian context.

Though there is a limited body of existing knowledge in the area, a recent exception is the research conducted by Davidson (2006); Whitten, G.W., Green Jr, K.W., and Zelbst, P.J. (2012); and Dubey, R., Singh, T., Gupta, O.K. (2015) proposing a performance measurement framework for relief logistics.

Whitten et al. (2012); and Dubey et al (2015) extended and further empirically investigated Triple A supply chain performance framework (Agility, Adaptability and Alignment,) proposed by Lee (2004) for measuring humanitarian supply chain performance. However, the concept of agility, adaptability and alignment remains in its infancy and requires further investigation -, it is an area that requires urgent attention (Dubey, R., & Gunasekaran, A., 2015).

Even though, researchers have immensely contributed in the field of commercial supply chain agility, supply chain adaptability and supply chain alignment, their impact on humanitarian supply chain performance and their relationship is not well known.

Similarly, studies in humanitarian supply chain performance for nonprofit organizations operating in Ethiopia are limited and have not been widely developed. To the best of the researcher knowledge, almost no imperial research prevails regarding HSC performance assessment based on Triple A supply chain framework (Agility, Adaptability and Alignment) for none-profit humanitarian food aid organizations in Ethiopia. Except those few researches conducted by WFP (2006) and Christina Sujin Kim and Javed Singha, (2010) focusing on the humanitarian supply chain practices and challenges in Ethiopia.

Therefore, the researcher's inability to find such studies in this sector is certainly the basic reasons for conducting the present study. In this study, the researcher tries to explore the possible relationship among Agility, Adaptability, and Alignment and HSC performance in the context of Ethiopian humanitarian supply chain management.

In the present study, the researcher wants to assess HSC performance of selected Non-government emergency relief food aid organizations operating in Ethiopia based on an existing HSC performance measurement framework called Triple A supply chain (supply chain Agility, supply chain Adaptability and supply chain Alignment,) proposed by Lee (2004) and later extended by Whitten et al. (2012) and Dubey et al (2015). Accordingly, the impact of Agility, Adaptability, and Alignment on humanitarian supply chain performance of selected relief organizations in Ethiopia will be tested empirically.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this research is to assess the existing HSC performance of selected humanitarian organizations implementing emergency food aid programs in Ethiopia.

1.3.2 Specific Objectives

The specific objectives of this research are:-

- To assess the relationship between HSC Performance of the organizations with their agility.
- To assess the relationship between HSC Performance of the organizations with their Adaptability.
- To assess the relationship between HSC Performance of the organizations with their Alignment.

1.4 Research Hypothesis

Past studies have indicated that the supply chains agility, supply chain has positively related to humanitarian supply chain performance and have an impact on organizational performance. For example, Lee (2004) Lee (2004) referred the agility as "the ability to respond to short-term changes in demand or supply quickly [and] handle external disruptions smoothly." Dubey et al (2015) Supply chain agility is a key to humanitarian supply chain performance. Supply chain agility can positively impact operational performance (Gligor and Holcomb 2012) and can also prepare the supply chain network to recover promptly from external forces, contributing to delivery and service levels (Lee 2004). Therefore, the first hypothesis is developed as follows.

Hypothesis 1: The HSC performance is positively related with the agility of the organizations

On the other hand, Past scholars have also widely acknowledged the significant role of supply chain adaptability in cost savings (Lee 2004; Richey, Tokman, and Wheeler 2006; Baramichai, Zimmers, and Marangos 2007). Supply chain adaptability can also improve supply chain performance (Lee 2004; Whitten, Green, and Zelbst 2012). There are sufficient arguments to support the direct impact of supply chain adaptability on supply chain performance. However, one cannot ignore the possibility of an indirect effect of supply chain adaptability under the mediating effect of supply chain agility. Based on this argument the second hypothesis is developed as follow:

Hypothesis 2: The HSC performance is positively related with the adaptability of the organizations.

On the other hand**,** Lee (2004) defined as "the ability of great firms to align the interests of all of the firms in their supply chains with their own." Dubey et al (2015) confirmed that Humanitarian supply chain Alignment is vital for supply chain performance. It involves information sharing among supply chain partners. Supply chain alignment is the property of the supply chain network design that enables the supply chain network to flexibly adjust its configuration to align the objectives of all members (e.g. transparency among supply chain members; collaboration; and risk sharing) (Bryson 2004; Matthyssens and Vandenbempt 2008). Tang and Tomlin (2008) identified that alignment among actors in supply chain network is of critical importance and strong impact on HSC performance. Based on this third hypothesis is developed as follow:
Hypothesis 3: The HSC performance is positively related with the alignment of the organizations.

Based on the above, the dependent and independent variables of the present study are;

- **Dependent Variable:** *Performance of Humanitarian Organizations in Supply Chain Management.*
- **Independent Variables:**
    1. *Humanitarian Supply chain agility*
    2. *Humanitarian Supply chain adaptability*
    3. *Humanitarian Supply chain alignment*

1.5 Significance of the study

Even though researchers have immensely contributed in the field of supply chain agility, supply chain adaptability and supply chain alignment, their impact on humanitarian supply chain performance and their relationship is not well known. The concept of agility, adaptability and alignment remains in its infancy and requires further investigation. In this regard, the contribution of this study to the effort of developing the newly emerging performance assessment framework for relief chain sectors and to existing theories will be paramount importance.

Since this research is designed to assess the performance of relief supply chain operation, the result will be beneficial to humanitarian organizations currently executing emergency food aid programs in particular and other humanitarian organizations implementing relief operations in Ethiopia in general.

Meanwhile, in Ethiopia, the study of humanitarian supply chain management has not sufficiently been studied, the output this study will contribute for the knowledge pool in relation with the functioning and performance of the HSCM in Ethiopia. Additionally, the result of this study is expected to serve as a basis for other studies to be initiated by researchers.

1.6 Scope/Delimitation of the study

In view of the limited resources & time available at the disposal of the researcher this particular study specifically cover the HSCM system of selected humanitarian-NGOs who have been implementing Emergency relief food assistance programs in Ethiopia. Which means the study is not considered organizations like, Donors, host government, other supply chain actors etc.

In addition this study is expected to give an insight in relation to the research question & objectives specified above and not meant to address all the issues related to the HSCM system of NGOs operations in Ethiopia.

1.7 Organization of the research paper

This paper is organized as follows. Chapter II presents reviews previous literature. It includes commercial supply vs. Humanitarian supply chain management, the theoretical foundation, conceptual development and hypotheses are presented. Chapter III describes the methods implemented it determines data collection and analysis methods and the proposed methodology. Chapter IV presents the analysis of the data and presents the findings and discussion of findings of the study. Finally, in the last chapter, Chapter IV concluding remarks, recommendations and directions for future research are provided.

CHAPTER TWO
2. REVIEW OF RELATED LITERATURE

2.1 Introduction

In this section, the researcher undertakes a systematic literature review on the works of various scholars in the field of supply chain management and HSC management to understand the state of the art and then develop his theoretical framework and data collection instrument. It includes definition and concepts such as, commercial supply chain, humanitarian logistics, humanitarian supply chain management, humanitarian supply chain performance, Triple-A supply chain framework, supply chain agility, supply chain adaptability, supply chain alignment; empirical review related to the topic of the study and conceptual framework.

2.2 Humanitarian supply chain management.

According to Torre et al (2011) the humanitarian supply-chain management (HSCM) involves managing the different interrelated factors important for the effectiveness of the humanitarian operation system such as goods and materials, information, manpower, political authorities, available infrastructure & etc. to reduce the impact of a disaster for the people who are affected. In the same document they underlined the fact that the HSCM and the commercial supply-chain management are different in their motives and the realms at which they operate. While the driving force behind commercial supply chain management is basically profit maximization, efficiency & business long term growth that of HSCM is mainly reducing human suffering & rehabilitation of disaster affecting people in timely manner. As a result disaster relief operations requires the activities in many dimensions, such as, rescue efforts, health and medical assistance, food, shelter and long-term relief activities in coordinated & effective manner. The success of any relief activity depends heavily on the effectiveness of the logistics operations of the supply delivery. However, despite the fact that the logistics operation is the heart of the entire relief activities, it was not until recent times the importance of the logistics was identified (Torre et al, 2011).

The humanitarian supply chain (HSC) network is very similar to business supply chain network but the objective and parameters to measure HSC network performance are different (Kovacs & Spens, 2007). A business supply chain network aims to maximize supply chain surplus, whereas a HSC network aims to provide maximum relief to the victims of an undesirable and unpredictable event (Petti & Beresford, 2006; Trunick, 2005). The real challenge of any HSC network is heavily purposed and human life driven. However, the complexity of the network depends upon the nature of materials that is needed to be supplied to disaster-hit areas, which is almost uncertain from both the demand and supply end. In humanitarian aid activities, delays in delivery or relief can cost lives. Therefore, efficiency in logistics is a key factor as it ensures the smooth flow of goods and services in a complex supply chain system.

Humanitarian Supply Chain Management is referred to as the process of effective and cost-efficient plans, implementations and controls for aid flows (i.e., materials, goods, services, financial resources, information, etc.) from the point of origin to the point of consumption with the intention of meeting the aid recipients' requirements (Thomas and Kopczak, 2005 ; Day et al., 2012; etc.).

On the other hand, Thomas and Kopczak, (2005) defined humanitarian logistics as "the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from point of origin to point of consumption for the purpose of meeting the end beneficiary's requirements" and alleviating the suffering of vulnerable people. Except for its focus on the end beneficiary, this definition is largely comparable to any definition of business logistics.

According to Thomas and Kopczak, (2005) there is evidence that a growing number of natural and man-made disasters happen all around the world, affecting hundreds of millions of people every year. In spite of this fact, only in these years starting from 2005 has supply chain management for humanitarian aid and disaster relief been a topic of interest for researchers. Consequently, the academic literature in this field is comparatively new and still sparing, indicating a requirement for more academic studies in this field.

2.3 Triple-A Supply Chain framework:

Lee (2004) proposed Triple-A supply framework and claimed that successful organizations have capabilities to establish their supply chains that are aligned, adaptable and agile which will enhance the supply chain performance but organizational performance as well.

Triple-A supply chain is considered as viable strategy, when successfully implemented, which directly related with the supply chain and indirectly associated with organizational performance. Lee, (2004) claimed that "organizational success depends on supply chain success which depends on the abilities of a supply chain partnering organizations to build a supply chain that simultaneously exhibits agility, adaptability, and alignment". Long-term strategic relationships are considered as key of supply chain management that should essentially developed by the managers by taking accurate decisions with respect to all supply chain partners. Managers should work to build-up adaptable, agile and aligned supply chain to harvest higher organizational performance (Lee, 2004).

2.4 Empirical review of studies

Here, the researcher has adopted the Tranfield, Denyer and Smart (2003) and systematic literature review (SLR) approach to conduct a review. In this section, he has divided his review into four stages.

Stage 1: Planning the Review

To identify potential journals that had published articles related to supply chain management, humanitarian logistics and supply chain management, and supply chain performance measures, the researcher first used keywords such as, humanitarian logistics supply chain management, humanitarian supply chain performance measures, humanitarian supply chain design, Triple-A supply chain, supply chain agility, supply chain adaptability and supply chain alignment. In this way, the researcher identified over **25** articles published in reputable journals in the field of supply chain management and HSC management. The researcher classified the journals (Table-1) based on (1) HSC, (2) performance in HSC and (3) Triple –A Supply Chain- Agility, Adaptability, and Alignment.

Stage 2- Development of a Review Protocol

The researcher decided initially to review the published literatures. In order to eliminate his biasness towards any work, he selected and critically reviewed only those articles published from 2010 to January 2016, comprising a period of more than 6 years, in all the above mentioned journals related to Supply chain management, humanitarian logistics and supply chain management, performance in humanitarian supply chain, Triple A-supply chain performance (supply chain Agility, Adaptability, Alignment) and its related concepts so that the researcher does not end up with irrelevant literature.

Table 1 Classification of Journals and number of articles scanned

#	Title of Journal	Key Words			Total # of Articles Scanned
		Humanitarian Supply Chain Management	Humanitarian Supply Chains Performance	Triple –A Supply Chain (Agility, Adaptability, Alignment)	
1	*International Journal of Physical Distribution and Logistics Management*	4	1	1	6
2	*Journal of Humanitarian Logistics and Supply Chain Management*	3		1	4
3	*International Journal of Logistics Research and Applications*	1		2	3
4	*Journal of Humanitarian Logistics*	2			2
5	*Journal of Transport and Supply Chain Management*			1	1
6	*International Journal of Logistics*			1	1
7	*International Journal of Logistics System and Management*	1			1
8	*International Journal of Production Research*		1		1
9	*International Journal of Public Sector Management*		1		1
10	*School of Doctoral Studies (European Union) Journal*			1	1
11	*Engineering Management Journal*		1		1
12	*European Journal of Business and Management*		1		1
13	*Global Business Review*			1	1
14	*Harvard Business Review*			1	1
	Total	**11**	**5**	**9**	**25**

Source: Compiled by researcher, 2016

Stage 3: Conducting a Review

In this stage, the researcher initially reviewed some of the articles that deal with humanitarian supply chain and its related issues to identify his research and define the scope of the present study. Accordingly, the researcher derived following issues, which are very relevant in present scenario.

2.4.1 Humanitarian Supply versus Commercial Supply Chain

In recent years, some scholars have called for a different community, which has recently become known as humanitarian logistics and supply chain management (Van Wassenhove, 2006; Dubey, R., & Gunasekaran, A. 2015). Contributions from the humanitarian supply chain community are increasing as they attempt to delineate humanitarian logistics and supply chain from the established field of commercial supply chains.

Scholars have clearly pointed out, that in spite of similarities, there are dissimilarities between commercial supply chain and HSC network. The business supply chain network is driven with an objective to maximize supply chain surplus; on the other hand, the HSC network is driven with an objective to reduce the potential loss of human and infrastructure (pre-disaster) and provide maximum relief and ensure quick recovery during the post-disaster phase (Holguin-Veras et al., 2012). The commercial supply chain aims to generate maximum supply chain surplus without compromising service level (Pettit and Beresford 2006), whereas HSC is driven by non-profit objectives. The aims of the HSC are to provide maximum relief to the affected victims in terms of medical aid, food, shelter and drinking water.

The researcher has thus tried to differentiate HSC from the commercial supply chain as follows:

- HSC is guided by non-profit objectives, whereas the commercial supply chain is guided by a profit objective (Bhattacharya, Hasija, and Van Wassenhove 2014).
- The humanitarian logistics involved in relief chains is primarily reactive, guided by the ad hoc design; however, for a successful operation, it requires extensive advance planning, which has three main foci: preparedness, response and collaboration (Balcik et

al. 2010); (Tomasini and Van Wassenhove 2009; Bhattacharya, Hasija, and Van Wassenhove 2014). The logistics involved in commercial supply chains, in contrast, vary between proactive and reactive, guided by four factors: quality, cost, time and risk.

- One major difference between the two types of chains is the demand pattern. For many commercial supply chains, the external demand for products is comparatively stable and predictable. Often, for the commercial chain, the demands seen from warehouses occur from established locations in relatively regular intervals. However, the demands in the relief chain are emergency items, equipment, and personnel. More importantly, those demands occur in irregular amounts and at irregular intervals and occur suddenly, such that the locations are often completely unknown until the demand occurs (Thomas and Kopczak, 2005; Van Wassenhove, 2006).

On the other hand, Beamon (2004) suggests other specific characteristics of disaster response logistics that differentiate them from traditional commercial supply chains. These include

- Zero lead time that dramatically affects inventory availability, procurement, and distribution.
- High stakes (often life-and-death) that requires speed and efficiency
- Unreliable, incomplete, or non-existent supply and transportation infrastructure.
- Many relief operations are naturally ad hoc, without effective monitoring and control.
- Variable levels of technology is available depending on the disaster area

More recently, some studies such as (Beamon 2004; Thomas and Kopczak, 2005; Van Wassenhove, 2006), emphasized that some supply chain concepts share similarities to emergency logistics and therefore some tools and methods developed for commercial supply chains can be successfully adapted in emergency response logistics. Using commercial supply chain techniques in disaster management is still in its infancy.

Therefore, it is concluded that some of the concepts associated with commercial supply chains are directly applicable to humanitarian relief chains. However, future work must develop methods that specifically address the challenges presented by characteristics unique to humanitarian relief and logistics of disaster response.

Table 2 Commercial Supply Chains vs. Humanitarian Relief Chains (Beamon 2004)

Characteristic	Commercial Supply Chain	Humanitarian Supply Chain
Strategic Goals	Typically to produce high quality products at low cost to maximize profitability	Minimize loss of life and alleviate Suffering.
Distribution Network Configuration	Well-defined methods for determining the number and Locations of distribution centers.	Challenging due to the nature of the unknowns (locations, type and size of events, politics, and culture)
What is "Demand"?	Products.	Emergency Supplies, equipment and Personnel.
Lead Time	Lead time determined by the supplier-manufacturer-DC-retailer	Zero time between the occurrence of the demand and the need for the demand
Inventory Control	Utilizes well-defined methods for determining inventory levels based on lead time, demand and Target customer service levels.	Inventory control is challenging due to the high variations in lead times, demands, and demand locations.
Information System	Generally well-defined, using Advanced technology.	Information is often unreliable, incomplete or non-existent.

Source (Beamon, 2004)

2.4.2 HSC Performance measures and measurements

Humanitarian supply chain performance will be measured in terms of time of delivery, quality of delivered materials, reduction in loss of lives, reducing stock-out of necessary medicines, equipment and other necessary items, best use of donated items. Thomas, A. (2003).

Performance measurement is critical to NGO accountability (Beamon, 2004). Lindenberg and Bryant (2001, p. 209) state: "As resources become tighter, NGOs face new pressures for greater accountability for program impact and quality. Today, contributors, donor agencies, scholars, and relief and development practitioners are all asking: do NGOs practice what they preach? How do we know? How effective are their programs and projects?" The increased frequency and scale of disasters, scarce resources, funding competition, and the need for accountability require more efficient, effective and transparent relief operations. Since logistics is central to relief operations and the most expensive part of any relief operation (Van Wassenhove, 2006), measuring the performance of relief chains has become vital for all organizations involved in disaster management.

Given the stakes and size of the relief industry (the largest relief organizations engage in billions of dollars' worth of relief and development activities per year), the study of humanitarian relief chains is an important domain for supply chain management that has received little attention. Moreover, despite its significance, performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain. Various factors make performance measurement a challenging task for NGOs. Particularly due to the difficulties associated with measuring program outcomes and impacts in humanitarian relief, NGOs tend to measure performance focusing on inputs rather than outputs. This is common in the nonprofit sector (O'Neill and Young, 1988).

O'Neill and Young (1988) also state that, owing to the central role of logistics in relief operations, the effectiveness and efficiency of the relief chain are important indicators of relief performance. However, the area of relief chain performance measurement of relief chains has not attracted much attention in the literature (O'Neill and Young, 1988).

On the other hand, performance measurements for the humanitarian sector have been developed where most frameworks (de Leeuw, 2010; Schulz and Heigh, 2009; Moe et al., 2007) are based on the balance score card introduced by Kaplan& Norton (1992). However, Davidson (2006) saw the balance score card unfit for the humanitarian sector due to the rigidness of the framework and the complexity of the humanitarian context.

Even though there is a limited body of existing knowledge in the area, a recent exception is the research conducted by Davidson (2006) ;Whitten et al. (2012); and Dubey et al (2015) proposing a performance measurement framework of relief logistics. Accordingly, Davidson (2006) develops a performance measurement framework for relief logistics for the International Federation of Red Cross and Red Crescent Societies and describes an application of the framework to actual relief operations. The proposed framework relies upon four performance metrics, namely appeal coverage, donation-to-delivery time, financial efficiency, and assessment accuracy. Whitten et al. (2012); and Dubey et al (2015) extended and further empirically investigated Triple A supply chain performance framework (Agility, Adaptability and Alignment,) proposed by Lee (2004) for measuring humanitarian supply chain performance. However, the concept of agility, adaptability and alignment remains in its infancy (Whitten et al. 2012) and requires further investigation – and, from a sustainable humanitarian supply chain perspective, it is an area that requires urgent attention.

Thus, it is clearly confirmed that the study of humanitarian relief chains performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain and even the existing HSC performance measurement models are rigid. Hence, these are interesting gaps the researcher has found in most of the available literature, which demand urgent attention from the HSC community. Besides, the researcher found that measuring HSC performance against agility, adaptability and alignment called Triple-A supply chain framework is clearly missing in most of the available literature. Therefore, these issues will be the main agenda of the proposed study.

2.4.3 Humanitarian supply chain design

An inefficient supply chain design, in the HSC network (HSC), can cause potential loss of lives in comparison to increase the cost of distribution in the business supply chain network (Whitten, et al., 2012). Humanitarian logistics consists of various different operations at different times and as a response to the various catastrophes (Kovacs & Spens, 2007). Further, they support that humanitarian supply networks could also include the delivery of material to areas of chronic need over time. It should be recognized as a special field of research.

In this regard, the researcher has carried out an in-depth review of articles (Nathan Kunz & Stefan Gold 2015). Each of these considered influencers, design decisions, and identified building blocks, with most highlighting the need for either agility or resilience, but they did not consider the important characteristics of supply chain network design-agility, adaptability and alignment – and the impact of these on humanitarian supply chain performance is yet to be explored. The researcher found that measuring HSC performance against agility, adaptability and alignment called Triple-A supply chain framework is clearly missing in most of the available literature. However, most recently, some scholars have attempted to measure HSC performance against Triple-A supply chain properties (e.g., Whitten, et al., 2012; Dubey, R., & Gunasekaran, A. 2015; Dubey et al., 2015).

Stage - 4: Selection of Studies and Variables

The researcher decided that the second and third issues, which are very relating to the objectives of the research and interesting due to the fact that both performance measurement and assessing HSC performance against Triple-A supply chain framework is a new concept and not widely developed so that they can provide more insight into an emerging field like Humanitarian supply chain management in Ethiopia. Therefore, in the proposed research, the researcher will further explore and empirically investigate the possible linkage among agility, adaptability and alignment on HSC performance of selected humanitarian relief organizations operating in Ethiopia.

Finally, the variables the researcher identified through the literature review are Humanitarian supply chain Agility, supply chain Adaptability, supply chain Alignment, and HSC performance.

2.5 Conceptual Framework

Dubey & Gunasekaran (2015) in their framework proposed that Triple-A supply chain (Agility, Adaptability and Alignment) have an impact on humanitarian supply chain performance but sustainability of relief chain operations as well.

On the other hand, Dubey et al (2015) in their research hypothesis discuss the impact of Agility, Adaptability and Alignment on Humanitarian Logistics Performance: Mediating Effect of Leadership.

With modification from the above, this study came up with a conceptual framework which examine the relationship among the three research constructs; Humanitarian supply chain agility, Humanitarian supply chain Adaptability, Humanitarian supply chain Alignment, and Humanitarian supply chain performance.

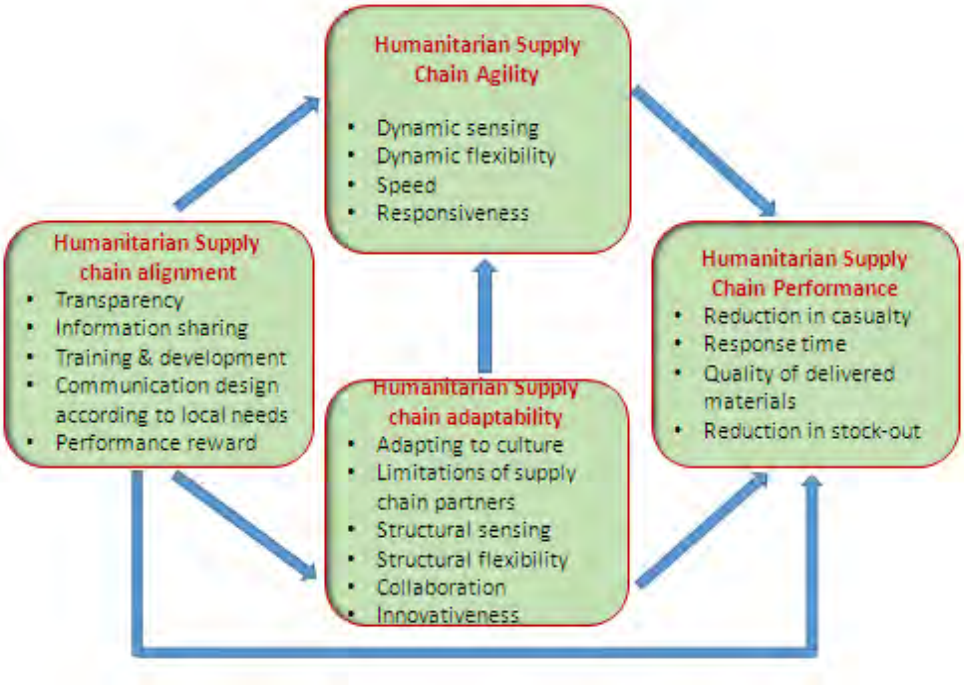

Figure 1 Conceptual framework of the study
Source: Modified from Dubey & Gunasekaran (2015) and Dubey et.al (2015)

A detail description of the relationship between the independent and dependent variables is provided in the following paragraphs. Consuming literature support, the expected relationships among Agility, Adaptability, Alignment and humanitarian supply chain performance of selected relief food aid organizations in Ethiopia are discussed, and hypotheses relating these variables are developed.

2.5.1 Humanitarian supply chain Agility and HSC Performance:

Lee (2004) referred the agility as "the ability to respond to short-term changes in demand or supply quickly [and] handle external disruptions smoothly." Dubey et al (2015) Supply chain agility is a key to humanitarian supply chain performance. On the other hand, Betts,T. and Tadisina,S.K.(2009) defined Supply chain agility as, "an externally focused capability that is derived from flexibilities in the supply chain processes" (Swafford, Ghosh, & Murthy, 2006: 172). It is important to note the difference between agility and flexibility. Agility is an outwardly focused capability, while flexibility is an inwardly focused competency. Supply chain agility is a measure of how rapidly the supply chain can respond. It is a measure of the supply chain responsiveness capability (the speed). On the other hand, Supply agility is widely acknowledged as a source of competitive advantage (Gunasekaran 1999). This holds for environments characterized by erratic supply and demand and pronounced dynamism and complexity (Blome, Schoenherr, and Eckstein 2014). Supply chain agility can positively impact operational performance (Gligor and Holcomb 2012) and can also prepare the supply chain network to recover promptly from external forces, contributing to delivery and service levels (Lee 2004). Therefore, the first hypothesis is developed as follows.

Hypothesis 1: The HSC performance is positively related with the agility of the organizations.

2.5.2 Humanitarian supply chain Adaptability and Performance:

Lee (2004) explained the adaptability as "the ability to adjust the supply chain's design to meet structural shifts in markets [and] modify the supply network [to reflect changes] in strategies, technologies, and products." Dubey et al (2015) Supply chain adaptability to humanitarian environment is a critical aspect of humanitarian relief supply chains.

Past scholars have widely acknowledged the significant role of supply chain adaptability in cost savings (Lee 2004; Richey, Tokman, and Wheeler 2006; Baramichai, Zimmers, and Marangos 2007). Supply chain adaptability can also improve supply chain performance (Lee 2004; Whitten, Green, and Zelbst 2012). There are sufficient arguments to support the direct impact of supply chain adaptability on supply chain performance. However, one cannot ignore the possibility of an indirect effect of supply chain adaptability under the mediating effect of supply chain agility. Therefore, based on the above arguments, the second hypothesis is developed as follows.

Hypothesis 2: The HSC performance is positively related with the adaptability of the organizations.

2.5.3 Humanitarian supply chain Alignment and Performance:

Alignment defined by Lee (2004) as "the ability of great firms to align the interests of all of the firms in their supply chains with their own." Dubey et al (2015) it is vital for supply chain performance. It involves information sharing among supply chain partners.

Supply chain alignment is the property of the supply chain network design that enables the supply chain network to flexibly adjust its configuration to align the objectives of all members (e.g. transparency among supply chain members; collaboration; and risk sharing) (Bryson 2004; Matthyssens and Vandenbempt 2008). Tang and Tomlin (2008) identified that alignment among actors in supply chain network is of critical importance and strong impact on HSC performance. Finally, the third hypothesis of the research is developed as follows.

Hypothesis 3: The HSC performance is positively related with the alignment of the organizations.

CHAPTER THREE
3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodologies that were used in this study: It includes, the choice of particular research designs, data type and source of data, research approach, data gathering technique and instruments, sampling and sampling techniques, data analysis techniques, validity and reliability of the study along with an appropriate justification associated with each approach.

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 main purpose of this research is to assess HSC performance of emergency food aid organizations in Ethiopia based on three main factors (humanitarian supply chain agility, adaptability and alignment). This study is an empirical research which follows a correlational research approach in order to address the aforementioned objectives. Correlational studies trace relationships among two or more variables in order to gain greater situational insight. The purpose of such studies is not to establish cause-effect relationship among variables but to determine whether the variables under study have some kind of association or not. Variables being studied may have positive or negative relationship or they may not have relationship at all (Experiment Resources, 2008). Therefore, using correlational study, this research investigates the direction and level of relationship between HSC specifics factors (agility, alignment, and adaptability) and HSC performance of emergency food aid organizations operating in Ethiopia.

The data used in the study are quantitative in nature which is collected from primary sources. The researcher used the survey method to assess the relationship between HSC specifics factors (agility, alignment, and adaptability) and HSC performance of emergency food aid organizations operating in Ethiopia. In the survey, independent and dependent variables were measured at the

same point in time by using a standard questionnaire. The researcher selected samples from the target population by using non- probability sampling method particularly purposive sampling technique.

After the data were collected, the researcher analyzed the data by using correlation, particularly Pearson's coefficient to investigate relationships between the dependent variable and the independent variables and Regression analysis was used to test the hypotheses of the research. Correlational research aims to ascertain if there is a significant association between two or more variables (Reid, 1987).

3.3 Research Approach

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 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). Therefore, in terms of methods, this research employed quantitative method while conducting the study.

3.4 Data Type and Source of Data

There are two types of data, which are used, in research. These are primary data and secondary data. Gathering of data is also very important task in writing a research thesis. In order to achieve the objective of this research, both primary and secondary sources of data were used.

3.4.1 Primary data

Primary data is defined as the data that a particular organization collects itself for the purpose of dealing with a specific problem (Gates & Jarboe, 1987). The main advantage with this type of data is that it is collected with the research's purpose in mind. Primary data is collected by your own creating and analyzing your own results. The researcher used primary data for the entire analysis of this study. The researcher sent a standard questionnaire to sample of respondents/ humanitarian logistics and supply chain professionals and practitioners selected from six humanitarian organizations in Ethiopia. Hence, the data collected from the respondents through standard questionnaires was used as primary data.

3.4.2 Secondary Data

Most common source to get secondary data is social science include censuses, surveys, organizational records and through research and qualitative methods. It saves time that will otherwise be spent to collect data. Secondary data can be obtained from the previous research, journals, and other study literature, which may help in one's study research. The researcher also used secondary data to construct the basic framework of the study before proceeding with the primary data. Humanitarian logistics and supply chain books, journals, relief logistics magazines and articles, international published researches, documents, and reports were reviewed as source of secondary data.

3.5 Data collection methods

The primary data was gathered particularly using survey questionnaire. The researcher distributed the questionnaire to sampled respondents of professional humanitarian logistician and HSC practitioners. For the purpose of this study a quantitative methodology involving a close-ended questionnaire was used as the measuring instrument. The close-ended questionnaires can be administered to groups of people simultaneously, since they are less costly and less time consuming than other measuring instruments. The standard questionnaire used to collect the necessary information regarding the study was modified from the work of Lee (2004); Dubey & Gunasekaran (2015) and Dubey et.al (2015). The questionnaire had two sections. The first section dealt with the profile of the respondents and the organization and the second section contained information on research objectives. The questionnaire design was in the form of Likert scale where respondents were required to indicate their views on a scale of 1 to 5. Accordingly, Indicators representing independent variables in research framework were captured using a 5-point Likert scales, ranging from strongly disagree to strongly agree. HSC performance variables were captured using a 5-point Likert scale, ranging from not at all improved to significantly improved over the last five year's arrangement of Joint emergency operation program in Ethiopia. The questionnaire was administered by the researcher via email and drop-off to the respective professional humanitarian logistician and collection at an agreed time and place.

3.6 Sampling and Sampling Techniques

3.6.1 Target Population

As per the information obtained from official sources, currently there are **52** humanitarian organizations registered in Ethiopia to implement humanitarian relief assistance programs in various areas of the country. Hence, Humanitarian organizations functioning in Ethiopia during this research period are considered as the target population of the present study.

Among the list of Humanitarian organizations operating in Ethiopia, Non-Governmental organizations (NGOs) which are engaged in the provision of Emergency food assistance

programs were selected as a sample frame of the study. According to government's official sources, there are 6 (**six)** NGO partners implementing emergency food aid programs in Ethiopia as a consortium called the Joint Emergency Operation Program (JEOP). Hence, these NGOs are selected to conduct a survey for the present study. The organizations were purposely selected by the researcher considering their experience in the sector, current capacity, volume of emergency operation, and area of coverage they are working in.

The population of study comprised six (6) non-governmental Humanitarian organizations implementing emergency food aid programs in Ethiopia and working as a consortium for at last five years. Organizations selected for the purpose of this study were;

1. Catholic Relief Services (CRS) Ethiopia
2. Save the Children International (SCI)
3. CARE Ethiopia
4. World Vision Ethiopia (WVE)
5. Food for the Hungry Ethiopia (FHE)
6. Relief Society of Tigray (REST).

3.6.2 Sampling Techniques

There are two types of sampling techniques probability and Non-probability sampling Techniques: Non-probability sampling is that sampling procedure which does not afford any basis for estimating the probability that each item in the population has of being included in the sample. Non-probability sampling is also known by different names such as deliberate sampling, purposive sampling and judgement sampling. In this type of sampling, items for the sample are selected deliberately by the researcher; his choice concerning the items remains supreme. In other words, under non-probability sampling the organizers of the inquiry purposively choose the particular units of the universe for constituting a sample on the basis that the small mass that they so select out of a huge one will be typical or representative of the whole (Creswell, 2009).

Therefore, the sample units of the research are chosen based on the non-probability sampling method of judgmental sampling. The reason why the researcher prefers to use judgmental sampling method is aiming to collect comprehensive and reliable information from the sources having relevant knowledge and/or experience directly related to the subject of the study. Accordingly, HSC professionals and other key staff members responsible for planning, implementing, and managing and controlling Emergency relief food assistance programs in the above mentioned humanitarian organizations were selected as a sample unit of the present study.

3.6.3 Sample Size

The researcher followed past researches i.e. (Davies, 2013 and Dubey et al 2015) to determine the sample size of the present study. Accordingly, he involved 10 (ten) respondents (HSC professionals related to Logistics/supply chain/procurement/warehouse/transport and food aid programming) from each of the aforementioned organizations were selected.

Hence, a total of **60 (10X6)** respondents located in Addis Ababa & regional field offices were selected as sample size of the present study. These **60** respondents were selected and contacted to collect primary data through standard questionnaires.

3.7 Data Analysis

The data collected was reviewed for completeness and accuracy upon completion of the data collection process. Thereafter, the data was sorted & coded, then entered into the Statistical Package for Social Sciences (SPSS). For the analysis of the primary data, two statistical techniques were employed. These are descriptive and inferential statistical analysis techniques. With regards to the descriptive analysis such as percentages and frequencies were calculated for the analysis of the primary data particularly for the first section of the questionnaires- to present the general information about the respondents and their respective organizations. On the other hand, inferential statistical technique was employed to analyze the information related to the objective of the study. The statistical tools were aligned with the objectives of the research. Inferential statistics, particularly the Pearson's correlation was used to show the relationship and the strength/degree as well as direction of associations between variables. The other inferential

statistical technique, regression analysis was used to test the hypotheses of the research as this technique was considered most appropriate and more conservative compared to covariance based modeling approaches, due to the complexity of the model and the available data points, and the great robustness of this technique (Dubey et al., 2015).

3.8 Validity and Reliability

3.8.1 Assessing Reliability

Reliability is the extent to which a study's operations can be repeated, with the same results (Yin 1994); also Reliability involves the accuracy of the chosen research According to Wiedersheim-Paul and Eriksson (1991). According to Bryman and Bell (2007), reliability analysis is concerned with the internal consistency of the research instrument. As multiple items in all constructs were used, the internal consistency/reliabilities of HSC agility, adaptability, and alignment and HSC performance were assessed with Cronbach's Alpha and the reliability values for all constructs are confirmed as greater than 0.7, which are considered acceptable (Nunnally, 1978). The following table-3 shows the summary of reliabilities of all constructs.

3.8.2 Analysis of Validity

Validity means an instruments ability to measure what is meant to be measured (Wiedersheim-Paul and Eriksson, 1991). According to Malhotra (2010), there are three types of validity in a study: content validity, predictive validity, and construct validity. This study addressed content validity through the review of literature and adapting instruments used in previous research.

Table 3 Reliability of HSC specific factors (HSC Agility, Adaptability, and Alignment) and HSC Performance.

Variables	Items	Cronbach's Alpha
Humanitarian Supply Chain Agility (HSCAg)	Dynamic sensing-timely anticipate disaster in advance	.817
	Dynamic flexibility to accommodate relief food supplies in its variety and volume	.813
	Speed and timely suiting the demand of the needy	.818
	Responsiveness to deliver relief food supplies quickly and cost effectively	.826
Humanitarian Supply Chain Adaptability (HSCAd)	Adapt to the culture and the law of the country	.830
	Limitations of supply chain partners are understood by conducting regular performance assessment and provide support to enhance efficiency	.821
	Structural sensing/sensitive to identifying structural shifts	.823
	Structural Flexibility/ Flexible to adjust supply chain structure to adopt unexpected changes in demand & supply of relief assistance	.818
	Collaboration with supply chain partners, donors and other stake holders	.818
	Innovativeness/use of advanced information technology for integrating operations and tracking and tracing aid in the supply chain	.838
Humanitarian Supply Chain Alignment (HSCAl)	Transparency/Transparent information flow about each other's relief demand & supply, grant, order status, inventory status, delivery schedule etc	.825
	Information sharing with partners on supply chain strategy & operational processes	.819
	Training and development programs to enhance capacity	.823
	Communication with suppliers, transport companies & 3rd party logistics service providers	.821
	Reward suppliers, Transport companies & 3rd party logistics service providers based on their performance	.847
Humanitarian Supply Chain Performance (HSCP)	Reduction in casualties	.826
	Response Time/timely deliver emergency food supplies and equipment's	.813
	Quality of delivered relief food supplies and materials to beneficiaries	.823
	Reduction in stock-out of relief food supplies, equipment's & necessary items	.821

Source: Research Data (2016)

CHAPTER FOUR
4. DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis and findings with regard to the objectives and discussion of the same. Descriptive statistics analysis such as percentages and frequencies were calculated to present the general information about respondents and respective humanitarian organizations. In order to assess the relationship between HSC specific factors (humanitarian supply chain agility, adaptability, alignment) and organizations' performance on supply chain management, correlation and regression analysis were conducted for scale typed questionnaire. A total of 60 questionnaires were issued out. The completed questionnaires were edited for completeness and consistency. Of the 60 questionnaires issued out, 58 were returned. This represented a response rate of 97%, which is valid and used for analysis. The collected data were presented and analyzed using SPSS (version 20) statistical software.

As it is mentioned above, the study used correlation analysis, specifically Pearson's correlation to measure the degree of association between different variables under consideration. Regression Analysis was also used to test the hypotheses of the study and the influence of the independent variables on dependent variable.

4.2 General Information of Respondents and organizations.

The General Information of respondents and organizations considered in the study was the respondent's Age, sex, educational qualification, experience, department/work unit, and name of humanitarian organizations.

4.2.1 Respondents Sex

The respondents were asked to indicate their Sex. The results presented in table-4 below shows that 22.4 % of the respondents were females while the rest 77.6 % of the respondents were male.

Table 4 Respondents Sex

	Frequency	Percent	Cumulative Percent
Female	13	22.4	22.4
Male	45	77.6	100.0
Total	58	100.0	

Source: Research Data (2016)

4.2.2 Respondents Age

The respondents were also asked to indicate their Age. The results presented in table-5 below shows that 13.8 % of the respondents were 20-30 years old, 56.9 % of the respondents were 31-40 years old and the rest 29.3 % of the respondents were over 40 years old.

Table 5 Respondents Age

	Frequency	Percent	Cumulative Percent
20-30 years old	8	13.8	13.8
31-40 years old	33	56.9	70.7
Over 40 years old	17	29.3	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

4.2.3 Educational Qualification of respondents

Regarding question rose to respondents about their Educational Qualification, as indicated in table-6; 6.9 % of respondents had diploma, 67.2% of respondents had first degree and the rest 25.9 % of respondents had second Degree and above. The result indicates that most of the respondents were qualified professionals so that they can easily understand and provide their opinion on research questionnaire.

Table 6 Educational Qualification of respondents

	Frequency	Percent	Cumulative Percent
College Diploma	4	6.9	6.9
First Degree	39	67.2	74.1
Second Degree and above	15	25.9	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

4.2.4 Name of the organization

With regard to the question rose to respondents about their respective organization they have been working in, the results presented in table-7 shows that 17.2 % of the respondents were from CARE, 17.2 % of the respondents were from CRS, 17.2 % of the respondents were from FHE, 17.2 % of the respondents were from REST, 17.2 % of the respondents were from SCI while 13.8% of the respondents were from WVE. The result indicates that respondents from different humanitarian organizations can have different practice, experience and knowledge in HSCM and they will provide an independent view of humanitarian supply chain specific factors and HSC performance.

Table 7 Name of the organization

	Frequency	Percent	Cumulative Percent
CARE	10	17.2	17.2
CRS	10	17.2	34.5
FHE	10	17.2	51.7
REST	10	17.2	69.0
SCI	10	17.2	86.2
WVE	8	13.8	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

4.2.5 Respondents work Experience in current organization

Respondents were also asked to indicate their work experience in current organization, As the result shows in below Table-8, 10.3 % of the respondents had less than 2 years of work experience, 31% of the respondents had 2-5 Years of work experience, and 31% of the respondents had 6-10 Years of work experience while 27.6 % of the respondents had more than 10 Years of work experience in in current organization. The result indicates almost all of the respondents had sound knowledge and experience in HSCM of their respective organizations so that they will give sound and reliable information to the research question.

Table 8 Respondents work Experience in current organization

	Frequency	Percent	Cumulative Percent
Under 2 Years	6	10.3	10.3
2-5 Years	18	31.0	41.4
6-10 Years	18	31.0	72.4
Over 10 Years	16	27.6	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

4.2.6 Respondents department/work Unit

The respondents were asked to indicate their department/work unit in the organization and the results are presented in table below.

Table 9 Respondents department/work Unit

	Frequency	Percent	Cumulative Percent
Procurement	5	8.6	8.6
Logistics/supply chain	24	41.4	50.0
warehouse	6	10.3	60.3
Food Aid Programming	23	39.7	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

The results indicate that 8.6% of the respondents were from procurement department, 41.4% of the respondents were from Logistics/supply chain department, 10.3% of the respondents were from warehouse department, while 39.7% of the respondents indicated that they were from Food Aid Programming department. The results indicate that the respondents were from different department/work unit and thus they will give an independent view of humanitarian supply chain practice and humanitarian supply chain performance.

4.2.7 Respondents experience in humanitarian sector/relief chain operation

Finally, respondents were asked to indicate their professional experience in humanitarian sector/relief chain operation. As the result shows in below Table-10, 6.9% of the respondents had less than 2 years of work experience, 15.5% the respondents had 2-5 Years of work experience, and 36.2% of the respondents had 6-10 Years of work experience while 41.4 % the respondents had more than 10 Years of work experience in humanitarian sector/relief chain operation. The result indicates that almost all of the respondents had sound knowledge and experience in the area. Thus they will provide sound and concrete information to the study.

Table 10 Respondents experience in humanitarian sector/relief chain operation

	Frequency	Percent	Cumulative Percent
Under 2 Years	4	6.9	6.9
2-5 Years	9	15.5	22.4
6-10 Years	21	36.2	58.6
Over 10 Years	24	41.4	100.0
Total	**58**	**100.0**	

Source: Research Data (2016)

4.3 Inferential Statistics for HSC specific factors and factors related to HSC Performance of Organizations.

4.3.1 Correlation Analysis

Correlations are the measure of the linear relationship between two or more variables. As described by Kothari (2004), a Coefficient of correlation has the value of '*r*' lies between ± 1. Positive values of *r* indicate positive correlation between the two variables, whereas negative values of '*r*' indicate negative correlation. A zero value of '*r*' indicates that there is no association between the two variables.

According to Evan's (1996), the strength of the correlation can be described as, the absolute value of r namely 0.00-0.19 (Very Weak), 0.20-0.39 (Weak), 0.40-0.59 (Moderate), 0.60-0.79 (Strong) and 0.80-1.00 (Very Strong).

In this section, the researcher conducted correlation analysis in the light of each research objectives and hypotheses developed. The researcher used Karl Pearson's coefficient of correlation (or simple correlation) analysis as it is the most widely used method of measuring the degree of relationship between two or more variables. The relationship between humanitarian supply chain specific factors and HSC performance of organizations was investigated using Pearson's coefficient of correlation analysis. This provided correlation Coefficients which indicated the strength and direction of relationship. The p-value also indicated the probability of this relationship's significance.

4.3.1.1 Correlation Analysis between Construct of HSC specific factors and HSC Performance

Table 11 Correlation matrix between constructs of HSC specific factors and factors related HSC performance.

		Humanitarian Supply Chain Agility	Humanitarian Supply Chain Adaptability	Humanitarian Supply Chain Alignment	Humanitarian Supply Chain Performance
Humanitarian Supply Chain Agility	Pearson Correlation	1	.609**	.379**	.531**
	Sig. (2-tailed)		.000	.003	.000
	N	58	58	58	58
Humanitarian Supply Chain Adaptability	Pearson Correlation	.609**	1	.406**	.318*
	Sig. (2-tailed)	.000		.002	.015
	N	58	58	58	58
Humanitarian Supply Chain Alignment	Pearson Correlation	.379**	.406**	1	.431**
	Sig. (2-tailed)	.003	.002		.001
	N	58	58	58	58
Humanitarian Supply Chain Performance	Pearson Correlation	.531**	.318*	.431**	1
	Sig. (2-tailed)	.000	.015	.001	
	N	58	58	58	58
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Source: Research Data (2016)

The constructs of HSC specific factors which their relationship with HSC performance (HSCP) presented in the above table are Humanitarian Supply Chain Agility (HSCAg), Humanitarian Supply Chain Adaptability (HSCAd) and Humanitarian Supply Chain Alignment (HSCAl).

The correlation between constructs of HSC specific factors (Agility, Adaptability and Alignment) with HSC performance was checked as presented in the above table-11. The result of correlation matrix between each constructs and HSC performance are analyzed as follows:

As it is indicated in the above table-11, there is significant positive correlation between Humanitarian Supply Chain Agility (HSCAg) and Humanitarian Supply Chain performance (HSCP) with correlation coefficient of 0.531 (r=0.531) and significance level is less than 0.001. Therefore, Humanitarian Supply Chain Agility and Humanitarian Supply Chain performance are moderately and positively correlated.

Table-11 also shows that there is significant positive correlation between Humanitarian Supply Chain Adaptability (HSCAd) and Humanitarian Supply Chain performance (HSCP) with a Pearson's correlation coefficient of 0.318 (r=0.318) and significance level is less than 0.001. Hence, Humanitarian Supply Chain Adaptability and Humanitarian Supply Chain performance are weakly and positively correlated.

For Pearson correlation test conducted to know whether there is significant correlation or not between Humanitarian Supply Chain Alignment (HSCAl) and Humanitarian Supply Chain performance (HSCP), table-11 clearly indicated that there is moderate and positive relationship between humanitarian Supply Chain Alignment and Humanitarian Supply Chain performance. The result of correlation analysis between humanitarian Supply Chain Alignment and Humanitarian Supply Chain performance is correlation coefficient of 0.431 (r=0.431) and significance value less than 0.001.

4.3.1.2 Correlation Analysis between Humanitarian Supply Chain Alignment (HSCAl) and Humanitarian Supply Chain Agility (HSCAg).

As it is shown in the table-12 below there is significance positive correlation between Humanitarian Supply Chain Alignment and Humanitarian Supply Chain Agility with a Pearson correlation coefficient of 0.379 (r=0.379) significance value is less than 0.001. This significance tells that there is weak relationship between Humanitarian Supply Chain Alignment and Humanitarian Supply Chain Agility.

Table 12 Correlation between HSCAl and HSCAg

		Humanitarian Supply Chain Alignment	Humanitarian Supply Chain Agility
Humanitarian Supply Chain Alignment	Pearson Correlation	1	.379**
	Sig. (2-tailed)		.003
	N	58	58
Humanitarian Supply Chain Agility	Pearson Correlation	.379**	1
	Sig. (2-tailed)	.003	
	N	58	58
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Research Data (2016)

4.3.1.3 Correlation Analysis between Humanitarian Supply Chain Alignment (HSCAl) and Humanitarian Supply Chain Adaptability (HSCAd)

Table 13 Correlation between HSCAl and HSCAd

		Humanitarian Supply Chain Alignment	Humanitarian Supply Chain Agility
Humanitarian Supply Chain Alignment	Pearson Correlation	1	.406**
	Sig. (2-tailed)		.002
	N	58	58
Humanitarian Supply Chain Adaptability	Pearson Correlation	.406**	1
	Sig. (2-tailed)	.002	
	N	58	58
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Research Data (2016)

As shown in table-13 above, Pearson correlation test was conducted for Humanitarian Supply Chain Alignment and Humanitarian Supply Chain Adaptability. The result indicates that there is moderate positive significant association between Humanitarian Supply Chain Alignment and

Humanitarian Supply Chain Adaptability with correlation coefficient of 0. 406 (r=0. 406) and significance level less than 0.001.

4.3.1.4 Correlation Analysis between Humanitarian Supply Chain Adaptability (HSCAd) and Humanitarian Supply Chain Agility (HSCAg)

As it is shown in the table-14 below there is strong positive significant correlation between Humanitarian Supply Chain Adaptability and Humanitarian Supply Chain Agility with a Pearson correlation coefficient of 0. 609 (r=0. 609) significance value is less than 0.001. This significance tells that there is genuine relationship between Humanitarian Supply Chain Adaptability and Humanitarian Supply Chain Agility.

Table 14 Correlation between HSCAd and HSCAg

		Humanitarian Supply Chain Adaptability	Humanitarian Supply Chain Agility
Humanitarian Supply Chain Adaptability	Pearson Correlation	1	.609**
	Sig. (2-tailed)		.000
	N	58	58
Humanitarian Supply Chain Agility	Pearson Correlation	.609**	1
	Sig. (2-tailed)	.000	
	N	58	58
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Research Data (2016)

4.3.2 Regression Analysis

Regression is the determination of a statistical relationship between two or more variables (Kothari 2004). This regression analysis is conducted to know by how much the independent variable explains the dependent variable.

The researcher tested the hypotheses of the research using regression analyses as this technique was considered most appropriate and more conservative compared to covariance based modeling approaches, due to the complexity of the model and the available data points, and the great robustness of this technique (Dubey et al., 2015).The regression was conducted between humanitarian supply chain management specific factors (independent variables) and humanitarian supply chain performance (dependent variable).The results of the regression analysis are presented as follows.

4.3.2.1 Multi Collinearity Test

Muliti collinearity test of independent variables was conducted to check whether the assumptions for regression analysis are met or not. According to Mendard, (1995) Tolerance should be more than 0.2 and VIF (Variance Inflation Factor) should be less than 10 (Myers, 1990).

Table 15 Multi Collinearity Test of independent variable

Independent Variables	Collinearity Statistics	
	Tolerance	VIF
Humanitarian Supply Chain Agility	0.608	1.645
Humanitarian Supply Chain Adaptability	0.593	1.686
Humanitarian Supply Chain Alignment	0.808	1.238

a. Dependent Variable: Humanitarian Supply Chain Performance
Source: Research Data (2016)

The result in table-15 above shows that the collinearity between independent variables has no series problem. Since the value of tolerance for all independent variable is greater than 0.1 and all VIF is less than ten (VIF<10).Therefore, the assumption for regression analysis are met.

4.3.2.2 Regression Analysis for Hypotheses Tests

As it is already mentioned above, the researcher tested hypotheses of the study using liner regression analysis suggested by Dubey et al (2015) and Baro and Kenny (1986). The researcher presented a regression analysis output for three hypotheses in table-16 as follows.

4.3.2.3 Regression Analysis between HSCAg and HSCP

Table 16 Regression Analysis HSCAg and HSCP

Hypothesis	R	R^2	F	Beta coefficient	P
Hypothesis-1	0.531	0.282	22.044	0.534	0.000

Predictors: (Constant), $HSCAg_a$
Dependent Variable: $HSCP_b$
Source: Research Data (2016)

As we can see from above Table-16, Hypothesis-1, that is, humanitarian supply chain agility positively related to humanitarian supply chain performance, is supported. Humanitarian supply chain agility is statistically positively linked with humanitarian supply chain performance. R2=0.282 for the linkage, shows that humanitarian supply chain agility has a positive and very strong impact on humanitarian supply chain performance. It explains nearly 28.2 % of the total humanitarian supply chain performance variance. The Beta coefficient is 0.534 and statistically significant which implies that HSC agility has a positive influence on organizational performance. This suggests that the humanitarian supply chain agility is a significant driver of humanitarian supply chain performance.

4.3.2.4 Regression Analysis between HSCAd and HSCP

Table 17 Regression Analysis HSCAd and HSCP

Hypothesis	R	R^2	F	Beta coefficient	P
Hypothesis-2	0.318	0.101	6.291	0.308	0.015

Predictors: (Constant), $HSCAd_a$
Dependent Variable: $HSCP_b$
Source: Research Data (2016)

As shown in the above Table-17, Hypothesis-2, that is, humanitarian supply chain adaptability positively related with humanitarian supply chain performance, is also supported. It is also seen that humanitarian supply chain adaptability has a positive and statistically significant relationship and with humanitarian supply chain performance. R2=0.101 for the relationship, shows that humanitarian supply chain adaptability has a positive and strong impact on humanitarian supply chain performance. It explains nearly 10.1% per cent of the total humanitarian supply chain performance variance. The positive Beta coefficient also implies that HSC adaptability has a positive and statistically significant impact on HSC performance.

4.3.2.5 Regression Analysis between HSCAl and HSCP

Table 18 Regression Analysis HSCAl and HSCP

Hypothesis	R	R^2	F	Beta coefficient	P
Hypothesis-3	0.431	0.186	12.775	0.416	0.001

Predictors: (Constant), $HSCAl_a$
Dependent Variable: $HSCP_b$
Source: Research Data (2016)

It is also seen from the table-18, Hypothesis-3, that is, humanitarian supply chain alignment positively linked with humanitarian supply chain performance, is also supported. As it is clearly shown in the table, humanitarian supply chain alignment has also a positive and statistically significant relationship and with humanitarian supply chain performance. R2=0.186 for the linkage, suggesting that HSC alignment has a positive and strong impact on humanitarian supply chain performance. It explains nearly 18.6 % of the total humanitarian supply chain performance variance. The positive Beta coefficient also implies that HSC alignment have a positive and significant influence on HSC performance.

4.4 Discussion of the Results

The objective of this study is to assess humanitarian supply chain performance of selected relief organizations in Ethiopia using Triple-A supply chain performance assessment tool proposed by Lee (2004). The study also aimed to empirically test the proposed framework identifying the relationships among HSC specific factors and factors related to HSC performance of selected humanitarian organizations which have been implementing emergency food aid programs in Ethiopia as a consortium.

Literatures on supply chain management have suggested that Supply chain agility, adaptability and alignment are a key to be successful in logistics and supply chain operation. Literatures have also suggested that there is a relationship among agility, adaptability, alignment and supply chain Performance. But, most of the literatures were conducted in the context of commercial supply chain network design; in the case of humanitarian supply chain network design, there was an urgent need for empirical study.

In the present study makes contributions by further exploring and empirically investigating the possible relationship among agility, adaptability and alignment on HSC performance of selected humanitarian relief organizations in Ethiopia. The results of the study are discussed as follows:

This study revealed that there is a significant and positive correlation between Humanitarian Supply Chain Agility (HSCAg) and Humanitarian Supply Chain performance (HSCP) with correlation coefficient of 0.531 (r=0.531) and significance level is less than 0.001. Therefore, Humanitarian Supply Chain Agility and Humanitarian Supply Chain performance are moderately and positively correlated.

Hypothesis test result of regression analysis also indicates that Humanitarian supply chain agility is statistically positively linked with humanitarian supply chain performance. R2=0.282 for the linkage, shows that humanitarian supply chain agility has a positive and very strong impact on humanitarian supply chain performance. It explains nearly 28.2 % of the total humanitarian supply chain performance variance. This finding is consistent with the work of other researchers (e.g. Whitten et al 2013; Dubey and Gunasekaran (2015); (Gligor and Holcomb 2012); Dubey et.al, 2015.

This suggests that the humanitarian supply chain agility is a significant driver of humanitarian supply chain performance. Since, it is a measure of the supply chain responsiveness capability (the speed) supply chain agility can positively impact operational performance (Gligor and Holcomb 2012).

The other finding of the study also shows that there is significant and positive correlation between Humanitarian Supply Chain Adaptability (HSCAd) and Humanitarian Supply Chain performance (HSCP) with a Pearson's correlation coefficient of 0.318 (r=0.318) and significance level is less than 0.001. Hence, Humanitarian Supply Chain Adaptability and Humanitarian Supply Chain performance are weakly and positively correlated.

On the other hand, the finding of correlation analysis also shows there is strong positive significant correlation between Humanitarian Supply Chain Adaptability and Humanitarian Supply Chain Agility with a Pearson correlation coefficient of 0. 609 (r=0. 609) significance value is less than 0.001.This finding also support the work of other researchers for instance (Lee, 2004); and Dubey et al, 2015)

In addition to these, the finding of regression analysis made for hypothesis test confirmed that that humanitarian supply chain adaptability has a positive and statistically significant relationship and with humanitarian supply chain performance. R2=0.101 for the relationship, shows that humanitarian supply chain adaptability has a positive and strong impact on humanitarian supply chain performance. It explains approximately 10.1 % of the total humanitarian supply chain performance variance. This shows Supply chain adaptability can also improve supply chain performance. Past scholars have widely acknowledged the significant role of supply chain

adaptability in cost savings (Lee 2004). This finding is also consistent with the work of other researchers (i.e. Whitten et al (2012); Gligor and Holcomb 2012; and Dubey and Gunasekaran (2015).

The last constructs of the framework is HSC alignment which is positively correlated with Humanitarian Supply Chain performance with correlation coefficient of 0.431 (r=0.431) and significance value less than 0.001.

On the other hand, there is a significance and positively weak correlation between Humanitarian Supply Chain Alignment and Humanitarian Supply Chain Agility with a Pearson correlation coefficient of 0.379 (r=0.379) significance value is less than 0.001. Humanitarian Supply Chain Alignment has also moderate positive significant association with Humanitarian Supply Chain Adaptability with correlation coefficient of 0. 406 (r=0. 406) and significance level less than 0.001.

Besides, the result of regression analysis made for hypothesis test also confirmed that humanitarian supply chain alignment is statistically positively related with humanitarian supply chain performance. R2=0.186 for the linkage, suggesting that HSC alignment has a positive and strong impact on humanitarian supply chain performance. It explains nearly 18.6 % of the total humanitarian supply chain performance variance.

Therefore, both correlation and regression analyses results confirmed that HSC alignment is positively related not only with HSC performance but also with humanitarian supply chain agility and humanitarian supply chain adaptability. This result is also supported by the work of (e.g. (Bryson 2004; Whitten et al 2013; Dubey et.al 2015.

CHAPTER FIVE
5. SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Summary of Major Findings

This study is aimed to assess humanitarian supply chain performance of selected relief organizations in Ethiopia based on Triple-A supply chain performance assessment framework proposed by Lee 2004. Specifically, this study is intended to explore and/or test if there is a possible relationship among HSC Agility, HSC Adaptability and HSC Alignment on HSC performance. Based on the results of the study the summary of major findings are presented as follows.

The test result indicates that HSC Agility has positive and moderate correlation (r=0.531) with HSC performance at significance level less than 0.001. On the other way, hypothesis test result of regression analysis also indicates that HSC agility has positive and statistically very strong relationship with HSC performance and the linkage explains nearly 28.2 % of the total humanitarian supply chain performance variance. This shows that humanitarian supply chain agility has a positive and very strong impact on humanitarian supply chain performance.

On the other hand, the test result of HSC Adaptability and HSC performance indicates that HSC Adaptability has positive and week correlation (r=0.318) with humanitarian supply chain performance at significance level less than 0.001. The test result also shows that HSC Adaptability has positive and statistically strong correlation (r=0.609) with HSC Agility at significance value less than 0.001. Besides, the regression analysis made for hypothesis test also indicates that HSC adaptability has a positive and statistically strong relationship and with HSC performance and the linkage explains approximately 10.1 % of the total humanitarian supply chain performance variance. This shows that humanitarian supply chain adaptability has a positive and strong impact on humanitarian supply chain performance.

Finally, the test result shows HSC alignment has positive and moderate correlation (r=0.431) with HSC performance at significance value less than 0.001. It is also indicates that HSC alignment has positive and weak correlation (r=0.379) with HSC Agility at significance value less than 0.001. On the other way, the test result also indicates that, HSC alignment has also positive and moderate correlation (r=0. 406) and significance level less than 0.001 with HSC Adaptability. In other way, the result of regression analysis made for hypothesis test also confirm that HSC alignment has positive and statistically strong relationship with HSC performance and the relation explains nearly 18.6 % of the total humanitarian supply chain performance variance. This suggests that HSC alignment has a positive and strong impact on humanitarian supply chain performance.

5.2 Conclusion

Based on the results of the study and the summary of findings the following conclusions are given.

There is positive and statistically very strong relationship between humanitarian supply chain agility humanitarian supply chain performances. This suggests that humanitarian supply chain agility has very strong impact on humanitarian supply chain performance. Humanitarian supply chain adaptability has also positive and strong relationship with humanitarian supply chain performance. This also suggests that humanitarian supply chain adaptability has strong impact on humanitarian supply chain performance. On the other hand, Humanitarian supply chain alignment has positive and statistically strong relationship with HSC performance. This also suggests that humanitarian supply chain alignment has strong impact on humanitarian supply chain performance.

5.3 Recommendation

On the basis of the finding and the conclusion reached, the following suggestions are forwarded.

In humanitarian aid activities, delays in delivery or relief can cost lives. Therefore, efficiency in logistics and supply chain is a key factor as it ensures the smooth flow of goods and services in a complex supply chain system. Therefore, disaster relief organizations are trying to move relief goods more quickly and effectively so that victims can be saved. This requires the support of an agile, adaptable and properly aligned supply chain network. Hence,

- In order to become competitive and achieve sustainable performance in disaster relief chain operations, humanitarian organizations have capabilities to establish and/or improve their supply chains that are aligned, adaptable and agile which will enhance the supply chain performance but organizational performance as well.

- In order to improve humanitarian supply chain ***Agility,*** humanitarian organizations should give due attention on dynamic sensing, flexibility, speed and responsiveness.

- In order to improve humanitarian supply chain ***adaptability*** of the supply chain network, focus should be on culture, developing mutual respect and trust among supply chain partners, responding to environmental needs and improving collaboration, innovativeness and utilization of information technology.
- Humanitarian Supply chain ***alignment*** can be improved by effective communication design, through proper training and development, maintaining transparency, and establishing suppliers performance rewarding schemes

5.4 Theoretical and Managerial Implications

In the present study, researcher has attempted to empirically examine Lee's (2004) supply chain theories (i.e. triple As) in the context of humanitarian supply chain point of view. Even though researchers have immensely contributed in the field of supply chain agility, supply chain adaptability and supply chain alignment, but all are from a commercial point of view. In this regard, the contribution of this study to the effort of developing the newly emerging humanitarian supply chain performance assessment framework for relief chain sectors and to existing theories will be paramount importance.

Since this research is designed to assessing the performance of relief supply chain operation, the result will be beneficial to humanitarian organizations that have currently executing emergency food aid programs in particular and other humanitarian organizations implementing relief operations in Ethiopia in general.

Meanwhile, in Ethiopia, the study of humanitarian supply chain management has not sufficiently been studied, the output this study will contribute for the knowledge pool in relation with the functioning and performance of the HSCM in Ethiopia.

5.5 Further Research Directions

Based on the present research limitations, researcher has identified the following for future research directions.

- The present study can further be extended by covering more NGOs and humanitarian supply chain actors (i.e. Transport companies, host government, beneficiary and third party logistics service providers) and the donors.

- The impact of behavioral dimensions like leadership and humanitarian supply chain actors' culture, and supply chain resilience on HSC performance can further be explored.

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APPENDIX

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
MA PROGRAM

Questionnaire to be distributed for humanitarian supply chain professionals and practitioners.

Participant ID # _____

Dear Participant,

This questionnaire is developed for an academic effort planned for the collection of primary data that will be used to assess humanitarian supply chain performance of non-government emergency food aid organizations, in partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply Chain Management, Addis Ababa University, School of Commerce.

The information obtained from this questionnaire will be kept confidential and will not be used for any other purposes. Hence, I, kindly request you to answer to the questions freely and openly to share your competence and knowledge with me.

Thank you for your cooperation!

Endale H/Gebriel
Cell Phone: 0912101981
E-mail: endalehg@gmail.com
April, 2016
Addis Ababa, Ethiopia

General Instructions

- It is not necessary to write your name
- Try to address all the question given below
- Where answer options are available, please tick (√) in the appropriate box for PART-I and circle for your response to each statements of PART-II.

PART-I: General Information

This part of the questionnaire, tries to gather some general information about the background of the respondent and the organization.

1.1 Sex

1. Female ☐
2. Male ☐

1.2 Age

1. Under 20 Years Old ☐
2. 20-30 Years Old ☐
3. 31-40 Years Old ☐
4. Over 40 Years Old ☐

1.3 Educational Qualification:

1. Grade 10 completed ☐
2. Grade 12 completed ☐
3. College Diploma ☐
4. First Degree ☐
5. Second Degree and above ☐

1.4 Name of the organization:

_____

1.5 Years stayed at the organization:

1. Under 2 Years ☐
2. 2-5 Years ☐
3. 6-10 Years ☐
4. Over 10 Years ☐

1.6 Your department/work unit:

1. Procurement ☐ 4. Transport ☐
2. Logistics/Supply Chain ☐ 5. Food Aid Programming ☐
3. Warehouse ☐

1.7 How long have you been working in humanitarian sector/relief chain operation?

1. Under 2 Years ☐ 3. 6-10 Years ☐
2, 2-5 Years ☐ 4. Over 10 Years ☐

PART-II: Instruments for humanitarian supply chain management practices and humanitarian supply chain performance.

This part of the questionnaire relates to information on humanitarian supply chain management practices and humanitarian supply chain performance of emergency food aid organizations in Ethiopia.

Section One: Humanitarian supply Chain management practices.

With regard to HSC management practices of your organization, please circle the appropriate number to indicate the extent to which you agree or disagree with each statement as per rating; 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

	Humanitarian Supply chain Agility	Strongly disagree	Disagre	Neutral	Agree	Strongly agree
1	You and your implementing partners are on the position for timely to anticipate disaster in advance and quickly respond to the sudden changes in demand for humanitarian assistance in the country.	1	2	3	4	5
2	You and your implementing partners are adopting dynamics and flexibility to accommodate relief food supplies in its needed variety and volume so that efficiently/effectively addressing people affected by disaster.	1	2	3	4	5
3	You and your implementing partners are on keeping the time for suiting the demand of the needy in its provision of relief food immediate of disaster/drought.	1	2	3	4	5
4	You and your implementing partners are responsive to deliver relief food supplies to people affected by drought quickly and cost-efficiently.	1	2	3	4	5

	Humanitarian Supply Chain Adaptability	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	You and your implementing partners adapt to the culture and law of the country you serve.	1	2	3	4	5
2	You have regularly assessed performance of your implementing partners and Suppliers, and then provide the required support to resolve limitations and improve humanitarian supply chain efficiency.	1	2	3	4	5
3	You and your implementing partners are sensitive to identifying supply chain structural shifts by capturing the latest data, filtering out noise, and tracking key patterns of disaster/drought to relocate facilities, donations, and logistics in advance.	1	2	3	4	5
4	You and your implementing partners are flexible to adjust your supply chain structure quickly to adopt unexpected changes in demand and supply for relief assistance in the country.	1	2	3	4	5
5	You have consistently collaborate with your implementing partners, donors and other stakeholders on program planning, program delivery and operational processes; such as procurement, transportation & delivery, distribution, warehouse & inventory management, and internal reporting.	1	2	3	4	5
6	You and your implementing partners have invested in real time systems and advanced information technologies in order to integrate supply chain operations and tracking and tracing aid in the supply chain.	1	2	3	4	5
	Humanitarian Supply Chain Alignment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	You and your implementing partners have transparent information flow about each other's relief demand forecast, Grant, relief supply, beneficiary data, inventory status, order status and order tracking, delivery schedule, and etc.	1	2	3	4	5
2	You have consistently sharing information with your implementing partners on supply chain strategy and operational processes to improve coordination and performance of all members in a supply chain.	1	2	3	4	5
3	You and your implementing partners have formal training and development programs to enhance staff capacity on disaster and humanitarian supply chain management.	1	2	3	4	5
4	You have effective communications with your suppliers, transport companies and third party logistics service providers on supply chain operational processes/activities to improve coordination and effectiveness of aid delivery and avoiding delays.	1	2	3	4	5
5	You reward your suppliers, transport companies and third party logistics service providers based on their performance.	1	2	3	4	5

Section Two: Humanitarian supply chain performance

With regard to humanitarian supply chain performance of your organization and/or your implementing partners, please circle the appropriate number to indicate the extent to which you agree or disagree with each statement as per rating; 1 = Not at all improved, 2 = Of Little improved, 3 = Of Average improved, 4 = Very Improved, 5 = significantly improved.

	Humanitarian Supply chain performance How well humanitarian organization been successful in their supply chain target against achieving its humanitarian goals during the last five year's given that of Joint emergency operation program (JEOP) is the one amongst the primary.	Not at all improved	Of Little improved	Of Average improved	Very Improved	Significantly improved
1	Humanitarian organization's achievement in reducing casualties and impact of the disaster/drought on human lives.	1	2	3	4	5
2	Humanitarian supply chain's success in delivering emergency food supplies in timely wise immediate after disaster.	1	2	3	4	5
3	Humanitarian supply chain's achievement in delivering emergency food supplies to beneficiaries with consistence quality.	1	2	3	4	5
4	Humanitarian supply chain's success in reducing stock out of relief food supplies, equipment and other necessary items in areas affected by disaster.	1	2	3	4	5

If any comment you well come:

_____

_____

_____

_____

Many Thanks! I really appreciate your time for now and special thanks your continuous support to humanity.