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College of Business and Economics

School of Commerce

**Effect of Disaster Management Practice on Humanitarian Supply
Chain Management Performance: In the Case of Ethiopian Red
Cross Society.**

By

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A thesis submitted to Logistics and Supply Chain Management Unit, Postgraduate Program,
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Declaration

I declare that this thesis entitled “Effect of Disaster Management Practice on Humanitarian Supply Chain Management Performance: In the Case of Ethiopian Red Cross Society” is my original work, has not been presented in any of other university and that all sources of materials used for this thesis have been duly acknowledged.

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Certification

This thesis, entitled “Effect of Disaster Management Practice on Humanitarian Supply Chain Management Performance: In the Case of Ethiopian Red Cross Society” was carried by Metasebya Kebede as a prerequisite to obtain her second degree from Addis Ababa University School of Commerce. She conducted this thesis under my guidance and supervision.

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Lists of Acronyms and Abbreviations

ABC	Activity-Based Costing
BSC	Balanced Score Card
ERCS	Ethiopian Red Cross Society
CSCM	Commercial supply chain management
DMP	Disaster Management Practice
FLR	Framework for Logistics Research
HOs	Humanitarian Organizations
HSC	Humanitarian supply chain
HSCMP	Humanitarian supply chain management Performance
IBM	International Business Machines Corporation
ICRC	International Committee of the Red Cross
IRC	International Rescues Committee
OCHA	Office for the Coordination of Humanitarian Affairs
SC	Supply chain
SCI	Save the children international
SCM	Supply chain management
SCOR	Supply Chain Operation Reference
SPSS	Statistical Package for Social Science
NGOs	Non-governmental organizations
UNDP	United Nations Development Program
UNISDR	United Nations International Strategy for Disaster Reduction
VIF	Variance Inflation Factor

Abstract

The study investigates the impact of disaster management practices on the performance of the HSCM in the context of disaster relief, which seeks to minimize human suffering by preventing loss of life and injury, and providing timely medical care to those affected. Specifically, the research focuses on the Ethiopian Red Cross Society (ERCS). The study deployed mixed research approach so as to provide extensive insight and generalizable results. A census survey was conducted with a target population of 96 staff who is directly involved in logistics and supply chain management process at Addis Ababa and Adama geographical areas. The researcher used structured close ended questionnaires to collect primary data. Secondary data were also adopted from published and unpublished journals. Of the 96 questionnaires deployed, 85 were used and entered into SPSS version 27 for data analysis. A study was conducted using an explanatory study design to examine the impact of independent variables on dependent variables through a multiple linear regression analysis. The results of the analysis indicate a positive correlation between disaster management practices and the performance of humanitarian supply chain management (HSCM). The study also showed that disaster management practices (mitigation, preparedness, and response and recovery practices) have an effect on the HSCM performance. The key findings of this study shows only one of the disaster management practices (mitigation practices) has insignificant positive effect on humanitarian supply chain management performance of ERCS.

Key Words: Disaster relief operation, HSCM performance

CHAPTER ONE

INTRODUCTION

This chapter consists of research background, problem description, research questions and research goals, research significance, scope and limits, definitions of terms and research structure.

1.1 Background of the study

The growing incidence of disasters on our world forces humanitarian relief supply networks to prioritize the protection of the victims. Recent years have seen unprecedented humanitarian demands as a result of protracted complex crises, conflict escalation in multiple countries, climate change-induced vulnerability, and a succession of natural catastrophes (Sodhi 2016; OCHA Annual Report 2017). In 2017, natural disasters incurred costs exceeding \$306 billion, which was more than twice the \$189 billion incurred in 2016 (Tousignant 2017). Thomas and Kopczak (2005) stated there is an increasing need for humanitarian aid worldwide, particularly for disaster relief efforts, and this need is only expected to grow.

Thomas and Kopczak (2005) assert that effective management of the supply chain is crucial in addressing disaster relief operations because it amalgamates, organizes, and supervises the transportation of materials, products, and accompanying information from suppliers and donors to meet beneficiary requirements in a timely manner (Fritz Institute, 2012). Additionally, the common elements which is basic in any supply chain is getting the right goods, at the right time, to the right place and distributed to the right people is still applicable in the humanitarian context (Shepherd and Gunter, 2006).

The humanitarian supply chain (HSC) refers to the interconnected system that facilitates the flow of services, supplies, information, and funding among various stakeholders such as beneficiaries, donors, suppliers, and different units within humanitarian aid organizations. Its purpose is to ensure the efficient delivery of physical aid to those in need (Mentzer, 2001). HSC covers a wide range of activities. These activities occur at any one phases of the disaster/emergency management, i.e., mitigation, preparedness, response and recovery. Mitigation activities usually eliminate or reduce the probability of disaster occurrence or reduce the effect of unavoidable disasters. Any activity and measure taken in advance to ensure effective response is the

preparedness activity. The two activates mitigation and preparedness is performed before the disaster, to enhance safety and reduce the potential impact on people and infrastructure (Holguin-Veras, J., M. Jaller, L. N. Van Wassenhove, N. Perez, and T. Wachtendorf., 2012). The response activity starts after a disaster occurs. Response related humanitarian supply chain includes the transportation of supplies and equipment for search and rescue, and of equipment and material for emergency repairs to the infrastructure. The restoration, reconstruction and rehabilitation are done in the recovery phase. So, the effectiveness of HSC partially depends on the pre-disaster preparations as well as on post-disaster performance.

Performance is one of the most argued concepts about which there has never been an agreement among various researchers and theorists (Jenatabadi, H.S., 2015). The concept of performance is widely discussed in theoretical literature, but its definition poses a challenge due to its multiple interpretations. As a result, there is no universally accepted definition of this concept (Gavrea, Ilies & Stegorean, 2011). In the supply chain management context, performance can be defined as the multiple measures of performance developed by the organization to gauge the ability of a supply chain to meet an organization's long-term and short-term objectives (Deshpande, A., 2012). Coming to the HSCM performance, the performance measurement is much less developed. But for this study five performances attributes in the original Supply Chain Operation Reference (SCOR) model: reliability, responsiveness, agility, cost, and asset management are applicable in measuring the performance of humanitarian organization.

The research focuses on the Ethiopian Red Cross Society (ERCS) which was established on July 8, 1935, through a government directive. In the same year, it received official recognition from the International Committee of the Red Cross (ICRC) and subsequently became the 48th member of the International Federation of Red Cross and Red Crescent Societies. The ERCS has a well-established network comprising 11 regional offices, 33 zonal branches, 88 district branches, and over 4,500 Kebele Red Cross Committees at the grassroots level. This network is supported by thousands of volunteers who help the National Society in its activities to provide services to communities in need. ERCS operates under a Charter that was adopted in 1999.

To put it differently, the study of supply chain management in humanitarian aid is a crucial area that has received insufficient attention. Additionally, despite their significance, performance evaluation and measurement systems in charitable institutions have not been adequately

developed or frequently enforced. So this study focuses primarily on evaluating the effect of emergency management practice on the HSCM performance within the Ethiopian Red Cross Society.

1.2 Statement of the problem

The supply chain role is the backbone of any humanitarian organization's emergency response. Without response planning, rapid evaluation, proposal creation, and essential supply chain involvement, a detailed implementation plan may not be seamless, satisfy intended beneficiaries, or achieve intended goals (Abdifatah, H.M., 2012).

Ismael, 2017, conducted a research project titled "Practices and Challenges of Humanitarian Logistics: The Case of Selected International Non-Governmental Organizations in Ethiopia". The research found that humanitarian logistics operations encounter difficulties in several aspects, including organizational structures, distribution network arrangements, inventory management, disaster evaluation, cooperation and coordination, uncertainty and limitations in procurement, and performance evaluation. Managing and improving performance in humanitarian supply chains can be challenging due to several factors such as the unique characteristics of relief chains, difficulties in enhancing organizational performance, inadequate development and systematic implementation of performance metrics and measurement systems, as well as data accuracy issues (Beamon and Balcik, 2008).

Lindenberg and Bryant, 2001, found that as resources become scarce, NGOs face new pressures to take more responsibility for the impact and quality of their programs. The increasing occurrence and magnitude of disasters, scarcity of resources, competition for funding and the need for accountability call for more efficient, effective and transparent relief efforts. Given that logistics plays a crucial role in relief operations and represents a significant portion of the overall cost, evaluating the performance of relief chains has become necessary for organizations engaged in disaster management (Van Wassenhove, 2006).

The rise in frequency of natural disasters worldwide is posing a significant threat to the social and economic development of affected nations. While it may not be possible to prevent disasters altogether, measures can be taken to mitigate their impact. Rather than attempting to enhance the general efficiency of relief operations, organizations involved in crisis management should focus

on revamping their supply chains with the aim of enhancing the performance of humanitarian supply chains.

It is important that organizations continually evaluate, assess, and reassess their operational environments in order to minimize the risks associated with the uncertainty of disasters. Developing trust is crucial for entities engaged in relief activities, among other factors. Agility, flexibility, adaptability, and the strategic use of information technology are also key factors for the organizations involved in relief operations. Understanding factors that improve the performance of organizations during relief operations, continues to be a timely and critical area of research (Valero, Jung, & Andrew, 2015).

Performance measurement and management are crucial for the effective and efficient management of logistics networks (Melnik, S.A., Bititci, U.S., Platts, K., Tobias, J. and Andersen, B., 2014). Measuring and managing performance in a humanitarian supply chain is a concern and a challenge for academics and for practitioners (Abidi, H., de Leeuw, S. and Klumpp, M., 2014; Haavisto and Goentzel, 2015). The management of performance in humanitarian supply chains can be a difficult task because it is often seen as costly and challenging to establish a clear connection between an organization's yearly efforts and their impact on the organization's mission (Anjomshoae et al. (2017).

The Fritz Institute (2012), on the other hand, identified a shortage of skilled logisticians in the field as one of the problems. According to Beamon and Balcik (2008), an important but under-researched area of supply chain management is the study of disaster management practices. The lack of comprehensive research in this field and limited studies on humanitarian supply chains for nonprofit organizations in Ethiopia were the main motivations for conducting this study. Thus, the researcher aimed to bridge this gap by investigating and identifying the potential relationship and effect between disaster management practices and the performance of humanitarian supply chain management (HSCM).

1.3 Research Objectives

1.3.1 General Objectives

The general objective of this study is to examine the effects of disaster management practices on the humanitarian supply chain management performance in the case of the Ethiopian Red Cross Society.

1.3.2 Specific Objectives

The specific objectives of this study are:

1. To assess the effect of mitigation practices on HSCM performance of ERCS.
2. To uncover the effect of the preparedness activities on the HSCM performance of ERCS.
3. To examine the role of response practices in the HSCM performance of ERCS.
4. To assess the contribution of recovery activities to the HSCM performance of ERCS.

1.4 Research Hypotheses

The following hypotheses have been tested in this thesis:-

- Ho1: The mitigation practice has no significant effect on HSCM performance of ERCS.
- Ha1: The mitigation practice has significant effect on HSCM performance of ERCS.
- Ho2: The preparedness practice has no significant effect on HSCM performance of ERCS.
- Ha2: The preparedness practice has significant effect on HSCM performance of ERCS.
- Ho3: The response practice has no significant effect on HSCM performance of ERCS.
- Ha3: The response practice has significant effect on HSCM performance of ERCS.
- Ho4: The recovery practice has no significant effect on HSCM performance of ERCS.
- Ha4: The recovery practice has significant effect on HSCM performance of ERCS.

1.5 Significance of the study

The study's main goal is on determining the effect of disaster management on the HSCM performance of the Ethiopian Red Cross Society (ERCS). As a result, the findings of this study will provide ERCS with a thorough understanding of how crisis management methods affect HSCM performance. The research will also be helpful to other humanitarian organizations because it provides insight into disaster management practice and their impact on HSCM performance.

The findings will have an impact on practice, politics, research, and academia. This study is also expected to help researchers gain enhanced understanding about disaster management practices and their impact on HSCM performance.

1.6 Scope of the Study

Investigation only focuses on Ethiopian Red Cross Society, one of the oldest humanitarian organizations located in Addis Ababa and Adama offices. The study concentrates on the impact of disaster management practices, which include the phases of mitigation, preparedness, response, and recovery (Cozzolino, A., 2012), on the HSCM performance. The research assesses how these practices affect the agility, responsiveness, reliability, cost-effectiveness, and asset utilization of ERCS (Davidson, A.L., 2006). But the study only focus on the effectiveness of operational performance (service quality aspect) which are agility (flexibility), responsiveness (time) and reliability (quality). Due to time and budget constraints the study doesn't cover the financial performance (cost effectiveness and asset utilization) of the organization.

1.7 Limitation of the study

Due to the limitations in resources and time for research, the study primarily concentrates on the how disaster management practices affects HSCM performance of ERCS. ERCS has been conducting humanitarian aid programs in Ethiopia since 1935, both for emergency relief and development. Therefore, the study does not incorporate other entities such as government agencies, beneficiaries, and donors.

1.8 Definition of Terms

Disaster: - is an unexpected and disastrous event that severely hampers the functioning of a community or society. Such events result in huge losses in human lives, infrastructure, material possessions, and the environment. Typically disasters are occurrences that go beyond a community or society's capacity to manage with its resources. While natural factors are often responsible for such catastrophes, they can also be triggered by human activities. (Hatakka, I., 2019)

Disaster management: - refers to the set of decisions, actions, individuals, and technology involved in all phases of a disaster, spanning from planning to response and recovery, across various levels of jurisdiction. (Carter, W.N., 2008)

Supply Chain: - refers to a complex system of organizations that work together, both upstream and downstream, to carry out various processes and tasks that generate value in the form of products and services provided to the end consumer. (Christopher, 1992)

Supply chain management: - refers to an all-encompassing approach to effectively managing the entirety of activities involved in the flow of goods and services from the supplier to the ultimate consumer. (Cooper, Martha C., Douglas M. Lambert, and Janus D. Pagh, 1997)

Humanitarian Supply Chain: - The humanitarian supply chain pertains to the set of services, goods, information, and financial transactions that are exchanged among multiple units within humanitarian organizations to offer material support to donors, suppliers, and beneficiaries. Its primary aim is to provide tangible assistance to the recipients in times of crisis. (Mentzer, 2001)

Humanitarian performance: - refers to the combined impacts of the interconnected system of international, national, and local agencies within the humanitarian sector. These agencies collaborate to rescue lives, alleviate suffering, and uphold human dignity during and after disasters. (Ramalingam, B., Mitchell, J., Borton, J. and Smart, K., 2009).

1.9 Organization of the study

The work is broken into five chapters in total. The first chapter discusses the context of the study, purpose of investigation, research questions, and value of research, scope of the study, limitations of the study, definition of terminology, and work organization. The second chapter gives an outline of pertinent study topics as well as a literature review that provides a conceptual framework for the investigation. In Chapter three of the study, the research methodology is presented, and includes a detailed explanation of the study's setting, research strategy, design, population, and sample, as well as the data sources and types used, data collection procedures, integrity and consistency checks, ethical considerations, and data analysis methods. Chapter four of the study explores into the analysis and results obtained from the disclosed data, presenting the findings in a comprehensive manner. Furthermore, it provides a detailed discussion of these findings. The concluding chapter, chapter five, focuses on summarizing the research, drawing conclusions, and offering recommendations based on the study's findings.

CHAPTER TWO

RELATED LITERATURE REVIEW

This section gives a concise overview of the scholarly literature in humanitarian supply chain management and related areas, such as disaster relief operations and performance of HSCM. Its purpose is to examine and construct a theoretical framework based on previous research, as well as to conduct an empirical review and uncover any gaps in the current literature.

2.1 Theoretical Literature Review

2.1.1 Humanitarian Supply Chain Management

Humanitarian supply chain management (HSCM) entails the efficient planning, execution, and regulation of aid flows, such as financial resources, information, materials, goods, and services, from the point of origin to the point of utilization with the aim of satisfying the needs of the aid beneficiaries. HSCM is a component of supply chain management that involves many of the same functional procedures as commercial supply chain management (CSCM), such as sourcing, information management, logistics, distribution, and inventory management, and so forth. Supply chain management is crucial in ensuring successful disaster response efforts, as it is focused on the relationships between the various stakeholders involved in facilitating logistics movement (Cooper et al., 1997, Cozzolino, 2012).

The field of Humanitarian Supply Chain Management (HSCM) is a developing area of study within the larger domain of SCM (Kovács and Spens, 2007). HSCM can be described as the method of efficiently organizing, carrying out, and controlling the movement and storage of goods, along with associated information, in a cost-efficient manner from the starting point to the end location with the purpose of reducing the hardship faced by vulnerable individuals (Thomas and Kopczak, 2005). Another definition of HSCM is the seamless coordination and integration of numerous internal and external entities involved in aid flows (Cozzolino, 2012). HSCM includes a broad spectrum of activities to meet emergency needs; various processes must be used, including procurement, transportation, inventory management, warehousing, tracking and tracing, bidding and reserve bidding, reporting, and accountability.

According to Chandraprakaikul (2010), goods in humanitarian supply chains are often transported through multiple stages before reaching their intended recipients. These stages may

consist of numerous facilities. Chandraprakaikul (2010) also states that the primary objective of humanitarian supply chains is to efficiently provide vital emergency supplies to individuals impacted by natural or man-made disasters, with the goal of reducing human suffering and fatalities. Therefore, humanitarian supply chains not only focus on delivering aid to those in needs, but also on managing value for donors and other stakeholders.

The core principles of humanitarian operations include the belief that individuals impacted by disaster or conflict have the right to basic needs and assistance to maintain a dignified life. Additionally, humanitarian organizations strive to achieve the goal of saving lives, minimizing human suffering, and promoting development. (These beliefs are supported by research conducted by Beamon (2004), Kovács and Spens (2007), the International Committee of the Red Cross (ICRC) (2010), and the United Nations Development Programme (UNDP) (2012)).

According to Twigg (2004), humanitarian operations can be classified as either development or emergency operations. Non-governmental organizations can specialize in one sector or both by establishing separate departments for each. Emergency operations are launched immediately after a disaster and are primarily focused on search and rescue, damage mitigation, and other related activities aimed at preventing or reducing harm. The logistics involved in procuring and distributing goods to aid recipients are carried out with an urgent, time-sensitive approach. Meanwhile, development efforts aim to support the affected region by rebuilding homes and infrastructure, which can take anywhere from a few months to several years depending on available funding. During the developmental phase, there is greater emphasis placed on cost-effectiveness. Both types of activities necessitate logistical support; however, the duration, quantity of aid required, urgency, variety of supplies needed, and procurement location all vary depending on the specific disaster and activities being undertaken (Kalkidan F., 2020).



Figure 2.1 A common model for a HSC

Source: Oloruntoba and Gray (2006)

Donors, local governments, non-governmental organizations (NGOs), and aid recipients comprise the humanitarian supply chain. The figure above represents a typical humanitarian supply chain model that depicts the actors of the humanitarian aid supply network which was adopted from Oloruntoba and Gray (2006).

2.1.3 Disaster and Disaster relief operation

The term "disaster" is used to describe a disruption that has a physical impact on an entire system, endangering its main priorities and objectives (Van Wassenhove, 2006). Meanwhile, "relief" refers to foreign interventions aimed at providing assistance to local citizens (Long and Wood, 1995). Disaster relief operations focus on designing the transportation of critical supplies, such as first-aid materials, food, equipment, and rescue personnel, from supply points to numerous destination nodes scattered across the disaster-stricken region. Additionally, these operations may include the rapid and safe evacuation and transfer of affected individuals to healthcare facilities.

Taking into account the various impacts in terms of required logistical effort, four types of disaster can be identified.

- Calamities are catastrophes brought on by unforeseen natural occurrences like earthquakes, hurricanes, and tornadoes.

- Destructive actions, such as terrorist attacks, coups d'états, and industrial accidents, which are distinguished by human-induced factors and abrupt occurrences.
- Plagues, characterized catastrophes caused by gradual and natural events, such as poverty, droughts, and famines.
- Crises, characterized by emergencies arising from man-made causes and gradual progression, such as political unrest and refugee crises.

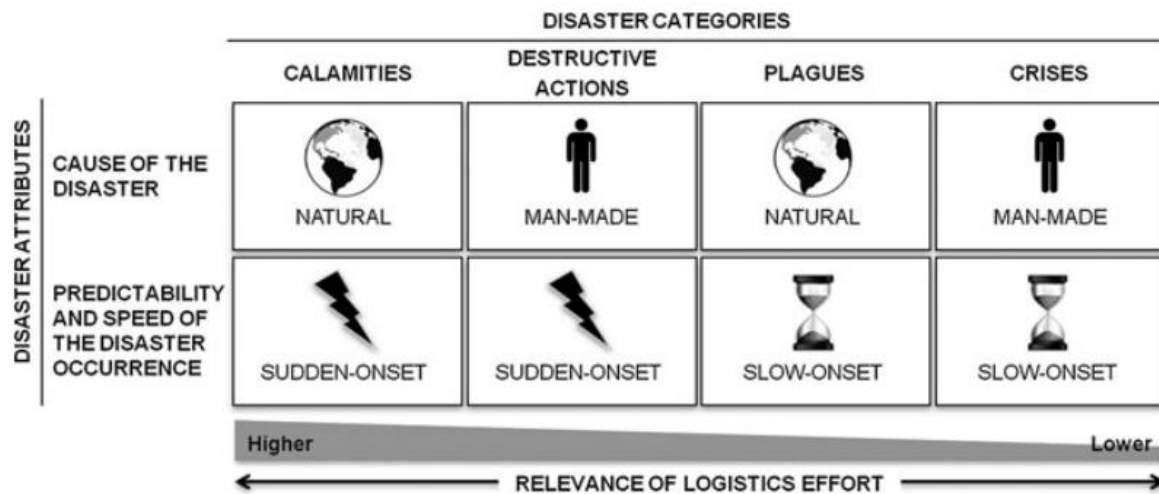


Figure 2.2 Types of disaster

Source: Van Wassenhove (2006)

The four categories - calamities, plagues, crises, and destructive actions - could be intertwined. For example, a calamity like an earthquake could lead to plagues such as epidemic diseases, and crises like economic instability. Therefore, it may be more appropriate to refer to disasters instead of a single disaster. Addressing calamities and destructive actions requires a greater logistical effort in terms of both knowledge and cost, as immediate action is necessary in devastated areas. According to Kovács and Spens 2007, humanitarian operations are divided into two main categories: catastrophe relief and ongoing assistance. Calamities, destructive actions, and plagues are often addressed through disaster relief (Long 1997). In times of crises and plagues, ongoing humanitarian assistance is primarily necessary.

2.1.5 Humanitarian Actors/ Players Involved

Aid organizations (Long and Wood, 1995) are generally responsible for distributing aid aimed at mitigating harm caused by both natural and human-made disasters on behalf of governments. Donors are of utmost importance, as they provide a significant amount of funding for major relief efforts. Besides country-specific funding (such as that provided by the United States and the European Union), aid agencies also rely on funding from foundations, individual donors, and the private sector, which have become increasingly important sources of financial support in recent years. Because of their superior planning and logistical abilities, the military is a crucial part of disaster relief efforts. Military personnel are frequently asked to provide initial support in fields like hospital and camp installation, telecommunications, and route repair (Kovács and Spens, 2007). The authorities that hold the power to approve and activate humanitarian logistics operations after a disaster are the governments of the affected country, neighboring countries, and other countries in the international community. These governments control essential resources such as fuel depots and warehouses, making their involvement crucial. Additionally, local or regional service providers in the affected area can either support or impede the effectiveness of logistics operations.

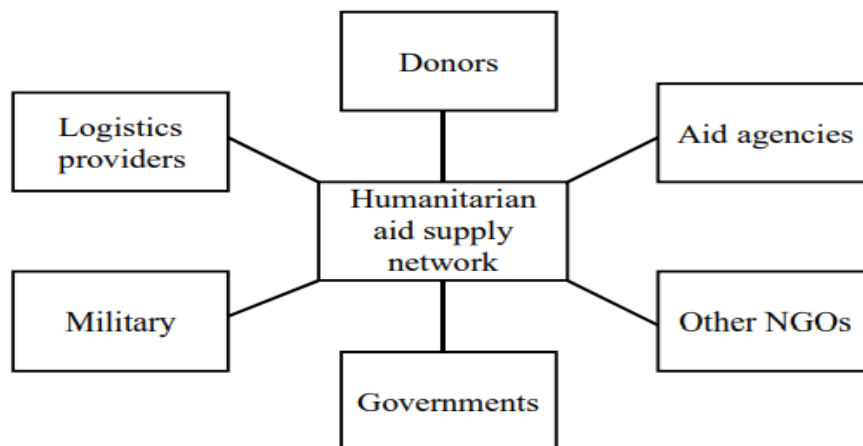


Figure 2.3 Humanitarian aid supply network

Source: Kovács and Spens, (2007)

2.1.6 Humanitarian Relief Supply Chain Management

Effective management is crucial in disaster relief efforts due to the high level of uncertainty and complexity involved. Proper management is necessary to ensure that responses are adequate and well-implemented, making disaster management a critical factor in the successful execution of relief efforts (Tomasini and Van Wassenhove 2009).

There are a variety of approaches to identifying the different phases in responding to disasters. Initially, these concepts came from the National Governors Association's (Maon, Lindgree, and Vanhamme, 2009) suggestion regarding "a four-stage standard process model of disaster relief that includes: preparedness; response; recovery; and mitigation". Maon et al. 2009, develops "the simplest disaster relief model" through "a linear sequence of prevent, disaster, and post-event". On the other hand, Safran, 2003, conceptualizes a more cyclical disaster management model viewing each phase as being intimately linked.

The basic disaster relief model has been used and improved (Messer, 2003; Tomasini and Van Wassenhove, 2009). The model for disaster relief has been expanded to include two main phases; relief and development, which each involve four crucial tasks: preparation, response, recovery, and mitigation. While preparation and mitigation are included in the development phase, response and recovery are covered by the relief phase. The four disaster relief activities are also known as disaster management practices.



Figure 2.4 Disaster Management Cycle

Source: Haddow and Bullock, (2004)

In the course of humanitarian operations, different phases may overlap, and it may be necessary to include a separate transition phase between the response and recovery phases. (Asian Development Bank, 2004). According to Kovács and Spens (2007) and Perry (2007) observed that humanitarian supply chains need to meet the requirements of beneficiaries in all stages of disaster relief, and logistic support is crucial throughout each phase. However, depending on the stage of disaster relief, the urgency of delivery, as well as the volume and diversity of supplies required, may differ.

2.1.6.1 Disaster Management Practices

Mitigation

Mitigation includes implementing measures that can either avert the occurrence of a disaster or mitigate its impacts in case it happens (Altay & Green, 2006). It is challenging to prepare for natural disasters due to their unpredictable nature. However, natural disasters such as droughts, floods, earthquakes, and tsunamis that occur in a cyclical pattern or are common to specific regions can be proactively planned for through mitigation strategies. These strategies aim to increase the ability of communities to withstand the impacts of natural hazards. Examples of mitigation activities include planting mangroves along coastlines to protect against cyclones, constructing dams, and reinforcing buildings based on the particular vulnerability of the community.

As stated, (Cozzolino, Rossi, and Conforti, 2012) the mitigation phase refers to the rules and mechanisms in place to reduce social susceptibility from disasters. These are issues that relate to the responsibilities of governments and do not involve the direct participation of logisticians. (Cozzolino, A, 2012) But humanitarian organizations engaged in these activities will necessitate logistics support, granting on a smaller scale compared to other phases. (Howden, M., 2009)

H₁: The mitigation practice has significant effect on HSCM performance of ERCS.

Preparedness

Preparedness refers to the “preemptive measures taken to ensure a prompt response to the effects of hazards. This can involve issuing timely and effective alarms or warnings, and evacuating people and property from areas at risk” (UNISDR, 2009).

The preparation phase encompasses the actions taken prior to a disaster, which enable an effective response to be carried out. Throughout this stage, crucial components such as network architecture, information and communication technology infrastructure, and collaborative frameworks are implemented. The aim of this stage is to avoid the gravest possible consequences of a disaster. This phase also incorporates the efforts that are made between disasters in learning and adapting from past experiences so as to meet new challenges. (Cozzolino, A., 2012)

The preparation phase enables an efficient disaster response through activities such as personnel training, deploying disaster response facilities, evacuating vulnerable populations, and stocking up essential goods in anticipation of the disaster (Goldschmidt, K.H. and Kumar, S., 2016). In addition, it entails strengthening the ability to respond to disasters through actions like collaborating with communities to inform them about evacuation options, pre-positioning emergency response supplies, and enhancing organizational capacity for disaster response. Such activities are continuous and are typically implemented before an actual crisis occurs (Howden, M., 2009).

H₂: The preparedness practice has significant effect on HSCM performance of ERCS.

Response

After a disaster occurs, the response phase involves immediate operations with two main objectives that are carried out consecutively, making up two sub-phases. (Cozzolino et al. 2012):

1. The initial goal is to activate the temporary or silent network, which is defined as the immediate-response sub-phase (Jahre, Jensen, and Listou (2009)),
2. The second aim is to rapidly reestablish basic services and the delivery of goods to as many beneficiaries as possible, within a minimal timeframe. This constitutes the restore sub-phase.

When a disaster occurs, both people and infrastructure are at immediate risk. To safeguard lives, property, the environment, and the social, economic, and political structure of the affected community, response efforts make use of resources and emergency procedures (Altay & Green, 2006).

In the response phase of humanitarian operations, logistics plays a crucial role in distributing vital resources like food, medical supplies, and other life necessities to affected populations. The speed at which logistics operations are carried out can be a determining factor in saving lives.

Depending on the extent of the disaster, the response phase could last for varying periods of time, ranging from days to several months. (Howden, M., 2009)

During the response phase, special emphasis should be placed on coordination and collaboration among all the parties involved in the humanitarian emergency (Balcik et al. 2016; Kovács and Spens 2007; Maon et al. 2009; Tomasini and Van Wassenhove 2009). In the initial phase, feasible connections with potential donors, suppliers, NGOs, and other partners are established, but they are not activated until the catastrophic event actually occurs. . Then, all the actors involved operate as quickly as possible: at the start, speed - at any cost - is of the essence, and the first 72 hours are crucial (Van Wassenhove 2006).

H₃: The response practice has significant effect on HSCM performance of ERCS.

Recovery

The recovery phase pertains to the different operations that follow in the consequences of a disaster. Maon et al. (2009) suggest that the recovery phase encompasses reconstruction, rehabilitation, and restoration of the affected area to its previous state of normalcy. Rehabilitation refers to the long-term actions carried out after the initial shock of the disaster has passed, with the aim of stabilizing the community and bringing back a sense of normalcy (Altay & Green, 2006). Additionally, these programs aim to assist affected people and their families while restoring institutions to promote confidence and economic growth, repairing damaged properties, and restoring government operations and services. The recovery phase often goes beyond the immediate aftermath of the disaster and includes mitigation measures to prevent damage from future incidents (Kalkidan F. 2020).

In the recovery phase, efforts may involve distributing resources and providing training for livelihood building, as well as rebuilding houses, buildings, and infrastructure. This phase can last for several months to years (Howden, M., 2009). By addressing the long-term effects of a disaster on a region and strengthening community resilience, these activities present an opportunity to not only rebuild but to build better, minimizing the effects of future disasters. Humanitarian organizations must prioritize the rehabilitation phase, for which continuity planning is necessary, rather than ignoring this crucial stage of the cycle (Kovacs & Spens, 2007). Unfortunately for many disaster-struck areas, the long-term reconstruction of

communities impacted by disasters is often the most underfunded and neglected phase in most humanitarian operations (Goldschmidt, K.H. and Kumar, S., 2016).

H₄: The recovery practice has significant effect on HSCM performance of ERCS.

2.1.7 Humanitarian Supply Chain Management Performance

The subjective nature of performance has resulted in a variety of definitions being attributed to this concept. According to Didier Noyé 2002, performance involves achieving the goals that were given in line with enterprise orientations. According to him, performance is the result of comparing the achieved outcome with the objective rather than simply achieving an outcome. Rolstadas, 1998, proposed the performance of an organizational system is a multifaceted connection that encompasses seven standards: productivity, effectiveness, efficiency, quality, quality of work, innovation, and profitability. Performance is intimately connected to the achievement of the goals outlined in the mentioned criteria, which can be viewed as performance objectives.

Measuring and managing performance help in the continuous enhancement of performance (Neely, A., Gregory, M. and Platts, K., 1995), implementing strategy effectively (Kaplan and Norton, 2001), facilitating organizational learning (Kueng, Meier, and Wettstein, 2001), fostering managerial development (Garengo, Biazzo, and Bititci, 2005), and aligning operations with strategic goals (Taticchi, Tonelli, and Cagnazzo, 2010). Furthermore, as stated by Parker (2000), the objective of measuring organizational performance is, to ascertain achievements, assess whether customer requirements are fulfilled, gain insights into organizational processes, identify issues, bottlenecks, and waste, ensure decisions are grounded in factual evidence rather than assumptions or emotions, and determine the actual implementation of planned improvements (Abidi and Scholten, 2015).

In the humanitarian sector, where resources are often scarce, the need for effective and efficient utilization of limited resources makes performance measurement exceptionally crucial (Abidi and Scholten 2015). Implementing effective performance measurement systems would support decision-making for relief chain practitioners, enhance the effectiveness and efficiency of relief operations, and provide evidence of the relief chain's performance. This would ultimately increase transparency and accountability in disaster response efforts (Beamon and Balcik, 2008). Groups such as Oxfam, the Red Cross, and International Rescue Committee (IRC) have come to

the realization that tracking their supply chain performance is crucial not only for donors, but for the betterment of their own operations as well (International Rescue Committee (IRC), 2010).

Measuring and managing performance in humanitarian supply chains are not as advanced as in the business industry. Therefore, monitoring and managing performance in this type of supply chain poses major challenges for both academics and practitioners (Abidi et al., 2014; Haavisto and Goentzel, 2015). Managing humanitarian supply chain performance is considered too difficult and too expensive to establish direct linkages between an organization's annual efforts and the impact of those efforts on the organization's mission (Anjomshoae et al., 2017).

Blecken, 2010, identified the absence of performance evaluation in humanitarian organizations. The author found that a majority of humanitarian organizations, 55%, do not track any performance indicators for their supply chain while 25% use only a few. Only around 20% of humanitarian organizations consistently measure the performance of their supply chains. The challenges faced by nonprofit organizations are attributed to the ambiguity of performance criteria. The environment for disaster relief also has special features that make it more challenging for NGOs to measure the effectiveness of the relief chain.

Bourne, Mills, Wilcox, Neely, and Platts, 2000, state that performance measurement systems aim to establish an organization's goals and success criteria and formulate corresponding performance indicators. In the business sector, it is a common practice to create and implement indicators using a standardized framework for performance measurement (Najmi, and Makui, 2012). Several models, including Activity-Based Costing (ABC), Framework for Logistics Research (FLR), Balanced Score Card (BSC), and Supply Chain Operation Reference Model (SCOR), can be used to assess the performance of a supply chain. The two most widely used frameworks for evaluating supply chain management performance are the SCOR model (Supply Chain Council, 2007) and the Balance Scorecard (BSC) (Kaplan and Norton, 2001).

The Supply-Chain Operations Reference (SCOR) model was created by the Supply-Chain Council (SCC) as a means of improving supply chain efficiency for businesses and implementing a process-oriented methodology to supply chain management (Lockamy & McCormack, 2004). Gizaw and Gumus, 2016, state that out of the various methods for assessing supply chain performance SCOR is a well-established and thorough approach that facilitates a systematic enhancement of supply chain performance. The SCOR model distinguishes five

supply chain attributes and proposes associated performance indicators (Supply Chain Council, 2007). These features include reliability, responsiveness, agility, cost effectiveness, and asset management (Davidson, 2006).

The SCOR approach outlines several attributes for evaluating supply chain performance. For instance, reliability is measured by the ability of the supply chain to deliver products accurately and on time, in the appropriate condition and quantity, and with the right documentation to the intended customer. Responsiveness, on the other hand, refers to how promptly a supply chain can provide products to customers, while agility measures its ability to adapt quickly to market changes. These attributes are crucial in humanitarian supply chains, except for asset management (Lu, Goh and De Souza, 2016). Hence for this study the researcher adopted the framework of SCOR model with the metrics of agility, responsiveness, reliability, cost effectiveness and asset management (Davidson, 2006) and with exception of the financial performance measurement metrics (cost effectiveness and asset utilization).

2.2 Empirical Literature Review

2.2.1 Review of Studies on Disaster Management Practices

In 2018, Jatani C. conducted research on the national disaster risk management commission in Ethiopia. The objective was to identify the challenges faced by the commission in emergency preparedness, and to identify strategies that could be implemented to overcome these challenges and assess logistics performance. The descriptive research study suggests that structured and consistent long-term development projects, successful implementation of upstream collaboration actions, the establishment of pre-negotiated contracts with logistics providers, and allocation and increase of funds can all contribute to a reduction in disaster and emergency preparedness challenges.

In 2021, Negi, S., and Negi, G. published a journal article titled "Framework to Manage Humanitarian Logistics in Disaster Relief Supply Chain Management in India." The main purpose of the article is to find the challenges and difficulties encountered in humanitarian logistics and to develop a framework that can be used to manage humanitarian logistics in disaster relief supply chain operations in India. The goal of the study is to examine the framework for humanitarian logistics as well as the structure and difficulties of India's disaster management system. The article identifies a number of crucial problems that prevent the

effective coordination of humanitarian supply chains and operations for disaster relief. These issues include inadequate information sharing, poor forecasting, assessment, and planning, inaccurate need assessments, inefficient resource utilization and mobilization during an emergency, and dubious location decisions. Additionally, there is insufficient coordination and collaboration between humanitarian actors.

2.2.2 Review of Studies on Humanitarian Supply Chain Management Performances

Shafiq and Soratana, 2019, conducted a comprehensive analysis of previously published works on Humanitarian Organizations Logistics and Supply Chain Management (HO-LSCM), assessing a total of 73 publications. The study aimed to analyze previous research related to the operational effectiveness and efficiency of humanitarian organizations (HOs). It examined various aspects of HO-LSCM, including challenges, performance, construction models/frameworks, and efficiency and effectiveness. The review found that effectiveness received more attention in HO-LSCM than efficiency management. The research also revealed that since each HO has its own policies and processes, standardization is crucial for optimizing logistics and supply chain operations.

Another Journal article, titled as “Performance Management Practices in Humanitarian Organizations” is done by Abidi, H., de Leeuw, S. and Dullaert, W., in 2020. Their objective is to explore how performance management practices from successful commercial organizations can be adapted and implemented in humanitarian organizations to guide the process of enhancing performance management. The study offers a thorough understanding of how supply chain performance evaluation methods are designed and put into use within a humanitarian organization. It implemented a humanitarian supply chain with ten performance management techniques from business literature. The primary theoretical contribution of the study is that humanitarian organizations can enhance their supply chain performance management by applying existing practices and tools from the business sector.

In 2020, Getnet conducted a study to assess the humanitarian logistics performance of SCI Ethiopia. The research aimed to explore and experimentally examine the potential connections between various factors that could impact the organization's humanitarian logistics performance and its actual performance. The research utilized a set of five criteria to assess the effectiveness of humanitarian logistics, which consisted of reliability, responsiveness, agility, cost, and asset

management. It was concluded that the organization's humanitarian logistics practices were effectively implemented and had a positive impact on performance. Additionally, it was noted that in order to enhance competitiveness and ensure long-term success in disaster relief operations, the organization should emphasize strategies aimed at minimizing the impact of disasters.

In their journal article titled "Performance measurement in humanitarian relief chains," published in 2008, Beamon and Balcik compared performance measurement in supply chains for commercial goods with performance measurement in chains for humanitarian aid. The study also concentrated on developing performance metrics for the latter and proposed a framework for a system of performance measurement in the relief sector. According to the study's findings, monitoring the effectiveness of the advancement of the humanitarian cause (saving lives and easing suffering) and the security of donor funds (accountability) depend on aid networks. It also suggested that a performance measurement system for the humanitarian sector could be built on the proposed performance measurement framework.

In 2020, Hailu Z. conducted a study on the factors that influence the humanitarian logistics performance of the ERCS. The research involved identifying and testing several factors empirically that impact humanitarian logistics performance. These variables include recognition variables, technological variables, real professional variables, collaboration variables, legal and political variables, socioeconomic variables, infrastructural variables, donor variables, and so on. According to the report, the organization is using humanitarian logistics techniques at a low level. The study's inferential analysis also showed how infrastructure factors affect the organization's performance in terms of humanitarian logistics, which is then impacted by technological factors.

In 2020, Seid S. conducted an empirical academic research study to identify the parameters that influence humanitarian logistics effectiveness at the International Medical Corps. As per the findings of the study, several factors impact humanitarian logistics performance, such as insufficient collaboration, inadequate donor funding, situational factors related to infrastructure, deficient professional staff, situational factors related to the government, measurement of humanitarian logistics performance, and a lack of recognition of logistics.

In 2015, Ira Haavisto from the Department of Supply Chain Management and Social Responsibility, and Jarrod Goentzel from the Massachusetts Institute of Technology conducted a study that aimed to measure the performance of humanitarian supply chains in a multi-goal context. They sought to gain a comprehensive understanding of the objectives and variables that drive the assessment of supply chain performance in a humanitarian context. This included examining concepts like efficiency. According to the research, the performance objectives for humanitarian supply chains center on efficiency, quality, and flexibility. However, the study suggests that more attention should be given to accountability (maintaining processes and transparency), reliability, responsiveness (meeting demand), and sustainability. Additionally, the study shows that conflicting goals can arise due to varying goals set by donors for their implementing partners and humanitarian organizations.

2.2.3 Review of Studies on the Relationship between Disaster Management Practices and HSCM Performances.

Rutaba, Y.A., 2022, conducted empirical research on “Determinants of Humanitarian Logistics Performance to Effective Disaster Relief Operations in Addressing Pandemics in Tanzania”. The study assessed key areas for humanitarian organizations to pave the way for effective disaster relief operations. From the analysis of the determinants of humanitarian logistics performance on disaster relief performance, it is found that, in measuring humanitarian logistics performance; having humanitarian logistics experts, humanitarian logistics preparedness, and support of humanitarian logistics policies make an important contribution to effective disaster relief operations. The study concluded that the overall effectiveness of disaster relief operations depends on suitable structures in humanitarian logistics that capture the effectiveness of logistics cooperation and the involvement of services logistics in the delivery of disaster relief operations. It also suggested that humanitarian logistics have the potential to improve disaster relief operations.

In 2021, Zewdi Y. conducted research that aimed to investigate how HSCM practices influence the performance of emergency response programs conducted by selected UN organizations operating in Ethiopia. The main aim of the study was to assess the influence of supply chain management practices on the effectiveness of emergency response efforts carried out by these organizations in Ethiopia. The findings of the research demonstrate that all the independent

variables (Procurement, Transportation, Warehouse Management, and Distribution) have a significant impact on the overall effectiveness of emergency response programs. The study indicates that besides warehouse management, HSCM practices have an impact on the efficiency of emergency response initiatives. Among these practices, distribution has the most significant effect on emergency response program performance, followed by transportation, procurement, and warehouse management.

Kalkidan F. conducted a study in 2020 titled "The Effect of Humanitarian Supply Chain Management Practices on Organizational Performance: A Case of Save the Children". The study provides proof that the practices used in HSCM and organizational performance are related and suggested implementing HSCM concepts can enhance an organization's overall performance. The research focused on how four variables affect organizational performance. According to the study, two HSCM strategies (mitigation and recovery) had a significant and positive impact on organizational performance. On the other hand, SCI Ethiopia's organizational performance did not demonstrate a statistically significant impact from preparedness and response. Based on these results, it is recommended to the two identified approaches by the organization to improve its organizational performance.

2.2.4 Gaps in the Empirical Studies Reviewed

All the theoretical and empirical literature reviewed unanimously agree that the fundamental purpose of humanitarian organizations is to address disasters, uphold human rights, offer relief services, and advance the universal aspiration for individual and societal safety, security, respect, and dignity, without any regard for making a profit.

Hailu Z. (2020), Seid S. (2020), and Getnet M. 2020, completed a thesis paper under the Department of Logistics and Supply Chain Management at Addis Ababa University. They found that five characteristics of reliability, responsiveness, agility, cost-effectiveness and asset management are the key to the effectiveness of humanitarian logistics. Asset management shouldn't be used as a metric to assess performance in humanitarian organizations (Lu, Goh, and De Souza, 2016). This is due to the fact that these organizations frequently have few resources and assets. According to Oloruntoba and Kovacs 2015, they also rely heavily on outside resources and abilities to carry out emergency relief operations.

The journal article of Shafiq, M. and Soratana, K, 2019, indicated that 94% of research studies related to Humanitarian Organizations Logistics and Supply Chain Management (HO-LSCM) employ qualitative research techniques. Furthermore, they observed that many of these studies have developed theoretical frameworks that have yet to undergo comprehensive testing and gain widespread adoption. The authors stated that humanitarian organizations typically face two major scenarios: disaster situations (characterized by sudden, severe, and widespread events that require immediate action) and standard humanitarian organizations logistics and supply chain management scenarios (which involve thorough planning and assessing circumstances). In-depth research on the disaster relief operation and the effect on the humanitarian supply chain has not been studied. To put it differently, there hasn't been a thorough investigation into how disaster relief operations impact the humanitarian supply chain performance. Furthermore, according to Rutaba, Y.A. 2022, it's been noticed that effective disaster relief operations necessitate well-organized humanitarian logistics, but the study doesn't provide a comprehensive overview of the four key activities involved in such operations.

In Negi, S. and Negi, G.'s, 2021 research, the main emphasis was on natural disasters and the corresponding relief operations. However, their framework excluded the functions required for the mitigation and reconstruction phases. On the other hand, Jatani C. 2018 conducted an evaluation of the disaster preparedness practices of Ethiopia's national disaster risk management commission. In his journal article, only the preparedness practice was examined out of the four attributes of disaster management practice.

Zewdi Y. 2021 emphasizes that organizational performance is a comprehensive notion that encompasses a vast array of factors, and it should be more precise in the context of their paper. Meanwhile, Kalkidan's 2020, thesis study states that the independent variables outlined in the conceptual framework are actually indicators of disaster relief operations; however, they are referred to as HSCM practices for the study's purposes.

According to the literature review above, earlier studies on humanitarian supply chain management mainly concentrated on evaluating and managing the performance of the supply chain. There is little research, however, on how disaster management practices impact the performance of humanitarian supply chain management. Studies on the performance of humanitarian supply chains following disasters are less common in Ethiopia than studies on

commercial supply chains. In general, the research has made its best effort to close this knowledge gap.

2.3 Conceptual Framework of the Study

A conceptual framework, also known as a model, is a comprehensive method of approaching a problem (Liehr and Smith, 1999). In the view of Leshem, S. and Trafford, V. 2007, The key elements to be studied, such as concepts or variables, are outlined in the conceptual framework, which is a visual or written tool that also depicts the proposed relationships between them. In this particular study, the focus was on examining the impact of the independent variable, which comprised of disaster management practices related to the four activates, on the dependent variable of humanitarian supply chain management (HSCM) performance that included agility, responsiveness, and reliability. The study was carried out specifically at ERCS.

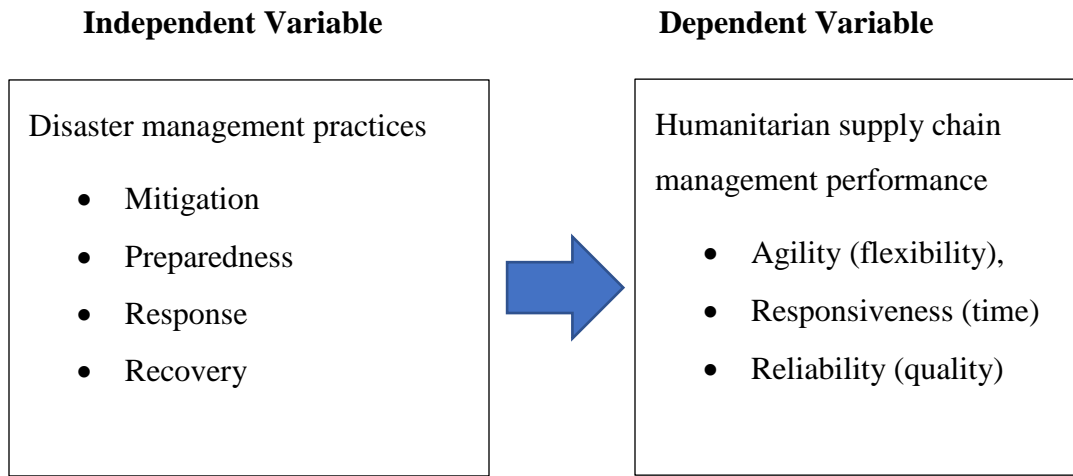


Figure 2.5 Conceptual framework

Source: Mostly adapted from the literature that was reviewed from Altay, N. and Green III, W.G., (2006) and Lu, Goh, and De Souza, (2016).

CHAPTER THREE

METHODOLOGY

This chapter deals with the study's methodology section. Starting with the description of the study area, other sections such as the population and sample, data source and types, research approach and design, and data collection techniques are also included. In addition, this chapter describes data analysis which is aimed at hypothesis testing.

3.1 Description of the study area

The research was carried out within the Ethiopian Red Cross Society (ERCS), which was established in response to the second Italian aggression on Ethiopia in 1935. Initially, ERCS provided humanitarian assistance to injured soldiers and civilian victims. In the same year, on September 25th, 1935, ERCS was officially recognized as the 48th member of the International Federation of Red Cross and Red Crescent Societies.

The goal of ERCS is to prevent and reduce human suffering by suitable and timely humanitarian and development interventions. This is done by organizing the public and partners in Ethiopia and other countries to support these initiatives. The organization has been operating emergency, recovery, and development initiatives in Ethiopia ever since it was founded. Currently, The ERCS provides support for disaster preparation and response, disaster risk reduction (building community resilience), the program for life-saving medications, building human service capacity, and humanitarian diplomacy.

3.2 Research approach

According to Creswell, (2012), there are three research methods namely qualitative, quantitative and mixed. Most researchers argued that the best method to use for a study depends on the purpose of the research, researcher data and the accompanying research questions. A qualitative research is a set of interpretive procedures that aims to clarify and translate ideas and phenomena (Maanen, 1983). And a quantitative research approach (Kumar, 2005) uses statistics and math to systematically investigate phenomena (the processing and analysis of numerical data). The mixed research approach is "research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches and methods in a single study" (Tashakkori and Creswell, 2007). The advantage of using mixed

method is that quantitative data can yield generalizable results and qualitative data can provide extensive insights (Zhang, W. and Watanabe-Galloway, S., 2014). Therefore, the researcher used a mixed approach to conduct the study in order to get the best results possible.

3.3 Research Design

According to many authors, there are three main types of research design: descriptive, exploratory, and explanatory. In this study, the aim was to examine the impact of disaster management practices on the performance of humanitarian supply chain management at the Ethiopian Red Cross Society (ERCS). Therefore, an explanatory research design was used as the study sought to establish a cause-and-effect relationship between variables.

3.4 Population and sampling

3.4.1 Population of the study

According to Kothari, C.R. (2004) the target population is defined as a set of individuals or objects that can be interrogated or observed in order to gather the information and data structures required. Perception of the respondents is collected from workers of the Ethiopian Red Cross Society who are working at Addis Ababa and Adama (East Shewa Zonal branch). The researcher chose the two geographical areas based on their accessibility for data collection purposes. At Addis Ababa it includes the head quarter, Addis Ababa branch offices (including the four zonal branches) and Oromia branch offices. The total employees who are working in ERCS at the two geographical areas are 457. From the total only 96 number of employees/population were selected for the study purposively, which have a direct relation to the study area at humanitarian supply chain management and program disaster risk management staffs. Due to the small number of the target population, the researcher used census survey.

3.4.2 Sample design and sample size

Due to small number of targeted population the study adopted Non-probability sampling design (probability of each element to be selected is not known). The non-probability sampling allows each item in the population to get involved in the sample. This kind of sample design is also known as deliberate, purposive and judgment sampling. Convenience sampling technique is also adopted when choosing the non-probability sampling design. Coming to the sample size total number of 96 employees of ERCS (Addis Ababa and Eastern Shewa Zonal Branch) who are

directly involved with humanitarian supply chain management and disaster management practice and other supporting staffs were involved for the purpose of conducting the study,

3.5 Data source and types

Both primary and secondary data sources were used to conduct this study. Respondents' primary information is gathered in relation to disaster management practice and humanitarian supply chain management performance through questionnaires. Perceptions of the respondents is collected by using closed ended questionnaires from humanitarian supply chain management staff (upper stream), program disaster risk management staff (lower stream) and other staff members who are directly involved on the humanitarian supply chain process. Secondary data sources are drawn from relevant studies, organizational databases, humanitarian aid-related reports, and topic-related journal articles to provide a comprehensive overview of the topic.

3.6 Data collection procedures

In order to analyze the effect of disaster management practice on humanitarian supply chain management performance of ERCS, both primary and secondary sources were used as a source of data. The primary data was collected from ERCS Addis Ababa and East Shewa Zonal branch (Adama office) personnel by distributing survey questionnaire in person. The data is collected at once meaning that the study conducted a cross sectional survey. For the purpose of gathering the required data for the study, standardized questionnaire was prepared by adapting the work of Altay, N. and Green III, W.G., (2006), Kalkidan F., (2020) and Lu, Q., Goh, M. and De Souza, R., (2016). In order to adapt the work to the particular purpose, the questions were carefully changed and rearranged based on the results of the literature review. The measuring device was a closed-ended questionnaire. There are two sections to the questionnaire. The general information about the respondents and the organization is the main topic of the first section. The second section's questions are connected to the study's goals. According to a Likert scale that ranges from strongly disagree to strongly agree, respondents to the questionnaire are asked to rate their opinions on a scale of 1 to 5. The secondary data was gathered from written sources including academic books, reports from organizations, and the internet.

3.7 Data analysis

For the data analysis, first the questionnaires have been checked for completeness. After that data is checked for consistency. The next step is feeding the data to the software Statistical Package for Social Sciences (SPSS) version 27 for analysis. Techniques for descriptive and inferential statistical analysis are given. For demographic-related questions, the descriptive analysis is used. Information pertaining to the study's goals is analyzed using the inferential statistical technique. The Pearson's correlation is castoff for displaying the relationship, degree, and direction of relationships between variables. Multiple regression analysis method is also applied to make predictions about the dependent variable based on the independent variable.

3.8 Scale Reliability and Validity

The main objective of questionnaires in research is to obtain pertinent information in the most accurate and efficient manner possible. Questionnaires are one of the most widely used data collection tools, particularly in social science research. As a result, validity and reliability, also known as the accuracy and consistency of the questionnaire, are crucial components of research methodology (Taherdoost, H., 2016).

3.8.1 Reliability Test

According to Carmines and Zeller (1979), reliability is the degree to which a phenomenon can be measured and the results are stable and consistent. It also has to do with repeatability. Testing for reliability is crucial because it examines the consistency of each component of the instrument (Huck, 2007). Items on a scale are said to be "related" and have high internal consistency if they measure the same structure (Huck, 2007; Robinson, 2009).The Cronbach alpha coefficient is the internal consistency metric that is most frequently used. When using the Likert scale, this is thought to be the most suitable reliability measurement (Whitley, 2002; Robinson, 2009). Although there are no unbreakable rules for internal consistency, most experts agree that it should be at least 0.70 (Whitley, 2002; Robinson, 2009).

Excellent reliability (a score of 0.90 or higher), high reliability (0.70-0.90), moderate reliability (0.50-0.70), and low reliability (0.50 and below) are the four reliability cut-off points proposed by Hinton et al. (2004).

Table 3. 1 Reliability Test

No.	Variables	Number of Items	Cronbach's Alpha (α) Coefficient	reliability ranges
1	Mitigation	8	.716	High reliability
2	Preparedness	12	.846	High reliability
3	Response	9	.642	Moderate reliability
4	Recovery	9	.833	High reliability
5	HSCM Performance	12	.742	High reliability

Source: SPSS output (2023)

3.8.2 Validity Test

Validity describes how well the data collected cover the real research area (Ghauri and Gronhaug, 2005). Validity basically means “measuring what should be measured” (Field, 2005). The study selected content validity from a variety of validity tests. According to Straub, Boudreau et al. 2004, content validity is defined as "the extent to which items in an instrument reflect the content universe to which the instrument will be generalized." In order to ensure that a new survey instrument contains all the necessary items and omits any that are unimportant to a particular construct domain, it must be evaluated (Lewis et al., 1995; Boudreau et al., 2001). Literature reviews are the first step in the judgmental approach to establishing content validity, followed by follow-up evaluations by panels or judges who are subject matter experts.

Questionnaires regarding disaster management practices and humanitarian supply chain management performance was adopted and modified from the work of Altay, N. and Green III, W.G., 2006 and Lu, Q. and De Souza, 2016 respectively. In addition some questionnaire was adopted from Kalkidan F., 2020. Kalkidan’s study mentioned the validity test of mitigation (.856), preparedness (.882), response (.888) and recovery (.884) in addition to that; the substantive relevance of the study was reviewed by the study adviser, who reviewed the appropriateness of the questions and scales.

3.9 Ethical consideration

Prior to distributing the questionnaire, a formal letter from the Department of Logistics and Supply Chain Management at the Addis Ababa University School of Commerce was sent to the respondents to obtain their consent to gather the required data. Respondents were given the assurance that the data they provided wouldn't be used against them, their identities wouldn't be made public, and the data collected wouldn't be given to outside parties or used for anything other than research. Additionally, respondents were made aware of their right to decline to participate or complete the questionnaire.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The analysis, interpretation of the results, and discussion of the study are provided in this chapter. Data for this study was gathered solely through questionnaires, which were designed to align with the research objectives, and utilized a five-point Likert scale to capture respondents' perceptions. The collected questionnaires were then coded and analyzed using IBM (SPSS) version 27. Descriptive statistics were used to analyze the demographic information of the participants. Additionally, Pearson correlation was used to evaluate the relationship between the explanatory and outcome variables. In order to investigate the effects of independent variables on the dependent variables, regression analysis was lastly used.

4.2 Response Rate

Of the 96 questionnaires issued, 90 questionnaires were returned after being properly checked for discrepancies. Five questionnaires were found to be incomplete and were omitted. Therefore from 96 questionnaires, 85 fully completed questionnaires are used for the study. According to Mugenda and Mugenda (2003), a 50% response rate is sufficient for analysis and reporting. 60% is good, 70% and above is excellent. An 89% response rate was recorded in this study. This means that the response rate is sufficient to allow the analysis.

4.3 Demographic profile of the Respondents

Descriptive statistics about the demographics of the respondents based on six demographic variables which contain gender, age, education level, professional experience in humanitarian organization, divisions/operating units at ERCS and their areas of work were analyzed in the table 4.1 below.

Table 4.1 Demographic profile of the respondents

Characteristics	Category	Frequency	Percent (%)
Gender	Male	51	60.0
	Female	34	40.0
	Total	85	100
Age	Below 25 years	4	4.7
	From 25 to 30 years	21	24.7
	From 31 to 40 years	43	50.6
	From 41 to 50 years	9	10.6
	Above 50 years	8	9.4
	Total	85	100
Education Level	College Diploma	5	5.9
	BA/BSc Degree	60	70.6
	MA/MBA/MSc	20	23.5
	Total	85	100.0
Work Experience	Less than 2 years	8	9.4
	2 - 5 years	12	14.1
	5 - 10 years	34	40.0
	> 10 years	31	36.5
	Total	85	100.0
Department or Work unit	Humanitarian supply chain management	30	35.3
	Program disaster risk management	42	49.4
	Other	13	15.3
	Total	85	100.0
Work Area	National Head Quarter	36	42.4
	Addis Ababa branch office	33	38.8
	Oromia branch office	16	18.8
	Total	85	100.0

Source: SPSS output (2023)

The study determined the gender distribution and the results are presented in the above table 4.1. The outcome indicates that 60.0 % is covered by male and 40.0 % by female employees. This indicates respondents at ERCS are dominated by male employees.

Distribution of respondents' by age results 50.6% of respondents in their 31s to 40s accounted for the most. The table 4.1 also shows, 24.7% are between the ages of 25 and 30, and 10.6% are

in between the ages of 41 and 50. Of these, only 9.4% are over the age of 50, while 4.7% of employees are below 25 years old.

The education level results shown in Table 4.1 indicate that the majority of respondents have at least a college degree 70.6% have a bachelor's degree and 23.5% have a master's degree. Only 5.9% of ERCS respondents had a college diploma. This means that most respondents (94.1%) have a college degree, are capable staffs, and can simply comprehend and complete the survey question.

Table 4.1 also gives the distribution on duration of work. The findings indicate that 36.5% of the respondents had worked at the ERCS above 10 years. 40.0% had served at their respective workplace for a period of between 5 - 10 years. Those who had worked at the organization for duration of less than 2 year and 2 - 5 years were represented by 9.4% and 14.1% respectively. These findings indicate that the employees under investigation have worked at ERCS long enough to comprehend the operations of the organization.

The above table 4.1 indicates that 49.4% were from the program disaster risk management. Humanitarian supply chain management covers 35.3% and other supporting staff's covers 15.3%.

The distribution of respondents by their work area includes the two geographical location Addis Ababa and Eastern Shewa (Adama). Majority of the respondents work at the national head quarter office covers 42.4%. 38.8% is covered by employees from Addis Ababa branch office including the four zonal coordination offices. The minimum number of employees participated in the study is 18.8% from the Oromia branch office.

4.4 Descriptive Analysis of Disaster Management Practice and HSCM performance of ERCS

This section of the study involves examining the quantitative data gathered about disaster management practices within the Ethiopian Red Cross Society. The focus is on how respondents view various aspects of disaster management and the performance of the HSCM. To do this, the study used IBM SPSS version 27 to calculate the mean and standard deviation for both the predictor and outcome variables.

Field 2013 explains that the mean values calculated in the study fall within a range of 1 to 1.80, indicating a strong level of disagreement among respondents. Mean ranges of 1.81 to 2.6 suggest that respondents tend to disagree, while ranges of 2.61 to 3.4, 3.41 to 4.2, and 4.21 to 5.00 reflect varying degrees of neutrality, agreement, or strong agreement among respondents. A value of 0.8 served as the cutoff for each measure in the five point Likert scale questionnaire applied in the study.

In statistics, the sum of square and standard deviation are used as a measure of "goodness of fit", which refers to how accurately the mean represents the data. If the standard deviation is small relative to the mean, it suggests that the data points are close to the mean and that respondents hold similar opinions. On the other hand, if the standard deviation is large compared to the mean, it suggests that the data points are far from the mean, indicating that the mean does not accurately represent the data and that respondents have expressed differing opinions.

Disaster management practices are measured according to the four variables listed below. Mean value of preparedness (3.5461), mitigation (3.4147), response (3.2850) and recovery (3.0039) are mentioned in the table 4.2 below. High preparedness practice and a very low recovery practice are noticeable in ERCS. Overall perception of the respondent indicates disaster management practice at ERCS is not defined (neutral). The detail description of each independent variable is mentioned in Appendix B.

Table 4.2 Descriptive Data of the Disaster Management Practices of the ERCS

	Number of Items	Mean	Std. Deviation
Mitigation	8	3.4147	.49183
Preparedness	12	3.5461	.59324
Response	9	3.2850	.41625
Recovery	9	3.0039	.63539
DMP	38	3.3124	.44947
Valid N (listwise)			

Source: SPSS output (2023)

From the most commonly used performance measurement framework the study adopted SCOR model that is used to help businesses improve the efficiency of their supply chains. The SCOR

model distinguishes between five supply chain attributes and suggests related performance indicators such as reliability, responsiveness, agility, cost efficiency and asset management (Supply Chain Council, 2007). The study considered only three operational performances (reliability, responsiveness, and agility) that deal with the beneficiaries.

From the table 4.3 below, its observed that mean of reliability is great compared to the other attributes. According to Field, A., 2013, the mean value (3.7694) indicates respondent's agreement on the questions of reliability. Meaning that, the reliability performance of ERCS is good. Responsiveness and agility has a mean of 3.4871 and 3.4941 respectively. In general, performance measure for humanitarian supply chain management has a grand mean of 3.6059, demonstrating that the ERCS had a good degree of HSCM performance according to perception of the respondents. The detail description of each dependent variable is mentioned in Appendix B.

Table 4.3 Descriptive Data of the HSCM Performance of the ERCS

	Number of Items	Mean	Std. Deviation
Reliability	5	3.7694	.54117
Responsiveness	5	3.4871	.54024
Agility	2	3.4941	.67917
HSCMP	12	3.6059	.42732
Valid N (listwise)	85		

Source: SPSS output (2023)

4.5 Correlation analysis

The study has used Pearson correlation coefficient also known as Pearson product- moment correlation coefficient used to measure the strength and direction of a linear association between two quantitative variables.

In Field's., 2013, explanation of the correlation analysis, the resulting correlation coefficient can have a value between -1 and +1. A coefficient of +1 indicates a completely positive relationship between two variables, while a coefficient of -1 indicates a completely negative relationship. A coefficient of 0 indicates that there is no linear relationship between the two variables. According to Evans' (1996) proposal, an absolute value of r (the correlation coefficient) between 0.0 to 0.19

is considered very weak, 0.2 to 0.39 is considered weak, 0.4 to 0.59 is considered moderate, 0.6 to 0.79 is considered strong, and 0.8 to 1 is considered very strong.

Table 4.4 below shows the relationship between independent and dependent variables with two-tailed test (According to Field, A., 2013, two-tailed test is deployed when it's unable to predict the nature of the relationship)

Table 4.4 Correlation matrix between DMP and HSCMP

		HSCMP	Mitigation	Preparedness	Response	Recovery
HSCMP	Pearson Correlation	1	.543**	.715**	.615**	.635**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	85	85	85	85	85

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output (2023)

The SPSS output provides a correlation coefficient matrix for the five variables. As shown in Table 4.4, the performance of HSCM is strongly correlated with preparedness practice with Pearson correlation values (r) of .715** having the highest value of r compared to the other variables. Response and recovery practice are positively related to the HSCM performance with Pearson correlation values of .615** and .635** respectively. The analysis also reveals a moderate correlation (.543**) between mitigation practice and HSCM performance. Additionally, the table highlights that there is a positive plus significant relationship between all predictor variables and HSCM performance at a two-tailed significance level at $p \leq 0.01$.

4.6 An Analysis of the Effect of Disaster Management Practices on HSCM performance of the ERCS

In particular, a multiple linear regression analysis is included in this section of the chapter. It was done to put the theories to the test as formulated in the Chapter one of the thesis. Before running the regression, the following seven assumptions are tested in the following portion.

1. Sample Size Adequacy

Green., 1991, suggests that to test the overall fit of a regression model (by testing the R square), the minimum acceptable sample size can be determined using the formula $50 + 8k$, where k represents the number of predictors in the model. So, for the four numbers of predictors

(mitigation, preparedness, response and recovery), a sample size of $50 + 8 \times 4 = 82$ is required. In addition according to Miles and Shevlin, 2001, graph seen in the Appendix C, shows sample size required for regression as a function of the number of predictors and the expected effect size. In accordance with the graph for the four numbers of predictors, with medium effect the required sample size is 80. So the study collected 85 sample sizes which are adequate to run multiple linear regressions.

2. Outlier, leverage and influential point

Residuals refer to variations in the predicted outcome values of a model when compared to the observed outcome values in the sample. They indicate the degree of error present in the model. If the sample data fits the model well, the residuals will generally be small, and in the best case scenario, they will be zero. On the other hand, if the model is not a good fit for the sample data, the residuals will be large. Any cases with outliers may also be identified through large residuals. An outlier refers to an observation within a random sample that is irregularly distant from other values within the same sample, in comparison to the population.

Outliers can be tested for each individual variable using box-whisker diagrams. As seen on the Appendix D it can be seen that there is no outlier for each predictor and outcome variable, due to there is no dot below and above the box plot. Additionally, Mahalanobis number distances, which are produced by multiple regression analysis, can be examined to check for outliers. For the four number of degree of freedom (number of independent variable) and alpha value of 0.01, the critical chi-square value table (Appendix E) has a value of 13.28. So, in the Mahalanobis number distances value more than 13.28 must be considered as outlier. Therefore, it can be said that there is no outliers because the maximum Mahalanobis distances is 11.295 as it can be seen from the table 4.5 below.

The evaluation of how much a value observed in the outcome variable influences the predicted values is known as leverage, also referred to as hat values. Leverage values can range from 0, which suggests that the case has no influence on the model's predictions, to 1, indicating that the case has complete control over the outcome. If none of the cases have an excessive impact on the model, then we would expect leverage values to cluster around the average value of $(k + 1)/n$.

Influences can be measured by using cook's distance. Cook's distance is a metric used to evaluate how much an individual data point affects the model. Cook and Weisberg, 1982, have

indicated that values exceeding 1 may be considered problematic. As it can be seen from the table below the maximum cook's distance is .119 in which it satisfies the assumption.

Table 4.5 Residual Statistics

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	2.9131	4.3488	3.6059	.32403
Std. Predicted Value	-2.138	2.293	.000	1.000
Standard Error of Predicted Value	.038	.109	.067	.017
Adjusted Predicted Value	2.8998	4.3357	3.6074	.32445
Residual	-.64844	.62565	.00000	.27858
Std. Residual	-2.272	2.192	.000	.976
Stud. Residual	-2.349	2.311	-.003	1.006
Deleted Residual	-.69351	.69543	-.00155	.29615
Stud. Deleted Residual	-2.419	2.377	-.002	1.016
Mahal. Distance	.523	11.295	3.953	2.493
Cook's Distance	.000	.119	.013	.020
Centered Leverage Value	.006	.134	.047	.030

Source: SPSS output (2023)

3. No perfect Multicollinearity

The occurrence of multicollinearity or near-linear dependence in a multiple regression model refers to a statistical phenomenon where two or more predictor variables are highly correlated. It is generally preferred that there should be no perfect linear relationship between any two predictors, i.e., the predictors should not be strongly correlated. The detection of multicollinearity is commonly done through a metric called the Variance Inflation Factor (VIF), as stated by Daoud, 2017.

In the case where there exists a correlation between the coefficients of predictors, there is an increase in the standard error of these coefficients, ultimately leading to an increase in their variance. The Variance Inflation Factor (VIF) serves as a useful tool for measuring and quantifying the extent of such an increase in the variance. According to Daoud, J.I., 2017, VIF value between 1 and 5 is acceptable and is moderately correlated and above 5 indicates the independent variables are highly correlated. On the other hand Miles, J., 2014, described tolerance, in which it is the reciprocal of the VIF. A rule of thumb that is sometimes given

regarding tolerances and VIF is that the tolerance should not be less than 0.1 and therefore the VIF should not be more than 10.

Table 4.6 Multicollinearity Test

		Tolerance	VIF
1	Mitigation	.389	2.569
	Preparedness	.210	4.771
	Response	.515	1.941
	Recovery	.518	1.932

a. Dependent Variable: HSCMP

Source: SPSS output (2023)

As demonstrated in Table 4.6, the VIF values range from 1.932 to 4.771 while the tolerance values range from 0.210 to 0.518. According to Miles, 2014, based on the tolerance and VIF values noted in the table, there are no significant issues with multicollinearity.

4. Homoscedasticity

In regression analysis, homoscedasticity is a fundamental assumption that requires the residuals at each level of the predictor variable(s) to have similar variances. Field, 2013, highlighted that the residuals must exhibit the same variance or homogeneity of variance at each level of the independent variable. This further implies that the error should be uniformly distributed among the variables, and at each level of the predictor, the residual term's variance should be constant.

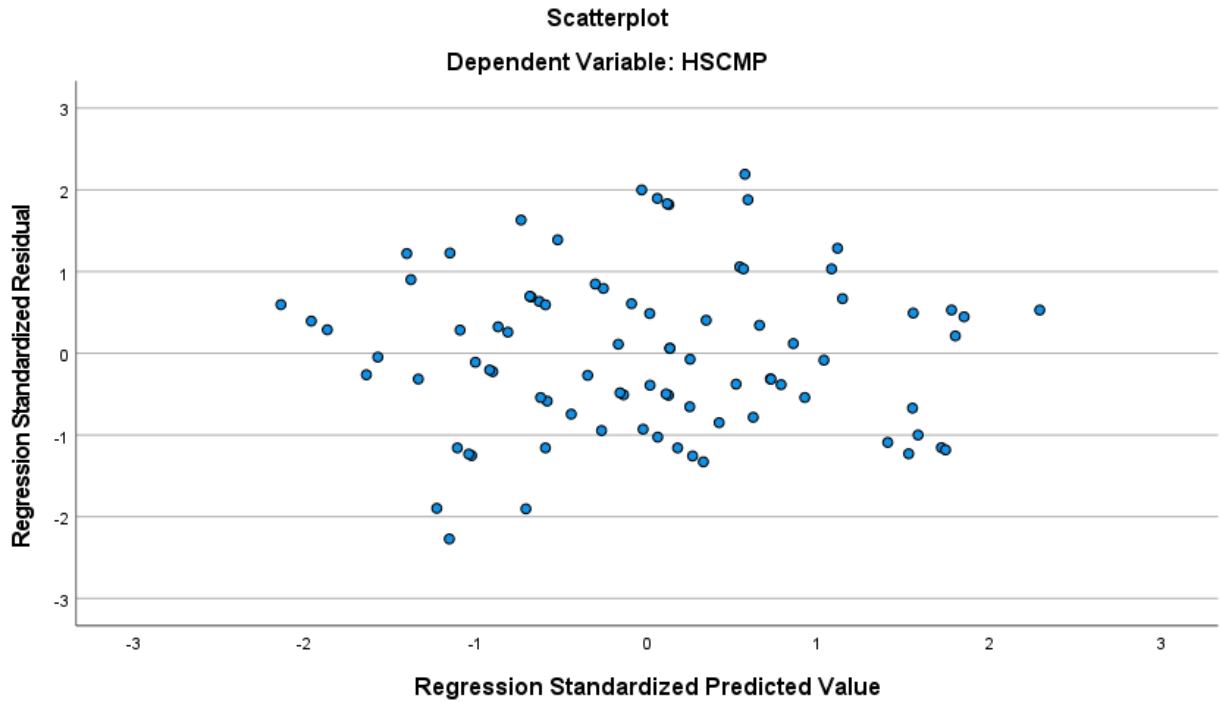


Figure 4.1 Scatterplot

Source: SPSS output (2023)

To check for homogeneity of variances, one can visually examine the standardized residuals plotted against the standardized predicted values from regression. The figure 4.1 demonstrates such a plot, where the points are uniformly scattered across the graph, indicating that the assumption of homoscedasticity is fulfilled.

5. Linearity Test

Linearity in regression analysis refers to the dependent variable being a linear function of the independent or predictor variables, which means that the mean outcome variable for each increment of the predictor follows a straight line (Field, 2013). One can test this assumption by using a scatter or dot chart in SPSS. The notice provided in Appendix F reveals that there exists a linear relationship where the dots tend to follow the straight fitted line for each independent variable concerning the dependent variable. This implies that the linearity assumption is satisfied for both variables.

In addition, for a regression analysis the test of linearity can also be seen from the scatter plot figure 4.1 above in which points are randomly and evenly dispersed throughout the plot indicating that assumption of linearity is also satisfied.

6. Autocorrelation

The lack of correlation between residual terms from two observations is important to ensure accurate results in regression analysis. This lack of correlation, or independence, can be determined through the Durbin-Watson test. This test examines whether adjacent residuals are correlated and yields a value ranging from 0 to 4, with 2 indicating uncorrelated residuals. To satisfy the assumption of independent errors, the Durbin-Watson measure should be between 1.5 and 2.5. In the model summary overview table 4.8, the Durbin-Watson value is shown to be 1.870, which falls within the acceptable range and confirms fulfillment of the autocorrelation assumption.

7. Normality Distribution test

To assess whether a distribution is normal, the skewness and kurtosis tests can be utilized. Kurtosis describes the width of the tails of a distribution, where a wider tail results from less data points near the poles of a normal distribution. Skewness, on the other hand, measures the symmetry of the distribution, with a symmetric data set being equivalent on either side of its midpoint (Mardia, K.V., 1970).

Hair, 2010 emphasizes the importance of examining the values of skewness and kurtosis when checking for normal distribution. The author suggests that a skewness or kurtosis value of zero indicates normal distribution in the variable being assessed. Conversely, non-zero values for these tests indicate deviation from normality, but values within ± 1 are acceptable. From the table 4.7 below Skewness Statistic value (-.176 to .001) and Kurtosis Statistic value (-.696 to -.424) found to be within the acceptable range and emphasizes it is approximately normally distributed.

Table 4.7 Normally Distribution test

	N Statistic	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Mitigation	85	-.176	.261	-.605	.517
Preparedness	85	-.023	.261	-.696	.517
Response	85	.079	.261	-.491	.517
Recovery	85	.134	.261	-.650	.517
HSCMP	85	.001	.261	-.424	.517
Valid N (listwise)	85				

Source: SPSS output (2023)

Field, A., 2013, suggests that it is important to evaluate whether errors in a regression analysis are normally distributed. In this context, normally distributed errors imply that the residuals in a model are random and follow a normal distribution with a mean of zero. Essentially, this means that any difference between the model and observed data is typically very small or zero and any differences beyond zero are rare occurrences.

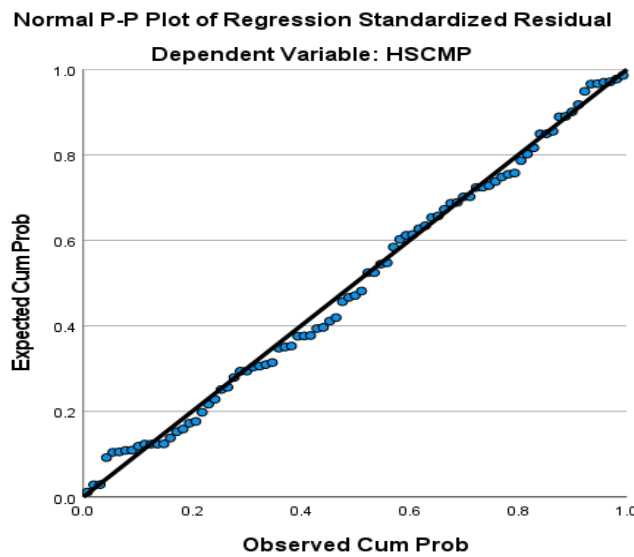


Figure 4.2 Normal P-P plot

Source: SPSS output (2023)

The study utilized two tools, a histogram and a normal probability plot (also known as a normal P-P plot), to evaluate the normality of residuals. The normal probability plot consists of a straight line representing a normal distribution, while the points represent observed residuals. Ideally, all

data points fall exactly on the line in a perfectly normal distribution. Looking at Figure 4.2, it can be deduced that the residuals are close to normally distributed since the points are not too far from the line. Additionally, the histogram (Appendix G) appears to be bell-shaped, indicating that residuals follow a normal distribution.

4.7 Model Fit Analysis

A regression model provides a function that describes the relationship between the outcome variable of HSCM performance and the explanatory variables of mitigation, preparedness, response, and recovery. Table 4.8 shows the summary of the model where the values of multiple correlation coefficients (R) between predictors and the outcome variables are (0.758). This indicates a strong correlation between disaster management practices and HSCM performance is visible. The next is value of R square, which indicates a measure of how much of the variability in the outcome is accounted for by the predictors. The value of R square (coefficient of determination) from the model summary is .575. This means that predictors (mitigation, preparedness, response and recovery) accounts for 57.5% of the variation in HSCM performance. The unexplained portion of the variation in HSCM performance cannot be accounted for by the stated disaster management practices. This indicates 42.5% variation in HSCM performance remains unexplained even after considering the indicated disaster management practices.

Table 4.8 Model summary

Model Summary^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.758 ^a	.575	.554	.28546	1.870

a. Predictors: (Constant), Recovery, Mitigation, Response, Preparedness

b. Dependent Variable: HSCMP

Source: SPSS output (2023)

4.7.1 ANOVA

The ANOVA test evaluates if the model can accurately predict the outcome variable. According to table 4.9, the p-value is less than 0.05 which means that the overall regression model is

significant in predicting how independent variables such as mitigation, preparedness, response, and recovery can influence HSCM performance for ERCS.

Table 4.9 ANOVA Results

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.820	4	2.205	27.057	.000 ^b
	Residual	6.519	80	.081		
	Total	15.339	84			

a. Dependent Variable: HSCMP

b. Predictors: (Constant), Recovery, Mitigation, Response, Preparedness

Source: SPSS output (2023)

4.7.2 Statistical Significance Analysis of the Regression Coefficient to test the Hypothesis

The regression coefficient table tells which variables significantly influence the dependent variable and which variables significantly predict the dependent variable. The table 4.10 below shows the B value for each predictor variables. The B-values tell us about the relationship between HSCM performance and each predictor. Positive B value is observed in the entire explanatory variable (mitigation, preparedness response and recovery) which indicate these four predictors and the outcome variables have a positive relationship. So, as mitigation practice increases, HSCM performance increases; as preparedness practice increase HSCM performance increases, and the same is true for response and recovery practice. The B-values also indicate to what degree each predictor affects the outcome if the effects of all other predictors are held constant. This represents a one unite increase in mitigation practice there will be an increase in HSCM performance by .047 units, this is true if the effect of preparedness, response and recovery practices are held constant.

Table 4.10 Coefficients of Disaster Management Practices

Model		Coefficients ^a		Standardized Coefficients	t	Sig.
		Unstandardized Coefficients	Std. Error			
		B		Beta		
1	(Constant)	1.308	.287		4.556	.000
	Mitigation	.047	.102	.054	.466	.643
	Preparedness	.253	.115	.352	2.209	.030
	Response	.220	.104	.214	2.106	.038
	Recovery	.172	.068	.256	2.526	.014

a. Dependent Variable: HSCMP

Source: SPSS output (2023)

To evaluate the impact of predictor variables on the model, a t-test is employed. If the t-test related to the B-value is deemed significant, indicated by a value less than 0.05 in the 'Sig.' column, then that specific predictor has a significant influence on the model. As outlined by Field, 2013, predictors with smaller 'Sig.' values and larger t-values contribute more significantly to the model.

For the above regression model, preparedness practice ($t(85) = 2.209$, $p = .030$), response practice ($t(85) = 2.106$, $p = .038$) and recovery practice ($t(85) = 2.526$, $p = .014$), are significant predictors of HSCM performance except mitigation practice ($t(85) = .466$, $p = .643$) which has p value greater than .05 makes it less significant in predicting the outcome variable.

The Beta value (β) which is in standardized units indicates the number of standard deviations by which the dependent variable changes corresponding to a shift in the standard deviation of an independent variable. Beta values quantified in standard deviations give better understanding to the relevance of predictors utilized in the model (Field, 2013). The beta values for response ($\beta=.214$) and recovery ($\beta=.256$) suggest that these two predictors have a close magnitude of significance in the model.

4.7.3 Hypothesis Testing Result and Discussion

According to Field, A., 2013, Accept the alternative hypothesis if the p value is less than the significant level.05. Otherwise, reject alternative hypothesis. The proposed hypothesis result can be seen from the table 4.11 below.

Table 4.11 Hypothesis test result

No	Hypothesis	Accepted?(Yes or No)
H ₁	The mitigation practice has significant effect on HSCM performance of the ERCS.	No
H ₂	The preparedness practice has significant effect on HSCM performance of the ERCS.	Yes
H ₃	The response practice has significant effect on HSCM performance of ERCS.	Yes
H ₄	The recovery practice has significant effect on HSCM performance of ERCS.	Yes

The first alternative hypothesis is rejected due to the sig. value is more than .05. This is

- Ho1: The mitigation practice has no significant effect on HSCM performance of the ERCS.

This study's overarching goal was to investigate how mitigation strategies affect the effectiveness of humanitarian supply chain management (HSCM) at the Ethiopian Red Cross Society (ERCS). As mentioned above the first null hypothesis regarding the significant relationship between mitigation practice and outcome variable is accepted.

Activities that will either prevent the onset of a disaster or reduce the impacts should one occur (mitigation), is not highly practiced at ERCS. This is because some mitigation measures can be expensive (as noted by Carter in 2008) and the organization has allocated a minimal budget for mitigation during rapid onset relief operations (see Appendix B). And lack of insufficient appropriate mitigation measures for example zoning and land use controls to prevent occupation of high hazard areas is not practiced well (Appendix B). Majority of activities in mitigation is covered by the government/ National level and less likely practiced at the organization level (ERCS) compared to the three independent variables. Even though mitigation practice has no significant relationship with HSCM performance but it have a positive relationship with HSCM performance this is because the B and Standardized beta value is positive.

The second, third and fourth alternative hypothesis is accepted and this is

- Ha2: The preparedness practice has significant effect on HSCM performance of the ERCS.

The second aim is to find the correlation between preparedness practices and HSCM performance. As a result strong positive relationship between the predictor variable and outcome variable does exist. With proper preparedness activity maintained the influence of disaster can be reduced because it involves building the capacity to respond to a disaster. The Ethiopian Red Cross Society (ERCS) has been noted to have effective preparedness practices that include the recruitment of emergency personnel and community volunteers, as well as the establishment of programs and protocols for mutual support among various humanitarian organizations. These practices have significant implications on ERCS's HSCM performance, as demonstrated in Appendix B.

- Ha3: The response practice has significant effect on HSCM performance of ERCS.

The study's third goal was to look at the role of response practices in the HSCM performance of ERCS. From the SPSS result it's observed that the response practice has strong positive and significant contribution on determining HSCM performance of the humanitarian organization. Effectiveness of response activity which includes central logistics activities is basic in determining disaster relief operation which intern has a contribution on HSCM performance (Thomas and Kopczak 2005). The existence of well-maintained emergency rescue and medical care and provision of required items for those who truly needed at minimum cost quickly is the base for the HSCM performance of ERCS

- Ha4: The recovery practice has significant effect on HSCM performance of ERCS.

The study purpose was to evaluate how recovery activities impact the performance of HSCM at the Ethiopian Red Cross Society. As a result, the activities included in the recovery practice were found to have a noteworthy and favorable predictive value in determining the performance of HSCM at ERCS.

In general the Sig. value of preparedness, response and recovery practices, are .030, .038 and .014 which indicates there exist a significance relationship between preparedness practice and HSCM performance, response practice and HSCM performance and recovery practice and HSCM performance. Moreover all predictor variables are positively related with HSCM performance having B and Standardized beta value of (.253 and .352, .220 and .214 and .172 and .256) respectively. So, per disaster preparedness and post disaster activity has a great contribution on HSCM performance of ERCS.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter gives a brief overview of the conclusions, recommendations, and findings related to disaster management practice, performance of HSCM and its relationship to disaster management procedures at the Ethiopian Red Cross Society. Additionally, it suggests areas for further research based on existing constraints.

5.1 Summary of Findings

The study intended to evaluate the disaster management practice and HSCM performance. It examines the effect of disaster management practice on the HSCM performance at ERCS specifically in Addis Ababa office (Head quarter, Addis Ababa branch and Oromia branch) and Adama office (Eastern Shewa zonal branch). Effect of four determinants of disaster management practice features (mitigation, preparedness, response and recovery) on HSCM performance is covered in general.

From the SPSS result, the model fit and regression results are discussed in chapter three, but in general the analysis indicates that mitigation practice is statistically insignificant predictor of HSCM performance ($p < .643$). And it have a positive relationship ($\beta = .054$) with the outcome variable having positive beta value. Attributes of disaster management practices, the three predictor variables (preparedness, response and recovery practices) are statistically significant predictor of the dependent variable with 5% significant value. The positive beta value also indicates that the three variables are positively related to the outcome variable. As a whole, the regression model summery discloses predictors (mitigation, preparedness, response and recovery) accounts for 57.5% of the variation in HSCM performance.

5.2 Conclusion

The study concludes strong positive and significant relationship has been disclosed by preparedness, response and recovery with HSCM performance. Moderate and statistical significant relationship between mitigation and HSCM has also been revealed. Among the four predicting variable preparedness is the most correlated variable with HSCM performance.

The study concludes that the Ethiopian Red Cross Society has implemented disaster management practices to a significant degree and that there is a correlation between the disaster management

practices and HSCM performance. ERCS follows four disaster management practices: mitigation, preparedness, response, and recovery. Among these, preparedness, response, and recovery practices were found to have an impact on the HSCM performance of the organization. Thus, the study concludes that these three practices have a predictive capacity for HSCM performance.

5.3 Recommendation

The recommendations presented are based on the results and conclusions of the study.

- The study recognized that mitigation practice doesn't significantly predict the performance of the HSCM of ERCS. From the finding even if the activity doesn't predict but it has a positive relationship with the HSCM performance of ERCS. Mitigation measures tend to focus on significant policy decisions at the governmental level and are typically directed primarily by senior management. So the study suggests ERCS senior management to have budget allocation in order to mitigate for an immediate relief effort. In addition, the study also recommends to capture good risk analysis measures for extreme hazards, while maintain adequate zonal and restrictions on land use to avoid occupying high-risk areas.
- The research acknowledged the importance of preparedness having a significant effect on the HSCM performance of ERCS. Preparedness measures encompass the development of practical disaster plans, the upkeep of necessary resources, and the training of staff members. Preparedness measures are typically more focused on action taken by individual organizations. The involvement of numerous organizations in preparedness highlights the critical need for coordination, which may be even more essential than in the case of prevention and mitigation efforts. Majority of planning activities/ pre disaster activities are covered in the preparedness phase even though low logistic volume is required. The study suggests that the Ethiopian Red Cross Society (ERCS) to have well maintained emergency supplies. It recommends that ERCS establish clear procedures for handling, grouping, and packaging aid items to ensure that emergency supplies are well-maintained and effectively delivered to beneficiaries.
- One of the activities which haven't get great attention in the response practice is existence of emergency infrastructure protection and recovery of lifeline services and

response given to the affected community within 72 hours. The ability to plan and prepare for specific response actions in the event of potential threats is a significant benefit of response in disaster management. This serves as a clear objective for disaster management efforts. Response operations often occur in disruptive and potentially traumatic conditions. They can be challenging to execute and place significant demands on personnel, equipment, and resources. Therefore, without a solid foundation of planning, organization, and training, response operations are unlikely to achieve the best possible outcomes. As the study recognized that response practices have a major impact on the HSCM performance of ERCS, it suggests the organization to give high emphasis on the response activity. In addition, as majority of the logistics activities are included in response phase, the study suggests ERCS to have a comprehensive assessment for a relief operation.

- An activity which requires long term action, which is, recovery is less likely practiced in ERCS even though it has a significant effect on the HSCM performance. There may be limitations in implementing recovery programs, such as shortages of materials, equipment, and skilled personnel. The formulation of recovery programs may be hindered by restrictions on the availability of finances or uncertainties surrounding international assistance funding. Usually, the financial and material requirements of recovery programs limit the resources that could otherwise be allocated to strengthen other management efforts, such as mitigation and preparedness measures. The reconstruction of major infrastructure projects, such as bridges, roads, and rail systems, often takes a considerable amount of time. This prolonged process can result in economic losses, increased hardships, and other challenges for the communities affected by the disaster. So the study suggests having a comprehensive budget allocation for recovery, reconstruction and rehabilitation even if the affected vulnerable people have got the required response.
- In general as the humanitarian organization, ERCS demonstrate extensive disaster management practices and HSCM performance. Among the four determinant of disaster management, recovery has the least grand mean value. So, the organizations disaster management practice regarding on recovery practice should be improved. Additionally, from the HSCM performance attributes responsiveness is the list scored on the mean

value. As a result, the organizations should be faster at delivering aid items for the affected people.

5.4 Suggestion for Further Researches

This study's primary goal was to examine how disaster management practices affect the performance of HSCM at the Ethiopian Red Cross Society. Therefore, it is suggested that more research be conducted in different contexts to expand and enhance the existing knowledge base in the field of disaster management and HSCM performance.

Time constraints arguably limit this study to the following description;

- The study has not considered other organizations and stakeholders like, government agencies, beneficiaries, and donors.
- The study does not consider the financial performance (cost effectiveness and asset utilization) on assessing HSCM performance.
- The study has also been limited to ERCS at Addis Ababa (National Head Quarter, Addis Ababa branch and Oromia branch offices) and Eastern Shewa zonal branches (Adama office)

Nonetheless, further studies could capture other agencies, governmental agencies, beneficiaries and donors with broad study area. From the study result, R square value covers 57.5%, the remaining 42.5%, of the variance in HSCM performance has not been covered in the study so the study additionally suggest further researchers on the remaining factors.

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APPENDIX A: Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

Masters of Arts in Logistics and Supply Chain Management

Title: Effect of Disaster Management Practice on Humanitarian Supply Chain Management
Performance of ERCS

Dear Sir/Madam,

Thank you in advance for becoming my respondent in this research.

Dear Respondent, I am undertaking a Master's thesis on the title "Effect of Disaster Management Practice on Humanitarian Supply Chain Management Performance of ERCS" as a partial fulfillment of requirement for Masters of Arts in Logistics and Supply Chain Management. I do believe that your response and participation in the survey questionnaire is a great input to the research study. So, I kindly request you to participate and answer all the questions.

The purpose of the questionnaire is fully for academic (will not be used for any other purposes). Your responses will be kept confidential and will not be traceable to the individual respondents. Please be informed that it is not necessary to write your name.

With Kind Regards,

Metasebya Kebede Jembere

Tel: (+251) 910-59-91-49

E-mail: metikeb16@gmail.com

SECTION 1: Demographic Characteristics

This section is aimed to obtain information related to your background. (Please tick (√) to provide your answer.

1. Gender

- a. Male
- b. Female

2. Age

- a. Below 25 years
- b. From 25 to 30 years
- c. From 31 to 40 years
- d. From 41 to 50 years
- e. Above 50 years

3. Educational level

- a. College Diploma
- b. BA/BSc Degree
- c. MA/MBA/MSc
- d. PhD and above

4. Year of experience (work experience)

- a. Less than 2 years
- b. 2 - 5 Years
- c. 5 - 10 years
- d. Above 10 years

5. Department/Work unit

- a. Humanitarian supply chain management
- b. Program disaster risk management
- c. Other

6. Work area

- a. National Head Quarter
- b. Addis Ababa branch office
- c. Oromia branch office

SECTION 2: Disaster Management Practice and Humanitarian Supply Chain Management Performance at ERCS

I. Disaster Management Practice

Please show the extent of your agreement by ticking (√) on the following statements concerning disaster management practice in your organization.

Use the scale of: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

No	Disaster Management Practice					
A.	Mitigation	1	2	3	4	5
1.	There is a process to develop a disaster reduction action plan.					
2.	There is an action plan in place to eliminate or reduce the likelihood of rapid onset disaster.					
3.	There are active preventive measures to control developing situations.					
4.	Sufficient human resources are available for disaster management.					
5.	There exists an action plan to raise awareness of disaster risk factors at community level and mass media projects.					
6.	There is budget allocated for mitigation for rapid onset relief operation.					
7.	There is zoning and land use controls to prevent occupation of high hazard areas.					
8.	There is risk analysis to measure the potential for					

	extreme hazards.					
B.	Preparedness	1	2	3	4	5
1.	There exist recruiting personnel for the emergency services and for community volunteer groups.					
2.	There exists emergency planning for disaster management in relief operation.					
3.	There exists development of mutual aid agreements and memorandums of understanding.					
4.	There exists training for both response personnel and concerned citizens.					
5.	There exists threat based public education.					
6.	There exists budgeting for and acquiring vehicles and equipment for use when rapid disaster occurs.					
7.	There exist well-maintained emergency supplies.					
8.	There exists construction of an emergency operations center.					
9.	There exist a programs and procedures for mutual assistance between different humanitarian actors.					
10.	There is a good inventory/ stock management process.					
11.	There is a well-established process for handling, sorting and packaging relief items for storage or distribution to beneficiaries.					
12.	There exist collaboration and coordination between					

	various players in humanitarian relief operation.					
C.	Response	1	2	3	4	5
1.	There exists a work on activating the emergency operations plan.					
2.	There exists a plan of action for activating the emergency operations center within 72 hours of the occurrence of a disaster.					
3	Within 72 hours response are given to the affected community.					
4.	There exists evacuation of threatened populations.					
5.	There exists opening of shelters and provision of mass care.					
6.	There exists emergency rescue and medical care.					
7.	There is action plan to provide the exact items requested to those who truly need them at minimum cost as quickly as possible.					
8.	There exists emergency infrastructure protection and recovery of lifeline services.					
9.	There exist comprehensive assessments for a relief operation					
D.	Recovery	1	2	3	4	5
1.	There exists an activity on disaster debris cleanup.					
2.	There exists financial assistance to individuals.					

3.	There exists rebuilding of roads and bridges and key facilities.					
4.	There exists sustained mass care for displaced human and animal populations.					
5.	There is a good inventory(stock) management processes for recovery, reconstruction and rehabilitation					
6.	There exists full restoration of lifeline services					
7.	There exists an activity on mental health and pastoral care.					
8.	There is a procedure of keeping records of past or pervious disasters.					
9.	There is budget allocated for recovery, reconstruction and rehabilitation.					

II. Humanitarian Supply Chain Management Performance

Please show the extent of your agreement by ticking (√) on the following statements concerning humanitarian supply chain management performance in your organization.

Use the scale of: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

No	Humanitarian Supply Chain Management Performance					
A.	Reliability Statement	1	2	3	4	5
1.	Emergency items are accurately delivered to the beneficiaries during emergency relief interventions.					
2.	ERCS supplies emergency goods as the demanded quantity.					

3.	ERCS provide emergency goods to the correct location and recipients.					
4.	ERCS's suppliers complete correct and readily accessible required documentations (quality certificate) and shipping documentations.					
5.	ERCS provide damage free items and faultless operation in delivering relief items.					
B.	Responsiveness Statement	1	2	3	4	5
1.	ERCS authorizes supplier payment cycle time.					
2.	ERCS selects suppliers and negotiates cycle time.					
3.	All requested demands are delivered at the right time					
4.	ERCS selects transporters and rates shipments cycle time.					
5.	There is an integrated relationship with suppliers and third-party service providers to ensure that ERCS is responsive to requests.					
C.	Agility Statement	1	2	3	4	5
1.	ERCS can easily accommodate unplanned items that are requested during the emergency response.					
2.	ERCS can easily handle modified volume requests from initial assessments during emergency response.					

APPENDIX B: Descriptive statistics of predicting variables

Descriptive Statistics of Mitigation practice

	N	Mean	Std. Deviation
There is a process to develop a disaster reduction action plan.	85	4.22	.643
There is an action plan in place to eliminate or reduce the likelihood of rapid onset disaster.	85	3.82	.658
There are active preventive measures to control developing situations.	85	3.66	.700
Sufficient human resources are available for disaster management.	85	3.22	.918
There exists an action plan to raise awareness of disaster risk factors at community level and mass media projects.	85	3.71	.949
There is budget allocated for mitigation for rapid onset relief operation.	85	2.80	.884
There is zoning and land use controls to prevent occupation of high hazard areas.	85	2.73	.956
There is risk analysis to measure the potential for extreme hazards.	85	3.15	1.006
Valid N (listwise)	85		

Source: SPSS output (2023)

Descriptive Statistics of Preparedness Practice

	N	Mean	Std. Deviation
There exist recruiting personnel for the emergency services and for community volunteer groups.	85	3.98	.938
There exists emergency planning for disaster management in relief operation.	85	3.68	.929
There exists development of mutual aid agreements and memorandums of understanding.	85	3.66	.853
There exists training for both response personnel and concerned citizens.	85	3.71	1.045
There exists threat based public education.	85	3.58	1.095
There exists budgeting for and acquiring vehicles and equipment for use when rapid disaster occurs.	85	3.73	.905
There exist well-maintained emergency supplies.	85	2.96	.932
There exists construction of an emergency operations center.	85	3.15	.982
There exist a programs and procedures for mutual assistance between different humanitarian actors.	85	3.68	.929
There is a good inventory/ stock management process.	85	3.45	1.064
There is a well-established process for handling, sorting and packaging relief items for storage or distribution to beneficiaries.	85	3.19	1.086
There exist collaboration and coordination between various players in humanitarian relief operation.	85	3.79	.888
Valid N (listwise)	85		

Source: SPSS output (2023)

Descriptive Statistics Response Practice

	N	Mean	Std. Deviation
There exists a work on activating the emergency operations plan.	85	3.74	.861
There exists a plan of action for activating the emergency operations center within 72 hours of the occurrence of a disaster.	85	3.54	.867
Within 72 hours response are given to the affected community.	85	3.08	.848
There exists evacuation of threatened populations.	85	3.41	.541
There exists opening of shelters and provision of mass care.	85	3.04	.851
There exists emergency rescue and medical care.	85	3.59	.890
There is action plan to provide the exact items requested to those who truly need them at minimum cost as quickly as possible	85	3.52	.908
There exists emergency infrastructure protection and recovery of lifeline services.	85	2.84	.769
There exist comprehensive assessments for a relief operation.	85	2.81	.764
Valid N (listwise)	85		

Source: SPSS output (2023)

Descriptive Statistics of Recovery Practice

	N	Mean	Std. Deviation
There exists an activity on disaster debris cleanup.	85	3.13	.704
There exists financial assistance to individuals.	85	3.33	1.095
There exists rebuilding of roads and bridges and key facilities.	85	2.51	.946
There exists sustained mass care for displaced human and animal populations.	85	2.87	.961
There is a good inventory(stock) management processes for recovery, reconstruction and rehabilitation	85	2.99	1.086
There exists full restoration of lifeline services	85	2.94	1.016
There exists an activity on mental health and pastoral care.	85	3.06	.917
There is a procedure of keeping records of past or pervious disasters.	85	3.42	1.062
There is budget allocated for recovery, reconstruction and rehabilitation.	85	2.79	.888
Valid N (listwise)	85		

Source: SPSS output (2023)

Descriptive Statistics of Reliability

	N	Mean	Std. Deviation
Emergency items are accurately delivered to the beneficiaries during emergency relief interventions.	85	3.96	.957
ERCS supplies emergency goods as the demanded quantity.	85	3.73	.993
ERCS provide emergency goods to the correct location and recipients.	85	4.07	.593
ERCS's suppliers complete correct and readily accessible required documentations (quality certificate) and shipping documentations.	85	3.68	.834
ERCS provide damage free items and faultless operation in delivering relief items.	85	3.40	.889
Valid N (listwise)	85		

Source: SPSS output (2023)

Descriptive Statistics of Responsiveness

	N	Mean	Std. Deviation
ERCS authorizes supplier payment cycle time.	85	3.55	.779
ERCS selects suppliers and negotiates cycle time.	85	3.60	.676
All requested demands are delivered at the right time.	85	3.52	.796
ERCS selects transporters and rates shipments cycle time.	85	3.35	1.008
There is an integrated relationship with suppliers and third-party service providers to ensure that ERCS is responsive to requests.	85	3.41	.791
Valid N (listwise)	85		

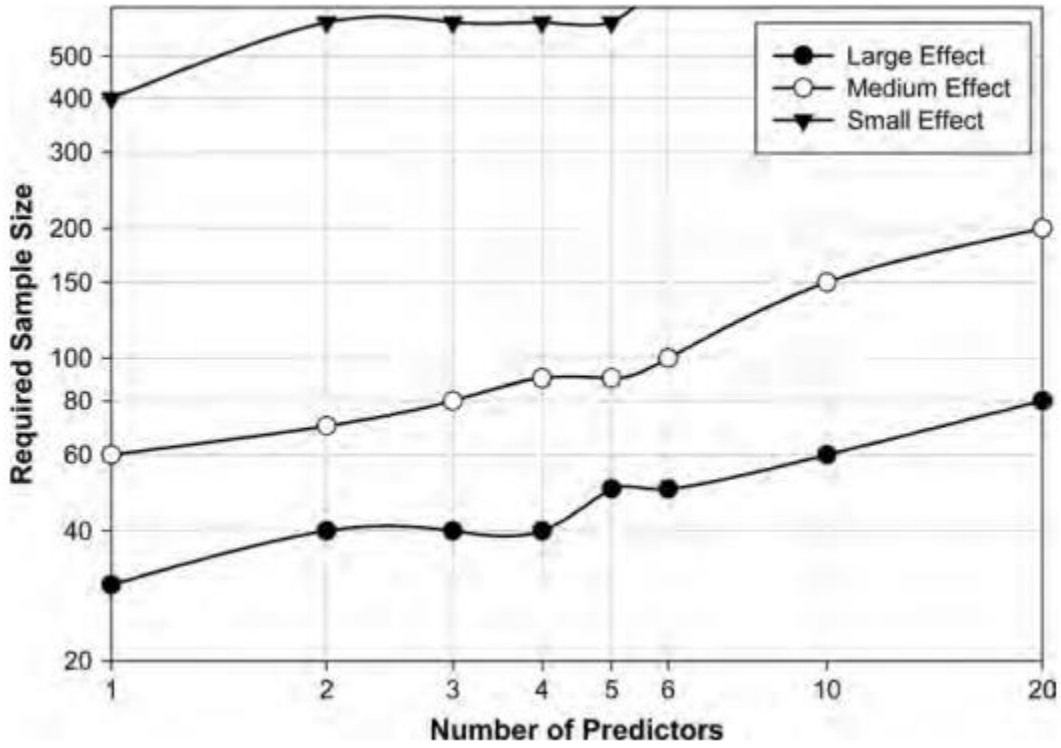
Source: SPSS output (2023)

Descriptive Statistics of Agility

	N	Mean	Std. Deviation
ERCS can easily accommodate unplanned items that are requested during the emergency response.	85	3.44	.919
ERCS can easily handle modified volume requests from initial assessments during emergency response.	85	3.55	.699
Valid N (listwise)	85		

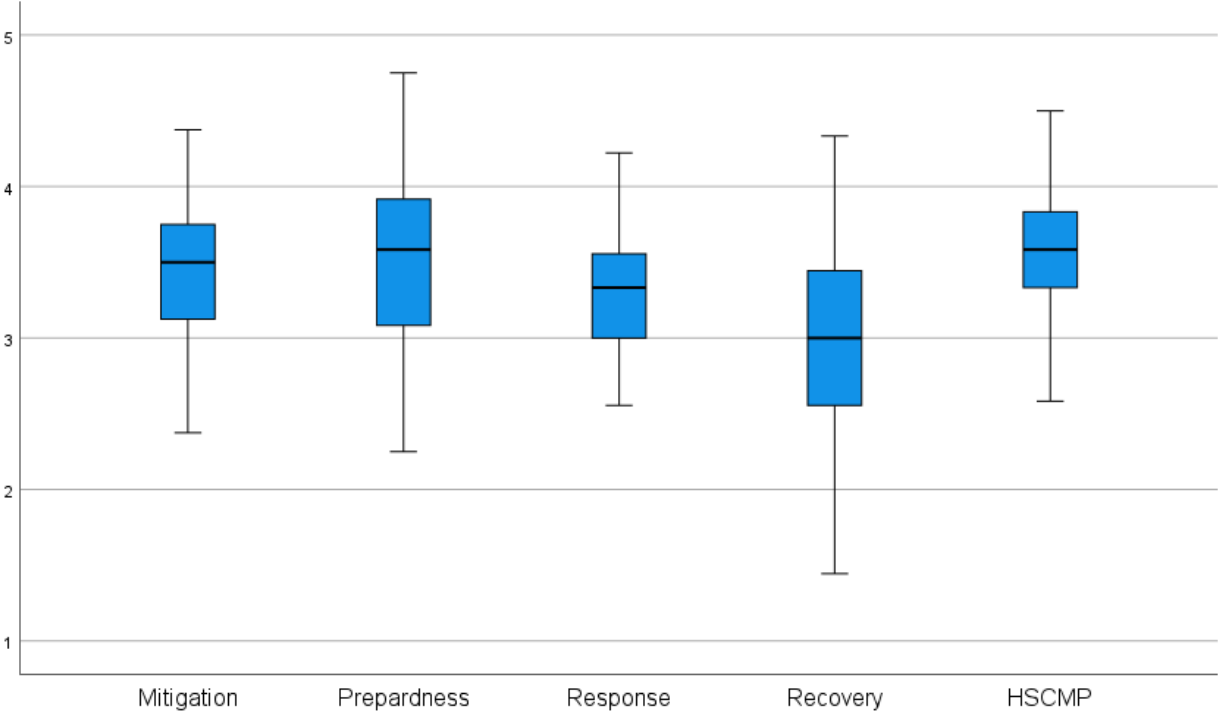
Source: SPSS output (2023)

APPENDIX C: Sample size required in regression depending on the number of predictors and the size of expected effect



Source: Field, A., 2013, Page No - 223

APPENDIX D: Box-Whisker diagram for outlier test



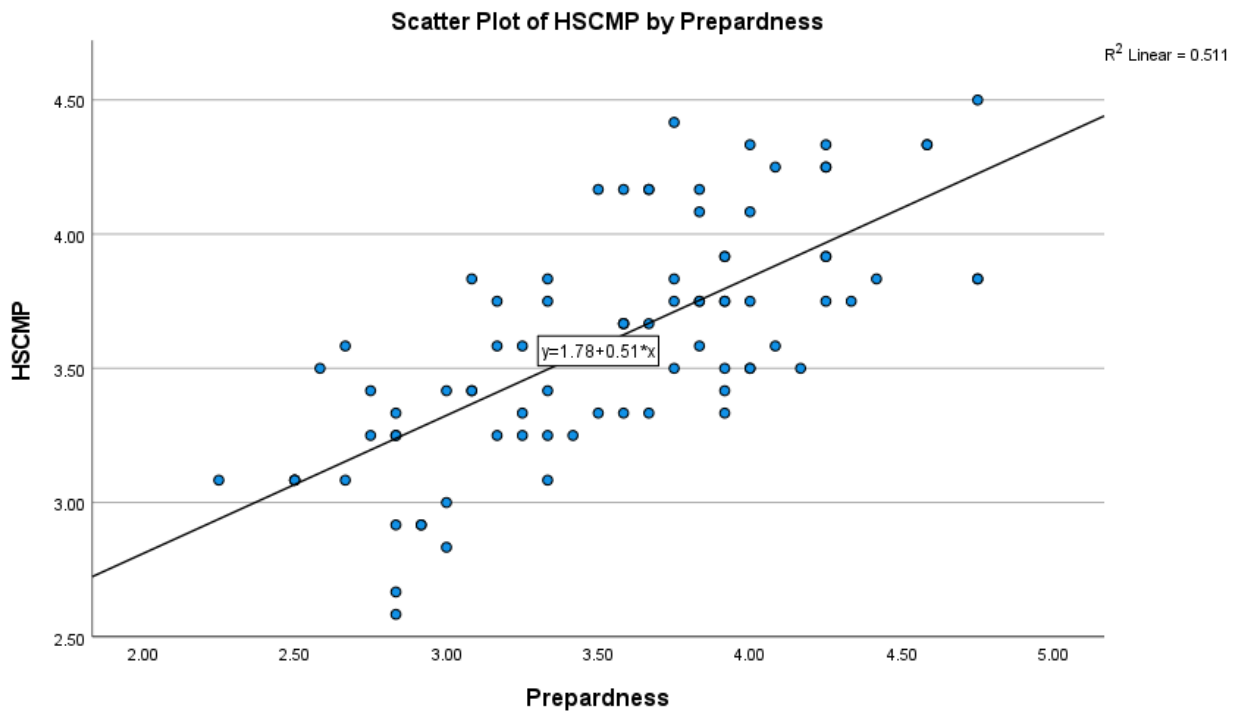
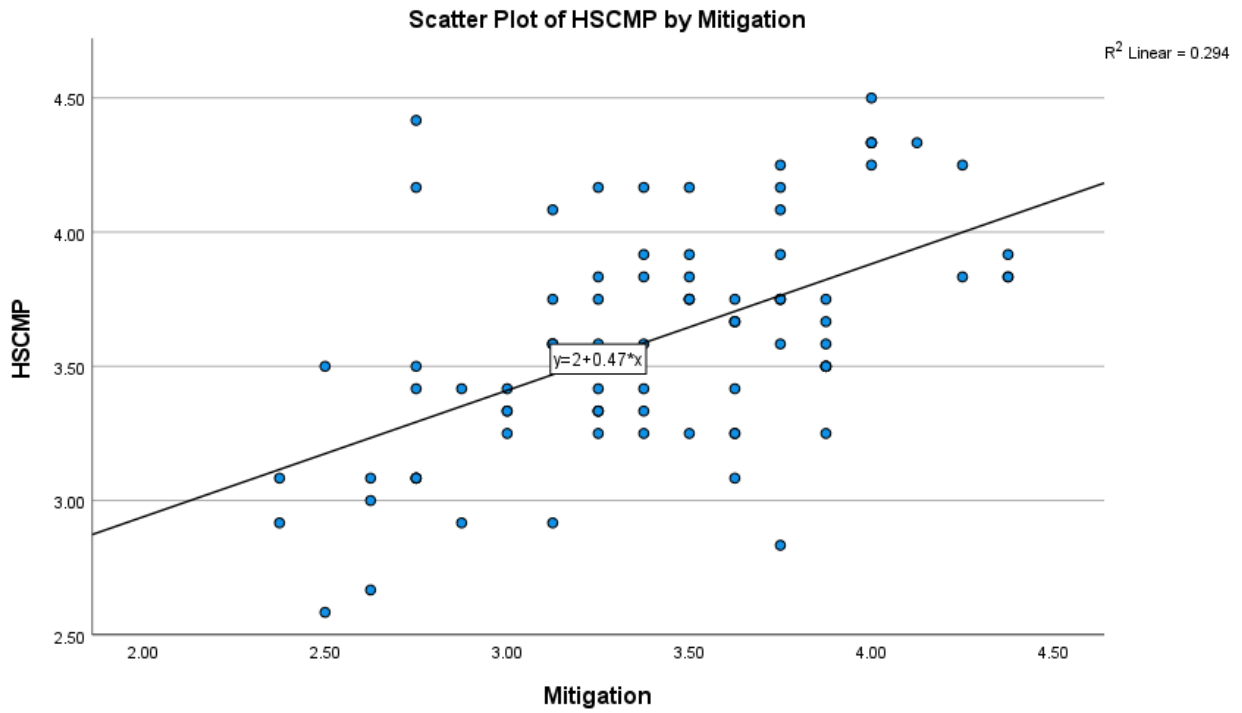
Source: SPSS output (2023)

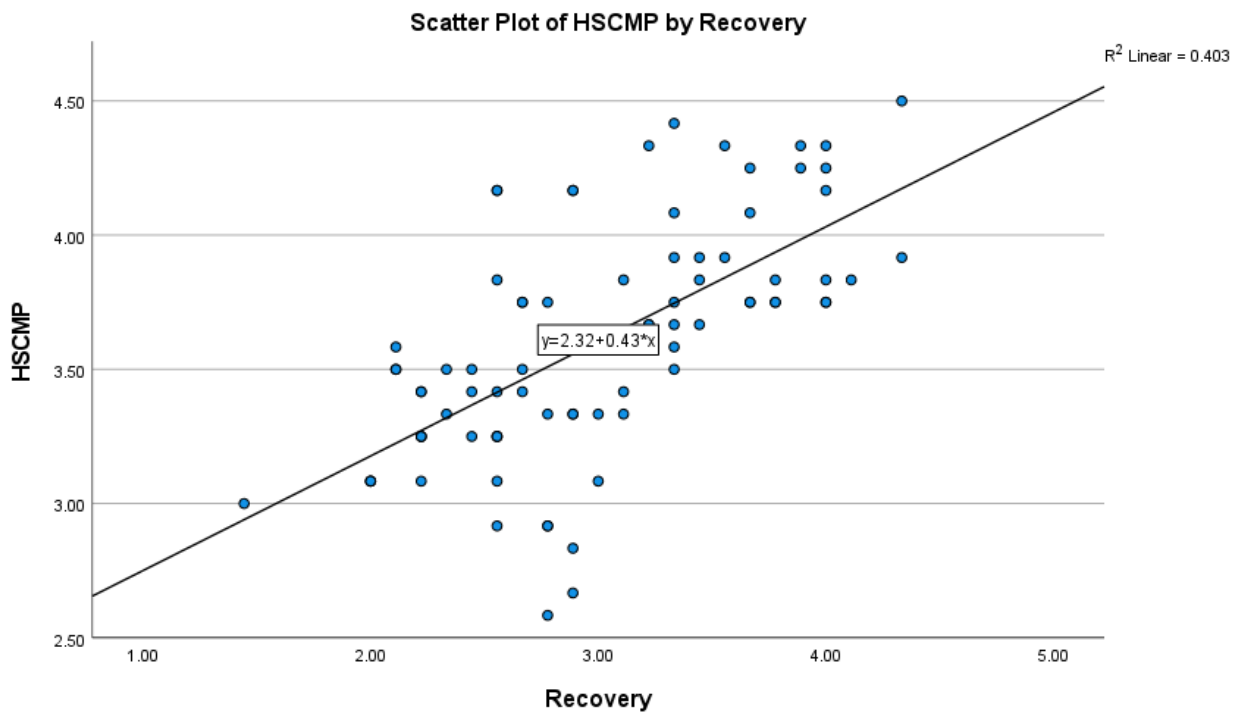
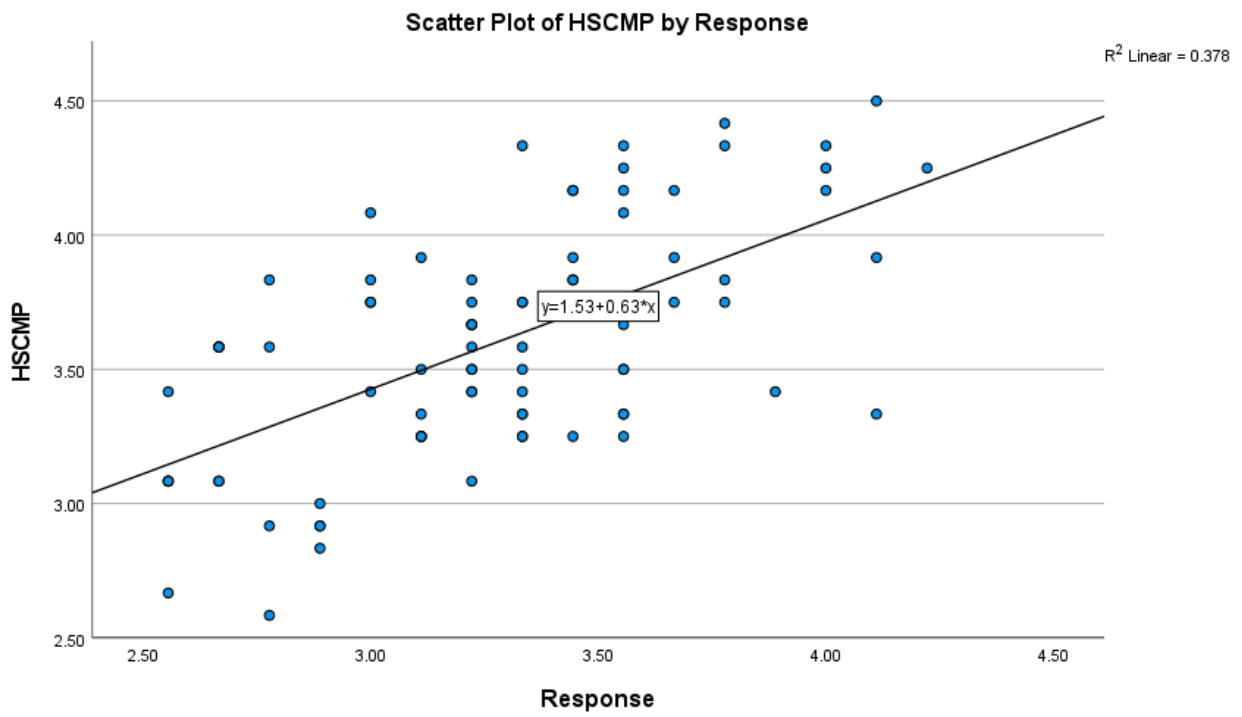
APPENDIX E: Critical values of the Chi-Square distribution

df	p	
	0.05	0.01
1	3.84	6.63
2	5.99	9.21
3	7.81	11.34
4	9.49	13.28
5	11.07	15.09
6	12.59	16.81
7	14.07	18.48
8	15.51	20.09
9	16.92	21.67
10	18.31	23.21
11	19.68	24.72
12	21.03	26.22
13	22.36	27.69
14	23.68	29.14
15	25.00	30.58
16	26.30	32.00
17	27.59	33.41
18	28.87	34.81
19	30.14	36.19
20	31.41	37.57
21	32.67	38.93
22	33.92	40.29
23	35.17	41.64
24	36.42	42.98

Source: Field, A., 2013, Page No - 808

APPENDIX F: Linearity Test





APPENDIX G: Normality of residual test

