ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMNET

THE EFFECT OF LOGISTICS ACTIVITIES ON DISASTER RESPONSIVENESS: THE CASE OF OXFAM IN ETHIOPIA

BY

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTER OF ART IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ADVISOR

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OCTOBER 2024

ADDIS ABABA, ETHIOPIA

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Approval sheet

BY

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Declaration

I, the undersigned, declare that this thesis entitled: “The Effect of Logistics Activities on Disaster Responsiveness: the case of Oxfam in Ethiopia” is my original work. I have undertaken the research work independently with the guidance and support of the research advisor.

This study has not been submitted for any degree or diploma program in this or any other institutions and that all sources of materials used for the thesis has been duly acknowledged.

Name of Student _____Signature _____ Date _____

Certificate of Approval

This is to certify that the thesis entitled: “The Effect of Logistics Activities on Disaster Responsiveness: the case of Oxfam in Ethiopia” submitted by Dagne Legesse Hunde in partial fulfilment of the requirements for the degree of Masters of Logistics and Supply Chain Management postgraduate studies at Addis Ababa University, is a record of original research conducted under my supervision. To the best of my knowledge, no part of this thesis has been for any other degree or diploma.

The assistance and support provided during the research have been duly acknowledged.

Therefore, I recommend this thesis for acceptance in fulfilment of degree requirement.

Name of Advisor: _____ Signature_____ Date _____

Acknowledgments

First and foremost, I would like to thank God for giving me the courage and patience throughout this journey and for accomplishing this research study.

I am sincerely thankful for my advisor Busha Temesgen (PhD), for his invaluable contribution, guidance, understanding, patience and support throughout the entire course of the thesis.

I also extend my heartfelt thanks to all Oxfam in Ethiopia staffs who participated in responding to the questionnaire and giving me all the necessary information for the study.

And to all my family and friends, thank you for the love, encouragement and your belief in me have given me the strength and I am truly grateful to have you by my side.

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List of Acronyms

AMA - American Marketing Association

CILT - Chartered Institute of Logistics and Transport

CSCMP - Council of Supply Chain Management Professionals

IDP – Internally Displaced People

IFRC - International Federation of Red Cross and Red Crescent Societies

IJPD & LM - International Journal of Physical Distribution & Logistics Management

NGO – Non-Governmental Organisation

OXFAM – Oxford Committee for Famine Relief

OXFAM GB – Oxfam Great Britain

QFC - Quantity Flexible Contract

UN – United Nations

UNDAC - UN Disaster Assessment and Coordination

UNDRR – United Nations office for Disaster Risk Reduction

UNISDR - United Nations International Strategy for Disaster Reduction

UNOCHA – United Nations Office for the Coordination of Humanitarian Affairs

Abstract

This study aimed to analyze the effect of logistics activities on disaster responsiveness in Oxfam in Ethiopia. To analyze the effect, the study applied descriptive and explanatory research designs with quantitative and qualitative research approaches. Questionnaire and interview were the primary data gathering tools and 157 questionnaires were filled by Oxfam in Ethiopia employees using census. The collected data were analysed using descriptive statistics, such as mean and standard deviation, and inferential statistics, including correlation and regression analysis with the help of SPSS (version, 21). The research finding revealed that, logistics activities of Oxfam in Ethiopia including transportation, warehouse and inventory management moderately impacted on disaster responsiveness. The descriptive finding indicated that, logistics activities of Oxfam in Ethiopia were quite good and positively contributed for the intervention of disaster responsiveness. Also, the correlation and regression finding revealed that, there was a positive and moderate association between logistics activities and disaster responsiveness. Particularly, inventory was statistically positive and strong effects on disaster responsiveness with the highest Beta value of 0.348 while transportation and warehousing had statistically moderate significant effects on disaster responsiveness with beta value (B=0.324 and 0.241) respectively. However, being disaster logistics is a lifeline in humanitarian operations; access issues (to transport materials), urgency, limited resources (vehicles concentrated in non-operational area) and lack of sufficient facilities (warehouse) has somehow limited Oxfam in Ethiopia disaster response capability. As a result, Oxfam Ethiopia used the comparative advantage above properly and improves the positive impacts of inventory, transportation and warehousing to facilitate disaster responsiveness and reduced the above challenges to maximize the speed, resource allocation and effectiveness of disaster responsiveness.

Key words: inventory, transportation and warehousing and disaster responsiveness.

CHAPTER ONE

INTRODUCTION

This chapter deals with background of the study, statement of the problem, research questions and objectives, significance, limitation and scope of the study, definition of terms, and organization of the study.

1.1 Background of Study

Disaster is seriously disrupted community, or a society function and it is a cause for widespread human, material, economic or environmental losses and impacts. Particularly, it has high impacts which exceed the ability of the affected community or society to cope using its own resources. Further, disasters occurred due to the combination of the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts is a means for loss of life, injury, disease and negatively influenced human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption, and environmental degradation (UNISDR, 2009).

As disasters continue to pose significant challenges, there is a growing recognition of the need for more robust responses and efficient relief operations. Corresponding to the rise in numbers of natural and man-made disasters, there exists an increasing trend in the occurrence of natural and man-made disasters of sufficient scale that warrant responses from outside the affected area. According to Thomas and Kopczak (2005) disaster relief is and will continue to be a growth market. Both natural and man-made disasters are expected to increase another fivefold over the next fifty years" (PK Freeman, 2003). With such developments, arise a call for more efficient and effective handling of disaster relief operations. Efficient and effective relief management is based on anticipating problems and identifying them as they arise and providing specific supplies at the right time where they are needed the most.

Logistics is central to disaster relief for several reasons, Logistics is crucial to the effectiveness and speed of response for major humanitarian programs such as health, food, shelter, water, and sanitation. Secondly, logistics usually is one of the most expensive parts of a relief effort, as it deals with procurement and transportation.

Thirdly, as logistics department handles tracking of goods through the supply chain, it is a repository of data that can be analysed to provide post-event learning. The data from logistics reflects all aspects of execution, from the effectiveness of suppliers and transportation providers to the cost and timeliness of response, to the appropriateness of donated goods and the management of information. Therefore, it is critical to the performance of both current and future operations and programs (Thomas & Kopczak, 2005).

Emergency response is humanitarian assistance to a crisis-affected population that seeks, as its primary purpose, to save lives and alleviate suffering. Humanitarian assistance is deeply rooted in history and culture from ethno-religious beginnings and post war interventions of the 'modern' era of humanitarianism. Considered as the desire to help others, humanitarian action is as old as humanity itself (UNDAC Handbook, 2018).

Ethiopia is facing multiple humanitarian emergencies due to climate change, conflict, disease outbreaks, poor macroeconomic conditions, and high commodity and food prices due to inflation. Humanitarian access in northern Ethiopia has gradually but significantly improved since the Cessation of Hostilities Agreement in November 2022. Some area remains hard to reach, but operations have expanded in Afar, Amhara and Tigray Regions. Across Ethiopia, some 4.6 million internally displaced peoples need assistance. The country is at risk of sixth consecutive below-average rainy season between March and May. But even with more rain, the drought's impact will still be felt in the east and the south. A cholera outbreak in drought-affected Oromia and Somali Regions is still not contained, with a 30 per cent rise in cases since January 2022. Humanitarian assistance remains an essential lifeline for 20 million Ethiopian who shoulder the weight of multi-faceted humanitarian situations driven by man-made and natural hazards, including conflict, climate shocks (drought and floods), as well as disease outbreaks (UN OCHA, 2023).

Disaster responsiveness refers to the ability of organisations to address the needs arising quickly and effectively from natural or man-made disasters. In logistics, it involves ensuring that logistics activities such as transportation, warehousing, and procurement systems are agile and adaptable to rapidly challenging circumstances during emergencies. In a humanitarian crisis review of the last four decades, Kent (2004) concluded that humanitarian operations have become big business and a major concern

in the international community. Other authors have stated that these operations are approximately 80 percent logistics (Bonney, 2005; Trunick, 2005).

Ethiopia faces multiple humanitarian crisis, including natural disasters, food insecurity, and displacement, making effective disaster response critical. Logistics activities such as transportation, warehousing and inventory management are fundamental to humanitarian operations, directly influencing the speed, efficiency, and reach of aid distribution. However, research examining the collective impact of these logistics activities on disaster responsiveness is scarce, particularly in Ethiopia context. Given Oxfam's extensive work in the country, this study explores how logistics processes can be optimized to enhance disaster response, addressing a gap in both local and global research on humanitarian logistics in complex environment like Ethiopia.

Therefore, in large part the success of any humanitarian operation is directly attributable to the logisticians' efficiency and effectiveness in getting the necessary people and supplies to the right place quickly.

1.2 Statement of the Problem

Natural and man-made disasters frequently hit populations in an unpredictable manner. They often have devastating effects that exceed the populations' ability to recover on their own. External assistance is needed in the form of disaster relief, be it through national emergency management agencies or international relief organisations. Logistics is an important function in every disaster relief operation. It aims to deliver the supplies needed to support the affected populations as fast as possible. Logistics in a disaster response setting has some elements in common with commercial logistics, but it differs in many ways (Aagman Saini, 2016).

First, the unpredictability of the timing, location and extent of the next disaster is such that it is impossible for logisticians to prepare and establish accurate plans. Second, disaster relief operations are subject to high time pressure, as every hour counts when responding to the urgent needs of a population and lives are at stake. Third, existing transport and communication infrastructure may be destroyed by the disaster, requiring relief organisations to operate in extremely difficult conditions. Fourth, the populations affected by the disaster do not have a strong voice in expressing their needs, which may lead to the convergence of unsolicited donations that clog up the transportation network.

These reasons have led to the creation of a very specific function, often referred to as humanitarian logistics. Thomas and Kopczak (2005) define it as ‘’as the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people’’ (Thomas and Kopczak, 2005).

Knowing that natural and human-made disasters are occurring with increasing frequency, humanitarian aid organisations work to save the lives of those affected by such events worldwide (Fritz Institute, 2005; EM-DAT, 2008). In this context, humanitarian logistics plays a crucial role in distributing aid among field officers, local institutions, and disaster victims (Usman & Wismadi, n.d). Additionally, Kent (2004, as cited in Overstreet et al., 2011) suggests that humanitarian logistics could become a major international commercial issue and a focal point for the next four decades. However, Thomas and Kopeczak (2005) highlighted those numerous problems in emergency relief and life-saving efforts for disaster-affected people stemmed from logistics-related challenges within humanitarian aid organizations. Consequently, humanitarian logistics received insufficient attention, and logistics skills remained underdeveloped (Van Wassenhove, 2006). In fact, disasters are a worldwide problem, but the impacts are varying due to countries’ socio-economics status and disasters experiences.

Like many developing country Ethiopia faced different disasters or problems and many peoples of Ethiopian needs humanitarian assistance in different times. According to Global Humanitarian Assistance Report, the number of people who were targeted for humanitarian assistance rose significantly from 2.7 to 4 million people, with funding requirements between USD$500 and $600 million. The numbers of needy people increased and reached 10.7 million and the funding requirements to $1.6 billion due to major climate-induced shocks or El Nino (droughts) 2015-2016 (Reliefweb, 2015).

In addition, between 2015 and 2017, the number of people targeted for assistance remained above 8 million and the funding requirements beyond $1 billion, indicating a lack of recovery from the consecutive climatic shocks. In addition to droughts, Ethiopia is also prone to other climate shocks and natural hazards. Particularly, Floods occurred in some parts of the country and contribute to displacement and in 2019-2022 Ethiopia and

neighbouring countries were hit by a desert locust infestation; and contributing to lost livelihoods and widespread food insecurity (OCHA, 2023).

Moreover, due to Somali-Oromia border Conflict in 2017-2018 and 2018 West Guji; Gedeo and Guji Oromo tribe's conflicts displacing hundreds of thousands of people in Ethiopia and increased the numbers humanitarian assistance peoples. In 2020, the people in need considerably increased to 15.1 million due to Covid-19 pandemic, which has driven and compounded health needs as well as wider socio-economic needs across the country. This was closely followed by the start of the conflict in northern Ethiopia in 2020. These crises, in addition to the ongoing drought which began in late 2020, continued into 2021 and were the key humanitarian priorities for that year. In 2022 the number of people in need rose drastically again to 29.7 million, attributed to exacerbation of conflict, displacement, and drought in various parts of the country. The 2022 HRP targeted 22.6, million people for response while the funding requirement was $3.09 billion (OCHA, 2023).

In the face of escalating natural disasters and human crisis worldwide, understanding the intricate relationship between logistics activities and disaster responsiveness is paramount. Despite significant advancement in disaster management strategies, gaps persist in comprehensively assessing the precise impact of logistics activities on the effectiveness and timeliness of disaster response efforts. Such reality is profound in the case of humanitarian response in Ethiopia as well.

The gaps in disaster responsiveness often relate to shortcoming in the preparedness, coordination, and efficiency of logistics activities including transportation, warehousing, and inventory. This could manifest as delays in delivering essential supplies, inadequately stocked warehouses, or insufficient procurement processes during emergency. These gaps relate to logistics activities in different ways such as reports of delays or bottlenecks in transporting relief supplies to affected areas, instances of insufficient storage capacity or lack of pre-positioned emergency supplies in warehouse, and examples of procurement processes being hindered by bureaucracy or lack of contingency planning, leading to delay in acquiring essential resources during disaster. These gaps highlight the need for improved coordination, resource allocation, and contingency planning within logistics systems to enhance disaster responsiveness (Kovács et. al, 2007; Taltham et. al, 2010).

As a result of this, humanitarian organizations mobilize funding and supplies billions of dollars in aid to victims of natural disasters, civil conflicts, and wars (Thomas, 2003). In addition, humanitarian organizations managed this aid and its distribution to vulnerable beneficiaries after the occurrence of disasters, worldwide. In this regard, logistics is critical issues for quick disaster response and humanitarian relief missions. According to Thomas, (2003), logistics, processes may represent the most expensive part in a disaster response operation so; the excellence of these processes generates economies of resources that can be mobilized to meet the needs of the affected population, such as health, food, shelter water and sanitation. Response time and quality of care, significant factors for the reduction of social and economic losses arising after nature disasters, are significantly influenced by the degree of excellence of logistics processes (Schulz, 2009). However, only a few aid agencies have focused on improving the performance of logistics processes in response operations (Altay, 2006). Thus, relief operation ns have not been as efficient as they could be with the use of appropriate methodology and logistics processes.

Despite the fact there are many other humanitarian organisations in Ethiopia, I chose Oxfam in Ethiopia for this research due to Oxfam's global reputation as one of the leaders in humanitarian relief and its established presence in regions like Africa prone to crises. Ethiopia, as one of Oxfam's primary focus areas in Africa, is often affected by various humanitarian challenges, offering a valuable context for studying how logistics influence the effectiveness of disaster response operations.

While limited research exists in the Ethiopia context, these studies have typically focused on general topics like practice and challenges of humanitarian logistics (Sara Geremew, 2020), practice and factors affecting the humanitarian logistics performance (Selam Fitsum, 2021) and the practices, challenge and performance of humanitarian logistics management (Wolde Wodaje, 2019) my research stands apart from previous studies on disaster responsiveness in Ethiopia by examining three key logistics activities – transportation, warehousing and inventory management on disaster responsiveness.

This study aims to address this gap by examining the multifaceted role of logistics activities (transportation, warehousing, and inventory) in enhancing or hindering disaster responsiveness. By elucidating the critical factors influencing logistics operations during disaster situations, the research endeavour to provide valuable insights for humanitarian

organisation, logistics professional, and decision makers to optimize logistics strategies and improve disaster response outcomes.

1.3 Research Questions

Based on points discussed above on study background and statement of the problem; this research addressed the following research questions:

- What is the effect of transportation management on disaster responsiveness in Oxfam in Ethiopia?
- What is the effect of Warehousing management on disaster responsiveness in Oxfam in Ethiopia?
- What is the effect of inventory management on disaster responsiveness in Oxfam in Ethiopia?

1.4 Research Objectives

The research objectives classified as general and specific objectives as follows.

1.4.1 General Objectives

The general objective of the study was to examine effect of logistics activities on disaster responsiveness in Oxfam in Ethiopia; the research aims to analyse the below more specific objectives.

1.4.2 Specific Objective

- To analyse the effect of transportation on disaster response in Oxfam Ethiopia.
- To analyse the effect of warehousing on disaster response in Oxfam Ethiopia.
- To analyse the effect of inventory on disaster response in Oxfam Ethiopia.

1.5 Significance of the Study

This study provided valuable insights into how logistics can be leveraged to enhance disaster response effort in humanitarian organisation in Ethiopia with the case focus on practice in Oxfam in Ethiopia. In addition, the study helped and gave information for humanitarian practitioners by indicating the relationship between logistics activities and disaster response.

Moreover, not only that but also considering the number of studies carried in the past on the effect of logistics activities on disaster responsiveness in Ethiopia humanitarian sector; the result of this study will be used as a base for other more related studies in the future academicians and researchers who pursue to contribute for the betterment of the logistics activities in disaster responsiveness.

In general significance of this study lies in its potential to enhance disaster management knowledge by revealing how logistics activities impact responsiveness. It offers practical recommendations for INGOs to improve logistics processes, supporting fast faster, more effective response that can save lives. The study aids decision-makers in prioritising investment in logistics infrastructure, improve resource allocation efficiency, and contribute to existing literature on disaster and humanitarian logistics, offering a valuable framework for future research and practical applications in disaster relief operations. And as a researcher to broader my knowledge in study field and get research experience.

1.6 Scope of the Study

The scope of the study addressed key dimensions like geographically, conceptually, and methodologically. Geographically, the scope of the study focused on Oxfam in Ethiopia. Conceptually, despite the fact the scope of the study on the effect of logistics activities on disaster responsiveness can be broad and multifaceted, however, due to the reason and the fact that covering all dimensions will not be possible, it is limited to aspect of certain logistics activities (Transportation, warehousing, and inventory) and on disaster responsiveness (speed of delivery, and resource) of Oxfam in Ethiopia and Methodologically the scope of the study is logistics & supply chain staffs, other support functions staffs (Finance, Human Resource, Administration, etc), and Humanitarian Department staffs of Oxfam in Ethiopia.

1.7 Limitation of the Study

One of the limitations of the study is that Today, Oxfam operates in about 70 countries; however, this study focusses only on Oxfam in Ethiopia. The population size is not entire staffs and mainly those who are directly related to logistics, support function and humanitarian department. The other limitation is shortage of time and accessibility of relevant documents that clearly shows the effect of logistics activities (Transportation, Warehousing, and Inventory) on disaster responsiveness. Moreover, considering not

much research has been done globally in the past and shortage of similar studies in Ethiopia context will be among the major challenges.

1.8 Definition of Terms

Since there are several operational terms related to logistics, logistics activities, disaster, humanitarian, response, are some of the mentioned definitions of terms as below.

Logistics: logistics refers to the process of planning, implementing, and controlling the flow of goods, services, and information from the point of origin to the point of consumption to meet the requirements of customers or organisations (Council of Supply Chain Management Professionals, 2014).

Logistics Activities: logistics activities encompass a wide range of tasks involved in the management and coordination of the supply chain, including transportation, warehousing, inventory management, procurement, and distribution (Monczka, Handfield, Giunipero, & Patterson, 2015).

Disaster: a disaster is a sudden, catastrophic event that causes significant disruption, destruction, or harm to human lives, property, infrastructure, and the environment, exceeding the ability of affected communities to cope using their own resources (UNDRR, 2009).

Humanitarian: humanitarian refers to action or initiatives aimed at alleviating the suffering of people affected by emergency or disasters, with a focus on preserving human dignity, providing essential assistance, and promoting recovery and resilience (OCHA, 2015).

Humanitarian Response: humanitarian response refers to the collective effort of governments, international organisation, NGOs, and other stakeholders to address the immediate needs of affected populations in the aftermath of disasters or emergencies, including the provision of food, shelter, medical care, and other essential services (OCHA, 2008)

1.9 Organization of the Study

This thesis organized into five chapters. Chapter one providing introduction such as the research topic or brief background of the study and its significant, research problem and questions to be addressed, discuss the objectives, scope, and limitation of the study.

Chapter two include literature review where relevant related literature summarised and reviewed, and conceptual framework guiding the study was highlighted.

Chapter three described research design and approach, explain the sampling technique and sample size, detail data collection methods and instruments to be used, and discuss data analysis techniques and any ethical considerations.

The analysis and findings of the study were in chapter four, while chapter five covered summary of finding, conclusions, policy recommendations and suggestions for further research.

CHAPTER TWO

RELATED LITERATURE REVIEW

This chapter aims to identify relevant related studies, empirical studies, develop a conceptual framework, and summarise existing research with identified literature gaps related to the logistics activities that affect disaster responsiveness with the overall aim to demonstrate the research's familiarity with existing scholarship, establish the basis for the current study, and its significance and relevance.

2.1 Theoretical Literature Review

2.1.1 Definition and Concept of Logistics

Different authors define logistics and its origin. The word ''logistics'' has its origins in the military context, dating back to ancient Greece. It is derived from the Greek word ''logistikos'', which means skilled in calculating or skilled in organising. In ancient times, logistics referred to the science of planning and executing the movement and maintenance of military forces (Waters D. 2003).

According to Köseoglu, (2011) Disaster logistics involves the planning, execution, and management of the storage and movement of aid materials, along with the necessary flow of information. Efficiency and cost considerations are also crucial throughout the process. Key functions of disaster logistics include preparedness, procurement, transportation, tracking, storage, inventory management, and customs clearance. In the initial emergency response, the transportation of medical supplies, communication equipment, repair tools, food, shelters, and personnel to the affected area is essential (United Nations Disaster Response and Coordination Team, 2006).

Effective disaster logistics require collaboration between governments and non-governmental organizations, as well as the use of multiple transportation modes. Humanitarian operations often face challenges such as inadequate infrastructure, logistical bottlenecks, and political barriers. Additionally, these efforts may be hindered by the presence of multiple actors in the field, lack of cooperation between and within organizations, and poor communication (R. Oloruntoba ve R. Gray, 2006).

One widely accepted definition of logistics comes from the Council of Supply Chain Management Professionals (CSCMP) "Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements." This definition emphasizes the comprehensive nature of logistics management, covering both forward and reverse flows of goods and information, and its ultimate aim of satisfying customer demands (Mentzer, Stank, & Esper, 2008).

The management of the flow of goods between the point of origin and the point of consumption to meet certain requirements, such as those of customers or corporations, is known as logistics. The resources managed in logistics can include abstract items, such as time, information, particles, and energy, as well as physical items, such as food, materials, animals, equipment, and liquids. The logistics of physical items typically involve the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security. The intricacy of logistics can be modelled, analyzed, visualized, and optimized by specialized simulation software. The goal of import and export logistics is often to minimize the use of resources (Xiang Li, 2014). Here, logistics is seen as a value-adding function within the broader supply chain, enhancing the efficiency and effectiveness of operations by optimizing various processes and activities.

Over time, the concept of logistics has evolved and expanded beyond its military roots to encompass a broader range of activities in various fields, including business, transportation, and supply chain management. Different professionals and practitioners have offered broader definitions of logistics to reflect its application in different contexts. Here are some perspectives:

Military Perspective: In the military context, logistics refers to the planning, execution, and coordination of the movement, maintenance, and supply of military forces. It involves activities such as transportation, procurement, inventory management, and distribution to support military operations (Waters, D., 2003).

Business Perspective: In the business world, logistics encompasses the management of the flow of goods, services, and information from the point of origin to the point of consumption. It includes activities such as transportation, warehousing, inventory management, packaging, and distribution. From a business perspective, logistics is

essential for ensuring the efficient and effective delivery of products and services to customers while minimizing costs and maximizing profitability (Chopra S., & Meindl P., 2015).

Supply Chain Perspective: Within the context of supply chain management, logistics refers to the planning and execution of the physical and information flows that enable the movement of materials, products, and information across the supply chain. It involves coordinating activities among suppliers, manufacturers, distributors, and customers to ensure the timely delivery of goods and services (Ballou R. H., 2004).

Transportation Perspective: From a transportation perspective, logistics focuses on the efficient movement of goods and people from one location to another. It involves selecting the appropriate modes of transportation, optimizing routes, and managing logistics networks to minimize transit times and transportation costs (Coyle et. al, 2017).

2.1.1.1 Logistics Activities

Logistics involves a large variety of activities that help ensure goods, services, and information flow efficiently throughout a business. These activities include inventory control and management, order fulfilment, materials handling, supply chain management, transportation, and warehousing (Nathan Mahr, 2023).

The role of each element of logistics often defines the logistics activities within a supply chain. The problem with definitions and discussions of supply chains is that it is not easy to recognise the role of logistics within them, which is why the supply chain river is a simple way to relate the role of logistics within a supply chain. The elements of logistics further help to explain what logistics activities and processes are being undertaken in a supply chain (Rushton, A., Croucher, P. & Baker, P., 2017).

Logistics activities include all activities from the procurement of raw materials, all the way through to delivering the right products to customers. Activities includes (1) Procurement and ordering of goods/materials by manufacturers or retailers to fulfil expected customer demand (2) Movement of goods using airplanes, trains, ships, and trucks (3) Manufacturers producing the right goods in line with expectations using the raw materials (4) Storage of produced goods in warehouses or distribution centres and (5) Collaborating with inventory management to ensure correct stock levels and to avoid shortages.

Specific terms associated with these activities includes Procurement, Order management, Transportation management, Material handling, Inventory management, Warehouse management, Demand forecasting, Customer service, Packaging, Facility locating, and Reverse logistics considers in the study.

Logistics activities, emphasizes the implementation of complex logistics functions, among which distinguishes basic (supply, production, sales), key (transportation, inventory and order management, service, or information support) and supporting (warehousing, cargo processing, packaging, collection, disposal, maintenance, etc.) (Mirotin, 2002).

2.1.1.2 Logistics Management

Logistics management is the process of managing the activities that are required to transport goods from its source to the final customer. That process involves a series of logistics activities such as order processing, material handling, packaging, warehousing, transportation and customer service management (Camilo Tristancho, 2023).

Here are key definitions and concepts from various sources:

Council of Supply Chain Management Professionals (CSCMP): Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements." (CSCMP, 2013)

International Journal of Physical Distribution & Logistics Management (IJPD&LM): Logistics management encompasses the planning, implementation, and control of the movement of goods, services, and related information across the entire supply chain, from sourcing of raw materials to the delivery of finished products to end customers." (IJPD&LM, 2013)

The Chartered Institute of Logistics and Transport (CILT): Logistics management involves the integration of information, transportation, inventory, warehousing, material handling, and packaging, which are vital for the efficient flow of goods from the point of origin to the point of consumption. (CILT, 2013)

These definitions and concepts provide a comprehensive understanding of logistics management, encompassing its role within supply chain management and its importance in meeting customer requirements efficiently.

2.1.2 Definition of Disaster and its Attributes

A broader definition of disaster encompasses any event that causes significant disruption, destruction, or distress to a community or society, often exceeding the affected area's ability to cope using its own resources. This definition includes natural disasters such as earthquakes, hurricanes, floods, and pandemics, as well as human-made disasters like industrial accidents, terrorist attacks, and war. Disasters can have wide-ranging impacts on human life, infrastructure, economy, environment, and social well-being, highlighting the need for preparedness, response, and recovery efforts at local, national, and international levels.

Some of disaster definition by different authors from different perspective discussed below. According to Quarantelli, (1998) defines disaster as a social phenomenon resulting from the interaction between a hazardous event and a vulnerable community. This definition emphasizes the importance of understanding the social, economic, and cultural factors that shape disaster vulnerability and resilience. And the second definition from a failure of risk management perspective defined by Alexander, D. (2002) describes disaster as a failure of risk management, highlighting the role of inadequate preparedness, response, and recovery measures in exacerbating the impacts of hazardous events. This definition underscores the importance of proactive risk reduction strategies to mitigate the effects of disasters.

2.1.2.1 Disaster Management

Disaster management refers to the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular, preparedness, response, and recovery to lessen the impact of disasters (UNDRR). The definition of disaster by the International Federation of Red Cross and Red Crescent Societies is that ‘’Disaster management encompasses a range of activities aimed at minimizing the impact of disasters on communities and individuals. This includes preparedness measures, such as planning and training, as well as response efforts during and after disaster, with the goal of restoring normalcy and reducing vulnerability to

future events'' (IFRC). These definitions emphasize the importance of preparedness, response, and recovery in mitigating the effect of disaster on communities.

The other very important concept of disaster management is Quarantelli research where he conceptualizes disaster management as a multifaced process involving various stages, including mitigation, preparedness, response, and recovery. The framework emphasizes the importance of understanding the social, cultural, and organisational dynamics that influence how communities and individuals perceive, prepare for, and respond to disaster. Quarantelli advocates for a comprehensive approach that integrates interdisciplinary perspectives and considers the complex interplay between human behaviour, social structure, and environmental factors in disaster management efforts. The conceptualization highlights the need for flexibility and adaptability in strategies to effectively address the diverse challenge by disaster (Quarantelli, E. L., 1998).

2.1.2.2 Disaster Management Cycle

The disaster management cycle is a framework that defines the stage of the disaster. It can be used by organisation or individuals to prepare for and respond to disasters of every kind, including natural disaster, technological disasters, and man-made disasters. It allows professional to identify potential hazards, assess the risk, and develop plans to prevent, mitigate, and respond to them. Disaster management typically broken down into four stages: Prevention, preparedness, response and recover (What is a Disaster Management Cycle, Tulane University Blog, June 14, 2023).

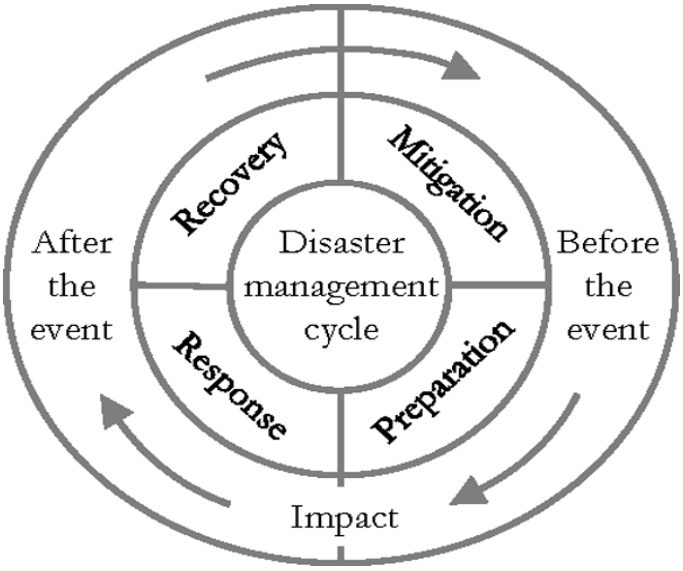

Figure 1 – Disaster management Cycle (Alexander, 2002)

There are many others who define and explain further the disaster management cycle in general. According to Martinho and Reis, the United Nations' perspective of disaster risk reduction aims at reducing vulnerabilities and disaster risks, preventing the loss of human lives as well as increasing communities' resilience throughout society, public, and private. Martinho and Reis further noted that disaster risk reduction requires managing risk beyond disaster responses to prevention and mitigation (Martinho and Reis, 2022).

With strategic process design, disaster management is key to successful disaster responses and relief efforts. At an operational level, disaster management can be described as a process through several cyclical and overlapping stages (R. M. Tomasini and L. N. Van Wassenhove, 2009). However, in general, the literature concurs that disaster management has four phases, namely (1) preparedness, (2) response, (3) recovery, and (4) mitigation (F. Maon, A. Lindgreen, and J. Vanhamme, 2009) which are described below.

Preparedness - The preparation phase refers to activities taken before a disaster occurs to avoid possible consequences and prepare all relevant organisations and communities by learning from the past. The literature suggests common preparedness activities, namely developing information and communication, developing collaboration and coordination between relevant organisations and people, training and practicing relief services with communities, designing physical networks, and stockpiling supplies and equipment (B. Balcik, B. M. Beamon, C. C. Krejci, K. M. Muramatsu, and M. Ramirez, 2010).

Response - The response phase refers to activities immediately implemented after a disaster. Relief efforts are carried out to rescue and delivery basic supplies to the highest possible number of beneficiaries as well as to restore the essential services and infrastructures in the shortest time possible. In this phase, it is also important to assess the disaster situation and keep relevant people (e.g., beneficiaries and relief staff) updated on the disaster situation and the current relief efforts. Therefore, coordination and collaboration among all organisations and actors involved is key to successful relief efforts (L. N. Van Wassenhove, 2006).

Recovery - The recovery phase refers to activities involving reconstructions and rehabilitations operated in the aftermath of a disaster and carried out to recover the

situation back to the default state. Therefore, activities are undertaken in this phase to address the problems from a long-term perspective (R. Banomyong, et.al, 2019).

Mitigation - The mitigation phase refers to actions taken after and before a disaster to reduce the effects of disasters. These actions often involve revising strategies, procedures, mechanisms, regulations, measures, and policies that aim to reduce social vulnerability. The key difference between mitigation and preparation is that mitigation is the application of measures that aim to prevent a disaster and reduce its impact, while preparation includes activities that prepare for an effective and efficient response (F. Sabouhi et. al, 2019).

2.1.2.3 Actors involve in Disaster Response

Many actors, like donors, aid agencies, governments, military, or non-governmental organizations (NGOs) are involved in disaster relief (Kovács & Spens, 2007). Each of them has different motives for providing relief (Long & Wood, 1995). Political issues might even prevent a successful conduction of relief actions (Murray, 2005).

An NGO is a non-profit, voluntary group of citizens (locally, nationally, or internationally organized), that contains common interests and focuses on specific issues (human rights, environment, health, or disaster relief) (NGO, 2013).

Donors are very special actors, as they provide the basis for relief activities, but are not directly linked to the benefits of satisfying demand. Donor expectations however shape the funding structure of humanitarian organizations and are in this respect, often regarded as the real customers of relief organizations, not the aid recipients (Kent, 1987). The military is important in delivering communications and logistics capabilities. Host governments are crucial as well, as they typically command and control all operations (Seaman, 1999).

2.1.2.4 Disaster Logistics

Following the discussion about logistics, disaster, disaster management and disaster management cycle above, it is key to see the general term definition of disaster logistics. Disaster logistics is described as efficient and cost-effective flow, storage, planning, implementation and control of goods, merchandise, and related information from the first production point to the end consumption points to satisfy the needs of the people. Stages of disaster logistics are pre-disaster preparedness, disaster response process and post

intervention logistics activities. Disaster logistics must be event-based and dynamic. Due to every disaster have its own features as the type, severity, according to temporal and geographic features and the sensitivities, disaster logistics is an issue that a constantly working area and requires the development of new approaches. Therefore, the continuous measurement of risk and disaster management plan always needs revision (Işıktekin, 2015).

Disaster logistics has a crucial effect on disaster relief operations, and it helps to facilitating the efficient flow of resource and personnel to reached affected areas. In disaster relief operations there are necessary activities such as establishing of communication infrastructures, undertaking search and rescue operations, and providing any necessary first aid services (Narayanan & Ibe, 2015).

In addition, disaster relief operations focused for transportation of food, equipment, first aid supplies, rescue workers from supply points to many geographically dispersed destination nodes within the disaster region, as well as the evacuation and transference of disaster victims to healthcare facilities safely and expeditiously (Barbarosoglu, Ozdamar & Cevik, 2002). In addition, the speed of humanitarian aid delivered following a disaster is contingent on 'logisticians' ability to procure, transport, and receive supplies regarding with humanitarian relief effort' (Kovacs & Spens, 2007; Thomas, 2003).

Specifically, 'humanitarian logistics refers to the activities of: Planning, implementing, and controlling the efficient, cost-effective flow and storage of goods and materials, as well as associated information, from point of origin to point of consumption to alleviate the suffering of vulnerable people. (Thomas & Kopczak, 2005)

In a nutshell, for humanitarians, logistics refers to 'the processes and systems involved in mobilizing people, resources, skills, and knowledge to assist vulnerable people affected by the disaster' (VanWassenhove, 2006).

The logistics component of any humanitarian aid programme accounts for the largest share (approximately 80%) of the overall activity and has always been a critical component of humanitarian assistance operations (Kovacs & Spens, 2007; Trunick, 2005). Following the 2004 Indian Ocean tsunami, both researchers and practitioners have developed an increased interest in logistics applied to disasters (Gunasekaran et al. 2018; Kovacs & Spens, 2007). The tsunami demonstrated that emergency aid response efficacy is reliant on the speed and efficiency of logistics operations (Pettit et al. 2011),

highlighting the importance of logistics in humanitarian relief efforts (Christopher & Tatham,2011).

As Daud et al. (2016) described, during Humanitarian Logistics, the following processes are required: (1) ensure that the appropriate supplies of goods are delivered in good condition; (2) bulk commodities storage, staging, and movement; (3) coordination and optimisation of the usage of limited and shared transportation; (4) people's movement; and (5) specific delivery from outside the affected area. Logistical coordination in humanitarian aid management, according to Dolinskaya et al. (2011), brings together individuals with experience, expertise, and capabilities in a variety of disciplines to the disaster-affected area, where their collaborative endeavours support alleviating the suffering of the affected people.

2.1.3 Logistics Activities Effects on Disaster Responsiveness

2.1.3.1 Transportation in Disaster Response

The role of transportation is extremely critical for the functioning of the whole humanitarian supply chain, as it links all nodes of the supply chain. Transportation is not only relevant for the response phase but is also critical for procurement and warehousing. It interconnects key nodes, namely the suppliers, the pre-positioning facilities, regional warehouses, and aid recipients. The chosen method of freight-forwarding primarily depends on physical characteristics of the cargo as well as the condition of infrastructure and the complexity of bureaucracy (Kapucu et al., 2007). Haavisto et al. (2018) points out that if transportation decisions cannot be executed as planned, the whole supply chain is negatively affected. Avoiding unsafe routes or rough roads often leads to choosing airfreight, which is significantly faster but also more costly (Spens and Kovács, 2012).

Transportation plays a crucial role in disaster management, facilitating timely response and relief efforts. Authoritative sources such as the Federal Emergency Management Agency (FEMA) emphasize the significance of transportation infrastructure in disaster preparedness, response, and recovery. In their publication "Transportation Emergency Preparedness Program: Workshop Summary," FEMA underscores the need for robust transportation systems to ensure the efficient movement of resources, personnel, and affected populations during emergencies (FEMA, 2008). Additionally, research by

Wisner et al. (2004) in "At Risk: Natural Hazards, People's Vulnerability and Disasters" highlights the importance of accessible and resilient transportation networks in reducing vulnerability and enhancing community resilience in the face of disasters. These sources underscore the critical role transportation plays in disaster management and the need for comprehensive planning and investment in resilient infrastructure.

As it is said above that transportation plays crucial role, selecting cost-effective transportation options for disaster response involves careful consideration of various factors, including accessibility, speed, capacity, and cost efficiency. In their study titled "Transportation Cost Analysis in Disaster Response," Peeta and Tavasszy (2013) analyse the cost-effectiveness of different transportation modes and strategies for disaster relief operations. They explore the trade-offs between using prepositioned assets versus deploying resources as needed and highlight the importance of flexible transportation solutions that can adapt to dynamic disaster scenarios.

Additionally, the International Federation of Red Cross and Red Crescent Societies (IFRC) provides valuable insights into cost-effective transportation strategies in their publication "Emergency Response and Preparedness: Guidance Note" (IFRC, 2015). This guidance emphasizes the need for efficient coordination among stakeholders, strategic prepositioning of relief supplies, and leveraging local transportation resources to minimize costs while maximizing the reach and effectiveness of disaster response efforts. By integrating insights from these authoritative sources, decision-makers can develop cost-effective transportation strategies that optimize resources and enhance the efficiency of disaster response operations.

Transportation is a major component of disaster relief operation. Post-disaster transportation, especially across the ‘’last mile’’, can particularly be challenging for relief agencies. The challenge arises from damaged infrastructure, limited transportation resources, and other sheer amount of bulk of supplies to be transported (Balcik et al., 2008).

2.1.3.2 Warehousing in Disaster Response

Humanitarian logistics is defined as “the process of planning, implementing, and controlling the efficient, cost-effective flow of and storage of goods and materials as well as related information, from point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people” (Thomas and Mizushima 2005).

Likewise, warehousing deals with the storage of goods and materials, a pre-determined location plays a vital role which makes facility location an integral part of humanitarian logistics. Warehousing is important because it directly helps reduce suffering of affected people by reducing the time to reach them while also encouraging cooperation and collaboration between large numbers of governmental, non-governmental, national, and international organizations working in the field of disaster management (Rajali Maharjan et al, 2017).

Besides, warehousing is a place for stock prepositioning and relief distribution, and it helps reduce suffering of affected people by reducing the time to reach them while also encouraging cooperation and collaboration between large numbers of governmental, non-governmental, national, and international organizations working in the field of disaster management (Rajali Maharjan et al, 2017).

Regarding with warehouses, many studies have addressed the importance of the preparedness phase and the need for pre-positioned warehouses in humanitarian relief logistics, but only a small number of papers are related to the location decision (Balcik and Beamon, 2008; Ukkusuri and Yushimoto, 2008; Dessouky et al., 2009; Rawls and Turnquist, 2010; Gatignon et al., 2010; Campbell and Jones, 2011, Roh et al., 2015).

The finding indicated that, disaster management of warehousing is one of the best logistics activities for maximizing the effectiveness of humanitarian supply chains (Roh et al., 2015).

Pre-positioned warehouses are essential to ensure the availability of supplies when required and to facilitate faster responses (Balcik et al., 2010). In the long run, such approach leads to the reduction of delivery costs by regular replenishment using inexpensive maritime transport (Gatignon et al., 2010). However, pre-positioned warehouses might be difficult to operate by some NGOs because it is both complicated and expensive given the limitations in finance and resources (Balcik and Beamon, 2008). Indeed, pre-positioned warehouses for humanitarian relief create various types of risks, but they haven’t been fully explored yet.

Indeed, warehousing plays key role in disaster response, ensuring efficiency storage and distribution of relief supplies. This to be effective the issues of capacity and flexibility, inventory management, collaboration and coordination, and resilience and sustainability were important (Balcik et al., 2010). However, pre-positioned warehouses might be

difficult to operate by some NGOs because it is both complicated and expensive given the limitations in finance and resources (Balcik and Beamon, 2008). Indeed, pre-positioned warehouses for humanitarian relief create various types of risks, but they haven't been fully explored yet.

2.1.3.3 Inventory in Disaster Response

Inventory plays a fundamental role in most logistics and supply chains (Zhang, 2013) and refers to the stock of goods kept for future sale or use. As a result, inventory management becomes a crucial component of logistics and supply chain management. Effective inventory management must address both existing stock within the organisation and local sources of supplies that can be quickly accessed (Long and Wood, 1995). In humanitarian logistics, unlike commercial logistics where lead-time is a critical service factor, it receives less emphasis. While commercial inventory management typically operates on a pull system, Whybark (2007) notes that disaster relief initially follows a push strategy, eventually transitioning to a pull system to better respond to the evolving disaster situation.

The goal of inventory management is to replace the costly asset of '' inventory'' with a more affordable asset, ''information''. The primary purpose of the manging inventory is to balance potentially conflicting objectives: maximizing customer service, enhancing purchasing and production efficiency, minimizing inventory investment, and maximizing profits (Viale, 1996). Inventory fulfils five key roles within an organization: it allows for economies of scale, balance of supply and demand, facilitates specialization in manufacturing, provides protection against uncertainties in demand and order cycles, and acts as a buffer between critical distribution channel interfaces (Lambert et al., 1998).

Indeed, inventory management is an indispensable part of logistics and supply chain management and in accordance with scholars it has four themes: traditional inventory management models, collaborative inventory management models, Just-In-Time (JIT) inventory management strategy and inventory prepositioning. Immediately after a disaster occurs, relief organisations conduct an initial assessment, typically within the first day, to estimate the quantity of supplies needed to address the relief requirements of the affected population, as well as to evaluate prepositioned supplies already available in the organisation's warehouses. During the response phase, supplies are primarily pushed

to disaster area, whereas in the reconstruction phase, a pull strategy for sourcing is predominantly used (Kovacs and Spens, 2007).

Usually, managing disaster relief inventories presents considerable challenges. Since emergencies cannot be fully planned in advance, a swift response is essential. So that emergency stockpiles of commonly needed items such as blankets, plastic sheets, and vehicles significantly reduce delivery times. The supply chain teams of relief organizations are responsible for tasks including transportation, warehousing and storage, order fulfilment, demand forecasting, inventory control, customer service, material handling, production planning and scheduling, and procurement (Sandwell, 2011).

On one hand, when companies lack sufficient inventory to handle a sudden surge in demand, they risk stock-outs. On the other hand, extended inactivity following a catastrophic event can lead to an excess of unused inventory. Two critical decisions that must be addressed during the disaster preparedness phase are facility placement and stock prepositioning, which are essential for ensuring an effective disaster response (Blacik and Beanmon, 2008).

Recently, several humanitarian aid and disaster relief organizations have begun prepositioning relief items in strategic locations to enhance their ability to deliver adequate supplies quickly. Prepositioning inventory means the vendor's location serves as the point of origin, while the point of consumption is the disaster site where victims are located. Additionally, the segment of the relief chain between the vendor's location and the humanitarian response depot is completed before the disaster occurs. Likewise, the segment from humanitarian response depot to victim location accomplish after disaster. Here after humanitarian response depot are named as facility. The transportation from vendor location to facility is not time sensitive action, rather cost sensitive since it takes place before disaster. Different kinds of relief items are needed at different times. Specifically, prepositioned items include food items, e.g., ready-to-eat meals; non-food items such as blankets, tents, and jerry cans; medical supplies; as well as equipment such as telecommunication equipment (Balcik and Beamon, 2008).

The prepositioning system should keep a balance between costs against risks in humanitarian aid supply chain and increase the benefits to the affected population (Balcik and Beamon, 2008).

In terms of planning, the most important issue is to focus on maintaining a reserve capacity as a buffer for the vital supplies in the aftermath of a disaster. According to Holguin-Veras et al. (2007) lack of an efficient humanitarian inventory control model caused major negative consequences for the disaster victims after Hurricane Katrina. Moreover, Brodie et al. (2006) indicated that the survival needs of the victims were not effectively satisfied in the shelters after the hurricane Katrina. In Haiti, more than 3 million people were in need of emergency supplies, and in Japan, 350,000 people were reported to become homeless and were staying in shelters in the aftermath of the two devastating earthquakes. Clearly, the underutilization and inefficient control of desperately needed resources can put the health and welfare of the survivors in jeopardy. Therefore, there is a need for the development and analysis of a humanitarian inventory management model developed prior to the occurrence of a natural or man-made catastrophe, which can determine the safety stock level that will prevent possible disruptions at a minimal cost.

2.2 Empirical Literature Review

This section of the chapter presents empirical evidence from previous studies that explores factors the researcher aims to examine and evaluate. It includes past research conducted in this area, providing a foundational basis for related concepts. Numerous studies by various scholars have examined the effect of logistics activities on disaster responsiveness. Consequently, the researcher references the following studies, noting where empirical findings align with or diverge from this research.

2.2.1 The Role of Disaster Logistics in Disaster Response

As a result of the Asian tsunamis in 2004, humanitarian logistics has received increasing interest both from logistics academics as well as practitioners. Humanitarian logistics is an umbrella term for a mixed array of operations. It covers disaster relief as well as continuous support for developing regions. Unfortunately, disaster relief will continue to expand market, as it is forecasted that over the next 50 years, both natural and man-made disasters will increase five-fold (Tomas and Kopczak, 2005).

Delivering humanitarian aid can, therefore, be seen as a substantial global industry. According to Long and Wood (1995), food relief alone accounted for $5 billion worth of food in 1991, which has important consequences for the world's agricultural and

transportation industries. In addition, Long and Wood (1995) estimated the number of major relief agencies at over 100 in 1995, with each of them managing annual budgets of over $1 million. In 2004, the combined budgets of the top ten aid agencies exceeded 14 billion dollars (Tomas and Kopczak, 2005). Also, almost every government in the world is involved as either a donor or recipient of relief operations (Long and Wood, 1995).

Logistics has always been an important factor in humanitarian aid operations, to the extent that logistics efforts account for 80 percent of disaster relief (Trunck, 2005). The speed of humanitarian aid after a disaster depends "on the ability of logisticians to procure, transport and receive supplies at the site of a humanitarian relief effort" (Thomas, 2003). But disaster relief operations struggle with very special circumstances. They often have to be carried out in an environment with destabilized infrastructures (Cassidy, 2003; Long AND Wood, 1995) ranging from a lack of electricity supplies to limited transport infrastructure. Furthermore, since most natural disasters are unpredictable, the demand for goods in these disasters is also unpredictable (Cassidy 2003; Murray, 2005).

2.2.2 Challenges of Disaster Logistics

Wolde (2019) investigated the practices, challenges, and performance of humanitarian logistics at Plan International Ethiopia. The findings highlighted that a thorough situational analysis of security, urgency, and the extent of damage in affected areas is crucial before deploying supplies. Utilizing various modes of transportation to mobilize supplies and personnel to emergency sites is an effective disaster response approach. Additionally, the study emphasized the importance of having a prequalified list of transport companies and employing transport optimization models to enhance supply delivery. It also found that providing accessible and adequately equipped warehouses for temporary storage facilitates smoother and more efficient aid distribution. Furthermore, established distribution centers were shown to streamline the distribution process and reduce operational costs (Wolde Wodaje, 2019).

Eliyas (2018) studied humanitarian logistics practices in disaster response operations at Goal Ethiopia. The research highlighted several challenges in Transportation challenges including an ineffective annual transportation management plan, insufficient infrastructure, and difficulties managing rented vehicles. Warehouse and distribution practices were also noted, stemming from limited technological use, issues with

receiving processes, an inefficient distribution system, inadequate warehouse space, and delays in commodity distribution. The study found a strong, positive correlation between effective humanitarian logistics practices and successful disaster response (Eliyas Wako, 2018).

A study by Saeyeon, Dong Wook, Beresford, and Pettit (2010) on challenges in humanitarian logistics management in Asia, specifically focused on pre-positioned warehouses, identified seventeen risk factors that can pose operational challenges. These factors include high asset and inventory maintenance costs, uncertain demand, lack of clarity on inventory requirements, forecasting errors, high transport costs, difficulties in securing funding, space limitations, infrastructure issues, stock shortages, equipment breakdowns, reliance on logistics providers, poor product quality, underperformance of logistics providers, local staff quality, and the impact of natural disasters and social instability. These risks, classified as internal and external, hinder the effectiveness of humanitarian logistics operations.

2.3 Conceptual Framework

The following conceptual framework is proposed after reviewing the literature on logistic activities and disaster responsiveness. The proposed model explains the relationship between the logistic activities (transportation, warehousing, and inventory) and disaster responsiveness. Disaster responsiveness (speed of delivery, accuracy of resource allocation, and overall effectiveness of the response) is a dependant variable, and Logistics activities (transportation, warehousing, and inventory) is an independent variable. To this end, this study will be guided by the following conceptual framework, which is used to explain the interrelationship between the variables.

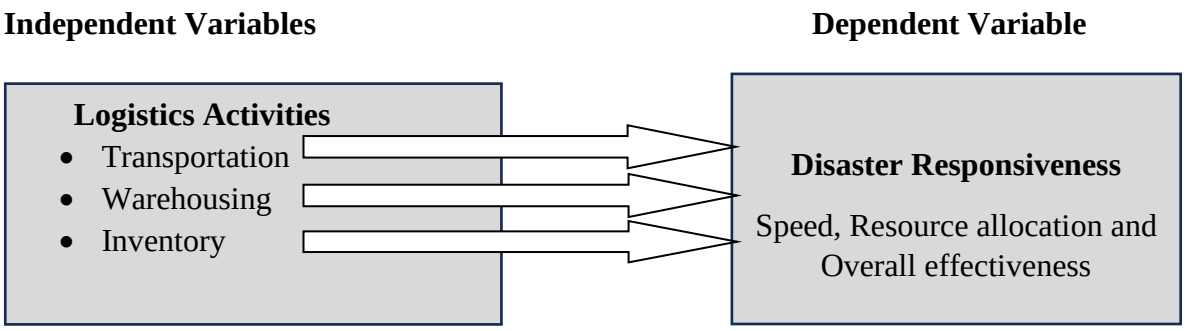

Figure 2. 1 Conceptual Framework

Sources adopted from Jahre et al. (2016)

From the above conceptual framework, one of the independent variables (warehouse) is included where some of the factor like speed/time are modified on dependent variable (disaster responsiveness).

2.4 Hypothesis and Research Gaps

A summary of hypothesis based on the conceptual framework provided above is as follows.

Efficient use of the transportation system is crucial in preventing or reducing the loss of life caused by disaster (Lindell et al., 2018). Rescue operations, disaster relief, and logistics distribution rely heavily on the transportation system to reach areas impacted by hurricanes during and after the events. Therefore, it is essential to use the transportation system in a timely and resource-efficient manner to minimize the potential loss of life caused by hurricanes (Riffat Islam, 2023). Therefore, the researcher proposes the below hypothesis.

H1: There is significant and positive relationship between transportation and disaster responsiveness in Oxfam in Ethiopia.

For the storage of goods and materials, a pre-determined location plays a vital role which makes facility location an integral part of humanitarian logistics. Warehousing is important because it directly helps reduce suffering of affected people by reducing the time to reach them while also encouraging cooperation and collaboration between large numbers of governmental, non-governmental, national, and international organizations working in the field of disaster management (Rajali Maharjana and Shinya Hanaoka, 2016). Therefore, the researcher proposes the second hypothesis below.

H2: There is significant and positive relationship between warehousing and disaster responsiveness in Oxfam in Ethiopia.

An effective humanitarian inventory management model and emergency logistics system is essential for ensuring a steady supply of critical resources to shelter residents and reducing the effects of unexpected disruptions. (Eren Erman Ozguven, Kaan Ozbay, 2013). All victims in a disaster situation need rapid assistance, yet in some cases this goal not accompanied by an ideal recording system on their logistic inventory management (Dachyar, 2019).

H3: There is significant and positive relationship between Inventory and disaster responsiveness in Oxfam in Ethiopia.

From the review of related literature review, there are different research in logistics and disaster but very few in the context of Ethiopia and especially in the effect of logistics activities on disaster responsiveness. So, this study tried to attempt and address the gap by looking at the practice at Oxfam in Ethiopia in a way that other actors and stakeholders can be benefited.

CHAPTER THREE

RESEARCH METHODOLOGY

This section of the study defines the methodology that carried out during the research; where it is point out the study structure, area of the research, the population of the study, sample size and techniques, the methods used in data collection and data analysis.

3.1 Description of the Study

Ethiopia has had one of the fastest growing economies in the Horn of Africa region and the world in the last two decades. But the benefits of this growth have not been equally shared among the country's 100 million people, and the COVID-19 pandemic, recurring drought, and conflict in the northern part of the country threaten Ethiopia's hopes and its path out of poverty.

Most Ethiopians in rural areas rely on rain-fed agriculture for their subsistence, but climate change, shortage in public and private investment in the sector, as well as conflict in some areas and an upsurge of desert locusts in 2020-2021 have had negative effects on food production and incomes. As many as 20.4 million people across Ethiopia require food support, according to the World Food Program. It is one of four countries in East Africa where Oxfam is responding to extreme hunger (OXFAM International)

Oxfam is addressing urgent humanitarian needs in multiple areas, while also tackling the root causes of poverty by helping people make a decent living and adapt to and survive climate change. They also work to empower women and girls in all our programs and ensure women can advocate for their rights and participate in making policies that affect their lives (Schuemer-Cross, & Taylor, 2009).

According to OCHA, Ethiopia faces a complex humanitarian crisis affecting approximately 21 million people, primarily driven by conflict, climate-related shocks such as droughts and floods, and disease outbreaks. These intersecting crises have significantly increased food insecurity and malnutrition, with over 4.4 million individuals displaced and living in temporary shelters or with host communities. In addition, Ethiopia hosts over 942,000 refugees across 24 camps, making it the third largest refugee-hosting nation in Africa.

The country has endured recurrent droughts, with frequency and duration increasing over recent years. From late 2020 to 2023, the eastern and southern regions experienced an exceptionally severe drought due to five consecutive failed rainy seasons, the worst in four decades. Although rainfall between March and May 2023 has improved water and pasture availability, full recovery remains a long-term process. Moreover, extensive flooding in 2023 during the two main rainy seasons has further displaced populations and damaged essential infrastructure and livelihoods (OCHA, 2023).

3.2 Research Approach

In this study the researcher used descriptive and explanatory research design to answer the problem statement and research objectives. Such research approaches are good way of approaching issues as it enabled to respond and triangulate evidence (Archibald, 2016). Particularly, the quantitative research helps to examine the causal relationship of logistics activities and disaster responsiveness in Oxfam Ethiopia. The qualitative research approach employed to indicate employee perception towards logistics activities and its impacts by using details of information through interviews and open-ended questionnaires. The mixed research approach applied to analyse data collected through questionaries and interview.

3.3 Research Design

In this study the researcher used descriptive and explanatory research design to answer the problem statement and research objectives. Specifically, the researcher preferred descriptive research to gain practical evidence, and it describes demographic facts or characteristics of respondents. According to Kothari, (2004) the main characteristic of descriptive method is that the researcher has no control over the variables; he/she can only report what has happened or what is happening. Explanatory design sought because of its suitability for explaining the relationships between the effect of logistics activities and disaster responsiveness using multiple regression and correlation analysis. Also, explanatory research design is convenient for model testing and explanation of the causal relationships between dependent and independent variables such the effect of logistics activities and disaster responsiveness efficiency and effectiveness of Oxfam Ethiopia.

3.4 Target Population, Sampling Technique and Sample Size

In this research the targeted population were all Logistics and Supply Chain Department staffs, Support function staffs (Finance, Human Resources, Administration, etc.) and humanitarian department programme staffs at Oxfam in Ethiopia that are usually engaged and contribute to humanitarian response operations. They selected purposively, the reasons to select these departments were for the purpose of easily data collection, management and get reliable data from them, because they are closer and experienced about the issues. The total number of staffs in the identified departments, excluding guards, cleaners and other roles not relevant to the study, was 182. So that, the study was targeted all identified 182 employees only. To take reliable and precision respondents the researcher conducted a census. A Census refers to the complete enumeration of a population, which may include a specific locality, a group of people, or objects of interest from which data is collected. It helps for small populations as it treats the entire population as the sample. In addition, conducting a census is more advantageous for small populations less than 200 or so (Cook, Kasliwal, Van Sistine, Kaplan, Sutter, Kupfer, T & Kulkarni, (2019).

To examine the effects of logistics activities on disaster responsiveness in Oxfam Ethiopia, a total of 180 respondents from selected departments were surveyed using a census method. The remaining two were interviewed exclusively.

4.5 Data Source and Types

To collect valuable and relevant data, primary data collection tools were used. Questionnaires were distributed to staff to gather primary data, and unstructured interviews were conducted with two key staff members who had experience in logistics and humanitarian response. Secondary data sources were utilized solely for literature review purposes, drawn from relevant books, online sources, published and unpublished materials, and other related documents.

3.6 Data Collection Procedures

The study used primary data sources to gathered necessary data. The researcher employed both close-ended and open-ended questionnaire to collect relevant data and distributed the prepared questionnaire for Oxfam in Ethiopia office and specified

respondents. To examine the causal relationships of logistics activities and disaster responsiveness the study used close-ended questionnaire. The questionnaire design in the form of a Likert scale where respondent required to indicate their views on scale 1 to 5 ranging from ‘’strongly disagree to strongly agree’’. In addition to close-ended questionnaires the researcher used open questionnaire to depict the practices and experiences of logistics activities and disaster responsiveness of Oxfam Ethiopia in details.

Similarly, the study applied, unstructured phone interview with key staffs in logistics and humanitarian lead to conduct in depth. The participant selected through purposively because of their seniority and involvement in strategizing logistics and humanitarian activities at top level.

3.7 Data Analysis

After collecting the data, the researcher analysed the data. To conduct the study qualitative and quantitative methods of data analysis techniques were employed. Analysis of data in this research was done by using descriptive statistical methods like frequency, mean, and standard deviation. The quantitative research types of analysis with inferential statistical methods such as: correlation and regression. The regression analysis was conducted to determine by how much percent the independent variable i.e. logistics activities explain the dependent variable which is disaster responsiveness. Correlation analysis conducted to test the proposed hypothesis whether there is a positive and significant relationship between logistics activities and disaster responsiveness or not.

The researcher used Ordinary Least Square (OLS) model, to model the relationship between a dependent variable (disaster responsiveness) and a collection of independent variables (Logistics activities). In OLS models at least one dependent variable and two or more independent variables can be treated.

In addition, in this study the researcher used correlation and regression analysis to find out the causal relation relationships between logistics activities and disaster responsiveness. To indicate this relationship ordinary least squares regression model (OLS) were used and it needs at least one interval scale (dependent variables), and two or more independent variables are necessary (Pohlmann, & Leitner, 2003). This is treated by the regression formula indicated below.

$Y=B_0+B_1X_1+B_2X_2+ B_3X_{3+} \varepsilon$

Where Y = disaster responsiveness

B_0 is regression constant,

$\beta_1 - \beta_3$ regression coefficients,

X_1 is transportation

X_2 is warehousing

X_2 is inventory

ε model's error term.

3.8 Reliability and Validity of the Research

In conducting the study validity and reliability test and its measurements is important. Specifically, the degree to which a data gathering method or metric captures what it is supposed to capture is known as validity. Similarly, Validity will be addressed through the review of literature and adapting instruments indicated in the research and those in previous research combined. Content and face validity is used to check validity.

Furthermore, reliability is the degree to which your methods for gathering data or conducting analyses produce consistent results. To determine whether the data has a reasonably high level of internal consistency, a reliability test using Cronbach's alpha was conduct (Onwuegbuzie & Johnson, 2013).

According to Zikmund-Fisher et al., (2010) Cronbach's alpha 0.70 and above are considered to have good reliability, the Cronbach's alpha coefficient of was 0.756, it was appropriate and reliable. The details are given the table below.

Table 3. 1 Reliability Test

Variables	**Cronbach's Alpha result**	**No of items**
Transportation	.743	6
Warehousing	.736	6
Inventory	.775	6

Disaster response	.719	6
Total	.756	24

Source, field survey 2024

Further, to ensure the issue of validity, the researcher followed scientific research procedures and data collection from appropriate information providers. Moreover, the researcher reviewed various empirical literatures related to the titles and effectively used to ensure the validity of the research.

3.9 Ethical Consideration

Ethical considerations were addressed in the study, with the researcher provided full details about the study purpose, as well their role & status, to foster a trusting relationship with the respondents. The benefits of the research were also clearly explained to the organisation (Oxfam in Ethiopia) including the importance of the study for the organisation. The researcher followed logical procedures in every stage of the data collection process.

The researcher gave due respect for participants and explicitly expressed their right not to take part in the study and disclosing of the need for confidentiality of their response and used of data credible.

The issue of confidentiality assured to respondent by informing them that the information in the study is slowly used for academic purposes only.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

Introduction

This chapter discusses the findings of data analysis from the questionnaires and interviews. The data was analysed based on the research objectives and questionnaire items using a statistical tool, by using frequency, means, standard deviation, regression and correlation analysis. The data analysed and presented with the help of statistical package for social science (SPSS version 21). Descriptive analysis and inferential analysis of the study are presented respectively.

4.1 Response Rate

A total of 180 questionnaires were distributed to current and former employees of Oxfam in Ethiopia. Out of these, 157 questionnaires were completed and returned, resulting in a response rate of 87.22%. The remaining 12.78% are either incomplete or not returned. Therefore, the analysis for this study is based on the collected questionnaires.

4.2 Demographic Profile of Respondents

This section shows the demographic information of the respondents of sex, age group, level of education, work experience and department of employees at Oxfam in Ethiopia.

Table 4. 1 Demographic information of the respondents

Description	Category	Frequency	(%)
Sex	Male	88	56.1
	Female	69	43.9
Age	20-30 years	37	23.6
	31-40 years	45	28.7
	41-50 years	52	33.1
	Above 50 years	23	14.6
Educational background	Diploma	12	7.6
	First degree	107	68.2
	Master's and above	38	24.2
Department	Logistics and Supply Chain	25	15.9
	Support Services (Finance, HR, Administration, etc.)	64	40.8
	Programme/Project	68	43.3
	Others	-	-
Work Experience	1-3 years	38	24.2
	4-6 years	42	26.8
	7-9 years	37	23.6
	Above 9 years	40	25.5

Source, field survey 2024

The demographic profile of the respondents reveals a roughly balanced distribution of gender, with a higher number of male participants (56.1%) compared to female participants (43.9%). Consequently, a significant portion of those who participated in the research study were male.

Regarding age, the results presented in Table 4.1 indicate that 52 respondents, or 33.1%, were between 41 and 50 years old. Additionally, 45 respondents (28.7%) fell within the 31 to 40 age range, while 37 respondents (23.6%) were aged 20 to 30 years. The remaining 23 respondents, representing 14.6%, were over 50 years old. These findings suggest that most respondents were between the ages of 31 and 50.

In terms of education, 12 respondents (7.6%) held a college diploma, while 107 respondents (68.2%) had completed their first degree, and 38 respondents (24.8%) held a

master's degree or higher. This indicates that the largest group, comprising 68.2% of the population, consists of first-degree holders.

The researcher was also interested in the departments where the participants work at Oxfam in Ethiopia. As shown in Table 4.1, 43.3% of the respondents are employed in Programme/Project staff roles. Additionally, 40.8% work in Support Services (Finance, HR, Administration, etc.), and 15.9% are part of the Logistics and Supply Chain department. This suggests that most respondents possess adequate knowledge and understanding of Oxfam in Ethiopia's logistics activities, contributing to the reliability of the data.

The work experience of the respondents is evenly distributed across different experience levels. Notably, 49.1% of the respondents had seven or more years of work experience, which indicates strong staff retention within the organization, facilitating the preservation of institutional memory and knowledge sharing.

Overall, the demographic profile of respondents from Oxfam in Ethiopia highlights a relatively young workforce that is fairly gender-balanced, well-educated, and possesses a diverse range of experience levels.

4.3 Descriptive Analysis of Logistics Activities and Disaster Responsiveness

This study tried to examine the effect of logistics activities on disaster responsiveness in Oxfam in Ethiopia. According to Zaidaton and Bagheri (2009), the mean score below 3.39 is considered as low, the mean score value from 3.40 to 3.79 is considered as moderate and the mean score value above 3.8 is considered as high. Based on that the research findings are interpreted in the table below.

4.3.1 Transportation Experience of Oxfam in Ethiopia

Table 4. 2 Transportation experience of Oxfam in Ethiopia

Statement	Mean	Std. Deviation
Oxfam in Ethiopia uses various transport optimization models to deliver goods and supplies with list possible cost.	3.52	.931
There is no transportation delay to deliver humanitarian needs to affected population.	3.48	.748

Transportation routes are quickly assessed and cleared to ensure accessibility during a disaster.	3.44	.803
There is a clear understanding of the roles and responsibilities within the transportation management team during disaster.	3.55	.780
Transportation resources (Vehicle, fuel, personnel) for humanitarian responses are adequately maintained and readily available.	3.38	.991
There are lists of pre-qualified transport companies at Oxfam in Ethiopia to be engaged quickly during humanitarian response.	3.31	.924

Source, Field survey 2024

As shown in Table 4.2, six questions were designed to assess transportation-related activities at Oxfam Ethiopia. The descriptive statistics reveal that four of the statements had means above 3.4, indicating a moderate level of performance, while the remaining two statements were rated at a low level. Specifically, Oxfam Ethiopia moderately utilizes various transport optimization models to deliver goods and supplies at the lowest possible cost, with a mean score of 3.52.

Additionally, the transportation management team has clear responsibilities and a good understanding of their roles during disaster response, as evidenced by a mean score of 3.55. These findings suggest that the transport and delivery of goods, as well as the responsibilities of the transportation management team during disaster response, are effective, contributing positively to Oxfam's humanitarian efforts in Ethiopia.

Conversely, Oxfam Ethiopia has not effectively identified pre-qualified transport companies, which could have facilitated a quicker humanitarian response by allowing for the swift engagement of these companies to deliver goods and supplies to disaster-affected areas. This may indicate either an efficient supply chain system that enables rapid engagement of transporters or a lack of focus on this issue, leading to an overemphasis on optimizing quick humanitarian responses.

An interview participant noted that Oxfam Ethiopia employs various mechanisms to enhance transportation during disaster response, such as utilizing its own vehicles, renting vehicles, and using those provided by donors under usage agreements. These resources are deemed adequate for facilitating optimized humanitarian activities.

Despite the country facing multiple humanitarian crises, Oxfam Ethiopia delivers assistance in areas such as Water, Sanitation, and Hygiene Promotion (WASH) and Livelihoods & Food Security (LFS). To implement its programs effectively, the organization employs a robust fleet management system supported by GPS tracking, disaster management, and target identification. However, the timely execution of operations is sometimes hindered by logistical challenges, such as the coordination of various stakeholders and resources necessary for delivering effective humanitarian aid promptly.

Moreover, feedback from the open-ended questionnaires suggested that while the organization's transportation vehicles are generally adequate and strategically distributed across regions where Oxfam operates (such as Gambella, Tigray, Somali, and Amhara), a significant number of vehicles are concentrated in the Addis Ababa office. This concentration can lead to delays in transportation, hindering the quick response needed for program staff to reach operational areas efficiently.

4.3.2 Warehousing Experience of Oxfam in Ethiopia

Table 4. 3 Warehousing experience of Oxfam in Ethiopia

Statement	Mean	Std. Deviation
The warehouse has a comprehensive disaster response plan in place.	3.40	.926
Relief supplies leave the warehouse clean and damage free for efficient delivery to beneficiaries.	3.50	.965
The warehouse layout is designed to facilitate quick, easier, and efficient delivery of materials to affect population during disaster response.	3.39	1.066
The warehouse is well equipped with necessary tools and resources to handle different types of disasters.	3.44	.936
The warehouse is able to secure and protect inventory from damage during disaster.	3.31	1.018
The warehouse staffs are effective in minimizing disruption to operations during disaster.	3.52	.971

Source, Field survey 2024

Table 4.3 indicates that the warehouse staff at Oxfam Ethiopia are moderately effective in minimizing disruptions to disaster response, with a mean score of 3.52. Furthermore, factors such as warehouse cleanliness and efficient delivery to beneficiaries, the adequacy of tools and resources in the warehouse, and the availability of a comprehensive disaster response plan received average mean scores of 3.50, 3.44, and 3.40, respectively, reflecting a generally positive assessment.

Conversely, the security of the warehouse is inadequate, failing to sufficiently protect inventory from damage during disaster response, and the warehouse layout is not optimally designed to facilitate quick and efficient delivery of materials. These aspects received mean scores of 3.31 and 3.39, respectively.

Additionally, the lack of adequate warehousing has negatively impacted humanitarian activities, causing delays in reaching operational areas, as noted by interview participants and responses to the open-ended questionnaires.

4.3.3 Inventory Experience of Oxfam in Ethiopia

Table 4. 4 Inventory experience of Oxfam in Ethiopia

Statement	Mean	Std. Deviation
The inventory management system is regularly updated and maintained to support disaster response efforts.	3.30	.843
Coordination with suppliers and distributors is well established to ensure continues inventory flow.	3.47	.978
Inventory levels are managed to ensure availability of essential items during and after disaster response.	3.30	.957
Inventory storage conditions are adapted to protect items from damage	3.40	.912
Inventory management staffs are perceived as reliable and competent in disaster situation.	3.71	.834
Critical inventory items are prioritized and protected during disaster.	3.45	.780

Source, Field survey 2024

As it can be seen in the above table, inventory management system of Oxfam in Ethiopia relatively good and positively contributes towards organization disaster response.

Particularly, inventory management staff are very good and easily perceived as reliable and competent in disaster situations with the mean value indicated 3.71. Moreover, critical inventory items are prioritized and protected during disaster and in addition suppliers and distributors flow of inventory is averagely well established and coordinated as it is indicated mean values (3.45 and 3.47) depicts in the above table.

4.3.4 Disaster Responsiveness Experience of Oxfam in Ethiopia

This part of the study showed disaster responsiveness implementation and its practices. The computed mean and standard deviation results are indicated in the table below.

Table 4. 5 Disaster responsiveness experience of Oxfam in Ethiopia

Statement	Mean	Std. Deviation
The organisation has a comprehensive disaster response plan.	3.42	.856
Oxfam in Ethiopia have strong coordination between humanitarian response team and logistics.	3.40	.861
There are contingency plans for critical operations and infrastructures in Oxfam in Ethiopia.	3.37	.976
Transportation, Warehousing facilities and Inventory management activities of Oxfam Ethiopia are well established and delivered on time	3.50	1.042
Emergency relief supplies and equipment are readily available and maintained.	2.76	.957
Cost-effective disaster response implemented in Oxfam Ethiopia.	3.47	.836

Source, Field survey 2024

The research findings indicate that most respondents believe that Oxfam Ethiopia's transportation, warehousing facilities, and inventory management activities are at a moderate level and well-established for timely disaster response, with a mean score of 3.50. This suggests that these areas are functioning effectively and support the organization’s humanitarian efforts. Additionally, Oxfam Ethiopia has a comprehensive disaster response plan that is cost-effective, reflected in a mean score of 3.42.

However, the organization has struggled with the availability and maintenance of emergency relief supplies and equipment, as indicated by a mean score of 2.76. This suggests a gap between employee expectations and the actual availability of emergency supplies and equipment.

One interviewee noted that Oxfam has been recognized for its humanitarian activities in Ethiopia for many years and has made a significant impact in responding to various crises, including drought, refugee situations, flooding, and internal conflict. The organization's capability to respond in a timely and results-oriented manner has been greatly appreciated during these challenging times.

Another interviewee emphasized that Oxfam Ethiopia's humanitarian assistance to mitigate the effects of disasters is crucial, primarily due to its strong collaboration with logistics activities. To achieve its objectives, the organization's humanitarian response plan consistently includes the logistics unit, which plays a vital role in ensuring effective disaster responsiveness, enabling quick reactions and minimizing issues. Furthermore, Oxfam Ethiopia has worked cooperatively with various stakeholders and utilized technology-assisted logistics to save more lives in less time.

Conversely, participants in the open-ended questionnaires pointed out that the organization's disaster response is affected by various challenges, including societal issues, security concerns, access problems, and the unpredictable nature of disasters, which can sometimes hinder the timely execution of logistics activities.

4.4 Inferential Statistics Analysis

The major objective of this study was investigating the causal relationships of logistics activities and disaster responsiveness of Oxfam in Ethiopia. To carry out its inferential statistics is the key and appropriate. Particularly, correlation and multiple regression analysis were implemented in ordered to answers research objective.

4.4.1 Correlation Analysis of Logistics Activities and Disaster Responsiveness

Correlation analysis is a technique is used to examine the direction and strength of linear association between two continuous or scale variables. In this study the correlation

analysis is performed to investigate the relationship between logistics activities and disaster responsiveness of Oxfam in Ethiopia.

A correlation coefficient is very important and useful tool that take values between -1 and 1 going from being negatively correlated (-1) to not correlated (0) to positively correlated (+1) (Field, 2013).

Correlation Coefficient is the most basic and most useful measure of association between two or more variables (Marczyk, Dematteo & Festinger, 2010). Therefore, to determine the existence and level of association, according to Field (2013) correlation coefficient (r) ranging with 0.1-0.3 is considered a week relationship, a correlation of 0.3-0.49 considered a moderate relationship, a correlation greater than 0.5 is considered strong and a correlation and greater than 0.75 is considered very strong positive relationship. The correlation matrix below shows that the relationships of logistics activities and disaster responsiveness in Oxfam in Ethiopia. The overall result of the study was given below with the significant value = 0.000.

Table 4. 6 logistics activities and disaster response relationship.

Determinant factors	Transportation	Warehousing	Inventory	Disaster response
Transportation	1			
Warehousing	.277**	1		
Inventory	.199*	.624**	1	
Disaster response	.455**	.562**	.569**	1

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

Source, field survey 2024

Table 4.6 shows, Pearson correlation coefficient(r) of all identified major logistics activities revealed that, there is a statistically significant positive association (at the 1% level) between logistics activities and disaster responsiveness. Particularly, Inventory, and warehouse had a direct and strong positive relationship with disaster responsiveness of correlation coefficient r= 0.569** and 0.562** indicated respectively. This implies that, these two identified logistics activities had strong relationship with disaster

responsiveness in Oxfam in Ethiopia however, the strength of variables nearer to moderate levels.

In addition, transportation had positive and moderate relationship with disaster responsiveness in Oxfam Ethiopia with the correlation coefficient $r=0.455^{**}$. As it can be seen the overall Pearson correlation result, the impacts of identified variables relativity similar and positively correlated with disaster responsiveness. On the others hand, the moderate relationships of logistics activities and disaster responsiveness indicated that, the absence of multi-collinearity problems because it occurred that the correlations between variables become too strong enough.

4.4.2 Regression Assumptions

In regression analysis, several assumptions underpin the model. This study specifically tested the most common regression assumptions: normality, linearity, multicollinearity, autocorrelation, and homoscedasticity. Before proceeding with the analysis of multiple regressions, basic assumptions were assessed to ensure the reliability and validity of the study. The results of these tests are presented below.

4.4.2.1 Normality Test

Normality test is used to determine whether the sample data drawn from the normal distributed population or not. Further, regression assumes that variables have normal distributions, and the regression result is reliable, and the histogram shows normal distributed population. Non-normally distributed variables (highly skewed or kurtotic variables, or variables with substantial outliers) can distort relationships and significance tests (Osborne, & Waters, 2019). Normality test result revealed by using histograms below.

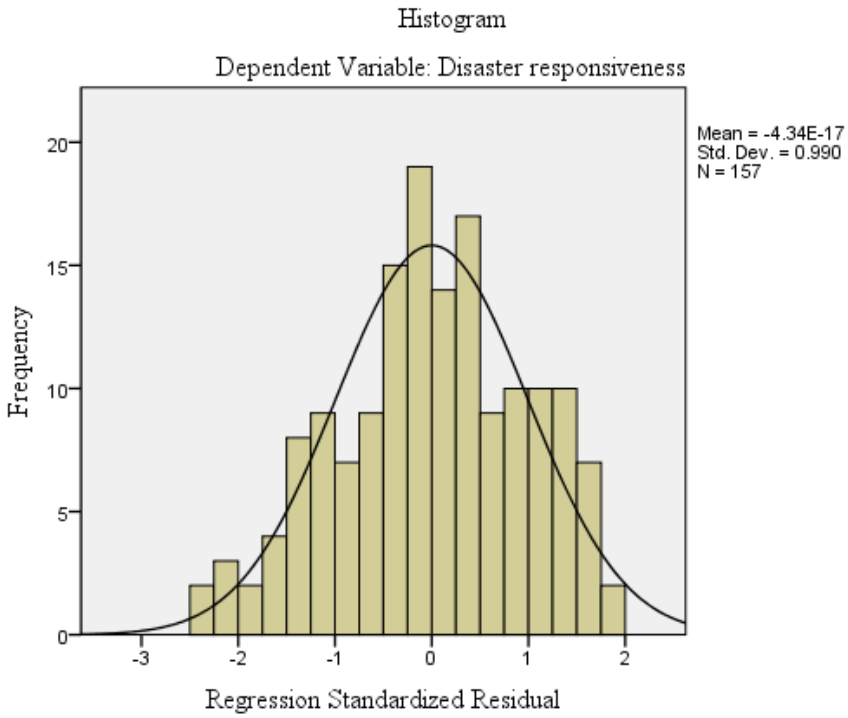

Figure 4. 1 Normality test of regression

4.4.2.2 Linearity Assumption Test

The assumption of linearity is essential for regression analysis and the basic regression model is fully or completely linear, meaning that the model is linear in both its parameters and its variables. The basic regression model is also linear in the variables: a unit change in one of the variables produces a constant change in the dependent variables whatever the value of the variable (Meuleman, Loosveldt, & Emonds, 2015).

Moreover, Standard multiple regression can only accurately estimate the relationship between dependent and independent variables if the relationships are linear in nature. If the relationship between independent variables and the dependent variable is not linear, the results of the regression analysis will under-estimate the true relationship (Osborne, & Waters, 2019).

Therefore, the study carried out linearity assumption test and the relationship between the dependent and independent variables and its linearity assumption test was indicated in the figure below.

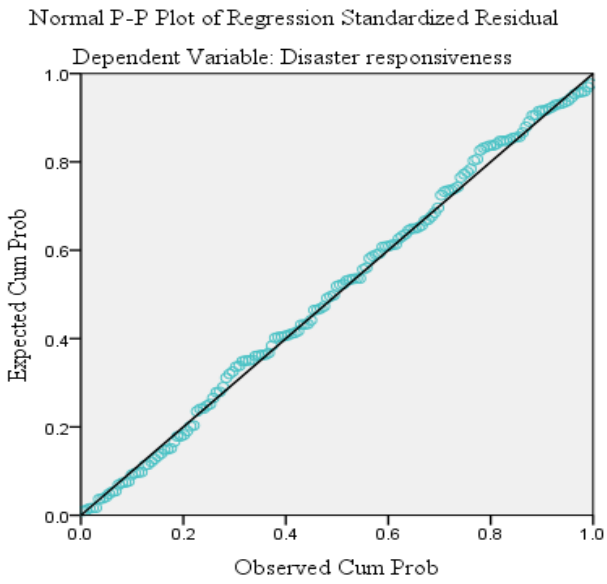

Figure 4. 2 Linearity assumption test

4.4.2.3 Assumption of Homoscedasticity

Homoscedasticity means that the variance of errors is the same across all levels of the independent variables. Similarly, homoscedasticity is an assumption of regression analysis used to test whether residuals are equally distributed, or whether they tend to bunch together at some values, and at other values, spread far apart (Rosopa, et. al, 2013). To heck this assumption the researcher used plotting the predicted values and residuals on a scatter plot. The result met the requirement and the result show below the picture.

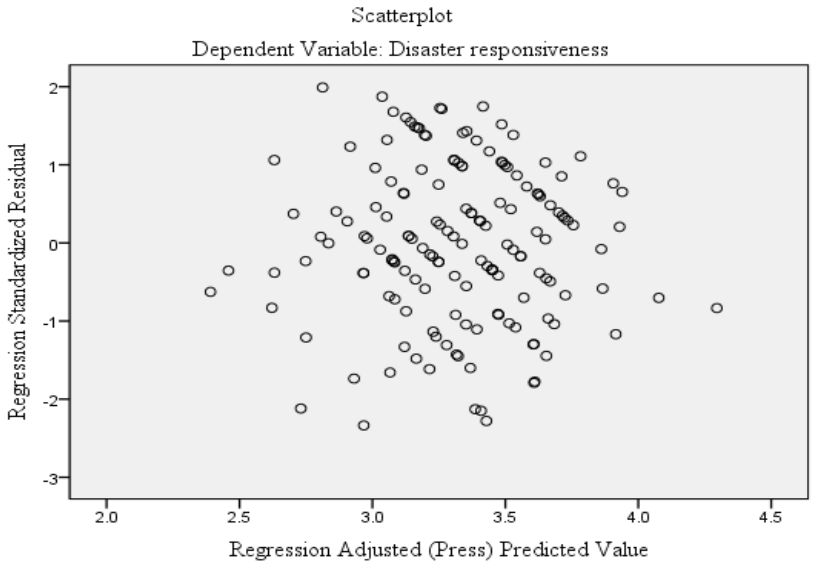

Figure 4. 3 Assumption of homoscedasticity

4.4.2.4 Multicollinearity Test

In multiple regression analysis, independent variables are not only often related to the dependent variable, but also regularly correlated among themselves. Multiple regression analysis was specifically designed as a statistical tool to deal with the situation of several correlated variables predicting a single outcome variable. However, if the correlations between the independent variables become too strong, problems can arise during the analysis. Multicollinearity refers to this situation where (a set of) predictor variables show very strong inter correlations. If it is a serious multicollinearity problem or there is perfect multicollinearity when one independent variable can be perfectly predicted by the other independent variables. The multicollinearity problem is detected by Tolerance values and Variance Inflation factor. Tolerance is the amount of variability in one independent variable that is no explained by the other independent variables. Tolerance values less than 0.10 and Variance Inflation factor (VIF) greater than 10 indicates the occurrence of multicollinearity problems in regression models (Meuleman, Loosveldt, & Emonds, 2015).

Table 4. 7 multi-collinearity test distribution result

Model	Collinearity Statistics	
	Tolerance	**VIF**
Transportation	.922	1.085
Warehousing	.586	1.706
Inventory	.610	1.639

Source: field survey of 2024

The presence of multicollinearity can be tested formally by using tolerance values and variance inflation factor statistics. Both measures quantify the extent to which certain predictor variable depends on the set of other predictors. According to the table above and Collinearity test, there was no multicollinearity problem because the tolerance values of all predicate's variable were greater than 0.1 and Variance Inflation factor of the variables were below 10 successfully meet the requirements.

Further, the researcher tested autocorrelation test of Durbin-Watson. According to Montgomery, Peck, & Vining, (2021) Durbin-Watson test statistic values is range of 1.5 to 2.5 are normal. In the study Durbin-Watson test result was 2.202 hence the study has

no autocorrelation problems, because The Durbin-Watson statistic is 2.202 which is between 1.5 and 2.5 and the data is not auto correlated.

4.5 Regression Analysis and its Result

Regression analysis has a pivotal role to examine the causal relationship of independent variables and dependent variables. As a result, the researcher utilized regression analysis to examine the effect of logistics activities (Transportation, Warehouse, and Inventory) on response dependent variable (disaster responsiveness) in Oxfam in Ethiopia.

Moreover, multiple regressions used in investigating presence of a statistically significant effect of the independent variables on the dependent variable at the significance level ($p<0.05$). The details of the finding clarified as follows.

Table 4. 8 model summary and ANOVA table

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.696[a]	.485	.475	.33123	2.202

a. Predictors: (Constant), Transportation, Warehousing, Inventory

b. Dependent Variable: Disaster responsiveness

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	15.800	3	5.267	48.004	.000[b]
	Residual	16.786	153	.110		
	Total	32.586	156			

a. Dependent Variable: Disaster responsiveness

b. Predictors: (Constant), Transportation, Warehousing, Inventory

In the model summery table, the value of R squared showed that, the dependent variable (Disaster responsiveness) is explained (impacted) by all independent variables. This means, identified three independent variables (Transportation, Warehousing, and Inventory) explained 0.485 or 48.5% of the variance in the dependent variable Disaster Responsiveness at the significant level of ANOVA table ($p = .000$) which is less than

0.05. so that the hypothesis is accepted. Generally, the study found a significant relationship between independent variable and dependent variable in the regression model.

Table 4.9 Regression analysis and its coefficients table

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.182	.268		.679	.498
	Transportation	.324	.062	.314	5.203	.000
	Warehousing	.241	.070	.260	3.428	.001
	Inventory	.348	.075	.344	4.635	.000

a. Dependent Variable: Disaster responsiveness

As it is observed in table 4.9 above, one of the key logistics activity, inventory was statistically positive and strong effects on disaster responsiveness, and it was the most important predictor variable and greatly facilitate for disaster responsiveness with the highest Beta value of 0.348. Secondly, transportation had statistically moderate significant effects on disaster responsiveness with Beta value (B=.324). This implies that, transportation of Oxfam in Ethiopia averagely helps to increase disaster responsiveness capability.

Like one of the elements of logistics activities warehouse had statistically positive and moderate significant effects on disaster responsiveness with the Beta value B=241 depicted. This indicated that, warehousing had moderate positive impacts on disaster responsiveness hence the organization and other actors intentionally implemented to increase disaster responsiveness more.

The overall result of the study revealed that, logistics activities (Transportation, Warehousing, and Inventory) practices of Oxfam in Ethiopia had moderate effect on disaster responsiveness. Specially, inventory had slightly great contribution for the implementation of effective disaster responsiveness.

4.6 Discussion and Hypothesis Testing

The findings were discussed in relation to the research objective and corresponding hypothesis. The study examined the effect of logistics activities on disaster responsiveness in the case of Oxfam in Ethiopia.

This study was guided by the following research hypothesis:

- H1: There is significant and positive relationship between transportation and disaster responsiveness in Oxfam in Ethiopia.
- H2: There is significant and positive relationship between warehousing and disaster responsiveness in Oxfam in Ethiopia.
- H3: There is significant and positive relationship between Inventory and disaster responsiveness in Oxfam in Ethiopia.

In relation, all identified logistics activities predicators (independent) variables were statically significant positive effects on disaster responsiveness with some degree of impact differences at Oxfam in Ethiopia.

The specific finding of descriptive finding revealed that, the implementation of logistics activities and disaster responsiveness of Oxfam in Ethiopia was moderately exercised and positively impacted. Moreover, the explanatory finding depicted that, inventory was statistically positive and strong effects on disaster responsiveness while transportation and warehousing had statistically positive and moderate significant effects on disaster responsiveness. After these other studies discussed in comparable with the study.

Vaillancourt, and Haavisto, (2016) research finding showed that, there was a significant relationship between country logistics performance and disaster impact overall logistic performance indicators.

The research conducted by Koseoglu, and Yıldırımlı (2015) and their finding was somehow similar with this finding; the finding revealed that, the organisation minimizes people's suffering and speed up the reconstruction process to ensure normal life of the disaster affected society and overcome community's adaptability capacity however, successful aid operation depends on the timely, balanced and fastest delivery of aid materials and equipment.

According to Anisya (2003) the availability of warehouses nearest the disaster site, transport capacity, absence of infrastructure and health canter, political situation, weather condition and safety and security issues influenced humanitarian activities of the organization.

Conversely, the effective prevention and management of public emergencies, such as natural disasters, is not a unique to China (Cao, and Jiang, 2021). This suggests that humanitarian logistics efforts during disasters are shaped by a country's level of development. As a result, Ethiopia's social and economic status has impacted the intervention of Oxfam in Ethiopia in the country, with a focus on transportation and warehousing.

Hypothesis Test

In this study, all identified predicators variable has significant effects on organization commitment in the study area. Each predicated variables and their hypothesis test indicated below.

The hypothesis testing results provide clear insights into the impact of logistics activities on disaster responsiveness at Oxfam in Ethiopia, confirming that transportation, warehousing, and inventory management all positively contribute to the organization's ability to respond to disasters.

Hypothesis H1: Transportation

The result ($\beta = 0.324$, $P < 0.05$) indicates that transportation activities have a statistically significant and positive effect on disaster responsiveness. This finding aligns with Oxfam's reliance on transport models for effective aid delivery. While the impact of transportation is moderate, enhancing partnerships with transport providers and diversifying transport options could further optimize delivery speed, especially for remote areas, thus strengthening overall disaster response.

Hypothesis H2: Warehousing

Warehousing also shows a positive and statistically significant impact on disaster responsiveness ($\beta = 0.241$, $P < 0.05$), although this effect is moderate. This suggests that while Oxfam's current warehousing facilities support response efforts, there is room for improvement. Increasing storage capacity and enhancing warehousing infrastructure,

especially near areas prone to disaster or crisis could ensure quicker access to emergency supplies, reduce lead times in critical situations.

Hypothesis H3: Inventory

Inventory management demonstrate the strongest positive effect on disaster responsiveness ($\beta = 0.348$, $P < 0.05$) among the three variables. This result highlights the critical role of inventory management, where well-organized stock levels and reliable supply chain practices enable swift aid delivery. Effective inventory management ensures that essential items are readily available, positioning Oxfam in Ethiopia to respond more quickly and efficiently to emergencies.

In summary, the hypothesis testing confirms that transportation, warehousing, and inventory management all positively impact disaster responsiveness at Oxfam in Ethiopia, with inventory management having the most pronounced effect. Addressing gaps in each area such as transport partnerships, warehousing capacity, and inventory forecasting could further enhance Oxfam in Ethiopia's disaster response capabilities.

The overall hypothesis test result indicates that, identified logistics activities constituents; Transportation, Warehousing, and Inventory had positive and statistically significant effect on disaster response because all predicator's variable significant values were < 0.05. Like others research findings, the logistics activities had a direct effect on disaster response hence the concerned body considered these issues during any intervention and decision-making process.

CHAPTER FIVE

FINDINGS, CONCLUSION AND RECOMMENDATION

This chapter summarized key findings and results, conclusions and gave further recommendations. The main aim of this study was to examine effect of logistics activities on disaster responsiveness in the case of Oxfam in Ethiopia.

5.1 Summary of Findings

This study's aimed to examine effect of logistics activities on disaster responsiveness in Oxfam in Ethiopia. To conduct the study, the study used explanatory research design with mixed research approach. To investigate the total of 157 questionnaires were used and the major research findings are presented as follows.

This study finding shows, 56.1% of the respondents were male and the rest 43.9% of the respondents were females; 61.8% of the respondents found the age bracket 31 to 50 years, the majority (68.2%) of the respondents were first degree holders. Also, 49.1% of the respondents had seven and above years' work experience and this show Oxfam in Ethiopia staff retention and maintain institutional memory or knowledge sharing practices.

The descriptive statistics research finding shows, logistics activities and response disaster implementation status of Oxfam Ethiopia was quite good, and the respondents moderately believed transportation, warehousing and inventory and disaster responsiveness well integrated.

Particularly, inventory management staffs are good and easily perceived as reliable and competent in disaster situation as the mean values 3.71 indicated. Also, Oxfam in Ethiopia moderately used different transport optimization models to deliver goods and supplies (M=3.52), and Transportation, Warehousing facilities and Inventory management activities Oxfam Ethiopia were found moderate status and well established to delivery disaster response on time with mean values 3.50 showed. Similarly, transportation management team had clear responsibilities and understanding during disaster and warehouse staffs of Oxfam in Ethiopia are averagely effective and minimized disruption during the response as the mean values 3.55 and 3.52 indicated respectively.

On the other hand, the organisation poorly experienced with emergency relief supplies and equipment of readily available and maintained as indicated 2.76 mean values and Oxfam in Ethiopia poorly practiced for the identification of pre-qualified transport companies to gives quick humanitarian response (M=3.31)

Regarding with Pearson Correlation result, there was a relationship between logistics activities (transportation, inventory, and warehouse) and disaster responsiveness. Particularly, Inventory and warehouse had a direct and strong positive relationship with disaster responsiveness, as it depicts the correlation coefficient r= $0.569^{**}$and 0.562^{**} respectively with a significance level (p) of 0.000. In addition, transportation had positive and moderate relationship with disaster responsiveness with correlation coefficient 0.455^{**}. .

Also, the regression result revealed that, logistics activities was statistically positive impacts on disaster responsiveness of Oxfam in Ethiopia. Specifically, one of the key logistics activity inventories was statistically positive and strong effects on disaster responsiveness with the highest Beta value of 0.348. In addition, transportation and warehousing had statistically moderate significant effects on disaster responsiveness with Beta value (B=0.324 and 0.241) respectively.

The model summary of multiple regression revealed that, identified independent (transportation, inventory, and warehouse) variables explained 48.5% of the variance in the dependent variable disaster responsiveness at the significant level of ANOVA indicated (p = .000) which is less than 0.05.

The regression model result indicated that, the predicting variable logistics activities has significant and pronounced effects on disaster responsiveness in Oxfam Ethiopia. Particularly, inventory shows greater pronounced effect on disaster responsiveness while transportation and warehousing relatively lower pronounced effect on disaster responsiveness.

On the other hand, interviews and questionnaires result shows that, Oxfam in Ethiopia humanitarian activities was limited, due to access issues (to transport materials), urgency, limited resources (vehicles concentrated in non-operational area) and lack of sufficient facilities (warehouse) has somehow limited Oxfam in Ethiopia disaster response capability.

In summary, the study investigated the role of logistics activities specifically inventory management, transportation, and warehousing in enhancing disaster responsiveness at Oxfam Ethiopia, using both descriptive and regression analyses. Descriptive findings indicate that these logistics functions are moderately effective in supporting disaster response, helping to facilitate timely aid delivery and resource use. However, the study identifies key gaps, particularly in Oxfam's emergency supply readiness and its partnerships with transport providers, which limit the speed and flexibility required during disaster situations. The regression analysis further substantiates these findings, revealing a positive correlation between logistics activities and disaster responsiveness, with inventory management showing the most significant impact. This suggests that well-organized inventory practices can substantially enhance Oxfam's ability to respond effectively to crises, while transportation and warehousing also contribute positively, albeit to a lesser degree. Addressing challenges in resource allocation and infrastructure such as improving warehousing facilities, developing transport partnerships (framework agreements), and refining inventory systems would be essential steps for Oxfam in Ethiopia to strengthen its overall disaster responsiveness.

5.2 Conclusion

This study focused to examine the effects of logistics activities on disaster responsiveness in the case of Oxfam in Ethiopia. Regarding with descriptive and explanatory research finding; the implementation of logistics activities was quite good and moderately contribute to ensure delivery speed of aid, efficient use of resource and overall effectiveness of disaster responsiveness.

The descriptive finding revealed that, logistics activities and implementation status of Oxfam Ethiopia is quite good, and the respondents moderately believed the transportation, warehousing and inventory and disaster responsiveness experiences. Particularly, Oxfam Ethiopia transportation models and its delivery, Transportation, Warehousing facilities and Inventory management activities were found moderate status and helped for disaster responsiveness practices.

In addition, inventory management staffs are good and easily perceived disaster situation, transportation management team has clear responsibilities and understanding during disaster and warehouse staffs' disruption minimizing capability was quite good and facilitate the humanitarian provision. On the other hand, the organisation poorly

experienced with emergency relief supplies and equipment and identification of pre-qualified transport companies to give quick humanitarian response.

This indicated that, the organization has its role to play in preventing or reducing the impacts of disasters.

The regression result showed that, all identified logistics activities predicators (independent) variables were statically significant positive effects on disaster responsiveness with some degree of impact differences at Oxfam Ethiopia. Specifically, inventory was statistically positive and strong effects on disaster responsiveness while transportation and warehousing had statistically positive and moderate significant effects on disaster responsiveness.

This implies that, inventory has direct positive and crucial effects on disaster responsiveness because it had strong impacts. On the other hand, transportation and warehousing relatively lower pronounced effect on disaster responsiveness hence the organisation gives additional efforts to enhance the positive impacts of them.

Moreover, the descriptive statistics result shows that, Disaster logistics (the distance between aid materials and disaster areas), absence of warehousing, multi directional problems of the society, vehicles specifics area concentration was limited disaster responsiveness.

In general, to improve Oxfam Ethiopia's disaster responsiveness, pre-positioning essential supplies and establishing partnerships with local vendors and pre-qualified transport providers are crucial steps for swift mobilization. Expanding and strategically locating warehousing facilities, along with implementing warehouse management systems, will enable real-time tracking and quick replenishment of stocks. Additionally, diversifying transportation options, such as having framework agreement with transport companies based on specific needs, can improve access to remote areas.

Strengthening inventory management through demand forecasting and training inventory teams in rapid response practices will ensure sufficient stock levels while maintaining resource efficiency. Investing in staff capacity building and fostering knowledge-sharing practices among logistics teams will enhance readiness and retain critical expertise. Furthermore, setting up a disaster response dashboard for real-time data visibility and conducting regular simulation drills will help Oxfam in Ethiopia identify areas for

improvement, enabling a responsive and resilient logistics practice for disaster preparedness.

As a result, the concerned bodies of Oxfam in Ethiopia need to improve these constraints to maximized disaster responsiveness and humanitarian activities of the organisation.

5.3 Recommendations

The logistics activities and its implementations had significantly contributed for the overall effectiveness of disaster responsiveness. Based on the research findings; the following suggestions are forwarded.

The effect of logistics activities on disaster responsiveness at Oxfam in Ethiopia is significant, particularly when viewed through the lenses of delivery speed, resource allocation, and overall effectiveness.

Speed of Delivery: Effective logistics activities, especially inventory management and transportation, play a central role in ensuring quick delivery of aid. By pre-positioning supplies and establishing relationships with transport providers, Oxfam can reduce lead times significantly, enabling faster response to disaster zones. However, the current moderate use of transport models and limited partnerships with pre-qualified transport companies suggest there's room for enhancing delivery speed. Inventory management's strong impact in particular highlights its role in ensuring that essential supplies are readily available for dispatch, minimizing delays.

Resource Allocation: Proper resource allocation in warehousing and transportation is crucial for minimizing waste and maximizing efficiency. For instance, the placement of warehousing facilities close to disaster-prone areas and investment in advanced warehouse management systems help in the strategic positioning of resources. The descriptive findings indicate that while Oxfam's logistics team has a solid understanding of disaster situations and responsibilities, gaps in emergency supply readiness and transport options can hinder optimal allocation. A more streamlined approach in warehousing and transportation logistics, supported by data-driven inventory forecasting, would strengthen resource management.

Overall Effectiveness of Disaster Responsiveness: Logistics activities when effectively implemented boost overall disaster response by ensuring aid reaches those in need with minimal disruption. The positive correlation between logistics functions (transportation,

inventory, and warehousing) and disaster responsiveness at Oxfam Ethiopia highlights their collective impact on response quality. Although inventory management has the strongest positive influence, transportation and warehousing need further refinement to achieve peak responsiveness. Addressing these gaps by enhancing infrastructure, expanding partnerships, and improving logistical coordination would enable Oxfam Ethiopia to deliver a quicker, more efficient, and reliable disaster response.

Together, these logistics improvements directly support Oxfam in Ethiopia's goals in disaster response by accelerating aid delivery, optimizing resource use, and increasing overall effectiveness in reaching affected communities swiftly and reliably.

Likewise, Policy makers, researchers, trainers, consultants, government bodies and other stakeholders should understand the positive impacts of such humanitarian organizations and work hand in hand to enhance the implementation of humanitarian activities and forwarded best solution to improve the response to any humanitarian disaster.

5.4 Further Research

The researcher recommends for further investigation the effect of logistics activities on disaster responsiveness by including the ideas of beneficiary and others humanitarian organization practices comparatively to improve the sector and ensure overall effectiveness of disaster response with logistics activities as one of the key elements.

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Annex II Questionnaire

Addis Ababa University

School of Commerce

Department of Logistics and Supply Chain Management

Questionnaire

Dear Respondents,

I am a graduate student at Addis Ababa University School of Commerce in the department of Logistics and Supply Chain Management. Currently, I am conducting research entitled '' **The Effect of Logistics Activities on Disaster Responsiveness in the Case of Oxfam in Ethiopia''** as a partial fulfilment of Master of Art Degree in Logistics and Supply Chain Management.

The purpose of this questionnaire is to collect data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information.

I confirm that your response will be kept confidential and will only be used for the aforementioned academic purpose.

I, therefore, kindly request for your assistance and cooperation to respond to the questions attached herewith.

Looking forward for your response.

Kind Regards,

Dagne Legesse Hunde

PART I – Demographic Profile of the Respondent

General Information

Please put a tick mark (✓) in the appropriate response category.

1. Gender (A) Male ☐ (B) Female ☐

2. Age (A) 20-30 ☐ (B) 31 – 40 ☐

(C) 41 – 50 ☐ (D) above years 50 ☐

3. Education Level (A) Diploma ☐ (B) Bachelor Degree ☐

(C) Master's Degree and above ☐

4. Your Department in the Organisation

(A) Logistics and Supply Chain ☐

(B) Support Services (Finance, HR, Administration, etc.) ☐

(C) Programme/Project ☐

(D) Others ☐

5. Years of Experience in the Organisation

(A) less than 3 Years ☐ (B) 4 – 6 Years ☐

(C) 7 – 9 Years ☐ (D) Above Years and above ☐

PART II – There are questions related to the Effect of Logistics Activities (Transportation, Warehousing, and inventory) on Disaster Responsiveness and please rate your level of agreement with rating scale from 1-5 as below.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree and 5. Strongly Agree

Variables	Questionaries	1	2	3	4	5
Transportation	Oxfam in Ethiopia uses various transport optimization models to deliver goods and supplies with list possible cost.					
	There is no transportation delay to deliver humanitarian needs to affected population.					
	Transportation routes are quickly assessed and cleared to ensure accessibility during a disaster.					
	There is a clear understanding of the roles and responsibilities within the transportation management team during disaster.					
	Transportation resources (Vehicle, fuel, personnel) for humanitarian responses are adequately maintained and readily available.					
	There are list of pre-qualified transport companies at Oxfam in Ethiopia to be engaged quickly during humanitarian response.					
Warehousing	The warehouse has a comprehensive disaster response plan in place.					
	Relief supplies leave the warehouse clean and damage free for efficient delivery to beneficiaries.					
	The warehouse layout is designed to facilitate quick, easier, and efficient delivery of					

	materials to affect population during disaster response.					
	The warehouse is well equipped with necessary tools and resources to handle different types of disasters.					
	The warehouse is able to secure and protect inventory from damage during disaster.					
	The warehouse staffs are effective in minimizing disruption to operations during disaster.					
Inventory	The inventory management system is regularly updated and maintained to support disaster response efforts.					
	Coordination with suppliers and distributors is well established to ensure continues inventory flow.					
	Inventory levels are managed to ensure availability of essential items during and after disaster response.					
	Inventory storage conditions are adapted to protect items from damage					
	Inventory management staffs are perceived as reliable and competent in disaster situation.					
	Critical inventory items are prioritized and protected during disaster.					
Disaster Responsiveness	The organisation has a comprehensive disaster response plan.					
	Oxfam in Ethiopia have strong coordination between humanitarian response team and logistics.					
	There are contingency plans for critical operations and infrastructures in Oxfam in Ethiopia.					

	Transportation, Warehousing facilities and Inventory management activities of Oxfam in Ethiopia are well established and delivered on time					
	Emergency relief supplies and equipment are readily available and maintained.					
	Cost-effective disaster response implemented in Oxfam Ethiopia.					

- If you have additional suggestion regarding with logistics activities of Oxfam in Ethiopia (Transportation, Warehousing, and inventory) practices, challenges and disaster responsiveness implementation status please discussed in detail? Also, indicate the mechanism/ possible measure to improved logistics activities and disaster responsiveness of Oxfam Ethiopia?

Do you have any important additional suggestion?

Thank you for taking your time to complete this questionnaire.

Annex II Interview Questionnaires

Interview Questions

1. What can you say about the organisation logistics activities (transportation, warehousing and inventory) effect on disaster responsiveness?
2. Do you think the logistics function is providing on time, cost effective and efficient support to organisation humanitarian response operations?
3. How do you see the coordination between logistics and humanitarian department regarding planning, coordination, and responding to disasters?
4. Does the organisation have enough fleet, strategically located warehouse and proper inventory control mechanism that benefits humanitarian response
5. What are the major challenges that are faced the overall implementation of logistics activities of Oxfam in Ethiopia and its disaster responsiveness?
6. What are the possible mechanisms to improved logistics activities and disaster responsiveness of Oxfam in Ethiopia?

Thank you for taking your time to complete this interview.