ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

FACTORS AFFECTING LAST MILE DELIVERY OF EMERGENCY RESPONSES: A STUDY ON SELECTED HUMANITARIAN ORGANIZATIONS IN ETHIOPIA

BY

TIMIHIRT GETACHEW GASHAW

JUNE 2024

ADDIS ABABA, ETHIOPIA

FACTORS AFFECTING LAST MILE DELIVERY OF EMERGENCY RESPONSES: A STUDY ON SELECTED HUMANITARIAN ORGANIZATIONS IN ETHIOPIA

BY

TIMIHIRT GETACHEW GASHAW

ID. GSD/3353/14

ADVISOR: MATIWOS ENSERMU (Ph.D.)

A THESIS SUBMITTED TO THE SCHOOL OF COMMERCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR MASTER OF ARTS DEGREE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

JUNE 2024

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

APPROVAL SHEET

FACTORS AFFECTING LAST MILE DELIVERY OF EMERGENCY RESPONSES: A STUDY ON SELECTED HUMANITARIAN ORGANIZATIONS IN ETHIOPIA

BY

TIMIHIRT GETACHEW GASHAW

APPROVED BY BOARD OF EXAMINERS

MATIWOS ENSERMU (PhD)	**----------**
Advisor	**Signature & Date**
----------	**----------**
External Examiner	**Signature & Date**
----------	**----------**
Internal Examiner	**Signature & Date**

DECLARATION

I, Timihirt Getachew, declare that this thesis, "Factors Affecting Last-Mile Delivery Of Emergency Responses: A Study On Selected Humanitarian Organizations In Ethiopia," is my original work, prepared under the guidance of Matiwos Ensermu(Ph.D.) All sources of materials used for this thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or full to any other higher learning institution to earn any degree.

TIMIHIRT GETACHEW GASHAW

Name	Signature
Addis Ababa University	June 2024

Certification by Advisor

This thesis entitled "**Factors Affecting Last-Mile Delivery of Emergency Responses: A Study On Selected Humanitarian Organizations In Ethiopia has been submitted to Addis Ababa University, School of Commerce** for examination with my approval as a university advisor.

MATIWOS ENSERMU(Ph.D.)

Advisor	Signature
Addis Ababa University	June 2024

ACKNOWLEDGEMENT

First and foremost, I would like to give my glory and praise to the Almighty God for His invaluable care and support throughout my life. He helped me from the inception of my education to its completion and enabled me to achieve my career.

Conducting a thesis on a specific subject during my postgraduate studies proved to be a valuable and enriching learning experience. Completing this research marks a new beginning and a significant step towards my future academic and career development. This preface provides an excellent opportunity to acknowledge the assistance and contributions of those whose intellectual insights and constructive criticism have shaped this preliminary research.

Firstly, I would like to express my deepest gratitude to my advisor, Dr. Matiwos Ensermu, for his guidance throughout the process.

Secondly, I wish to extend my sincere thanks to the staff of various government, local, and international organizations engaged in humanitarian aid services in Ethiopia. Their unwavering assistance in providing me with the necessary information has been invaluable. I also wish to express my gratitude to the respondents at the case companies who generously took the time to provide their responses without hesitation.

Lastly, I would like to seize this golden opportunity to express my deepest thanks to my dear family and life Partner. Their love, affection, and support have been my guiding light at every step of my life, especially during this crucial phase of my education. Their belief in me has been a constant source of strength and motivation.

Ms. Timihirt Getachew Gashaw

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATION AND ACRONYMS

ANOVA	Analysis of Variance
ERC	Emergency Response Coordinator
GLC	Global Logistics Cluster
HRR	Humanitarian Response Review
ICT	Information Communications Technology
IDPs	Internally Displaced Persons
IGOs	Intergovernmental Organizations
INGOs	International Non-governmental Organizations
NGOs	Nongovernmental Organizations
SD	Standard Deviation
WFP	World Food Program

ABSTRACT

This study sought to examine factors affecting the last-mile delivery of emergency responses in the case of selected humanitarian organizations based in Ethiopia. An explanatory research design with a quantitative approach was applied to address the objective. The employees of governmental, international, and local non-governmental aid organizations were considered the study population. The survey was conducted on a total of 192 respondents comprising executive directors, program officers, project managers, supply managers, and logistics coordinators. These sample respondents were selected using a mixed sampling technique, a combination of judgment, and stratified random sampling methods. The primary data were collected by a self-administered standardized questionnaire and analyzed using a multiple linear regression model with the help of SPSS 22.0. Both descriptive and inferential statistics were applied to interpret the findings. The results show that all five factors are institutional competency, government policy, socio-cultural orientation, infrastructural facility, and stakeholder accountability. The result revealed that the five factors positively and significantly contribute to the effectiveness of the last-mile delivery operation in distressed areas in Ethiopia. More specifically, accessibility of infrastructural facilities followed by flexibility of government (both federal and regional state governments) policy and competency of aid institutions had the highest effect. While the accountability of stakeholders shows relatively moderate influence, the diversity of beneficiaries' socio-cultural orientation has the least effect on last-mile delivery. Despite last-mile delivery of emergency responses at prone areas being subjected to multifaceted issues, institutional competency, government policy, socio-cultural orientation, infrastructural facility, and stakeholder accountability factors are good predictors. It is important for humanitarian aid organizations to invest in improving transportation networks, warehousing facilities, and communication systems while the government strives to create a conducive regulatory environment that supports them in their relief operation.

Key words: Accountability, Competency, Cultural, Infrastructural, Logistics, Last-Mile Delivery

CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

Disasters have always had grave impacts on people and their surroundings. To deal with natural or human-made disasters, humanitarian logistics plays significant role on the efficacy of emergency response and relief activities. Humanitarian logistics involves a range of activities such as preparedness, planning, procurement, storage, and transportation, of either relief items or information, from the source to the destination, with the aim of alleviating the pain of vulnerable people. In most situations, as per a United Nations report (2019), logistics makes up about 75 percent of the disaster relief program and thus it is the most vital way to accomplish the goals of humanitarian relief through smooth, efficient, and effective logistics coordination. However, many of the emergency responses fail during the final stage of delivering relief items, often the most difficult and expensive part of the humanitarian logistics process.

Emergency relief operations as the processes of providing and delivering adequate relief supplies to the people who are affected by a disaster in a timely manner (Mentzer and Konrad, 2019). It also helps to restore the basic functions and services of the society by creating the conditions for recovery and reconstruction as a disaster damages the infrastructure and disrupts or reduces the supply of essential items for survival. Consequently, the victims are forced to leave their homes because they are unsafe or inaccessible and the ability of getting food, medicine, hygiene and sanitary items are also affected as well (Hemalatha, 2017). Thus, emergency response is crucial as it may reduce the mortality and morbidity rate of the disaster, alleviate the physical and psychological suffering of the affected people, and prevent the escalation or spread of the disaster as well. Despite inclusive global attention, huge financial budgetary and high caliber human resources, responses of humanitarian aid organizations are often characterized by delays in emergency responses (Swiss, 2016).

Studies show that the effectiveness of disaster relief operations relies on the robustness of the humanitarian logistics system. For instance, Thomas and Kopczak (2019) argue that emergency logistics, which make up about 80% of the total spending in disaster relief operations, are more complex and different from commercial logistics in aspects such as demand, transportation, storage, and performance evaluation. In support of this argument, Ertem and Rossetti (2020) conclude that, unlike commercial logistics, demand of relief aid is uncertain and variable due to the inherent unpredictability; and the level of storage and transportation resources are hard to estimate. Sheu (2017) states that information scarcity is a major challenge for emergency logistics managers; and performance assessment is also a problem as the main goal is to meet the needs of the disaster victims

in the shortest possible time. This indicates that the difficulty in reaching the last stage of the disaster areas make it harder to determine the demand of emergency relief responses (Beamon, 2018).

Last mile delivery is a critical component of humanitarian logistics, playing a pivotal role in ensuring that aid is distributed fairly and reaches the most vulnerable populations efficiently and effectively. In many cases, survivors in distress lose their lives due to lack of in time delivery of emergency responses. For instance, The UN World Food Program report (2018) shows that the Asian Tsunami in 2005 caused hundreds of thousands of deaths due to the unpredictability of natural disasters and the lack of effective logistics delivery. Likewise, compared to the causality caused by the earthquakes in Pakistan and Haiti, the bottlenecks to distribute food and other aid items resulted in severe casualties among the citizens. Same vein, the humanitarian assistance in Darfur, the South Sudan's civil war, was literally adequate but lack of coordination and accountability among the international, national, regional, and local aid organizations at last mile delivery costed hundred thousand of survivors (Hemalatha, 2017). The humanitarian logistics in Ethiopia is not far from these facts.

Ethiopia's humanitarian logistics landscape is deeply influenced by its history of enduring both natural and man-made disasters. Emergencies including droughts, floods and locusts are critical impediments that precipitate severe food scarcities, leading to widespread malnutrition and a lack of essential micronutrients. On top of natural catastrophes, the nation has grappled with repercussions of civil unrest, ethnic strife, and political volatility for over a century (Samuel, 2022). In response, numerous aid organizations have stepped in to alleviate the detrimental effects of these calamities. Prominent international bodies such as the World Health Organization, the World Food Programme, and the United Nations High Commissioner for Refugees have established comprehensive protocols to evaluate, calculate, and track the emergency food and nutritional requirements of affected populations (Ertem and Rossetti, 2020). Specifically, the UN Children's Fund is dedicated to averting fatalities due to hunger and illness, diminishing the rates of malnutrition, and safeguarding the fundamental human right to adequate food and nutrition.

Nonetheless, failure at the last mile delivery is more pronounced in emergency response inefficiency characterized by poor strategic approach and mere concentration on "fire-fighting" responses after the crisis (Osman, 2021; Zaid, 2019). These days, it's become a common phenomenon to see relief items on near-by markets before reaching the beneficiaries, implying the failure of accountability at the last-mile delivery of the emergency responses. Samuel (2022) argues that the process of logistics operation at last-mile should be well-designed and strategically addressed so as to affirm the effective and efficient delivery of the humanitarian responses in time. The humanitarian logistics is widely perceived to be variable depending on the nature of the disaster, social, economic and political

orientation of the nation. Thus, the main question is what factors do affect the last mile delivery of the relief aid in the context of the geographic location and cultural orientation of the disaster areas.

The trends in emergency food requirements and the role of last mile humanitarian logistics in Ethiopia are significant topics, especially considering the country's challenges with food security. This study, thus, focuses on examining the factors affecting the performance of the last mile humanitarian logistics delivery based on the perception of active humanitarian aid organizations in Ethiopia. The opinion of the logisticians and other concerned staff will be collected to thoroughly understand the determinant factors that aggravate the failure of aid organizations in supplying the relief items at the last point of delivery. Having the holistic view of the factors affecting the final stage of delivery practices provides an analytical framework to assist relief decision-makers in making effective and efficient distribution decision minimizes the survivors' suffering and mortality.

1.2. Statement of the Problem

The Last Mile Humanitarian Logistics Delivery is a critical component of the overall humanitarian supply chain, responsible for the final stage of delivering aid and relief supplies to the intended beneficiaries. Last-mile delivery refers to the final stage of a humanitarian relief chain. It involves the delivery of relief supplies from local distribution centers to beneficiaries affected by disasters (Robert, 2022). This critical phase ensures that essential aid reaches the people most in need, especially those living in remote or isolated areas. However, it is subjected to multifaceted and complex factors that influence the performance of this vital stage of the logistics process, often varying based on the unique context and circumstances of the affected region.

At the global level, the performance of last -mile delivery is influenced by several factors, including infrastructure, political stability, and funding. Firstly, the availability and quality of transportation infrastructure, such as roads, bridges, and ports, can significantly impact the efficiency and timeliness of last-mile delivery (Wassenhove, 2016; Diehlmann 2021). In regions with poorly maintained or underdeveloped infrastructure, humanitarian organizations may face logistical hurdles, leading to delays and increased costs. political stability and security also play a crucial role in the performance of last-mile delivery. Effective coordination with local authorities and military/security forces can be essential in navigating such complex environments (World Health Organizations report (2023). Moreover, the availability and allocation of funding for humanitarian aid and logistics operations can also influence the delivery. Insufficient or inconsistent funding can hinder the procurement of necessary resources, such as transportation, storage facilities, and skilled personnel, ultimately impacting the overall efficiency and reach of last-mile delivery (Sharma, 2022).

In the African context, the performance of last-mile humanitarian delivery is further compounded by the diverse geographical, economic, and sociopolitical landscapes across the continent. One of the primary factors affecting last-mile humanitarian delivery in Africa is the vast and often dispersed populations, with many communities residing in remote or hard-to-reach areas. This geographical challenge can necessitate the use of specialized transportation modes, such as off-road vehicles, boats, or even air transport, which can be resource-intensive and logistically complex (Hemalatha, 2017; Zaid, 2019). Additionally, the variable levels of infrastructure development across the African continent can create significant disparities in the accessibility and reliability of last-mile delivery. Lack of paved roads, reliable electricity, or adequate storage facilities, posing additional barriers to effective last-mile humanitarian delivery (Osman, 2021). Factors such as poverty, corruption, and political instability can hinder the smooth coordination and implementation of logistics operations, potentially leading to delays, inefficiencies, or even the diversion of aid resources.

Like many developing nations, Ethiopia faces a complex and pressing emergency situation, exacerbated by various crises affecting millions of its populace. For instance, according to the World Health Organizations report (2023), the conflict in northern Ethiopia, displacement of over 2.7 million individuals, food insecurity, human rights violations, and access constraints, alongside drought in the southern and southeastern regions impacting over 7.5 million people, underscores the urgent need for comprehensive relief aid. Moreover, climate change-induced challenges, such as crop damage and threats to food security, further amplify the need for robust aid delivery mechanisms. Nonetheless, the uncertainties in emergency logistics coupled with the lack of coordination among stakeholders pose challenges to effective relief operations in the country.

The existing literature on humanitarian logistics, predominantly rooted in Western contexts, may not fully address the complexities of delivering aid in a developing and underdeveloped country like Ethiopia (Getaneh, 2019; Samuel, 2022; Solomon, 2022). For instance, Wassenhove (2016) claims that geographical terrain, characterized by mountainous landscapes and deficient Besides, since many surveys were conducted to assess the challenges of humanitarian logistics, more of qualitative data were used for analysis which has limitations in examining the relationship among factors affecting last mile delivery. road infrastructure, poses significant obstacles to delivering aid to remote communities. Diehlmann (2021) also concludes that limited access to critical infrastructure like basic amenities, information technology and communication networks exacerbate coordination challenges among stakeholders. The existence of significant gaps in understanding and practice in the realm of last-mile delivery in Ethiopian context results in inefficient humanitarian emergency responses. That means, the lack of comprehensive frameworks tailored to the country's unique contextual factors,

such as political, sociocultural, economic, and infrastructural challenges hamper effective emergency aid delivery in time at the right place for the right beneficiaries.

The aim of this study is, thus, to investigate factors affecting the performance of last mile humanitarian logistics provided by different stakeholders. The last-mile delivery of humanitarian aid in Ethiopia is a complex and multifaceted issue that requires a thorough understanding of the factors at play. Filling these gaps with more comprehensive research, the study could contribute to the development of effective strategies for overcoming the challenges of delivering aid to the most remote and vulnerable populations of the country. Thus, a framework integrating these factors in a holistic approach is crucial for a nuanced understanding of which factor is more affecting the last-mile aid delivery.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of the study is to identify factors affecting the last-mile delivery of emergency responses: a study of selected humanitarian aid organizations in Ethiopia.

1.3.2. Specific Objectives

1. To assess the effect of institutional competency of humanitarian aid organizations on their last-mile emergency response.
2. To analyze the effect of government policy on the operation of last-mile delivery by humanitarian aid organizations.
3. To examine to what extent the socio-cultural orientation of the survivors affects the last-mile delivery of emergency responses.
4. To evaluate the effect of infrastructure on last-mile delivery of emergency response.
5. To determine the effect of stakeholders' accountability on the last-mile delivery of the emergency response.

1.4. Significance of the Study

This research aims to provide essential information and expertise on the factors that influence the performance of last-mile humanitarian logistics. The output of this study would have various benefits. It will add to the existing literature on the controversy about the perception of the last-mile delivery performance of humanitarian organizations. It is important to note that not all humanitarian organizations and other concerned stakeholders are well-informed about the complexity of last-mile delivery in the humanitarian logistics process. By identifying the factors affecting last-mile delivery

and their impact on the efficiency of the humanitarian logistics service, this study would provide adequate knowledge and understanding to reduce unnecessary costs and operational duplication. The outcome of this study would also be a valuable effort to benefit society as a whole by identifying the challenges faced during humanitarian coordination to save lives and reduce suffering. Furthermore, the empirical evidence would also assist the actors of aid assistance in Ethiopia by raising awareness about the factors affecting effective implementation of last mile aid responses. This would help identify the areas for improvement and formulate action plans to achieve their respective objectives. Finally, it would also serve as a future reference for scholars and researchers on similar topics.

1.5. Scope of the Study

The ever-escalating frequency of disasters and their adverse consequences on the lives of millions has led to increased concern in last-mile delivery of humanitarian logistic operation management, particularly in Ethiopia. This study examined the factors affecting the last-mile delivery of emergency responses by taking selected humanitarian aid organizations and the Disaster Risk Management Commission - DRMC from the government into account. It also examined the last-mile delivery of humanitarian logistics in terms of institutional competency, government policy, socio-cultural orientation, infrastructural facility, and stakeholder accountability. The empirical study in this research was based on the opinions of professional employees and logisticians from governmental, international, and local non-governmental organizations in Ethiopia. Despite different types of humanitarian aid, the organizations involved in the provision of food aid and non-food items (such as clothes, hygiene kits, cooking equipment, blankets, and tents) were considered. The perception of the respondents regarding the performance of the last mile delivery was collected through self-administered questionnaires. The data collection took place within the period of March – April 2024.

1.6. Definition of Key Terms

The definitions of key terms in this study are presented as:

Humanitarian Aid - Humanitarian aid is the assistance provided to people who are affected by crises, such as conflicts, natural disasters, or displacement. For this study, only food aid and non-food items aid are considered. (Osman, 2021, p. 28).

Institutional Competency: The ability of an institution to perform its functions effectively and efficiently, and to adapt to changing circumstances and challenges. (Zaid, 2019, p. 91).

Government Policy - The set of decisions, actions, and directives that a government makes and implements to achieve its goals and objectives regarding humanitarian aid. (Robert, 2022, p. 107).

Stakeholder Accountability - The extent to which stakeholders, such as governments, NGOs, donors, beneficiaries, and others, are responsible for and transparent about their actions, decisions, and outcomes. (Wassenhove, 2016, p. 138)

Socio-cultural Orientation - The degree to which a person or a group is influenced by the social and cultural norms, values, beliefs, and practices of their society or community. (Diehlmann, 2021, p. 53)

Infrastructural Facility - The quality and availability of roads, bridges, ports, airports, warehouses, and communication networks that can influence the accessibility, speed, and cost of the humanitarian delivery. (Sharma, 2022, p. 111)

Last Mile Delivery - The last mile delivery of humanitarian relief items is a critical and challenging process that involves transporting goods from the nearest distribution point to the final beneficiaries in disaster-affected areas. (Wassenhove, 2016, p. 145)

1.7. Organization of the Study

This research report comprises five chapters. Chapter One consists of an introduction that includes a background of the study, a statement of the problem, objectives, research questions, hypothesis, significance of the study, definition of terms, limitations, and scope of the study. Chapter Two consists of a Review of Related Literature, Chapter Three refers to methodology which includes description of the study area, research design and strategy, method of data collection, sampling design, data collection instruments, and method of data analysis. Chapter Four shows data analysis and interpretation and Chapter Five which is the last chapter consists of a summary of the major findings, conclusions, and recommendations drawn based on the conclusions of the study.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

The related literature review provides a comprehensive review of theoretical literature, empirical research, and a conceptual framework that aligns with the study's objectives. It offers an in-depth analysis of the literature on last-mile delivery and the potential factors affecting its effectiveness in the humanitarian logistics process. This chapter comprises a review of theoretical, empirical studies, and the conceptual framework of the study. The theoretical literature review includes theories and concepts pertaining to logistics, last-mile logistics, and the identification of factors that impact the performance of last-mile humanitarian logistics responses. Empirical studies are also included to either corroborate or challenge the findings of previous applied research concerning factors that influence last-mile humanitarian logistics. Lastly, a conceptual framework is introduced to illustrate the relationship between the identified factors and the practices of last-mile logistics.

2.1. Theoretical Literature Review

2.1.1. Logistics

The term logistics describes the total process of managing the acquisition, storage, and delivery of resources to their intended location (Robert, 2020). A resource or input must be available in the necessary quantity and timing, transported to the relevant place in good shape, and delivered to the proper internal or external customer. This is the essence of logistics management. Choosing potential distributors/ suppliers and evaluating their efficiency and accessibility are all part of logistics management. The term logistics is used to describe logistics managers. The term was originally coined by the military to describe the methods used by military personnel to acquire, store, and transport equipment and supplies. It is increasingly frequently used in the corporate world, especially by organizations in the industrial sectors, to describe the management and movement of resources along the supply chain.

2.1.2. Humanitarian Logistics

Humanitarian relief logistics is defined 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 in order to alleviate the suffering of vulnerable people" (Thomas, 2020). Indeed, logistics serves as a link between disaster planning and response; as a result, humanitarian logistics is critical to the effectiveness and timeliness of reaction for large-scale humanitarian operations.

Giving vital relief to individuals in need without making any distinctions is what humanitarian ideals define as humanitarian assistance (Wassenhove, 2016). They discriminate between military or ideological nature. Respecting the humanitarian tenets makes it easier for people to welcome you and helps you do your job as a humanitarian worker. Four guiding concepts are used to carry out humanitarian missions. Humanity, neutrality, fairness, and independence are these guiding values. Large-scale activity, variable demand, and peculiar restrictions characterize humanitarian logistics (Beamon, 2016). The issues can range from a lack of power to restricted transportation infrastructure, including a 'controlled' environment with some modest fluctuation (e.g., traffic congestion). Donors (i.e., supply) drive the majority of humanitarian groups, and aid recipients have no choice; hence, 'real demand' does not exist in humanitarian logistics (Kovacs, 2019).

Most of the vital supplies that arrive at the disaster site in the early stages of the deployment phase come from an organization's global pre-positioned inventories (Beamon, 2018). One justification for pre-purchasing the supplies is cost, as they can do so at a fair price. When a calamity strikes, demand surges rapidly, prompting suppliers to boost prices. To respond swiftly, relief organizations modify their advanced buying strategy and stock up in prepositioned warehouses (Beamon, 2018).

2.1.3. "Last Mile" Delivery of Humanitarian Logistics

Last-mile humanitarian logistics refers to the final step of the delivery process in humanitarian aid, where goods are transported from a distribution hub to the end recipients, often located in remote or hard-to-reach areas (Humanitarian Logistics Association, 2022). This is a critical aspect of humanitarian logistics, as it directly impacts the effectiveness and efficiency of aid delivery. Supply chain planning is critical for last-mile delivery. One of the key organizational challenges today is to get vital pharmaceutical supplies to hard-to-reach communities. This so-called 'last mile' logistics for temperature-sensitive products, like vaccines and reagents, calls for even more critical planning to ensure an unbroken cold chain. Planning, communication, and orchestrating the supply chain at each node delivers efficiency and cost savings, especially when considering last-mile delivery.

The objective of a humanitarian aid chain is to promptly distribute the proper emergency supplies to individuals affected by natural and manmade disasters to reduce human suffering and death. Similar to commercial supply chains, goods pass through the relief chain via a series of long-haul and short-haul shipments. The distribution mechanism utilized in humanitarian aid operations may vary depending on the specific situation. Emergency supplies for a typical disaster relief effort involving international actors are distributed to a major hub after arriving from various areas throughout the world (Haghani, 2019). Supplies are then transported to a secondary hub (big, permanent warehouses in major cities), where they are kept, sorted, and moved to tertiary hubs (local and temporary

distribution facilities). Finally, LDCs deliver relief supplies to beneficiaries. In this study, last mile logistic is considered.

The socio-cultural orientation of the recipients, institutional competency to manage logistics, governmental policies and procedures to support and facilitate relief aid, availability and accessibility of infrastructure, and stakeholder accountability are all necessary for the effective management of the inflow and outflow of relief materials (Angelis, 2017). Similarly, the effectiveness of handling relief materials is influenced by a number of factors, which also affect how quickly and efficiently the materials are distributed to the afflicted people. As a result, it is evident that these decision-making variables are connected to one another sequentially.

2.1.4. Measure of Last Mile Logistics

The "Last Mile" delivery in humanitarian logistics is an essential stage in providing aid to those in need. This final stage involves the transportation of relief supplies from distribution centers to the individuals or communities requiring assistance. The effectiveness of this process is crucial, as it directly impacts the overall success of humanitarian efforts.

One of the key factors influencing the effectiveness of the "Last Mile" delivery is speed and efficiency (Osman, 2021). A swift and efficient supply chain process can significantly reduce casualties and ensure that aid reaches those in need in a timely manner. Delays in the delivery of relief supplies can have dire consequences, exacerbating the suffering of affected individuals and potentially leading to loss of lives. Therefore, ensuring a timely and efficient delivery process is paramount in aid logistics.

Equitable distribution is another critical factor to consider in the "Last Mile" delivery process. Ensuring that aid is distributed fairly and evenly among affected individuals or communities is essential in preventing further harm and addressing the needs of the most vulnerable populations (Zaid, 2019). Inequities in distribution can lead to disputes, delays, and ultimately hinder the overall effectiveness of the humanitarian operation.

Effective inventory management is also key in ensuring the success of the "Last Mile" delivery. The ratio of inventory to daily consumption rates at dispensing sites, known as the slack, is a crucial decision criterion that can impact the availability of relief supplies (Wassenhove, 2016). Objectives such as maximizing safety stock levels or minimizing stock-outs can help optimize inventory management and ensure that aid is readily available when needed.

Logistics practices play a significant role in the last-mile delivery process. Many humanitarian organizations adopt various practices such as partnering with other organizations, outsourcing key logistics processes, and implementing best practices to enhance efficiency and effectiveness. These

practices can help streamline the delivery process and improve the overall outcome of humanitarian operations (Diehlmann, 2021).

Developing a logistical framework can further enhance the effectiveness of the "Last Mile" delivery in humanitarian logistics (Sharma, 2022). By identifying and categorizing the factors that influence the delivery process, organizations can create an optimization model to improve efficiency and effectiveness. This framework can help measure the success of the delivery process and identify areas for improvement.

In conclusion, by considering factors such as speed and efficiency, equitable distribution, inventory management, logistics practices, and implementing a logistical framework, the effectiveness of the "Last Mile" delivery in humanitarian logistics can be measured and improved. It is crucial to tailor these strategies to the specific context and nature of the humanitarian operation to ensure the successful delivery of aid to those in need.

2.2. Theoretical Framework

For this study, the theoretical review looks into three theories namely Transaction Cost Theory, Resource Based Theory and Relief Coordination Theory in relation to humanitarian logistics. These three theories are briefly discussed as follows.

2.2.1. Transaction Cost Theory

Transaction Cost Theory, generally recognized as a valuable framework for examining transport and outsourcing decisions, was developed by Hobbs in 1996. The theory suggests that outsourcing logistics can reduce transaction costs, such as decentralized order processing, working capital, assets, and overhead. The application of Transaction Cost Theory supports the formation of alliances between organizations and their service providers (Iyer, 2011). It's worth noting that an organization's resource profile tends to influence the degree to which parts or all of the logistics process are outsourced, as discussed by Browne (2011) in the context of information technology outsourcing from a supply's perspective. In application, a higher asset specificity favors the decision for hierarchy. The total transaction costs can serve as an indicator for the outsourcing decision (Wang, 2017). When asset specificity and uncertainty are low, and transactions are relatively frequent, transactions will be governed by market outsourcing. High asset specificity and uncertainty lead to transactional difficulties, with transactions being held internally within the firm - vertical integration.

The theory can be applied to the Last Mile Delivery (LMD) of humanitarian logistics to understand and manage the costs associated with the delivery of aid to the final recipients. In the context of humanitarian logistics, transaction costs can include the costs of searching for and selecting logistics

providers, negotiating and enforcing contracts, and monitoring performance. These costs can be significant, especially in disaster response scenarios where time is critical, and the logistics environment is complex and uncertain (Pettit and Beresford, 2015). Humanitarian organizations might decide to manage certain logistics activities in-house if the transaction costs associated with outsourcing are too high. This could be the case if there is a lack of reliable logistics providers in the disaster-affected area, or if the costs of negotiating and enforcing contracts with external providers are prohibitive (Dewsnap and Hart, 2014). On the other hand, outsourcing LMD to external providers might be more cost-effective if these providers have specialized knowledge, equipment, or networks that the aid organization lacks (Wang, 2017). In this case, the transaction costs of outsourcing might be offset by the potential gains in efficiency and effectiveness. Therefore, this theory can provide valuable insights for humanitarian organizations in making strategic decisions about LMD, helping them to balance the trade-offs between the costs and benefits of different logistics options.

2.2.2. Resource-Based View Theory

The Resource-Based View (RBV) theory posits that organizations can gain a competitive advantage by leveraging their unique resources and capabilities (). Resources in this theory refer to both physical or tangible assets such as plants and equipment, as well as intangible assets such as knowledge, expertise, and other organizational assets (Barney, 2011). In keeping with this, having shared ownership of or access to distinctive or expensive assets such as transportation, technologies, and resource barriers might result in a competitive advantage. These resources can provide organizations with a competitive advantage in their operations by combining such resources and capabilities in a way that forms the core competencies of each specific organization.

Humanitarian organizations often possess unique resources such as specialized knowledge, equipment, or relationships that can be leveraged to enhance the efficiency and effectiveness of LMD. For example, an organization with specialized knowledge in a specific region or type of disaster might be able to more effectively and efficiently deliver aid in those situations (). The theory also emphasizes the importance of capabilities, which are the organization's ability to deploy resources effectively. In the context of LMD, capabilities might include logistics management skills, coordination abilities, or technological competencies. For instance, an organization that has developed strong capabilities in using modern technologies for logistics (such as GPS tracking or drones) might be able to improve the efficiency of its LMD operations (). Moreover, for resources and capabilities to provide a sustainable emergency response, they should have valuable human resources. In the context of LMD, this might mean developing logistics practices or technologies that are led by efficient and talented staff.

According to Zacharia (2011), Resource-Based Theory is crucial to many organizations due to their proficiency in their operations and the fact that investing in it might be costly. This is due to the fact that competency is a source of long-term competitive advantage that organizations can have, and its realization is dependent on the practicability of utilizing resources that a company must achieve efficiency and effectiveness by utilizing even resources that it does not own. As a result, the organizations have turned to outsourcing to acquire access to other firms' important resources in a competitive market. As the demand for such resources grows, humanitarian groups seeking and delivering such services become more mutually adaptable and value-reliant. According to the theory, coordination allows enterprises to access complementary resources and form considerably more competitive resource bundles, giving them a competitive edge (Zacharia, 2011). In conclusion, the RBV theory provides a useful framework for understanding how humanitarian organizations can leverage their unique resources and capabilities to improve the efficiency and effectiveness of LMD in humanitarian logistics.

2.2.3. Relief Coordination Theory

Coordination Theory advocates recognizing the relationships between the activities performed by different group members and the coordination mechanisms used by the group to coordinate their work, and then examining alternate mechanisms. Coordination among all players participating in humanitarian assistance delivery is a critical component of ensuring the most efficient, cost-effective, and successful operations possible (Aboah, 2018). According to relief coordination theory, it is feasible to organize the efforts of many organizations and the orderly and organized direction of actions (Seybolt, 2017). A more specific and frequently cited definition of humanitarianism is: managing information; mobilizing resources and ensuring accountability; organizing a functional division of labor in the field; negotiating and maintaining a serviceable framework with host political authorities; and providing leadership (Minear, 2012).

The efficacy of logistics operations is critical to the success of any relief effort. Scholars frequently emphasize that coordination is necessary to improve the effectiveness of service delivery. Indeed, while efficacy is rarely defined, it is frequently cited as a reason why developing cooperation among service providers is critical (Minear, 2012). An endeavor to avoid redundancy, sometimes portrayed as securing or improving organizational efficiency, is also regularly provided as justification for humanitarian groups seeking to coordinate their assistance efforts.

In conclusion, in the realm of humanitarian logistics, Transaction Cost Theory, Resource Based Theory, and Relief Coordination Theory play vital roles in understanding the complexities of delivering aid to those in need. Each theory offers unique insights into the challenges faced in the last

mile delivery process. Nonetheless, among these three theories, Relief Coordination Theory serves as the basis for last mile delivery in humanitarian logistics. This theory emphasizes the importance of collaboration and coordination between various actors involved in relief efforts, such as government agencies, non-profit organizations, and local communities. By working together, these entities can overcome logistical challenges and ensure that aid reaches its intended recipients in a timely and efficient manner. This theory also highlights the need for effective communication and information sharing among stakeholders to facilitate the smooth implementation of last mile delivery. By leveraging the resources and expertise of all parties involved, aid organizations can optimize their operations and maximize the impact of their efforts. It stands out as the key theory that underpins the success of last mile delivery. By prioritizing coordination and collaboration, relief organizations can navigate the complexities of delivering aid to those in need and make a meaningful impact on the lives of vulnerable populations.

2.3. Empirical Literature Review

Relief organizations encounter numerous challenges in ensuring the seamless execution of relief logistics. The creation of an effective pre-positioning plan and response implementation is complicated by uncertainties surrounding the occurrence, location, and magnitude of natural disasters (Simon, 2019). The framework of humanitarian logistics and supply chain management, along with its associated components, is extensively utilized to scrutinize the implications of humanitarian logistics in general, and the last mile logistics approach in particular. Many norms that underpin this relatively novel approach to humanitarian aid mirror key elements of efficient frameworks for the effectiveness of humanitarian logistics. However, the performance or effectiveness of humanitarian emergency responses is influenced by a variety of factors. This study considers five major factors related to humanitarian institutions, governmental policies, socio-cultural orientation, infrastructural facilities, and stakeholder flexibility.

A review of related literature reveals that several researches have been conducted in developing countries regarding the factors affecting last mile of humanitarian logistics. Nonetheless, their applicability in developing countries like in Ethiopia has yet to be investigated. Thus, it is undeniable the necessity of conducting or investigating the factors affecting the last mile humanitarian operation in Ethiopian context.

2.3.1. The effect of institutional competence on last mile humanitarian logistics

Anthony (2016) studied factors affecting humanitarian supply chain management performance of international non-governmental organizations in Kenya. Explanatory research design was adopted to investigate the factors affecting last mile humanitarian logistics. The study was conducted on a total of 217 sample respondents (staff) from selected International NGOs. The results of the findings showed that staff competence, team work and organizational capability determine the effectiveness of humanitarian logistics responses. The author concludes the institutional capability/ capacity plays significant role on the enhancement of the last mile logistics effectiveness. Having well defined organizational policies and procedures with talented human resource can make a difference in efficiently and effectively responding to the emergency relief aids during and after disasters.

Jane (2018) studied the factors affecting preparedness and coordination of humanitarian aid organizations in Pakistan. The study adopted both descriptive and explanatory research designs. A sample of 338 staff from selected local and international NGOs was participated in the survey. The results revealed that organizations with competent staff, well-developed structure, logistics policies and procedures had better performance in addressing sufficient emergency aids in time. Adopting quality communication and information system and equipment made the emergency response preparedness of the last mile humanitarian logistics. Without skilled human resources, well designed and implemented policies and procedures, humanitarian operations may suffer from inefficiencies, duplication of efforts, and confusion at the last mile.

Peter (2014) studied that the impact of supply chain management on the performance of humanitarian organizations in Uganda. The study was descriptive research design and employed the key performances indicators namely supply chain reliability, cost, preparedness, teamwork, collaboration, and timeliness along with improvement to measure the performance of humanitarian supply chain performance. The findings indicate that collaboration and teamwork foster knowledge sharing and learning, which can improve the performance and resilience of humanitarian supply chains. The findings further revealed that the humanitarian logistics does not include the capacity management process of field officers and local institutions as well as the identification process on situation and location of disaster affected.

Institutional factors are the conditions and formal and informal rules in the society that constrain behavior. They may stem from legislative, executive, or judicial actions, depend on administrative capabilities, informal norms, and social cohesion. They also reflect the efficiency of performance of governmental or non-governmental organizations, and influence the economic outcomes in the

markets. However, last mile humanitarian logistics has been neglected for a long time, leading to gaps in fulfilling logistics needs that affect the overall performance of the logistics chain. For example, last mile logisticians and concerned stakeholders are often excluded from planning, budgeting and decision-making activities that incur unforeseen logistics challenges and delays in delivering aid (Kovacs, 2019). However, Wassenhove (2016) argued that organizational factors like organization capacity, staff competence, communication technology adoption, teamwork and collaboration with other stakeholders are influential factors that determine efficiency of logistics. Based on these evidences, the following hypothesis is proposed:

H1a – Institutional competency has positive significant effect on last mile humanitarian logistics.

2.3.2. The effect of political/governmental policy on last-mile humanitarian logistics

Balcik (2017) studied the effectiveness of emergency responses by UN WFP through cluster approach. The survey was conducted on selected five countries which had experienced complex natural and man-made disasters. A descriptive research design with qualitative research approach was applied. The analyses revealed that many states impose regulations or limitations on the access, movement, or activities of humanitarian aid organizations, which can hamper their ability to deliver timely and effective assistance to the affected population. The study concluded that, in the humanitarian arena, thousands of donations are usually directed to the affected locations, however, the aid and relief processes are not always as effective as expected due to political interest of different stakeholders within and outside of the host country.

The study by Altay (2018) investigated the effectiveness of last mile logistics on humanitarian response responses by WFP in East Africa. A population of 415 local, governmental and non-governmental organizations was targeted for the survey, of which 571 sample staff were participated in the survey. Both descriptive and explanatory research designs were applied to examine the influence of last mile approach on humanitarian logistics responses. The findings revealed that achieving success, in managing humanitarian logistics and supply chains, depends on establishing effective communication, coordination and collaboration among the political leaders. However, it seems challenging to implement the logistics schemes as the supply and distribution chain is subjected to a number of stakeholders with different political interest. Furthermore, the author suggests that the peculiar nature of the humanitarian supply chains entails attaining the highest possible levels of collaboration and coordination between the different stakeholders (either political and civilian), to achieve greater effectiveness.

Wassenhove (2016) also conducted the role of political leaders on disaster risk management: in the case of Darfur's Civil War, South Sudan. An explanatory research design with quantitative research approach was applied to examine their influences on last mile humanitarian logistics. The study found out the complicated operating conditions, safety and security concerns, high staff turnover, uncertainty of demand and supply, time pressure, corruption and lack of coordination among large number of stakeholders in the politics adversely affected the effectiveness of the humanitarian responses. It recommends that partnership and collaboration between aid organizations and other international humanitarian actors should be stronger, especially as NGOs increasingly assume co-lead or co-facilitator roles.

Government factors are the external or situational factors that relate to the role and influence of the host government and its institutions on the relief operations. Government factors can have positive or negative effects on the performance of humanitarian logistics, depending on the type, quality, and efficiency of the government services and regulations. Some of the government factors that can affect humanitarian logistics are regime type, national policy, state efficiency, corruption level are some of the major characteristics of situational factors related to state of the host country. Support from the host government is the major factor in humanitarian operations. In fact, they are the activator of the supply chain. Without their authorization, other players like NGO's, neighbor countries' government etc. can't operate in the disaster region (Singh, 2018). Prior international agreement and good relations of the host government with the other countries helps at the time of disaster in the form of global humanitarian assistance. Based on these studies, the following hypothesis is proposed as:

H1b – Government policy has positive significant effect on last mile humanitarian logistics.

2.3.3. The effect of socio-cultural orientation on last mile humanitarian

Korpela (2016) studied the critical success factors of humanitarian logistics and supply chain management in Democratic Congo. The survey was conducted on 382 sample respondents from selected humanitarian aid organizations actively engaged in emergency responses. The findings revealed that the level of poverty and inequality in the affected area influenced the coping capacity of the population. The cultural and religious diversity and norms of the affected community, which may influence the preferences, expectations and acceptance of humanitarian assistance, as well as the potential for social cohesion or conflict.

A study conducted by Wolde (2019) on the practices, challenges and performance of humanitarian logistics management in Plan International Ethiopia. A descriptive research approach was conducted by collecting primary data from a total of 229 staff from Plan International through questionnaire and

interviews. The results of the findings identified four major risk elements that could generate challenges while operating in conflict zones. Among them, lack of accountability and transparency were the major bottlenecks for the effectiveness of the humanitarian response in the conflict regions due to cultural and religious imposition. It concluded that almost all humanitarian actors agreed that transparency and accountability improved through creating better understanding of the cluster among the members with different socio-economic status. That means, national and local actors, as well as newly arriving international actors, thus have a clearer point of contact.

Wassenhove (2016) also conducted a study on determinants of effective humanitarian logistics and supply chain management in the case of Bangladesh, Thailand. A mix of qualitative and quantitative research approach were applied. A population of 116 NGOs in Thailand participated in the survey, of which 414 staff were sampled to collect the primary data through questionnaire. The results revealed that the gap between humanitarian needs and the availability of resources is often unpredictable and fluctuate rapidly, making it difficult to plan and coordinate logistics activities.

Socio-cultural situational factors are the factors that relate to the social and cultural conditions and characteristics of the beneficiaries in the disaster area. It constitutes the level of development, poverty, education, health, culture, religion, language, etc. These factors can have influences on the performance of the last mile humanitarian logistics, depending on the degree of compatibility, cooperation, and communication between the humanitarian actors and the local stakeholders, such as the government, the beneficiaries, the suppliers, and the media as well (Nollet, 2021). Based on these arguments, the following hypothesis is proposed:

H1c – Socio-economic orientation has positive significant effect on last mile humanitarian logistics.

2.3.4. The effect of infrastructure (ICT) factors on last mile humanitarian logistics

Razzaque and Sheng (2014) studied a multi-objective logistics programming formulation that addresses facility location, resource allocation, and intermodal relief distribution considering effectiveness in humanitarian logistics. The survey uses a case study in Sinaloa, Mexico, to investigate the impact of intramodality measures on costs and shortage of relief for disaster victims. Both qualitative and quantitative research approaches were applied to examine the relationship between communication infrastructure and effectiveness of humanitarian logistics performance. The study identified a lack of organizing and leading logistics at the last mile due to domestic barriers/ difficulties like electricity, telecommunication and road infrastructure reaching affected populations adversely affected the effectiveness of the humanitarian response.

Thomas (2020) used a comprehensive literature survey to identify the factors affecting humanitarian supply chain management with regard to coordination of aid organizations' logistics activities. An explanatory research approach was conducted on a sample of 119 local NGOs in Haiti. The findings revealed that security, communication and infrastructure are the highest contributors to the effectiveness of emergency aid responses.

Kunz and Reiner (2019) also affirmed that an effective and timely humanitarian relief operation has the capacity to save thousands of lives. Planning, communication and leadership as well as performance monitoring against the standards were among the significant factors that affected the humanitarian response activities significantly. However, humanitarian logistics operates in such areas where difficult to reach under normal circumstances because roads and other necessary infrastructures are often inadequate.

Lack of infrastructure affects the coordination and collaboration among humanitarian actors, as it limits the information sharing, communication, and visibility of the supply chain. Thus, humanitarian organizations should adopt a contingency approach that considers the infrastructural constraints in the disaster areas and adapts their logistics strategies accordingly. This indicates that the performance of humanitarian logistics is hindered by the poor condition or lack of infrastructure in the disaster-affected areas. This includes roads, railways, airports, power supply, warehouses, and communication lines. Having a well-developed road network can improve the efficiency of logistical operations, while a bad road network can cause delays and disruptions in the delivery of relief items. Based on the above discussion, the following hypothesis is proposed:

H1d – Infrastructural facility has positive significant effect on last mile humanitarian logistics.

2.3.5. The effect of stakeholder flexibility on last mile humanitarian logistics

Solomon (2021) conducted a study on practices and challenges of humanitarian logistics management in Tigray, North Ethiopia in the case of management of pre-positioned warehouses in different regions of conflict. A descriptive research approach as applied to identify the challenges and existing practices of NGOs in conflict regions of Tigray. The findings revealed that inconsistency of fund raising due to lack of doner's flexibility hindered the effective supply of humanitarian aids to the victims. Based on the findings, the survey concluded that the lack of funding is a major challenge for humanitarian organizations, as it affects their ability to train and improve their logistics staff and operations.

Baldini's (2012) study on the influence of doner's characteristics and customized information systems on humanitarian response coordination in the case of Indian earthquake. Although information is one type of humanitarian supply chain flows, it combines the analyses of funds and information given

their close tie to each cluster involved. Guven and Ergen (2017) studied the impact of sufficiency and flexibility of doners on the effectiveness of last mile humanitarian logistics. The authors attempted to identify the local funding governmental and non-governmental agencies for effective aid responses after an earthquake in India. In depth interviews were conducted with managers and coordinators of selected 45 humanitarian aid organizations who participated in the rescue mission and coordination of humanitarian logistics.

The importance of humanitarian logistics as a central component of humanitarian response has become increasingly recognized by its accountability and transparency in recent years (Chaikin, 2013). Operationally, the constraints facing many of these actors are multiple and overlapping. They include donor demand/pressure for accountability and transparency, competition for scarce funding resources, marketization of the International NGO sector, high levels of staff turnover and low levels of institutional memory, and a lack of effective evaluation mechanisms. In these regards, these days, donors have become particularly influential in prompting humanitarian organizations to think in terms of greater donor accountability and transparency of the whole supply chain (Thomas, 2020). Based on this argument, the following hypothesis is proposed as:

H1e – Stakeholder accountability has positive significant effect on last mile humanitarian logistics.

2.4. Conceptual Framework of the Study

A conceptual framework is a tool that helps to clarify the main concepts, variables, and relationships of a study. It can be presented as a diagram, a table, or a narrative. Based on the related theoretical literature and empirical studies review, it can be summarized that factors related to last mile humanitarian logistics namely institutional, political, socio-cultural orientation, infrastructural facility and stakeholders' accountability have direct relationship with last mile of humanitarian responses. In this case, last mile delivery is measured in terms of speed/ efficiency, equitable distribution, inventory management, logistics practices and framework. Based on this understanding, the conceptual framework is set in such a way that factors related to last mile humanitarian logistics are considered independent variables, while the performance of last mile humanitarian response is the dependent variable. As depicted in Figure - 1, the arrows indicate the direct relationship of the five independent variables with the operation of last mile humanitarian logistics. It is adopted from the study by Nezih and Melissa (2019).

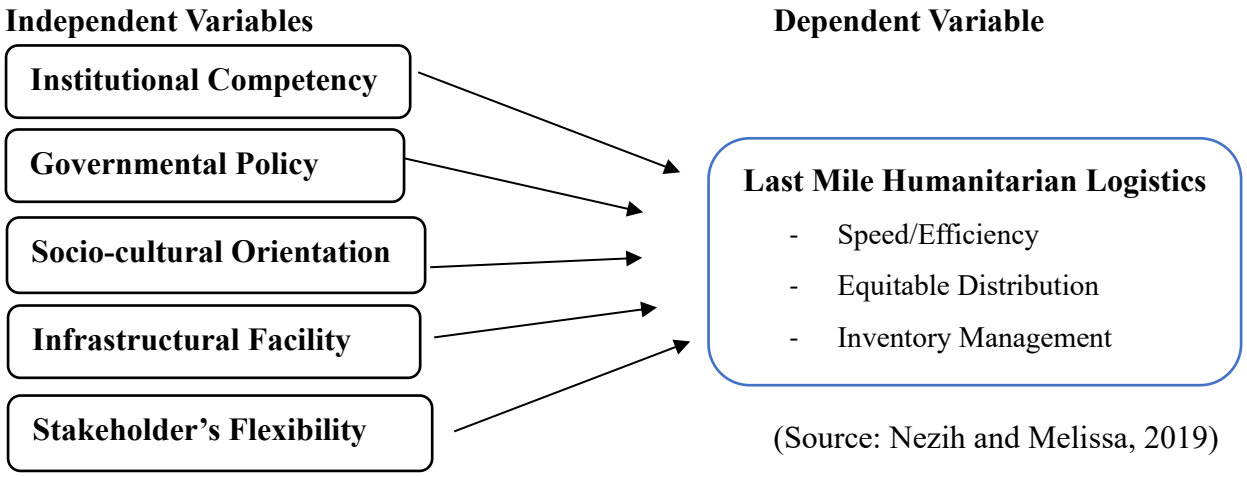


Figure 1: Conceptual Framework of the Study

2.5. Summary of Proposed Hypotheses

Based on the theoretical and empirical literature reviews, the proposed alternate hypotheses are summarized and presented as follows:

H1a – Institutional competency has positive significant effect on last mile humanitarian logistics.

H0 – Institutional competency doesn't have positive significant effect on last mile aid logistics.

H1b – Government policy has positive significant effect on last mile aid logistics.

H0 – Government policy doesn't have positive significant effect on last mile aid logistics.

H1c – Socio-economic orientation has positive significant effect on last mile aid logistics.

H0 – Socio-economic orientation doesn't have positive significant effect on last mile aid logistics.

H1d – Infrastructural facility has positive significant effect on last mile aid logistics.

H0 – Infrastructural facility doesn't have positive significant effect on last mile aid logistics.

H1e – Stakeholder accountability has positive significant effect on last mile aid logistics.

H0 – Stakeholder accountability doesn't have positive significant effect on last mile aid logistics.

CHAPTER THREE

RESEARCH METHODOLOGY

This study aims to investigate factors affecting the performance of last-mile delivery of emergency responses by taking selected humanitarian organizations in Ethiopia as a case. This chapter refers to the research methodology to be applied to achieve the stated objective. The methodological process followed to come up with a certain problem's solution is known as research methodology. The methodology used in this study outlines the steps that must be taken in order to gather the data, analyze the data to be collected, and then interpret and report the findings. In the sections that follow, the methodologies to have been used in this survey, are described.

3.1. Research Design

The aim of this study was to investigate factors affecting the performance of last mile delivery of emergency responses by humanitarian organizations. In light of this, the current research adopted an explanatory research design to test the proposed hypotheses (listed in chapter two) to examine whether they had significant relationships with last-mile humanitarian logistics operations. That means causal analysis is concerned with the study of how one or more variables affect changes in another variable (De Vaus, 2016). For this study, thus, the application of explanatory research design was appropriate as it tried to explain the cluster approach of humanitarian logistics response based on the identified factors, namely institutional competency, government policy, sociocultural orientation, infrastructural facility, and stakeholder accountability.

3.2. Research Approach

A research approach is a strategy of inquiry that provides a specific direction for procedure in a research design. Saunders (2016) classifies scientific research approaches into three, namely quantitative, qualitative, and mixed research. Among them, for this study, a quantitative research approach was adopted to address the research question raised and test hypotheses posited. The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to natural phenomena (Creswell, 2018). Thus, in this regard, the use of a quantitative approach to evaluate/measure the perception of humanitarian organizations employees regarding the factors affecting last-mile delivery and their effect on the effectiveness of the humanitarian responses was found to be appropriate. For the fact that quantitative research is the systematic and scientific investigation of quantitative phenomena along with their relationships.

3.3. Target Population

A population can be defined as the complete set of subjects that can be studied: people, objects, and organizations from which a sample may be obtained (Shao, 2019). The employees of humanitarian organizations, namely governmental organizations, international organizations, and local non-governmental organizations were considered the study population. These organizations were selected for the reason that they had enormous experiences in participating in different humanitarian aid projects implemented in both natural and man-made disaster areas. According to the United Nations Office for the Coordination of Humanitarian Affairs - UN-OCHA (2023) report, in the first half of 2023, 169 aid agencies in Ethiopia (9 UN agencies, 77 international NGOs, and 83 national NGOs) and selected Disaster Risk Management Commission – DRMC which together provided food assistance to 17.3 million people, and non-food assistance to 5.2 million people. Thus, a total of 170 humanitarian aid organizations were eligible to participate in this case study.

However, it is difficult to determine the precise number of employees actively working across these 170 humanitarian organizations, as there is limited publicly available data or research on the staffing levels of these groups. Additionally, different sources may utilize varying methods for counting personnel, further complicating the ability to pinpoint exact figures. Nonetheless, these organizations typically employ a range of job positions, including executive directors, program officers, project managers, logistics & supply managers, and logistics coordinators, among others.

Given the lack of comprehensive data, the participants for this study were purposefully selected based on the positions they held within the chosen humanitarian organizations. Specifically, staff members serving as executive directors, program officers, project managers, logistics & supply managers, and logistics coordinators were targeted for inclusion, as they were believed to possess more in-depth knowledge and direct experience regarding the performance of last-mile humanitarian logistics operations within their respective organizations.

Judgmentally, the research team selected 5 staff members from each of the 170 organizations to participate in the survey, under the assumption that these individuals would have the most relevant expertise on the topic. This resulted in a minimum sample size of 850 respondents (170 organizations x 5 participants per organization).

3.4. Sample Size

Sampling is the process of selecting a number of study units from a defined study population (Saunders, 2010). Determining sample size is very important issue because samples that are too large are uneconomical while too small samples may lead to inaccurate results. Here in this study, sampling

is required as the targeted population accounts for a total of 850 professionals from 170 humanitarian organizations, and since the size is substantially larger in number to conduct census, taking a representative sample respondent is more economical. Thus, a proportionate sample size is computed by using Yamane's proportionate sample size determination formula. The formula is:

$$n = \frac{N}{1+Ne^2} = \frac{(850)}{1+(850*0.05^2)} = 272 \text{ respondents.}$$

Thus, the study considered a sample of 272 respondents to participate in this survey. Their distribution based on organizational ownership structure is presented in Table 1.

Table 1: Distribution of Sample Respondents

Organization	Qty	Population (a)	Proportion (b = a/850	Calculated Sample Size (c = 272)	Sample Proportion (d = b * c)
Governmental (DRMC)	1	5	0.01	272	2
UN Agencies	9	45	0.05	272	14
International NGOs	77	385	0.45	272	123
National/Local NGOs	83	415	0.49	272	133
Total		**850**	**1.000**		**272**

(Source: UN-OCHA Database (2023) and Own Computation)

3.5. Sampling Technique

There are three sampling strategies in use to select the targeted respondents from the sample frame namely probability, non-probability and mixed sampling method (Creswell, 2010). The probability sampling applies a random (equal chance) selection, while the non-probability is subjective and relies on the researcher's decision or reasoning. Mixed sampling is a sampling method that comprises both probability and non-probability sampling methods.

In this study, a mixed sampling technique was adopted. First, a purposive (non-probability) sampling technique was applied to select 5 respondents (executive directors, program officers, project managers, logistics & supply managers, and logistics coordinator) from each organization. Second, in order to select a calculated sample size of 272 from 850 targeted respondents, proportional sample respondents from each stratum were selected to assure the representativeness of the sample. To do so, the list of all (850) staff from the targeted organizations was collected first. Then, the sample respondents were selected from each stratum proportionately by applying a stratified (probability)

sampling technique. This made probability sampling practical, and made it more appropriate to generalize the findings to the larger population.

3.6. Type of Data and Data Source

The process of data collection is integral to any research work and involves the accumulation of pertinent and significant data (Arbnor, 2014). This process forms the foundation for data procurement and can be bifurcated into two categories: primary and secondary data. Primary data encompasses all the data that is gathered during the research and has a direct correlation to the purpose of the study. Conversely, secondary data includes data that was initially collected for a different objective but is still valuable for the current study's purpose. However, in this context, the analysis of this study was merely based on primary data. Primary data is often considered highly reliable due to its objectivity and because it is sourced directly from the source. It also provides more current and up-to-date information about a research topic compared to secondary data (Saunders, 2010).

3.7. Data Collection Instrument

The questionnaire is used for the collection of primary data from targeted respondents. The questionnaire is one of the primary data-gathering survey instruments where respondents write answers to questions posed by the researcher on a question form. It helps to ask or address a number of respondents identical questions in order to gain data to be analyzed. The reason for selecting a questionnaire in this research is because it has the merit of giving adequate time for informants to respond. It is also economical and allows to easily approaching respondents (Wilkinson, 2003).

A structured questionnaire was prepared to collect the primary data. This questionnaire, which had definite, concrete, and pre-determined questions (Kombo, 2011), was presented with exactly the same wording and in the same order to all respondents. This standardization ensured that all respondents replied to the same set of questions. Thus, it was adopted from a previous similar study by Nezih and Melissa (2019) to collect data to address the objectives of this study.

The questionnaire had two parts. Part One referred to the personal information of the targeted respondents. Part Two included a total of 30 statements, of which 25 items were intended for measuring five factors affecting the performance of last mile humanitarian logistics in terms of institutional competency, governmental policy, socio-cultural orientation, infrastructural facility, and stakeholder’s accountability. Five statements were assigned for last mile humanitarian logistics. A 5-point Likert-scale based questionnaire was used as a major instrument of data collection. The questionnaire was used to convert the qualitative data to quantitative data by using a Likert scale that

ranged from 1 for "Strongly disagreed" to 5 for "strongly agreed". The Likert scale is a well-known measuring scale for categorical data (Saunders, 2010).

3.8. Validity Test

Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2004). That means, the precision of a methodology, procedure, or test is demonstrated by scale validity tests. To do so, a total of 30 questionnaires had been distributed to selected respondents who were eligible to participate in the pilot study. The test had been conducted on UN-WFP employees in Addis Ababa for the pilot test, and they were excluded from the primary study. As a result, the pilot data collected was used for validity and reliability testing. To guarantee content validity, the research advisor and other academics with experience in the field had reviewed and commented on the contents, their clarity, and their relevance to the subject. In the same vein, the contents, length, and clarity of the wordings were also discussed with the respondents. All necessary corrective measures were then taken to achieve an acceptable level of construct and content validity, even though the instrument had been recognized for its content and construct in previous studies. Therefore, the scale had been used in this study with minor modifications or adaptations to suit the context of the case study.

3.9. Reliability Test

Reliability is the extent to which the results can be reproduced when the research is repeated under the same conditions. According to Kothari (2004), a measuring instrument is reliable if it provides consistent results. A reliability calculation is employed to determine the mean reliability coefficient estimates for Cronbach's Alpha, with a significance level of $p \leq 0.05$.

Table 2: Results of the Reliability Test

Variables	**No. of Items**	**Cronbach's alpha Coefficients**
Institutional Competency	5	.755
Governmental Policy	5	.716
Socio-Cultural Orientation	5	.907
Infrastructural Facility	5	.913
Stakeholder Accountability	5	.830
Last-Mile Delivery	5	.792
Total Reliability	30	.888

(Source: Own Survey, 2024)

Utilizing the Cronbach Coefficient to assess the reliability of the tool allows for the evaluation of the robustness of items included in the questionnaire. A coefficient ranging from 0.7 to 1.0 indicates a high consistency of items used in the questionnaire. The data provided in Table 2 delineates the results of a reliability test for a scale designed to measure factors affecting last-mile delivery of humanitarian emergency response in terms of institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability. Each variable is associated with a specific number of items and a Cronbach's alpha coefficient. The Cronbach's alpha coefficients range from .716 to .913 for the individual factors measured by five items, indicating a high level of internal consistency. The overall reliability of the scale for a total of 30 items is also high, with a Cronbach's alpha of .888. The high Cronbach's alpha values suggest that the scale is a reliable tool for measuring the aforementioned factors. Thus, the scale presents a comprehensive and reliable scale, thereby enhancing the validity of the research findings in this domain.

3.1. Data Collection Procedure

In relation to the factors influencing last mile delivery, the data collection procedure adhered to a systematic approach to gather necessary information from a variety of sources, including governmental bodies, international and local NGOs, and other aid organizations. The process commenced with the development of an instrument, such as a questionnaire, designed to capture pertinent data. Following this, the questionnaires were disseminated and the data was collected in accordance with the sampling method and technique delineated in the preceding section. To facilitate access and conserve time, the selected humanitarian organizations, located within the same neighborhoods, were grouped together.

Prior to conducting the survey, permission was sought from the management of the chosen organizations. This involved identifying their location and obtaining approval to carry out the survey within their premises. Furthermore, the consent of the respondents was procured once again before the distribution of the questionnaires. These questionnaires were then administered to the respondents at a convenient time, such as during their tea break, ensuring that their operations were not disrupted. In addition to physical distribution, respondents were also contacted via their email and telegram accounts. Regular reminders were sent to them to encourage prompt responses. This comprehensive procedure ensured a systematic and efficient approach to data collection, thereby contributing to the reliability of the research findings.

3.2. Data Analysis Method

Data In this study, data was analyzed using both descriptive and inferential statistics. Descriptive statistics were utilized to interpret data in a general sense, and for testing hypotheses and investigating research objectives, an inferential method was employed using the Statistical Package for Social Science (SPSS) version 22. Descriptive statistics were applied to interpret the demographic variables of the respondents, as well as the mean and standard deviations of each study variable. Inferential statistics, on the other hand, were used for hypothesis testing, correlation, and multi-regression analysis. The results of the analysis were presented pictorially using tables and graphs.

For the model specification, a regression model was proposed for this study. This model was based on the identified independent variables (factors affecting last mile humanitarian logistics) and the dependent variable (last mile humanitarian logistics). The intention was to examine their relationship using the multiple linear regression method. Multiple linear regression is applied to define the relationship and to evaluate the most dominant factors affecting of the performance of last mile humanitarian logistics. The mode is specified as:

- **Independent variables** – Factors affecting last mile humanitarian logistics in terms of institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability.
- ***Dependent Variable*** **–** Last mile Delivery to be measured in terms of speed/efficiency, equitable distribution, inventory management, logistics practices and logistical framework.

In order to investigate the relationship between the five independent variables with a dependent variable, a multi-regression analysis model specification is designed as follows:

$$LMHL = \beta_0 + \beta_1 INS + \beta_2 POL + \beta_3 SCO + \beta_4 INF + \beta_5 STK + e$$

Where:

LMHL - Last Mile Humanitarian Logistics
INS - Institutional Competency,
POL - Governmental Policy,
SCO - Socio-Cultural Orientation,
INF - Infrastructural Facility, and
STK - Stakeholder's Accountability
β_0 - - Constant;
$\beta_{1,2,3,4,5}$ - Coefficients of Predictors , e - error term

3.3. Ethical Considerations

It is important to consider ethical principles when conducting business research. Adherence to ethical principles is crucial when undertaking business research. There were four main types of ethical issues to consider: harm to participants, lack of informed consent, invasion of privacy, and deception (Bryman, 2011). In that study, while there were questions about the respondent's age and gender, this information was insufficient to identify an individual. The second ethical principle, informed consent, was also important. The third principle pertained to privacy invasion. In that study, respondents had the option to skip any question they deemed sensitive. Moreover, the study was not sensitive in nature, which may have increased respondents' willingness to participate. The fourth principle, deception, occurred when respondents were misled about the research's purpose. After taking these ethical principles into account and meeting all requirements, the study could be deemed ethical.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

The research was designed to evaluate the elements influencing the final stage of emergency response delivery, focusing on selected relief agencies in Ethiopia.

Primary data were gathered using a standardized questionnaire, which was self-administered by the respondents. This questionnaire included sections for the respondents' personal details and for their perceptions of the five key factors impacting the operation of last-mile delivery within their respective organizations.

4.1. Response Rate

Table 3: Response Rate

Questionnaires	Frequency	Percentage (%)
Total distributed	272	100.0
Unreturned questionnaires	73	26.8
Returned questionnaires	199	73.2
Response errors	7	2.6
Total valid and usable	192	70.6

Source: Own Survey, 2024

As illustrated in Table 3, a batch of 272 questionnaires was distributed among the targeted respondents. Out of these, 199 questionnaires were received back, resulting in a response rate of 73.2%. However, 73 questionnaires, which make up 26.8% of the total, were not returned for various unknown reasons. Once collected, the returned questionnaires were subjected to a comprehensive screening process to detect and correct any missing data or discrepancies. This procedure identified that 7 questionnaires, equating to 2.6% of the total, had errors. As a result, these were considered invalid for the ensuing statistical analysis. Following this elimination process, 192 questionnaires, which constitute 70.6% of the total distributed, were deemed valid and suitable for use. These were subsequently inputted into SPSS 28.0 for additional processing. This encompassed coding and error rectification measures to ensure the data's appropriateness for the intended data analysis method. After the data preparation phase was completed, the required analyses were performed. The findings of these analyses are detailed in the subsequent sections.

4.2. General Information about the Respondents

Table 4: Demographic Characteristics of Respondents

	Category	***N***	***(%)***
Gender	Male	111	57.8
	Female	81	42.2
	Total	**192**	
Age	21 – 30 years	85	44.3
	31 – 40 years	72	37.5
	41 – 50 years	25	13.0
	50 – 60 years	10	5.2
	Total	**192**	
Education	High School	0	0.0
	Diploma	7	3.6
	First Degree	107	55.7
	Masters & above	78	40.6
	Total	**192**	
Position	Director	7	3.6
	Manager	21	10.9
	Coordinator	43	22.4
	Programmer	63	32.8
	Officer	58	30.2
	Total	**192**	
Department	Planning	11	5.7
	Supply	29	15.1
	Logistics	83	43.2
	Fleet	25	13.0
	Procurement	36	18.8
	Others	8	4.2
	Total	**192**	
Service Year	1 – 5 years	104	54.2
	6 - 10 Years	68	35.4
	Above 10 Years	20	10.4
	Total	**192**	

Source: Own Survey 2024

The first part of the questionnaire consists of the demographic characteristics of the respondents. This part of the questionnaire requested a limited amount of information related to the personal information of the study participants.

In social research, analyzing demographic data holds utmost importance as it provides valuable insights into the characteristics and distribution of individuals within specific categories. The following paragraphs focus into a detailed description of the demographic composition based on gender, age, educational background, organizational ownership, positions held, department-wise distribution, years of service, and regions where these 192 respondents frequently supplied humanitarian aid service.

Gender: according to the data shown in Table 4, the results show that, out of the total 192 respondents, 111 individuals identify as male, representing 57.8% of the sample. On the other hand, 81 (42.2%) individuals identify as female counterparts. This gender distribution sheds light on the male-female ratio within the surveyed group, showcasing a higher representation of males compared to female counterparts. More men are preferred as part of the workforce, especially in contexts such as emergencies and conflicts where access may be prohibitive, requiring a more agile labor force.

Age distribution: moving on to age distribution, the analysis further reveals that the majority of individuals fall within the 21-30 years age bracket, comprising 85 (44.3%) of the sample respondents. Following this, the 31-40 years age group stands at 37.5% with 72 respondents, while the 41-50 years and 50-60 years age groups represent 13.0% and 5.2% of the sample, respectively. This age distribution highlights the predominance of younger individuals within the surveyed group. Most humanitarian agencies prefer slightly more energetic and youth staff than the older cadres.

When considering educational backgrounds, the highest percentage is among those holding a first degree (55.7%), comprising 107 individuals. This is followed by those with Master's and above qualifications, comprising 78 respondents (40.6%). The rest 7 (3.6%) are diploma holders. This distribution showcases the educational diversity within the surveyed population, with a significant number of individuals holding at least a first degree. High levels of education were associated with more senior positions for most of the organizations interacted with.

In terms of positions held within the organizations, the data showcases a varied distribution, with programmers being the most common role at 32.8% with 63 respondents. Officers follow closely at 30.2% with 58 individuals, coordinators at 22.4% with 43 individuals, managers at 10.9% with 21 individuals, and directors at 3.6% with 7 individuals. This distribution provides insights into the hierarchical structure and job roles within the surveyed organizations.

The analysis further probes into the department-wise distribution of respondents within their organizations, revealing a predominant presence in the logistics department at 43.2% with 83 individuals. Procurement follows at 18.8% with 36 respondents, supply at 15.1% with 29 individuals, fleet at 13.0% with 25 individuals, planning at 5.7% with 11 individuals, and other departments at 4.2% with 8 individuals. This breakdown sheds light on the distribution of talent and expertise across various departments.

Examining the experience levels of the respondents, the data shows that 54.2% of individuals have 1-5 years of experience, accounting for 104 respondents. Additionally, 35.4% have 6-10 years of experience, comprising 68 individuals, while 10.4% have over 10 years of experience, represented by 20 individuals. This breakdown highlights the distribution of experience levels within the surveyed population.

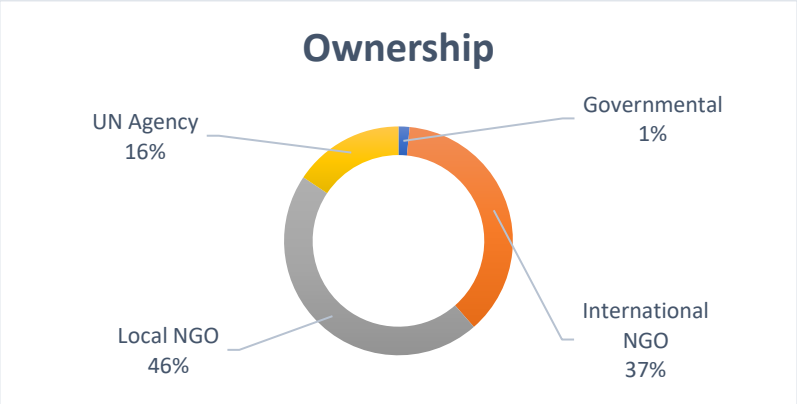
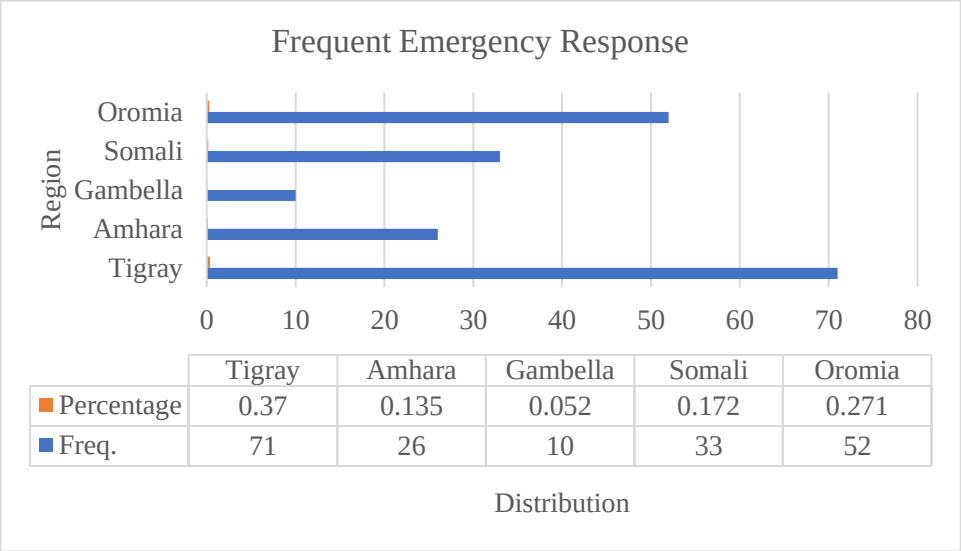


Figure 2: Ownership Structure of Humanitarian Organizations

Figure 2 illustrates the distribution of ownership of the humanitarian organizations under the survey. The results uncover that the majority are employed by local NGOs, which make up 88 (45.8%) of the sample respondents. Subsequently, International NGOs represent 71 (37.0%) individuals, UN Agencies account for 15.6% with 30 individuals, and governmental organizations contribute 3 (1.6%) individuals. This distribution sheds light on the employment spread across various organization types within the surveyed group. This implies the substantial presence of international NGOs highlights the role of global partnerships in addressing complex challenges on a larger scale. UN agencies, with their specialized expertise and global reach, play a crucial role in coordinating efforts and mobilizing resources for humanitarian assistance in the country. Acknowledging the nuanced roles and contributions of governmental bodies, international NGOs, local NGOs, and UN agencies is essential for fostering a more inclusive and coordinated approach towards addressing effective humanitarian logistics to the place where in dire needs.



	Tigray	Amhara	Gambella	Somali	Oromia
Percentage	0.37	0.135	0.052	0.172	0.271
Freq.	71	26	10	33	52

Figure 3: Frequency of Emergency Response Distribution Across Regions in Ethiopia

According to the data provided in Figure 3, the Tigray region accounts for 37.0% of the total emergency responses in Ethiopia, with 71 reported cases. This indicates a relatively high frequency of emergencies in the region, necessitating swift and effective response measures. In comparison, the Amhara region reported 26 emergency responses, representing 13.5% of the total cases. While lower than Tigray, the number of emergencies in Amhara still highlights the importance of allocating sufficient resources and infrastructure to enhance the region's emergency response capacity. Gambella, Somali, and Oromia regions reported 10, 33, and 52 emergency responses, accounting for 5.2%, 17.2%, and 27.1% of the total cases, respectively. These figures demonstrate the varying levels of emergency incidents across different regions, reflecting the diverse risk profiles and vulnerabilities present in each area. Effective coordination and collaboration among stakeholders are essential to address the specific challenges faced by each region and optimize emergency response efforts.

In conclusion, the comprehensive analysis of demographic composition within the specified categories offers valuable insights into the characteristics and distribution of individuals within the surveyed group. The data presented in this essay sheds light on the gender, age, educational background, organizational ownership, positions held, department-wise distribution, years of service, and regional representation of the respondents, providing a holistic view of the demographic composition. Such analyses play a crucial role in understanding the composition and diversity of individuals within specific categories, thereby facilitating informed decision-making and planning based on demographic insights.

4.3. Descriptive Statistics of the Study Variables

Descriptive statistics is employed to encapsulate and delineate the principal characteristics of a dataset, encompassing aspects such as central tendency and variability. These techniques offer a comprehensive overview of the data, facilitating the identification of patterns and relationships. In the context of this study, the focus is on the relationship between various factors affecting last-mile delivery of humanitarian logistics. To achieve the primary objective of the study, 25 statements were categorized into five factors, namely institutional competency, governmental policy, socio-cultural orientation, infrastructural facility, and stakeholder accountability. Additionally, five questions related to last-mile delivery practices were included based on the respondents' perceptions. Consequently, 30 questions were utilized to conduct these descriptive analyses.

Descriptive statistical measures of mean and standard deviation were employed to compare the respondents' perceptions of the variables. The mean score indicates the extent to which the sample group agrees or disagrees with the various statements. As per Field (2005), the scale is designed such that a mean score within the range of 1.00 – 1.80 signifies strong disagreement; 1.81 – 2.60 indicates disagreement; 2.61 - 3.40 suggests neutrality; 3.41 – 4.20 implies agreement; and a score within 4.21 – 5.00 denotes strong agreement. Furthermore, the standard deviation value represents the variability of the observed response. Specifically, the score exceeding the threshold (std. = 1.000) indicates a high degree of variability in the respondents' perceptions. This variability is a crucial aspect of the analysis as it provides insights into the diversity of opinions and attitudes within the sample group.

4.3.1. Institutional Competency

Table 5: Description of Institutional Competency (n = 192)

Statement	Mean	Std.
Logistics management policies are well-developed.	4.24	1.427
Procedures for emergency responses are well-defined.	2.36	1.583
Skilled labor is available for logistics responses.	3.48	1.825
Collaboration with other humanitarian clusters is evident.	3.72	1.832
Modern ICT is integrated into logistics operations.	3.42	1.894
Average	**3.44**	

Source: Own Survey, 2024

As depicted in Table 4, this study delves into the perceptions of respondents regarding the institutional competency of humanitarian organizations. The data indicates a moderately positive outlook on

institutional competency, with an overall mean score of 3.44, although notable disparities in responses were observed. Logistics management policies were generally considered well-developed, evident from a high mean score of 4.24 (std. 1.427). This suggests a consensus among respondents about the efficacy of these policies, yet the standard deviation hints at varying opinions. Conversely, emergency response procedures were deemed unclear, with a low mean score of 2.36 (std. 1.583). The availability of skilled labor for logistics responses garnered a moderate mean score of 3.48 (std. 1.825), indicating mixed perceptions regarding workforce expertise. Collaboration with other humanitarian clusters received a mean score of 3.72 (std. 1.832), depicting generally positive feedback with substantial response diversity. The integration of modern Information and Communication Technology (ICT) in logistics operations was rated at 3.42 (std. 1.894), showing differing views among participants. This variation underscores the complex and multifaceted nature of challenges in humanitarian logistics.

Last-mile delivery in humanitarian aid is a critical phase, ensuring that essential relief supplies reach beneficiaries, especially those in remote or isolated areas. Since institutional competency involves understanding the unique challenges faced during last-mile delivery, organizations must comprehend the local context, including infrastructure limitations, cultural nuances, and social conditions. Diehlmann (2021) explains that the effectiveness of this delivery hinges on various factors, including institutional competency. Competent institutions prioritize recruiting and training personnel who can navigate the complexities of last-mile operations. These individuals need skills beyond logistics; they must be culturally sensitive, adaptable, and capable of working in resource-constrained environments.

Moreover, they adjust strategies based on real-time information, weather conditions, and community dynamics. Agility allows them to respond effectively to unexpected challenges. Competency extends beyond individual organizations. Effective last-mile delivery requires collaboration with local partners, governments, and other stakeholders. Institutions that build strong networks enhance their ability to reach beneficiaries. Competent institutions continually assess their performance. Monitoring delivery processes, gathering feedback, and evaluating impact help refine strategies and address gaps. In summary, institutional competency significantly influences the success of last-mile humanitarian aid. Organizations that prioritize understanding, adaptability, collaboration, and continuous improvement enhance their ability to deliver critical assistance where it matters most.

4.3.2. Government Policy

Table 6: Description of Government Policy (n = 192)

Statement	Mean	Std.
Clear regulations govern humanitarian relief operations.	4.38	1.352
Consistent regulations for humanitarian goods/services exist.	3.45	1.784
Regional states have adequate capacity to support relief operations.	4.28	1.529
Government interference in relief activities is minimal.	2.28	1.863
Government supports local NGOs financially.	2.42	1.791
Average	**3.36**	

Source: Own Survey, 2024

The data analysis in Table 6 reveals interesting insights regarding respondents' perceptions of various aspects of humanitarian relief operations. It is evident that there is a generally positive consensus on the clarity and effectiveness of regulations governing such operations, as indicated by a high mean score of 4.38 with a relatively low std. of 1.352. However, the existence of consistent regulations for humanitarian goods and services seems to provoke more mixed opinions, with a moderate mean score of 3.45 and a notably higher std. of 1.784, signaling a wider range of viewpoints among respondents. Similarly, while there is a favorable view towards the capacity of regional states to support relief operations (mean score of 4.28), the data also shows some variability in responses (std. 1.529). Conversely, there is a clear trend of disagreement among respondents regarding government interference in relief activities and support for local NGOs, with low mean scores of 2.28 and 2.42 respectively, and high standard deviations indicating significant divergence of opinions. Nonetheless, the overall average mean score of 3.36 suggests a moderately positive perception of government policy's impact on last-mile delivery of humanitarian relief programs, albeit with notable variations in responses.

Government policies play a crucial role in shaping the effectiveness of last-mile delivery in humanitarian aid. According to Wassenhove (2016), government policies that prioritize infrastructure development such as roads, bridges, and communication networks, facilitate smoother last-mile logistics. Improved infrastructure reduces transportation bottlenecks and ensures timely delivery of aid. Clear and streamlined customs procedures are essential. Government policies that expedite customs clearance for humanitarian goods prevent delays and ensure efficient delivery. Governments must provide secure access to conflict zones or remote areas. Policies that grant safe passage for

humanitarian organizations enable them to reach beneficiaries without endangering personnel or supplies (Samuel, 2022).

Effective last-mile delivery requires coordination among government agencies, NGOs, and local authorities. Policies that encourage collaboration enhance aid distribution. Government funding or tax incentives can bolster last-mile operations. Policies that allocate resources to humanitarian logistics strengthen aid delivery. In summary, government policies significantly influence last-mile humanitarian aid (Diehlmann, 2021). When policies align with the needs of affected communities and prioritize efficient logistics, aid reaches those who need it most effectively. Thus, these findings underscore the importance of identifying areas for improvement in government policies to enhance the effectiveness of last-mile delivery in humanitarian relief efforts.

4.3.3. Socio-cultural Orientation

Table 7: Description of Socio-cultural Orientation (n = 192)

Statement	Mean	Std.
Aid recipients are culturally diverse.	4.37	1.434
Society exhibits a positive attitude towards aid workers.	4.29	1.510
Beneficiaries perceive aid workers as uncorrupted.	4.19	1.574
Cultural barriers impact relief operations.	4.40	1.392
Trust level with stakeholders at last mile delivery is high.	3.97	1.720
Average	**4.24**	

Source: Own Survey, 2024

The results in Table 7 show varying perceptions among respondents regarding several key aspects related to last-mile operation of humanitarian logistics. The findings indicate a strong agreement among respondents that aid recipients are culturally diverse, with a mean score of 4.37 and a std. of 1.434 suggesting some level of uniformity in this view. Similarly, the positive attitude towards aid workers and the perception of beneficiaries towards their integrity also received relatively high mean scores, albeit with noticeable variations in responses as indicated by the standard deviations. The impact of cultural barriers on relief operations was acknowledged, with respondents generally agreeing on this issue. However, the trust level with stakeholders at the last mile delivery stage presented a more mixed picture among respondents, with a moderate mean score of 3.97 and a high standard deviation of 1.720 reflecting divergent opinions. Overall, the average mean score of 4.24 suggest an overall positive perception of the impact of socio-cultural orientation on last-mile delivery

in humanitarian relief programs, underscoring the importance of addressing areas of improvement in this aspect to enhance program effectiveness.

This indicates that the effective delivery of last-mile humanitarian aid is directly influenced by the socio-cultural orientations of the target communities. Factors such as language, customs, religious beliefs, and traditional power structures can significantly shape the acceptance and utilization of aid resources (World Health Organization Report, 2023). Navigating these nuanced dynamics requires a deep understanding of the local context and a willingness to adapt aid distribution strategies accordingly. Failure to account for socio-cultural considerations can lead to the creation of barriers, undermining the overall impact of humanitarian interventions. Conversely, by embracing a culturally sensitive approach, aid organizations can foster greater trust, community ownership, and sustainable outcomes (Sharma, 2022). Ultimately, the integration of socio-cultural awareness into last-mile humanitarian aid delivery is a crucial step towards ensuring that assistance reaches those most in need, in a manner that is meaningful and effective within their unique societal frameworks.

4.3.4. Infrastructure Facility

Table 8: Description of Infrastructure Facility (n = 192)

Statement	Mean	Std.
Communication infrastructure supports delivery.	3.81	1.822
Road network suits aid delivery.	3.57	1.919
Multimodal transport for aid delivery exists.	3.89	1.782
Warehouse access for inventory is sufficient.	3.98	1.748
Electric power for delivery equipment is reliable	3.61	1.906
Average	**3.77**	

Source: Own Survey, 2024

Based on the data presented in Table 8, the evaluation of the communication infrastructure's support for delivery exhibits a moderate average score of 3.81 (std. 1.822), indicating a range of opinions among survey participants. The considerable standard deviation suggests a widespread of viewpoints, underscoring a substantial disparity in perceptions regarding the effectiveness of the communication infrastructure. Similarly, sentiments regarding the suitability of the road network for aid delivery vary, with an average score of 3.57 (std. 1.919). The assessment of multimodal transport for aid delivery also reflects mixed opinions, with an average score of 3.89 (std. 1.782). These results emphasize the diverse perspectives among respondents, signaling significant discord regarding the efficiency of current transport modalities for aid delivery. Noteworthy discrepancies are observed in views

concerning warehouse access for inventory, as denoted by an average score of 3.98 (std. 1.748), and the dependability of electric power for delivery equipment, with a mean score of 3.61 (std. 1.906). The overall average score of 3.77 indicates a generally High perception of the impact of infrastructure facilities on the final leg of delivery in humanitarian relief efforts, with substantial variance in responses.

These outcomes provide valuable insights for identifying areas of enhancement in infrastructure amenities, thereby improving the efficiency of last-mile delivery in humanitarian relief endeavors. Infrastructure limitations, such as damaged roads, inadequate communication technologies, and insufficient transportation databases, have been identified as significant obstacles to effective humanitarian logistics in disaster-prone regions (Sharma, 2022). For instance, the emphasis on coordinating logistics activities at multiple levels as a potential impediment to efficient last-mile delivery was highlighted in a study on disaster relief operations by Diehlmann (2021), which was not explicitly addressed in the present investigation. The current study's consideration of the facility as a key predictor of last-mile delivery further emphasizes the critical role of robust infrastructure in ensuring the success of relief operations

4.3.5. Stakeholder's Accountability

The data presented in Table 9 provides valuable insights into the influence of stakeholder accountability on the final stage delivery of humanitarian relief aid in disaster-stricken regions. The degree of involvement of dedicated personnel in managing last-mile logistics appears to be neutral, with a mean score of 2.93 (std. 1.238), indicating a fair amount of diversity in opinions and some discord among participants.

Table 9: Stakeholder's Accountability (n = 192)

Statement	Mean	Std.
Dedicated staff handle last mile logistics.	2.93	1.238
Beneficiaries cooperate for smooth aid supply operation.	3.55	1.760
Collaboration with other aid organizations is effective.	2.55	1.298
Donors allow flexible use of funds.	2.39	1.578
State governments support emergency aid response.	3.61	1.757
Average	**2.86**	

Source: Own Survey, 2024

Likewise, views on the engagement of beneficiaries for ensuring smooth aid distribution exhibit a mixed sentiment, illustrated by a mean score of 3.55 (std. 1.760). The efficacy of partnerships with other aid organizations garners a mean score of 2.55 (std. 1.298), indicating a somewhat unfavorable perception. The flexibility in the utilization of funds permitted by donors is viewed negatively, with a mean score of 2.39 (std. 1.578). Additionally, perspectives are split on the level of support provided by state governments for emergency relief efforts, scoring an average of 3.61 (std. 1.757). The overall mean score of 2.86 signifies a generally neutral outlook on the impact of stakeholder accountability on the final-stage delivery of humanitarian aid programs, showcasing a diverse array of responses. These findings can be instrumental in identifying key areas for bolstering stakeholder accountability and enhancing the efficiency of last-mile delivery in humanitarian relief endeavors.

The effective delivery of last-mile humanitarian aid is contingent upon robust stakeholder accountability. Stakeholders, including aid agencies, local governments, and community leaders, must uphold stringent transparency and reporting measures to ensure that scarce resources reach the most vulnerable populations in a timely and equitable manner (Hemalatha, 2017). For instance, Zaid (2019), fostering trust through open communication and collaborative decision-making is essential, as is the continuous monitoring of program implementation and outcomes. Equally important is the prioritization of local needs and the empowerment of affected communities to participate in the aid delivery process. By embedding accountability mechanisms throughout the humanitarian supply chain, organizations can enhance the efficiency, ethics, and impact of their life-saving interventions, ultimately making a meaningful difference in the lives of crisis-affected individuals and communities.

4.3.6. Last Mile Humanitarian Logistics

Table 10: Description of Last Mile Humanitarian Logistics (n = 192)

Statement	Mean	Std.
The delivery of humanitarian aid was timely.	3.73	1.833
The aid reached all intended recipients equally.	3.31	1.905
The inventory of aid was well-managed.	4.25	1.403
The delivery process was well-coordinated transparently.	3.87	1.793
The logistical framework was adaptable to changing circumstances.	3.14	1.478
Average	**3.66**	

Source: Own Survey, 2024

Table 10 illustrates the results of respondents' perception toward the practices of last-mile humanitarian logistics delivered to the disaster areas. The overall average mean score of 3.66 points

to a somewhat positive view of the effects of Last Mile Humanitarian Logistics on last-mile aid delivery, albeit with significant response diversity. The evaluation of the timeliness of humanitarian aid delivery yielded a mean score of 3.73 (std. 1.833), showcasing a diverse range of opinions among respondents. The standard deviation highlights significant differences in views regarding the punctuality of aid distribution. Similarly, the perception of aid reaching all intended recipients equally garnered a mean score of 3.31 (std. 1.905), indicating varying opinions among participants. The wide standard deviation underscores substantial disagreement on the equitable distribution of aid. Conversely, respondents viewed the management of aid inventory favorably, with a mean score of 4.25 (std. 1.403). While some differing opinions exist, the moderate standard deviation suggests general agreement on this aspect. In contrast, opinions on the transparency and coordination of the delivery process were more mixed, with a mean score of 3.87 (std. 1.793), reflecting significant disagreement among respondents. Concerning the adaptability of the logistical framework to changing circumstances, the mean score of 3.14 (std. 1.478) indicates relatively negative perceptions. These findings could guide improvements in Last Mile Humanitarian Logistics, enhancing the efficiency of humanitarian relief programs' last-mile delivery.

4.4. Inferential Analysis

Inferential statistics can help to provide explanations for a situation or phenomenon. It allows researchers to draw conclusions based on extrapolations and is thus fundamentally different from descriptive statistics, which simply summarize the data that has been measured (Hair, 2010). In this study, inferential statistics are adopted to examine the relationship between factors affecting last-mile delivery of humanitarian logistics. To do so, correlation tests, the assumption for regression model tests, and finally multi-regression analysis in terms of model summary, ANOVA test, and beta coefficient determination were performed to address the study objectives.

The findings derived from these statistical analyses can be used to make informed decisions and recommendations for improving last-mile delivery by incorporating institutional competency of the aid organizations, flexibility of governmental policy, socio-cultural orientation of the beneficiaries, infrastructural facility of the host country and accountability of the concerned stakeholder as well.

4.4.1. Correlation Test

A correlation coefficient is a useful tool for summarizing the relationship between variables with a single number ranging from -1.0 to 1.0 (Hair, 2010). It relies on correlation to assess the direction and strength of the relationship between variables. If the correlation coefficient falls between 0.1 and 1.0, the coefficient (r) is weak at 0.29; moderate at 0.3 to 0.49; and strong at >0.5 relationship between

variables. In this study, the Pearson correlation coefficient was calculated to determine the relationship between the variables, statistical significance at the level of 95% confidence interval, and significance at p< .05. Pearson correlation test is more appropriate for examining the relationship among categorical/ ordinal data.

Table 11. Pearson Correlation Matrix

	INS	**POL**	**SCO**	**INF**	**STK**	**LMHL**
Institutional Competency - INS	1					
Governmental Policy - POL	.439**	1				
Socio-Cultural Orientation - SCO	.228**	.508**	1			
Infrastructural Facility - INF	.239**	.232**	.469**	1		
Stakeholder Accountability - STK	.439**	.277**	.193**	.425**	1	
Last Mile Delivery - LMHL	.533**	.543**	.518**	.625**	.529**	1
**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).						

Source, Own Survey, 2024

The coefficient values associated with each predictor variable indicate the strength of their respective relationships. The correlation test results, as presented in Table 11, demonstrate a robust and positive relationship between the predictor variables (institutional competency, governmental policy, socio-cultural orientation, infrastructural facility, and stakeholder's accountability) and the dependent variable (Last-mile Delivery).

Each of the five independent variables exhibits a positive and substantial relationship with last-mile delivery. The infrastructural facility, with a coefficient value of r = .625, manifests the strongest positive relationship with last-mile delivery. This is followed by the institutional competency (r = .533) and the government policy (r = .543), both of which also show significant positive relationships.

The stakeholder accountability and socio-economic orientation, while having relatively stakeholder accountability coefficient values, still maintain positive and strong relationships with last-mile delivery. The stakeholder accountability has a coefficient value of r = .529, and the socio-economic orientation has a coefficient value of r = .518. Both of these relationships are statistically significant at the p < .05. These findings, thus, suggest that any alterations in the five factors influencing last-mile delivery (institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability) are directly and proportionally correlated

with changes in last-mile delivery within humanitarian aid organizations. Consequently, these variables can be considered reliable predictors of last-mile delivery, providing valuable insights for strategic planning and decision-making processes in humanitarian logistics.

This test is particularly useful when examining the co-variation of the study variables, which is essential for understanding complex phenomena and identifying potential causal relationships. By quantifying the degree of linear association between variables, correlation analysis provides insights that can guide decision-making, inform hypotheses, and enhance the overall understanding of the research subject.

4.4.2. The Assumptions for Testing Regression Analysis

In research, the testing of assumptions is a critical step in the application of multivariate statistical methods. This is because any violations of these assumptions can significantly impact the subsequent use and interpretation of these methods (Hair, 2010). Assumptions serve as the foundational premises upon which the validity of the statistical analysis rests. Therefore, any deviation from these assumptions can lead to erroneous conclusions, undermining the research findings' integrity. While there exists a multitude of assumptions to be considered in multivariate analysis, the researcher in this context has elected to concentrate on the principal ones that can be readily examined using the Statistical Package for the Social Sciences (SPSS). SPSS is a powerful tool that facilitates the testing of assumptions through its comprehensive suite of statistical tests and procedures. By focusing on the major assumptions, the researcher can ensure the robustness of the analysis while efficiently utilizing the capabilities of SPSS.

These major assumptions may include but are not limited to, normality, linearity, homoscedasticity, and the absence of multicollinearity. Each of these assumptions carries specific implications for the nature of the data and the appropriateness of the multivariate methods employed. Consequently, their verification is paramount to the successful execution and interpretation of the multivariate analysis. In conclusion, the testing of assumptions is an indispensable component of academic research involving multivariate statistical methods. By focusing on the major assumptions, researchers can enhance the validity and reliability of their findings, thereby contributing to the rigor and credibility of the study.

4.4.2.1. Multicollinearity

In regression analysis, multi-collinearity arises when the independent variables in a regression model exhibit a higher degree of correlation amongst themselves than with the dependent variable. The criteria for identifying the presence of multi-collinearity can be context-dependent and may vary

across different studies. For instance, Hair (2010) posits that a correlation coefficient below 0.90 may not necessarily lead to severe multi-collinearity. Conversely, Fidell (2019) advocates for a minimum correlation coefficient of 0.7 to facilitate more accurate inferences.

Table 12: Collinearity Statistics

Coefficients [a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Institutional Competency	.698	1.433
	Governmental Policy	.623	1.606
	Socio-Cultural Orientation	.603	1.659
	Infrastructural Facility	.657	1.522
	Stakeholder Accountability	.690	1.450
a. Dependent Variable: Last-Mile Delivery			

Source: SPSS output, 2024

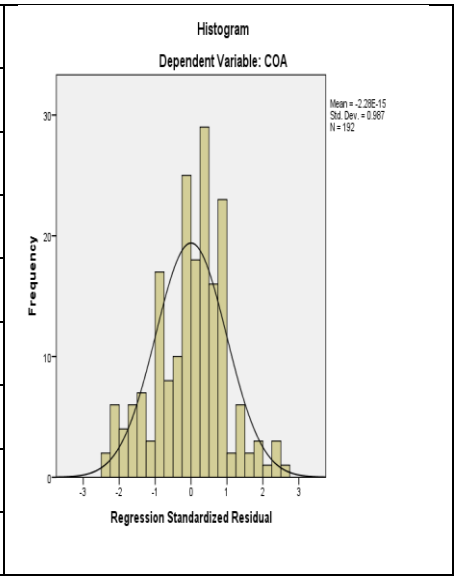
The results in Table 12, provide an analysis of multicollinearity within a regression model concerning e-banking adoption. It lists five factors (institutional competency, governmental policy, sociocultural orientation, infrastructural facility, and stakeholder's accountability), each with corresponding Tolerance and Variance Inflation Factor (VIF) values. The Tolerance values, all above 0.6, suggest no excessive multicollinearity among the predictors. The VIF values, all below 2.000, indicate that multicollinearity is not inflating the variance of the estimated regression coefficients to a concerning degree. Typically, a VIF value above 10 would indicate high multicollinearity. Therefore, the collinearity statistics for this model suggest that multicollinearity is not a significant issue for these predictors of last-mile delivery. This implies that the regression coefficients can be considered reliable for interpreting the relationships between the independent and dependent variable - last-mile delivery. This analysis is crucial for understanding the dynamics of last-mile delivery and can guide strategic decision-making in humanitarian logistics.

4.4.2.2. Test of Normality

Before executing a regression analysis, it is crucial to conduct a test of normality, which is one of the key assumptions underlying this statistical method. The determination of a normal distribution is based on the skewness and kurtosis statistics. As suggested by George and Mallery (2010), an acceptable range for both these statistics, indicative of normality, lies between -2 and +2.

Table 13: Normality of Distribution Using Descriptive Statistics (Skewness and Kurtosis)

Descriptive Statistics					
	N	Skewness		Kurtosis	
	Stat.	Statistic	Error	Statistic	Error
Org. Competency	192	-.535	.175	-1.008	.349
Government Policy	192	-.166	.175	-.650	.349
Socio-Culture	192	-1.597	.175	.865	.349
Infrastructure	192	-.841	.175	-1.171	.349
Accountability	192	-.200	.175	-1.161	.349
Last-mile Logistics	192	-.544	.175	-.651	.349



Source: SPSS output, 2024

As illustrated in Table 13, the kurtosis and skewness values for all variables are largely within this acceptable range, implying a close approximation to a normal distribution. This observation is based on the criteria of skewness and kurtosis values falling between -2 and 2. The skewness and kurtosis values provide insights into the distribution of the data. A negative skewness suggests that the distribution has a longer left tail, implying that the majority of the observations are concentrated on the right side of the mean. Additionally, the negative kurtosis values for most variables suggest a flatter distribution compared to a normal distribution, indicating the presence of more outliers or a wider spread of the data. These statistical measures can be valuable in understanding the underlying characteristics of the factors and informing further analyses or decision-making processes. Consequently, it can be inferred that the data utilized in this study can be reasonably assumed to follow a normal distribution. In addition to skewness and kurtosis, normality was also assessed through probability plots. Therefore, these findings collectively suggest that the data adheres to the normality assumption, thereby validating the use of regression analysis in this study.

4.4.2.3. Linearity Test

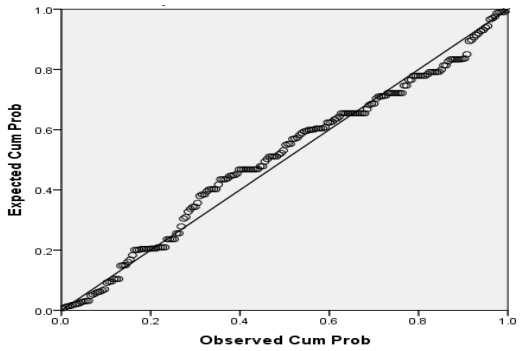


Figure 4: Frequency Distribution of Standardized Residuals

The linearity assumption can easily be checked using scatterplots or residual plots: plots of the residuals vs. either the predicted values of the dependent variable or against (one of) the independent variable(s). The graphical presentation in Figure 4 shows the assumption of linearity in regression analysis, which is typically verified using scatterplots or residual plots. These plots can display residuals against predicted values of the dependent or one of the independent variables, implying that for the variables considered in this study, the Q-Q plot resembled a straight line with minor deviations, indicating a linear relationship among the variables with slight deviations from linearity.

4.4.2.4. Homoscedasticity Test

Testing the assumption of homoscedasticity, meaning "same variance", is central to linear regression models. It describes a situation in which the error term is the same across all values of the independent variables. It is used to assess the assumption of homoscedasticity in regression analysis, which is the consistency of error variances across different levels of an independent variable. On the other hand, Heteroscedasticity (the violation of homoscedasticity) is present when the error term's size differs across an independent variable's values.

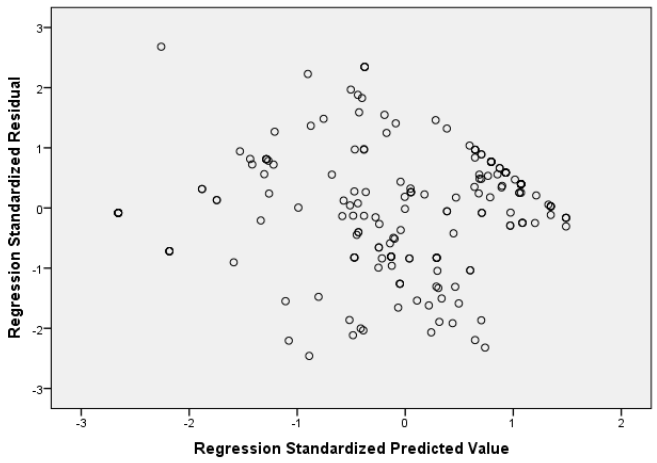


Figure 5. Scatter plot for Homoscedasticity Test

Residual scatter plots provide a visual examination of the assumption of homoscedasticity between the predicted dependent variable scores and the errors of prediction. The graph in Figure 5 has a horizontal axis labeled "Regression Standardized Predicted Value" and a vertical axis labeled "Dependent Variable: Last-mile deliver." The dispersion of dots across the graph does not show a clear pattern, indicating that the variances of the errors are consistent, thus satisfying the assumption of homoscedasticity for the regression model. This is an important diagnostic check in linear regression, as it ensures that the model's predictive performance is reliable across all values of the independent variables

4.4.2.5. Multiple Linear Regression Analysis

A multiple linear regression model was used to determine the explanatory power of the independent variables (institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability) on the dependent variable (last-mile delivery in this case).

Table 14. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806[a]	.650	.641	.72795

a. Dependent Variable: Last-mile Delivery

b. Predictors: (Constant), INS, POL, SCO, INF, STK

Table 14 shows the model summary of this study. The value of R indicates the value of the multiple correlation coefficients between the independent and the dependent variable, with a range from 0.0 to 1.0, a larger value indicating a larger correlation, and 1.0 representing an equation that perfectly predicts the observed value. In summary, the value of R (0.806) indicates a strong correlation between the independent and dependent variables, suggesting that the linear combination of the independent variables (institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability) can predict the dependent variable (Last-mile delivery) quite well. The value of R-Square (0.650) indicates that 65% of the variability in the dependent variable can be explained by the independent variables. This means that the independent variables chosen in the model, such as institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability, account for a significant portion of the variance in last-mile delivery. However, there are still other variables not included in the model that explain the remaining 35% of the variance.

Table 15: ANOVA Test

ANOVA [a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	183.212	5	36.642	69.149	.000[b]
	Residual	98.563	186	.530		
	Total	281.775	191			
a. Dependent Variable: Last-mile Delivery						
b. Predictors: (Constant), INS, POL, SCO, INF, STK						

Source: SPSS output, 2024

The ANOVA test, Table 15, shows the overall significance/ acceptability of the model from a statistical perspective. The output of the ANOVA analysis (F-value = 69.149) shows whether there is a statistically significant difference between the group means. It can be seen that the significance value is 0.000 (i.e., p = .000), which is below 0.05. Therefore, there is a statistically significant relationship between the variables which indicates the variation explained by the model is not due to chance. So, it shows that the acceptability of the model.

In this regression analysis examining the factors affecting last-mile delivery of humanitarian logistics, the aforementioned five variables in this study were considered, each with its own unstandardized coefficients, standardized coefficients, t-values, and significance levels. From the Multiple Linear Regression equation, the interpretation is presented as follows.

Table 16: Regression analysis of independent and dependent variable

Coefficients [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.016	.216		.073	.942
	Institutional Competency	.231	.052	.231	4.456	.000
	Governmental Policy	.255	.059	.238	4.323	.000
	Socio-Cultural Orientation	.116	.049	.133	2.385	.018
	Infrastructural Facility	.263	.037	.378	7.063	.000
	Stakeholder Accountability	.178	.053	.175	3.357	.001
a. Dependent Variable: Last-Mile Delivery						

Source: SPSS output, 2024

Table 16 reveals the relationship between dependent and independent variables. Accordingly, it shows the constant beta value (β) and the p-value of the variables to examine the significance of the hypothesis. Based on these results, the regression equation that predicts last-mile delivery based on the linear combination of institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability factors is as follows:

$$LMHL = 0.016 + 0.231\,INS + 0.238\,POL + 0.133\,SCO + 0.378\,INF + 0.175\,STK + e$$

Where:

LMHL - Last Mile Delivery
INS - Institutional Competency,
POL - Governmental Policy,
SCO - Socio-Cultural Orientation,
INF - Infrastructural Facility, and
STK - Stakeholder's Accountability
e = error term, β_0 = constant, term $\beta_{1, 2, 3, 4, 5}$ = coefficients of predictors

The constant 0.016 shows no effect of the five variables on last-mile delivery. It means that, in a condition where all independent variables are zero, last-mile delivery as a dependent variable is predicted to be 0.016.

The institutional competency demonstrated a notable positive relationship with Last-mile delivery, indicated by its sizable standardized coefficient of 0.231 and significant p-value of 0.000, showing its importance in predicting the last-mile delivery services. Similarly, government policy showed a significant positive relationship with a standardized coefficient of 0.238 and a low p-value of 0.000, suggesting its substantial impact on Last-mile delivery. The Socio-cultural orientation also exhibited a significant albeit smaller effect, with a standardized coefficient of 0.133 and a p-value of 0.018. Infrastructural facility, on the other hand, displayed the most significant impact on Last-mile delivery, as evidenced by its high standardized coefficient of 0.378 and very low p-value of 0.000. Finally, the stakeholder accountability was found to have a moderate positive influence, with a standardized coefficient of 0.175 and a p-value of 0.001.

These imply that the five factors namely institutional competency, governmental policy, socio-cultural orientation, infrastructural facility and stakeholder's accountability are good predictors of last-mile delivery. In summary, based on these results, all five proposed hypotheses (H1 – H5) are supported. These results provide valuable insights into the various factors that influence individuals' decisions to contribute to the humanitarian logistics especially at last-mile delivery services, highlighting the multidimensional nature of this phenomenon.

Table 17. Summary of the Research Hypothesis Test Result

Alternate Hypothesis	Result	Remark
Institutional competency has a positive significant effect on last-mile delivery.	Beta = 0.231, $p < .05$	H1a Supported
Government policy has a positive significant effect on last-mile delivery.	Beta = 0.238, $p < .05$	H1b Supported
Socio-cultural orientation has a positive significant effect on last-mile delivery.	Beta = 0.133, $p < .05$	H1c Supported
The infrastructural facility has a positive significant effect on last-mile delivery.	Beta = 0.378, $p < .05$	H1d Supported
Stakeholder accountability has a positive significant effect on last-mile delivery.	Beta = 0.175, $p < .05$	H1e Supported

Source: SPSS output, 2024

CHAPTER FIVE

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the summary of major findings, their respective conclusions and possible recommendations are presented.

5.1. Summary of Major Findings

Based on the results of the analyses, the following major findings are summarized as follows:

The effect of institutional competency on last-mile delivery

- The logistics management policies were viewed as the most well-developed aspect of the institutional competency of humanitarian organizations (mean 4.24). Nonetheless, the emergency response procedures were deemed the least clear (mean 2.36).
- Institutional competency stands out with the strongest positive relationship (r - .533) with last-mile delivery. Nonetheless, it shows a notable positive moderate effect as indicated by standardized coefficients of 0.231 (p-values of 0.000).

The effect of government policy on last-mile delivery

- Despite the clarity and effectiveness of regulations governing humanitarian relief operations (mean 4.38), poor government intervention poses a challenge to create a conducive environment for humanitarian efforts to thrive (mean 2.28).
- Government policy (r = .543) also shows a substantial positive relationship with Last-mile Delivery. It also contributes the highest positive effect (standardized coefficients of 0.238, p-values of 0.000), preceded by infrastructural facility.

The effect of socio-cultural orientation on last-mile delivery

- The existence of the cultural diversity among aid recipients received is acknowledged positively (mean 4.37) indicating a strong capacity for accommodating diverse cultural backgrounds. However, the trust level with stakeholders at the last-mile delivery stage is in question (mean 3.97).
- Despite having relatively lower coefficient value, socio-cultural orientation also maintains positive and strong significant relationships with Last-mile Delivery (r = .518). Nonetheless, it exhibits a significant albeit smallest effect, with a standardized coefficient of 0.133 (p-value of 0.018).

The effect of infrastructure facility on last-mile delivery

- The warehouse access for inventory received the highest mean score of 3.98, indicating a generally positive perception among respondents. Nonetheless, the suitability of the road network for aid delivery (mean 3.57) and availability of sustainable electrical power to operate machinery and equipment (mean 3.61) are found substantially poor.
- Infrastructural facility stands out with the strongest positive relationship (r - .625) with last-mile delivery. And it emerges as the most influential predictor of Last-mile Delivery, with a high standardized coefficient of 0.378 at p-value of 0.000) as well.

The effect of stakeholder accountability on last-mile delivery

- The level of support provided by state governments for emergency relief efforts (mean 3.61) as well as the flexibility in the utilization of funds permitted by donors (mean 2.39) received considerable doubts among respondents.
- The stakeholder accountability demonstrates positive and strong significant relationships (r - .529 at the $p < .05$ level). However, stakeholder accountability demonstrates a least positive effect (standardized coefficient of 0.175 at p-value of 0.001), preceding socio-cultural factor.

5.2. Conclusions

The efficient delivery of humanitarian aid in disaster areas is paramount for saving lives and mitigating suffering. Understanding the factors influencing last-mile delivery of humanitarian logistics is crucial for ensuring a prompt and effective response to emergencies. This study delves into the outcomes of a survey conducted in Ethiopia that scrutinized the diverse factors impacting last-mile delivery in disaster response scenarios. The study utilized a multiple linear regression model to evaluate the influence of institutional competency, governmental policy, socio-cultural orientation, infrastructural facility, and stakeholder accountability on last-mile delivery. The results revealed that these factors collectively account for 65% of the variability in last-mile delivery, underscoring their substantial role in shaping the efficacy of humanitarian logistics in emergency response operations.

When juxtaposed with existing literature, the current findings exhibit both similarities and disparities in the factors affecting last-mile delivery in humanitarian logistics. Previous studies conducted in various contexts have also underscored the significance of factors like infrastructural facilities, stakeholder accountability, and governmental policies in molding the efficiency of last-mile logistics. The convergence of these findings underscores the universal relevance of certain variables in ensuring successful humanitarian operations. Despite significant overlaps between the current study and prior research, some distinctions are discernible. For instance, a study on disaster relief operations emphasized the coordination of logistics activities at multiple levels as a potential hindrance to efficient last-mile delivery, a facet not explicitly addressed in the present investigation. This disparity underscores the intricate and multifaceted nature of challenges in humanitarian logistics. Infrastructure constraints, such as damaged roads, inadequate ICT, and insufficient transportation networks, have been identified as impediments to effective aid logistics in disaster-prone regions. Taking infrastructural facilities as a key predictor of last-mile delivery further underscores the pivotal role of robust infrastructure in ensuring the success of relief operations.

In conclusion, the study's findings illuminate the factors influencing last-mile delivery of humanitarian logistics in emergency response operations in Ethiopia. While echoing insights from prior research, the study offers specific insights into the Ethiopian context and underscores the critical role of institutional competency, governmental policies, socio-cultural orientation, infrastructural facilities, and stakeholder accountability in shaping the efficiency of last-mile delivery of humanitarian logistics.

5.3. Recommendations

Based on the findings and conclusions, the following possible suggestions are forwarded:

- One of the key factors affecting last-mile delivery is the competency of humanitarian organizations and agencies involved in relief operations. It is essential to invest in training and capacity-building programs for staff members to improve their skills and expertise in logistics management. Organizations should also establish clear policies and procedures to streamline operations and ensure effective coordination during disaster response efforts.
- Government policies and regulations can significantly impact the efficiency of last-mile delivery in disaster areas. The government must create a conducive regulatory environment supporting aid organizations' relief operations. This includes streamlining customs procedures, reducing bureaucratic barriers, and incentivizing private sector participation in disaster response efforts.
- Socio-cultural factors such as language barriers, cultural norms, and societal attitudes towards humanitarian aid can influence the success of last-mile delivery. Organizations must conduct thorough cultural assessments and engage with local communities to build trust and understanding. Adopting culturally sensitive communication and service delivery approaches can help overcome barriers and improve aid acceptance among the affected populations.
- Inadequate infrastructure can pose significant challenges to last-mile delivery, particularly in remote and hard-to-reach areas. Organizations should invest in improving transportation networks, warehousing facilities, and communication systems to address this issue. Collaborating with local authorities and leveraging technology solutions such as GPS tracking and mobile applications can help enhance the efficiency and reliability of logistics operations.
- Effective coordination and collaboration among stakeholders are essential for successful last-mile delivery in disaster areas. It is important to establish clear roles and responsibilities for each stakeholder involved in relief operations and hold them accountable for their actions. Regular monitoring and evaluation of performance metrics can help identify gaps and inefficiencies in the delivery process and facilitate continuous improvement.

5.4. Limitations and Suggestions for Future Investigation

Limitations of a study are potential weaknesses or influences that could affect the results or generalizability of the research as hard to control by the researcher. Acknowledging these limitations does not undermine the study's validity but gives a complete picture of the research process. Like any academic article, this thesis has several limitations. Among the majors:

The study is limited to Ethiopia. The findings may not be applicable to other countries with different socio-cultural, economic, and political contexts. It relies on the opinions of professional employees and logisticians from selected organizations. Their responses might be influenced by personal biases or organizational perspectives. The study also focuses on organizations providing food aid and non-food items. The results might not be applicable to organizations providing other types of aid (e.g., medical aid, educational aid). The data collection will take place from March to April 2024. Any changes in the humanitarian logistics landscape after this period are not captured in the study. It also uses self-administered questionnaires. This method might not capture all aspects of the last-mile delivery process. For example, in-depth interviews and focus group discussion data or case studies might provide additional insights. The study examines stakeholder accountability as a factor affecting last-mile delivery. But, measuring accountability can be complex and subjective, which might limit the accuracy of the findings in this area.

Future research endeavors should delve deeper into unexplained variances and explore additional factors that could enhance the effectiveness of last-mile delivery in disaster scenarios. This study underscores the importance of comprehending the intricate interplay of various factors in ensuring the successful delivery of humanitarian aid in times of crisis. By addressing the determinant factors and leveraging the strengths identified in this study, stakeholders can collaborate towards enhancing the effectiveness and efficiency of last-mile delivery in disaster response operations.

References

Ahmed, D. and Sultan, H. (2019). Knowledge management critical success factors. *Total Quality Management*, 14(2), 199–204.

Albert, M. and Heran, F. (2020). Assessing volunteer motives: a comparison of an open-ended probe and Likert rating scales. *Journal of Community and Applied Social Psychology*, 12 (4), 243–255.

Altay, N. (2018). OR/MS research in disaster operations management. *European Journal of Operational Research,* 17(5), 475–93.

Anthony, N. (2016). Drug supply in the aftermath of the 1988 Armenian earthquake. *International Journal of Logistics Management,* 33(5), 1388–1390.

Aboah, Y. (2021). Measuring supply chain performance. *International Journal of Operations & Production Management,* 1(9), 275–792

Balcik, B. (2017). Last mile distribution in humanitarian relief. *Journal of Intelligent Transportation Systems,* 12(2), 51–63.

Baldini, M. (2012). Coordination in humanitarian relief chains: practices, challenges and opportunities. *International Journal of Production Economics*, 12(1), 22–34.

Barney, H. (2011). Inventory management support systems for emergency humanitarian relief operations in South Sudan. *International Journal of Logistics Management*, 17(2), 187–212.

Beamon, M. (2018). Performance measurement in humanitarian relief chains. *International Journal of Public Sector Management,* 2(1), 4–25.

Browne, M. (2011). *Logistics out-sourcing. In Handbook of logistics and supply-chain management*. Emerald Group Publishing Limited.

Byman, D. (2011). *The dynamics of coercion: American foreign policy and the limits of military might*. Cambridge University Press

Bhattacharya, S. (2014). Designing efficient infrastructural investment and asset transfer mechanisms in humanitarian supply chains. *Production and Operations Management*, 23(9), 1511–1521.

Catherine, G. (2017). Resilient supply chains for extreme situations: outlining a new field of study. *International Journal of Production Economics*, 12(6), 1–6.

Chaikin, F. (2013). Transportation in disaster response operations. *Socio-Economic Planning Sciences,* 4(6), 23–32.

Chin, G. (2012). Understanding the volunteer market: the what, where, who and why of volunteering. *International Journal of Voluntary Sector Marketing*, 7(3), 44-57.

Creswell, (2010). *Research Design: Qualitative, Quantitative and Mixed Method Approach*. Los Angeles. SAGE Publications.

De Vaus, K. (2010). Supply chains for emergency responses: outlining a new field of study. *International Journal of Production Economics,* 1(6), 11–36.

Diehlmann, G. (2004). Disaster relief routing: integrating research and practice. *Socio Economic Planning Science,* 4(6), 88–97.

Demeke, M. (2016). Disaster relief routing: integrating research and practice. *Socio-Economic Planning Science*, 3(4), 48–97.

Ertem, P. and Rossetti, T. (2020). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of research on Technology in Education*, 42(3), 255-284

Dewsnap, B. and Hart, C. (2014). Category management: A new approach for fashion marketing? *European Journal of Marketing*, 38,809.

Disaster Risk Management Commission - DRMC Database, 2023.

Eisenhardt, N. (2020). The academic side of commercial logistics and the importance of this special issue. *Forced Migration Review*, 1(8), 5–8.

Fuad, J. (2017). Being good at doing good? Quality and accountability of humanitarian NGO's', *Disasters*, 2(6), 193–212.

Getaneh, M. (2019). Key performance indicators in humanitarian logistics', Master of Engineering in Logistics Thesis, *Massachusetts Institute of Technology*, Cambridge, MA.

Grant, G. (2017). Does failure to fund preparedness mean donors must prepare to fund failure in humanitarian supply chains?', *Proceedings*, 2(1), 265–282.

Gray, L. (2016). Supply chain design and coordination in humanitarian logistics', *Socio-Economic Planning Science*, 8(2), 1–16.

Guven, D. and Ergen, H. (2017). Identifying challenges in humanitarian logistics. *International Journal of Physical Distribution and Logistics Management*, 3(9), 506–528.

Habib, Y. (2016). Trends and developments in humanitarian logistics – a gap analysis. *International Journal of Physical Distribution & Logistics Management*, 4(1), 32–45.

Hair, F. (2010). *Research designs: Quantitative, qualitative, and mixed methods*, Sage Publications.

Horn Affairs Report (2019). Available at http/www.unwfp.org/hornafrica/snrjk

Humanitarian Logistics Association (2022) Report.

Hemalatha, K. (2010). Models for relief routing: equity, efficiency and efficacy', *Procedia – Social and Behavioral Sciences*, 1(7), 416–437.

Hemalatha, G. (2017). Does failure to fund preparedness mean donors must prepare to fund failure in humanitarian supply chains?', *Proceedings*, 2(1), 265–282.

Iyer, K. (2011). Demand chain collaboration and operational performance: Role of IT analytic capability and environmental uncertainty. *Journal of Business and Industrial Marketing*, 26(2), 81-91.

Jane, R. (2018). Humanitarian logistics in disaster relief operations. *International Journal of Physical Distribution & Logistics Management,* 3(7), 99–114.

Jury, G. (2017). Educating the supply chain logistics for humanitarian efforts in Africa: a case study. *International Journal of Productivity and Performance Management*, 5(8), 480–500.

Kombo, Y. (2011). Marrying logistics and technology for effective relief. *Forced Migration Review*, 1(8), 34–35.

Korpela, F. (2016). Logistics aspects of emergency preparedness in flood disaster prevention. *Journal of Physical Distribution & Logistics Management*, 4(4), 52-68.

Kothari, C. (2004). *Research Methodology: Methods and Techniques* (2nd Ed). New Delhi: New Age International (P) Ltd Publishers.

Kovacs, R. (2019). Logistics for disaster relief: engineering on the run. *IIE Solutions*, 29(6), 26–29.

Kunz, A. (2019). The logistics of famine relief. *Journal of Business Logistics*, 1(6), 213–239.

Mengistie, A. (2019). Benchmarking the collaboration in the supply chain. *International Journal of Services and Operations Management*, 2(4), 367–387.

Laan, T. (2019). Developing supply chains in disaster relief operations through cross-sector socially oriented collaborations: a theoretical model. *Supply Chain Management: An International Journal,* 4(2), 149–164.

Minear, l. (2012). *The Humanitarian Enterprise: Dilemmas and Discoveries*. Kumarian Press, Bloomfield, CT.

Nollet, M. (2021). Managing for value: organizational strategy in for-profit, nonprofit, and governmental organizations. *Non-Profit and Voluntary Sector Quarterly*, 2(9), 183–204.

Nezih, Y. and Melissa, R. (2019). Logistical challenges. *Forced Migration Review*, Special Issue July, p.38.

Office for the Coordination of Humanitarian Affairs - OCHA Report, 2016.

Oloruntuba, N. (2015). A wave of destruction and the waves of relief: issues, challenges and strategies. *Disaster Prevention and Management*, 1(4), 506–521.

Osman, J. (2021). Logistics for *humanitarian aid: a survey of aid organisations*. Proceedings of the 7th Logistics Research Network Conference, September, Birmingham.

Pache, K. (2010). Natural disaster management planning. *International Journal of Physical Distribution & Logistics Management*, 3(7), 409–433.

Pallant, W. (2005). Transforming humanitarian logistics: the journey to supply network management. *Operations Management*, 4(10), 609–622.

Perry, M. (2017). Natural disaster management planning. *International Journal of Physical Distribution & Logistics Management,* 3(7), 49–53.

Peter, G. (2014). Critical success factors in the context of humanitarian aid and supply chains. *International Journal of Physical Distribution and Logistics Management*, 3(9), 450–468.

Power, D. (2005). *DSS for crisis planning, response and management*. Paper presented at Online Abstract for 2nd ISCRAM Conference, Brussels.

Ramsden, T. (2019) A math-heuristic for the warehouse location-routing problem in disaster relief. *Computers and Operations Research*, 2(8), 56-69.

Rawls, K. and Turnquist, T. (2010). From emergency relief to livelihood recovery: lessons learned from post-tsunami experiences in Indonesia and India. *Disaster Prevention and Management*, 17(3), 410–430.

Razzaque, M. and Sheng, G. (2014). A general methodology for data-based rule building and its application to natural disaster management. *Computers & Operations Research*, 39(4), 63-73.

Reiner, H. (2019). *The humanitarian relief supply chain: analysis of the 2004 South East Asia earthquake and tsunami',* Master of Logistics thesis, MIT.

Robert, D. (2020). Disempowerment through disconnection: local women's disaster response and international relief in post-tsunami Batticaloa. *Disaster Prevention and Management*, 20(1), 63–81.

Salisbury, R. (2017). Disaster relief logistics. Benefits of and impediments to cooperation between humanitarian organizations', *Kuehne Foundation Book Series on Logistics*, 1(5), 78-96.

Samuel, M. (2022). Challenges of emergency logistics management. *Transportation Research Part E: Logistics and Transportation Review*, 4(3), 655–659.

Saunders, M. (2010). *Research Methods for Business Students*. (5th Ed.). New Jersey: Prentice Hall.

Schulz, W. (2018). Benchmarking and performance measurement of supply chain management practices: a survey of Indian organisations. *International Journal of Services and Operations Management,* 2(4), 313–334.

Seybolt, Y. (2017). Disaster response based on production network management tasks. *Management Research News,* 30(1), 829–842.

Simchi, D. (2019) Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, *Computers & Operations Research*. 2(8). 1–20.

Simon, L. (2019). Inventory decisions for emergency supplies based on hurricane count predictions. *International Journal of Production Economics*, 12(6), 66–75.

Solomon, A. (2021). The wicked problem of humanitarian logistics and disaster relief aid. *Journal of Humanitarian Logistics and Supply Chain Management,* 1(9), 15–31.

Stoddard, R. (2017). Towards a humanitarian logistics knowledge management system. *Disaster Prevention and Management,* 20(1), 6–26.

Thomas, A. and Kopczak, L. (2005). *From logistics to supply chain management. The path forward in the humanitarian sector*. Tata McGraw-Hill Education Private Limited, New Delhi, India.

Thomas, D. (2020). *Humanitarian Logistics: Enabling Disaster Response*. Fritz Institute, San Francisco, CA.

Tomasini, R. (2021). From preparedness to partnerships: case study research on humanitarian logistics. *International Transactions in Operational Research*, 16(5), 549–559.

Wassenhove, L. (2016) 'Humanitarian aid logistics: supply chain management in high gear. *Journal of Operational Research Society*, 57(5), pp.475–489.

UN WFP (2019). *Logistics*, 1st ed., United Nations Development Program, Geneva Schulz.

UN (2019). *United Nations: Office for the Coordination of Humanitarian Affairs (OCHA)* (2019) Central Register of Disaster Management Capacities.

Wang, F. (2017). Humanitarian aid logistics: supply chain management in high gear. *Journal of Operational Research Society*, 5(7), 475–489.

Wilkinson, L. and Birmingham, R. (2003). Issues in managing disaster relief inventories. *International Journal of Production Economics*, 10(8), 228–235.

Wolde, M. (2019). Identifying critical success factors in emergency management using a fuzzy DEMATEL method. *Safety Science*, 49(2) 243–252.

World Bank Report (2017). *Impacts of disasters since the 1992.* Rio de Janeiro Earth Summit.

World Food Program Reported (2023). Strengthening of the coordination of emergency humanitarian assistance of the United Nations. United Nations.

Yosef, P. (2018). Improving bid efficiency for humanitarian food aid procurement. *International Journal of Production Economics*, 13(4), 238–245.

OCHA (2006a) *Appeal for Improving Humanitarian Response Capacity: Cluster 2006 Consolidated Appeals Process (CAP)*, New York and Geneva: United Nations.

Zacharia, A. (2011). *Social Science Research: Principles, Methods, and Practice*, Ver 2.0, Fritz Institute, San Francisco, CA.

Zaid, N. (2019). Humanitarian logistics planning for natural disaster response with Bayesian information updates. *Journal of Industrial and Management Optimization*, 10(3), 665–689

Appendix

Survey Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF BUSINESS AND ECONOMICS

Questionnaire to be filled by Employees of Humanitarian Aid Organizations

Dear Participant,

I am Timihirt Getachew, a post graduate student in Logistics and Supply Chain Management at the School of Commerce, Addis Ababa University, Addis Ababa, Ethiopia. I am currently conducting a thesis entitled "FACTORS AFFECTING THE PERFORMANCE OF LAST MILE DELIVERY: A STUDY ON SELECTED HUMANITARIAN ORGANIZATIONS IN ETHIOPIA". The aim of this questionnaire is to explore how institutional competency, governmental policy, socio-cultural orientation, infrastructural facility, and stakeholder flexibility influence the performance of last-mile humanitarian logistics within the Ethiopian context. It is crucial to identify and examine their impact on the performance of effective and efficient humanitarian emergency responses in the country to ensure the timely delivery of food, water, shelter, medicines, and medical equipment to survivors. Your valuable feedback on these determinant factors affecting the performance of the last-mile humanitarian relief operation will assist me in making valuable recommendations for improving logistics in the field of emergency humanitarian aid. This study is purely for academic purposes and will not affect you in any way. Your honest, candid, and timely response is crucial for the success of this study. Therefore, I kindly request you to respond to each question with care. Thank you for your cooperation.

Thank you in advance for your cooperation and timely response.

TIMHIRT GETACHEW Gashaw

Mobile: 0911469876

e-mail: timaynae@gmail.com

General Information

Your Participation is Voluntary

Do not write your name on the Questionnaire

I. Demographic Profile of Respondents

Direction: The following statements are about your personal information. Please write the necessary information on the blank space provided and, in the optional items, indicate your answer by putting a "x" mark in the box.

1. Sex ☐ Male ☐ Female
2. Age (Years) ☐ 21 – 30 ☐ 31 – 40 ☐ 41 – 50 ☐ 51 – 60
3. Education ☐ High School ☐ Diploma ☐ Degree ☐ Masters +
   ☐ Other, please specify .....
4. Origin/ ownership of the organization
   ☐ Governmental ☐ International NGO ☐ Local NGO
   ☐ UN Agency ☐ Faith-based
5. Department ☐ Supply ☐ Planning ☐ Logistics ☐ Fleet ☐ Procurement
   ☐ Others, please specify _____
6. Position ☐ Director ☐ Manager ☐ Coordinator ☐ Programmer
   ☐ Officers ☐ Others, please specify _____
7. Service year ☐ 1- 5 ☐ 6 - 10 ☐ Above 10
8. Most participated humanitarian aid region/ location
   ☐ Tigray ☐ Amhara ☐ Gambelia ☐ Somali
   ☐ Oromia (Borena)

Part – II Questions related to factors affecting green supply chain management.

Kindly rate the following statements below as to the extent to which you agreed or disagreed with the statements described under each attribute based on your perception. Using the scale of 1 up to 5, tick in the appropriate box as to the extent of your agreement or disagreement with the statements given. Where: Scale 1= strongly disagreed; 2= disagreed; 3= Neither agreed nor disagreed; 4= agreed; 5= strongly agreed.

1. Factors	**Likert Scale**				
1.1 Institutional Competency	**1**	**2**	**3**	**4**	**5**
Logistics management policies are well-developed.					
Procedures for emergency responses are well-defined.					
Skilled labor is available for logistics responses.					
Collaboration with other humanitarian clusters is evident.					
Modern ICT is integrated into logistics operations.					
1.2 Government Policy	**1**	**2**	**3**	**4**	**5**
Clear regulations govern humanitarian relief operations.					
Consistent regulations for humanitarian goods/services exist.					
Regional states have adequate capacity to support relief operations.					
Government interference in relief activities is minimal.					
Government supports local NGOs financially.					
1.3 Socio-cultural orientation	**1**	**2**	**3**	**4**	**5**
Aid recipients are culturally diverse.					
Society exhibits a positive attitude towards aid workers.					
Beneficiaries perceive aid workers as uncorrupted.					
Cultural barriers impact relief operations.					
Trust level with stakeholders at last mile delivery is high.					
1.4 Infrastructure Facility	**1**	**2**	**3**	**4**	**5**
Communication infrastructure supports delivery.					
Road network suits aid delivery.					
Multimodal transport for aid delivery exists.					

Warehouse access for inventory is sufficient.					
Electric power for delivery equipment is reliable					
1.5 Stakeholder's Accountability	**1**	**2**	**3**	**4**	**5**
Dedicated staff handle last mile logistics.					
Beneficiaries cooperate for smooth aid supply operation.					
Collaboration with other aid organizations is effective.					
Donors allow flexible use of funds.					
State governments support emergency aid response.					
2. Last Mile Humanitarian Logistics	**1**	**2**	**3**	**4**	**5**
The delivery of humanitarian aid was timely.					
The aid reached all intended recipients equally.					
The inventory of aid was well-managed.					
The delivery process was well-coordinated transparently.					
The logistical framework was adaptable to changing circumstances.					

Many Thanks for Your Valued Time!!!