ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

FACTORS AFFECTING HUMANITARIAN LOGISTICS CLUSTER AT THE LAST-MILE DELIVERY: THE CASE OF SELECTED HUMANITARIAN ORGANIZATIONS IN ADDIS ABABA

BY

SARA ESHETU WOLDE

JUNE 2024

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DECLARATION

I, the undersigned, declare that this thesis titled ‘’Factors affecting humanitarian logistics cluster at the last mile delivery’’ is my original work, prepared under the guidance of Shiferaw M. (Ph.D.). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher-learning institution to earn any degree.

Sara Eshetu

_____ _____

Name Signature

Addis Ababa University, Addis Ababa June 2024

ENDORSEMENT

This thesis has been submitted to Addis Ababa University, School of Commerce for examination with my approval as a university advisor.

Shiferaw M. (Ph.D.)

_____	_____
Advisor Name	Signature
Addis Ababa University, Addis Ababa	June 2024

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Sincerely,

Sara Eshetu

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ACRONYMS AND ABBREVIATIONS

IGOs	Intergovernmental Organizations
INGOs	International Non-governmental Organizations
NGOs	Nongovernmental Organizations
HRR	Humanitarian Response Review
ERC	Emergency Response Coordinator
IDPs	Internally Displaced Persons
GLC	Global Logistics Cluster
WFP	World Food Program

ABSTRACT

This study sought to investigate factors affecting the performance of the logistics cluster at last-mile delivery by taking selected humanitarian organizations under the cluster of the United Nations World Food Program in Ethiopia. A quantitative research approach along with an explanatory research design was adopted. The survey was conducted on professional employees namely directors, managers, coordinators, programmers, and logistics and supply officers. A sample of 192 valid and usable responses was collected from targeted respondents. Stratified random sampling techniques were applied to select the respondents from each stratum. Primary data were collected through a self-administered questionnaire. A multiple linear regression inferential analysis was adopted to examine the relationship between the identified factors and their effects on the performance of the humanitarian logistics cluster with the help of the SPSS 22.0 application. The results of the findings revealed that infrastructural facilities and flexibility of governmental policy have the highest effect on logistics clusters at last-mile delivery. Nonetheless, organizational capacity and stakeholder commitment contributed moderate effects while cultural orientation had a positive but the least significant effect. The cluster approach of humanitarian logistics at last-mile delivery is affected by several factors to hinder the effective and efficient delivery of life-saving aid to the needy in time. The government authorities, country directors, and logistics managers are advised to collaborate and coordinate with different stakeholders like United Nations agencies, and international and local organizations to facilitate infrastructures and financial support for the smooth delivery of inventories to the disaster areas.

Keywords: Humanitarian Aid Organizations, Humanitarian Response, Logistics Cluster, Natural and Man-made disasters, Non-governmental Organizations, World Food Program

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CHAPTER ONE
INTRODUCTION

1.1. Background of the study

Catastrophes, whether natural or man-made, inevitably cause extensive harm to humans and their surroundings. A catastrophe refers to a sudden and widespread disaster that brings about significant damage or loss of life, surpassing typical disasters in severity and often arising unexpectedly from natural events like earthquakes, hurricanes, or floods, or human-made incidents such as terrorist attacks or industrial accidents (Sharma, 2022). In times of crises, a well-coordinated life-saving effort becomes crucial to swiftly mobilize vast resources and deploy them to address the needs of affected individuals or communities. Nonetheless, in many cases, emergency relief responses stumble during the final delivery phase, often the most complex and costly part of the humanitarian logistics process.

Emergency relief operations encompass the procedures ensuring the timely provision and distribution of essential supplies to those affected by disasters (Mentzer and Konrad, 2019). These operations also assist in restoring basic societal functions and services, fostering conditions for recovery and reconstruction post-disaster, which may have damaged infrastructure and disrupted access to survival essentials. Consequently, victims may be forced to abandon their homes due to safety concerns or inaccessibility, compromising their access to food, medication, and hygiene resources (Hemalatha, 2017). Thus, in time aid responses play a critical role in reducing mortality rates, easing the physical and psychological distress of the affected, and curbing the escalation or spread of the disaster.

The research underscores that the success of disaster relief efforts heavily relies on the strength of an organization's humanitarian logistics system and its collaboration with relevant stakeholders. Sheu (2017) highlights information scarcity as a substantial challenge for emergency logistics managers, while Thomas (2019) argues the complexity of emergency logistics compared to commercial ones due to factors like demand, storage, and performance evaluation, especially in the intricate last-mile scenario involving numerous stakeholders. Ertem (2020) emphasizes the importance of clustering to better coordinate with aid organizations and meet the demand for post-disaster relief effectively.

As per the UN World Food Program Report (2022), last-mile humanitarian logistics often lack a strategic approach by aid organizations, face governmental policy inflexibility, deal with poor infrastructure, and cultural/religious barriers, and are hindered by a lack of stakeholder accountability.

Historical events like the 2005 Asian Tsunami and earthquakes in Haiti have evidenced significant casualties due to a lack of preparedness and coordination (Zaid, 2019). The devastating earthquake in Morocco led to nearly 3,000 deaths, with almost half of them occurring post-disaster due to inadequate stakeholder accountability (Ertem and Rossetti, 2020). Additionally, severe drought conditions in Ethiopia, Somalia, and Kenya resulted in the loss of roughly 3.5 million livestock due to political correctness-driven decisions (Samuel, 2022).

In Ethiopia, the effectiveness of the humanitarian logistics cluster at the last-mile delivery varies based on the type of disaster and the societal context. Over half a century, the country has experienced numerous man-made disasters, such as civil wars and ethnic conflicts, due to political instability that necessitated urgent humanitarian responses. According to Solomon (2022), Various governmental and non-governmental aid organizations participate in mitigating the negative impacts of these disasters. However, it's common to see poor delivery along with misappropriation of the relief items before reaching the intended beneficiaries. This implies the difficulties in addressing humanitarian logistics in the final stages of disaster-stricken areas and the need for well-defined strategies to mitigate the bottlenecks that adversely affect their efficacy.

Despite the severity and nature of the disaster, it requires a thorough investigation of the related factors affecting the effectiveness of the logistics cluster operations in a holistic manner. This can be achieved through gathering information from the staff of active humanitarian aid organizations clustered UN – World Food Program in the delivery of emergency responses in different conflict areas of the country. Based on their perception, this study identifies and analyzes the individual as well as the overall influences of the factors affecting humanitarian cluster operation at last-mile delivery. In this case, the competency of the aid organizations, the collaboration of different interested stakeholders, the cultural orientation of the beneficiaries, accessibility/ availability of the infrastructural facility, and flexibility of state and federal government policies are considered as determinantal factors that affect the delivery of the right supplies to the right beneficiaries promptly.

1.2. Problem Statement

Ethiopia, a developing nation in Sub-Saharan Africa, is grappling with the effects of prolonged civil unrest and recurring droughts, exacerbated by political instability and climate change-induced rainfall deficits. These challenges have been further intensified by ethnic-based regional conflicts, resulting in the displacement of millions of individuals each year. According to the World Food Program

(2023), of the 21 million individuals currently requiring humanitarian aid, nearly half (10 million) are internally displaced, including approximately 5 million women and 1.3 million malnourished children. Despite the adoption of the cluster approach to humanitarian logistics, only about a quarter of these vulnerable groups in disaster-affected areas have been reached by cluster humanitarian aid organizations led by the World Food Program in Ethiopia (Hiwot and Selamawit, 2022). Paradoxically, survivors in various refugee camps within the country receive better relief aid supplies more readily (Robert, 2022), suggesting inefficiencies in the cluster approach's last-mile delivery of humanitarian logistics.

The Humanitarian Cluster System, implemented by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), is a multi-agency response initiative for major humanitarian crises (Beamon, 2018). It organizes humanitarian activities into eleven clusters, each coordinated by specific organizations. Each cluster has a designated UN institution as a lead organization to coordinate, monitor, and control the timely delivery of emergency responses. The Logistics Cluster, in particular, aims to support global, regional, and local actors in overcoming logistics constraints that hinder the delivery of humanitarian assistance to people in need worldwide. It operates in various regions, including Ethiopia, among others (OCHA, 2023). Since its inception in 2005, the system has played a crucial role in enhancing the quality of relief aid distribution to disadvantaged groups, despite several bottlenecks impeding its last-mile efficiency (Habib, 2016).

Previous research in the field has identified several key factors influencing the final stage of humanitarian aid delivery. Kundu (2021) posits that significant challenges and disruptions in humanitarian logistics arise from a range of internal and external factors. Sharma (2022) underscores the role of government policies towards humanitarian aid and the potential interference of political parties in the effectiveness of last-mile delivery. Kuo (2021) contends that the capacity and competence of institutions are vital in effectively reaching those in need, as the scale of the disaster often exceeds the capabilities of the government or individual or grouped humanitarian organizations. Furthermore, Wassenhove (2018) highlights that the lack of infrastructure, economic conditions, and societal cultural context can exacerbate the difficulties in implementing seamless emergency responses at the final stage. However, the literature lacks a rigorous assessment of the factors affecting the logistics cluster holistically, encompassing both external (political, social, economic, and technological aspects) and internal (organizational competency) factors.

In the context of humanitarian aid, the 'last mile' of logistics delivery is crucial to ensure that supplies reach those in need. However, there is a gap in the form of inadequate infrastructure and local logistics capabilities, which impedes the timely and efficient delivery of aid. Additionally, a policy gap is evident as current governmental regulations and coordination mechanisms are insufficient to address the complexities of last-mile delivery in diverse geopolitical contexts. There is also a lack of comprehensive data and research on the operational challenges and best practices for last-mile delivery in humanitarian settings. This trifecta of gaps hampers the ability of aid organizations to execute effective last-mile logistics operations, ultimately impacting the welfare of aid recipients. Therefore, a holistic understanding of the factors affecting the final stage of delivery practices from the perspectives of organizational capability, stakeholder accountability, cultural orientation, infrastructural availability, and governmental policies can enhance the delivery of the right supplies to the right beneficiaries in a timely and fair manner. This, in turn, provides an analytical framework to assist relief decision-makers in making effective and efficient distribution decisions to minimize the survivors' suffering and mortality.

This study aims to investigate the factors affecting the humanitarian logistics cluster at last-mile delivery by examining selected aid organizations clustered under the UN World Food Program in Ethiopia. A holistic view of the factors affecting the final stage of the logistics cluster fills the literature gap by analyzing the relationship between the aforementioned five factors and their influences on the effectiveness of the logistics cluster at the last-mile delivery. This provides an analytical framework to assist decision-makers in taking effective measures to mitigate the survivors' suffering and mortality, as timely delivery of emergency aid is crucial in saving lives during disasters.

1.3. Research Questions

The main question underpins what major factors affect the last-mile delivery of humanitarian logistics: in the case of selected aid organizations in Addis Ababa. Specifically:

- How does organizational capability affect the last-mile logistics of aid organizations clustered under the UN World Food Program?
- What is the influence of the flexibility of government policy on the last-mile logistics of aid organizations clustered under the UN World Food Program?

- How does the cultural orientation of the survivors impact the last-mile logistics of aid organizations clustered under the UN World Food Program?
- What is the effect of infrastructural facilities on the last-mile logistics of aid organizations clustered under the UN World Food Program?
- How does stakeholders' commitment influence the last-mile logistics of aid organizations clustered under the UN World Food Program

1.4. Objectives of the Study

1.4.1. General Objective

To investigate factors affecting the humanitarian logistics cluster at the last-mile delivery in the case of selected humanitarian organizations in Addis Ababa.

1.4.2. Specific Objectives

- To analyze the effect of organizational capability on the last-mile logistics of aid organizations clustered under the UN World Food Program.
- To examine the influence of the flexibility of government policy on the last-mile logistics of aid organizations clustered under the UN World Food Program.
- To evaluate to impact of the cultural orientation of the survivors on the last-mile logistics of aid organizations clustered under the UN World Food Program.
- To examine the effect of infrastructural facilities on the last-mile logistics of aid organizations clustered under the UN World Food Program.
- To investigate the effect of stakeholders' commitment on the last-mile logistics of aid organizations clustered under the UN World Food Program.

1.5. Significance of the Study

Like many of the academic pieces of literature, this study has some significant output. Among the majors, it is designed to shed light on the factors that impact the efficiency of the last-mile logistics cluster of humanitarian aid organizations. The findings would contribute to the ongoing debate about the perceived performance of last-mile delivery by humanitarian organizations clustered under the UN World Food Program in Ethiopia. It's crucial to note that not all humanitarian organizations and stakeholders are fully coordinated, collaborate, and take accountability to tackle the complexities

involved in last-mile delivery within the logistics cluster. By pinpointing the factors that affect the effectiveness of last-mile delivery and their impact on the efficiency of humanitarian logistics cluster services, this study aims to provide a comprehensive understanding that could help reduce unnecessary costs and avoid duplication of operations. The results would also be beneficial to society at large by identifying the challenges encountered during humanitarian coordination efforts aimed at saving lives and alleviating suffering. Moreover, the empirical evidence gathered could aid humanitarian aid actors in Ethiopia by increasing awareness about the factors that enable the successful implementation of clustered humanitarian responses. This would assist in identifying areas that need improvement and in developing actionable plans to achieve their respective goals. Lastly, this study might serve as a valuable reference for future scholars and researchers in this field.

1.6. Scope of the Study

The increased frequency of catastrophes and their impact on millions of lives had heightened the focus on last-mile delivery in humanitarian logistics. These logistics were clustered under the UN World Food Programs, especially located in Addis Ababa, Ethiopia. The scope was delimited to explore the factors affecting the effectiveness of the humanitarian logistics cluster. The focus was on organizational capability, policy flexibility, cultural orientation, infrastructure availability, and stakeholder commitment.

The empirical research was grounded on the viewpoints of professional staff and logisticians from governmental, international, and local non-governmental humanitarian organizations in Addis Ababa. Despite the variety of humanitarian aid types, the organizations involved in this study provided food aid and non-food items such as clothing, hygiene kits, cooking equipment, blankets, and tents.

The perceptions of the respondents about the effectiveness of the last-mile delivery were gathered through a self-administered questionnaire and comprehensive interviews. The data collection took place from February to May 2024.

1.7. Definition of Key Terms

The definitions of key terms in this study provide readers with the necessary background knowledge or foundation to understand the concepts that will be used throughout your research. This section ensures readers grasp the fundamental concepts of this study in the specific way they are utilized.

Humanitarian Logistics – Humanitarian logistics is a branch of logistics dealing with the preparedness and response phases of a disaster management system. (Osman, 2021).

Logistics Cluster – The coordination of different humanitarian actors for the implementation of effective emergency responses. (Robert, 2017).

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. (OCHA, 2022).

Organizational Capability - The ability of an institution to perform its functions effectively and efficiently, and to adapt to changing circumstances and challenges. (Habib, 2016).

Government Policy - The set of decisions, actions, and directives that a government makes and implements to achieve its goals/ objectives regarding humanitarian aid. (Oloruntuba, 2015).

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. (Osman, 2021).

Infrastructural Facility - The quality and availability of roads, bridges, ports, airports, warehouses, and communication networks that can influence the accessibility, speed, and cost of humanitarian delivery. (Zaid, 2019).

Stakeholder Commitment - The extent to which stakeholders, such as governments, NGOs, donors, beneficiaries, and others, are responsible for and transparent about their actions, decisions, and outcomes. (Robert, 2017).

1.8. Organization of the Study

The primary research document was composed of five sections. The first section served as an introduction, providing the study's background, problem statement, objectives, research queries, hypothesis, study's significance, term definitions, limitations, and study scope. The second section was a literature review related to the study. The third section detailed the methodology, encompassing the study area description, research design and strategy, data collection method, sampling design, data collection tools, and data analysis method. The fourth section presented the data analysis and interpretation. The final section, the fifth one, summarized the key findings, drew conclusions, and made recommendations based on the study's conclusions.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

This chapter offers a thorough examination of theoretical literature, empirical research, and a conceptual framework that aligns with the study's objectives. It delves into the literature on last-mile delivery and the potential factors influencing the effectiveness of cluster approach in humanitarian logistics. This chapter encompasses a review of theoretical and empirical studies, as well as the study's conceptual framework. Empirical studies are incorporated to either support or challenge the findings of previous research on factors influencing humanitarian logistics clusters. Finally, a conceptual framework is presented to depict the relationship between the identified factors and the effectiveness of last-mile logistics clustered under the UN World Food Program.

2.1. Theoretical Literature

The theoretical review includes several well-established theoretical perspectives that are used for logistics management. Here, both the theoretical framework of the study and the theoretical literature review are presented accordingly.

2.1.1. Logistics

Logistics, a vital aspect of supply chain management, involves the strategic planning, coordination, and execution of the movement and storage of goods, services, and related information from the source to the consumer. It covers a broad spectrum of activities, including transportation, warehousing, inventory management, packaging, and order fulfillment, all aimed at facilitating the seamless and efficient flow of goods within the supply chain (Kassema, 2020).

The concept of logistics has its roots in military operations, where it was initially used to denote the process of providing troops with essential equipment, supplies, and support on the battlefield. Over time, the scope of logistics has expanded to include a wider range of activities in the corporate sector, playing a crucial role in supporting the operations of businesses across diverse industries.

As defined by the Council of Supply Chain Management Professionals - CSCMP (2018), logistics is "a process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption to conform to customer requirements." This definition underscores the primary objectives of logistics: optimizing

the flow of goods, minimizing costs, enhancing customer satisfaction, and improving overall operational efficiency.

In the context of today's globalized and interconnected world, logistics has become increasingly intricate and sophisticated. Companies are striving to meet the escalating demands of customers while also grappling with the challenges of navigating a complex network of suppliers, manufacturers, distributors, and retailers. The advent of e-commerce and omnichannel retailing has further amplified the significance of logistics, with companies now expected to deliver products to customers more swiftly and efficiently than ever before. Thus, according to Stephano (2018), effective logistics management is indispensable for businesses to stay competitive and foster growth in a rapidly evolving marketplace. By streamlining operations, optimizing supply chain processes, and harnessing technology and data analytics, companies can enhance their overall performance and secure a competitive advantage in the market.

In conclusion, logistics is a critical function that covers a wide array of activities aimed at ensuring the smooth and efficient flow of goods within the supply chain. By effectively managing logistics operations, companies can boost customer satisfaction, cut costs, and improve overall business performance. As the business landscape continues to transform, the role of logistics in supporting supply chain operations will only continue to amplify, making it a key strategic focus for businesses across all sectors.

2.1.2. Humanitarian 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 frequently used in the corporate world, especially by firms in the industrial sectors, to describe the management and movement of resources along the supply chain.

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. 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. Donors 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. One justification for pre-purchasing the supplies is cost, as they can do so at a fair price (Salisbury, 2017). When a catastrophe 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).

2.1.2.1. Last Mile 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, the operation of the last-mile logistics cluster 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 commitment 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 several factors, which also affect how quickly and efficiently the materials are distributed to the victims. As a result, these decision-making variables are connected sequentially.

2.1.2.2. Cluster Approach

The cluster approach in logistics is a network of partners working together to overcome logistical challenges that hinder the delivery of humanitarian aid worldwide. The Logistics Cluster is a global network of humanitarian actors that provides coordination, information management, and access to common logistics services in emergencies and crises (Beamon, 2018). It is part of the cluster system established by the Inter-Agency Standing Committee (IASC). Due to its expertise in humanitarian logistics, the IASC designated the World Food Programme (WFP) as the Logistics Cluster's global lead agency. It manages logistics for all humanitarian actors during an emergency, provides information management services, and coordinates or offers common logistics services as needed. This approach was developed in response to coordination and capacity concerns following the weak operational response to the Darfur crisis in 2004 and 2005 (Salisbury, 2017). The Humanitarian Response Review (HRR) identified capacity gaps and unpredictable responses in key sectors, leading to the call for stronger sector leadership and the establishment of "clusters" at various levels.

However, not all major humanitarian funders were enthusiastic about the approach (Robinson, 2022). For instance, the United States of America, as the world's largest provider of foreign assistance and emergency relief, the United States may have been cautious about entering new agreements requiring fresh resource commitments. Rather, it actively participated in the Geneva-based donor group that collaborated with the IASC agencies and clusters to fund the early implementation of the cluster approach. Interestingly, more than two-thirds of the humanitarian donors surveyed by HRR ranked coordination as one of the top three factors for enhancing overall humanitarian performance, highlighting the importance of sound needs assessment, effective management, increased accountability, and a reduction in the number of actors operating in humanitarian aid (Beamon, 2016).

2.1.3. Last-mile Humanitarian Delivery Performance

The effectiveness of last-mile humanitarian logistics operations is a multi-faceted concept that can be evaluated through several key performance indicators. In humanitarian aid, the efficiency and efficacy of last-mile logistics operations play a pivotal role in determining the success of relief efforts. This essay delves into the multi-faceted concept of evaluating the effectiveness of last-mile humanitarian logistics operations through a range of key performance indicators (KPIs). The evaluation of these KPIs not only sheds light on the impact of aid delivery but also aids in the optimization of strategies for future operations.

2.1.3.1. Timeliness

Timeliness stands as a pivotal Key Performance Indicator (KPI) within the realm of evaluating the efficiency and efficacy of last-mile humanitarian logistics operations. This metric, often denoted as the speed of aid delivery, plays a crucial role in the overall impact of relief efforts (Reiner, 2019). Timeliness is not merely a statistic; it embodies the essence of urgency and responsiveness that can directly determine the survival and recovery prospects of populations affected by crises. In the face of adversity, the rapid and efficient delivery of aid holds the potential to be a literal lifeline, distinguishing between life and death for those grappling with dire circumstances. The ability to monitor and enhance the pace of aid delivery is therefore paramount in guaranteeing that essential assistance reaches afflicted regions promptly. By streamlining logistical processes, optimizing supply chains, and leveraging innovative technologies, organizations can significantly bolster their capacity to respond swiftly to crises and address the pressing needs of vulnerable communities. Embracing a proactive approach to enhancing timeliness not only enhances the impact of humanitarian interventions but also underscores a commitment to prioritizing the welfare and well-being of those in distress (Razzaque and Sheng, 2014).

Coverage is a crucial aspect of humanitarian aid efforts that cannot be overlooked. To effectively assess the impact of aid interventions, it is essential to understand the extent to which the affected population has been reached. This involves not only reaching those in urban or easily accessible areas but also ensuring that aid is reaching remote or hard-to-access populations (Seybolt, 2017). By evaluating coverage, humanitarian organizations can identify where there may be gaps in the distribution network and implement targeted interventions to reach underserved populations. Without adequate coverage, even the most well-intentioned aid efforts may fall short of their intended impact

(Stoddard, 2017). Therefore, it is important for aid organizations to continuously monitor and evaluate their coverage to ensure that aid is reaching those who need it most. Ultimately, by improving coverage, organizations can better serve the populations they aim to assist and make a more meaningful impact on the lives of those affected by crises.

2.1.3.2. Accuracy

Accuracy is a fundamental aspect of aid delivery, as it ensures that the assistance provided is in line with the needs of the recipients. Tailoring aid to the specific requirements of the affected population is not only essential for maximizing the impact of relief efforts but also for avoiding the inefficient allocation of resources (Simchi, 2019). By focusing on accuracy in aid delivery, organizations can effectively address the most pressing challenges faced by those in need, ultimately contributing to improved outcomes and long-term sustainability. Moreover, accuracy plays a critical role in building trust with the communities receiving aid, as it demonstrates a commitment to understanding their unique circumstances and providing assistance that truly makes a difference (Schulz, 2018). Overall, prioritizing accuracy in aid delivery is crucial for ensuring the well-being and resilience of individuals and communities in crises.

2.1.3.3. Cost Efficiency

Cost efficiency plays a crucial role in determining the effectiveness and sustainability of humanitarian operations. By evaluating the cost of delivering aid against the value it provides, organizations can make better decisions regarding resource allocation and budget management. Maximizing cost efficiency allows aid organizations to stretch their budgets further, reaching a larger number of people in need (Simon, 2019). This not only helps in extending the reach of aid programs but also ensures that the assistance provided is impactful and sustainable in the long run. Striking a balance between cost and impact is key to ensuring that humanitarian efforts are effective and responsive to the needs of the communities they serve. By focusing on cost efficiency, organizations can improve their overall performance and make a greater impact on the lives of those affected by emergencies and disasters. Additionally, efficiency in cost management enables aid organizations to build resilience and adaptability in their operations, making them better prepared to address future crises and challenges (Seybolt, 2017). In conclusion, cost efficiency is a fundamental aspect of humanitarian work that influences the effectiveness and sustainability of aid delivery, making it imperative for organizations to prioritize efficiency in their operations.

2.1.3.4. Security

Ensuring security in humanitarian logistics operations is crucial for the success of aid delivery efforts. The safety of aid workers and recipients must be prioritized to mitigate potential risks and vulnerabilities in the field. By implementing comprehensive security protocols, organizations can establish a secure environment that safeguards the well-being of all individuals involved in humanitarian operations. This includes measures such as security training for staff, risk assessments of operational areas, and the establishment of contingency plans for emergencies (Thomas, 2020). Additionally, collaboration with local authorities and communities can enhance security efforts by providing insights into potential threats and facilitating partnerships for joint security initiatives. Overall, maintaining a strong focus on security is essential for upholding the principles of humanitarian aid delivery and ensuring the effectiveness and sustainability of relief efforts.

2.1.3.5. Adaptability

Adaptability is a crucial aspect of logistical operations that can make all the difference in the success of aid delivery efforts. The ability to quickly adjust to changing circumstances and unexpected challenges is essential for ensuring that critical supplies and services reach those in need in a timely and efficient manner. In dynamic and unpredictable environments, aid organizations must be able to pivot and reevaluate their strategies to overcome obstacles and meet the evolving needs of the populations they serve (Stoddard, 2017). Being able to think on their feet, change course when necessary, and innovate new solutions in the face of adversity are all key components of adaptability in the field of humanitarian aid. Those organizations that can cultivate a culture of flexibility and responsiveness within their operations will be better equipped to navigate the complex and ever-changing landscape of humanitarian crises. By prioritizing adaptability and embracing change as a constant factor in their work, aid organizations can increase their overall effectiveness and impact in delivering assistance to those who need it most.

2.1.3.6. Sustainability

Sustainability in humanitarian logistics has become an increasingly important issue in recent years, as organizations strive to reduce their environmental impact and operate in an eco-friendlier manner. The concept of sustainability in this context involves evaluating the carbon footprint of aid delivery processes and working towards minimizing it through the implementation of green logistics solutions (Wang, 2017). By adopting practices such as using renewable energy sources, reducing waste, and

optimizing transportation routes, humanitarian organizations can significantly reduce the environmental impact of their operations and contribute to long-term sustainability goals. Organizations need to prioritize sustainability in their logistics operations to ensure that relief efforts do not inadvertently harm the environment or leave a lasting negative impact on the communities they are trying to help. According to Zaid (2019), by taking proactive steps to implement eco-friendly practices and continuously evaluating and improving their processes, humanitarian organizations can strive towards a more sustainable and environmentally responsible approach to their operations.

In conclusion, the evaluation of key performance indicators provides a comprehensive assessment of the effectiveness of last-mile humanitarian logistics operations. By analyzing metrics such as timeliness, coverage, accuracy, cost efficiency, security, adaptability, and sustainability, aid organizations can enhance their strategies and make informed decisions to optimize relief efforts. Continuous monitoring and improvement of these KPIs are essential for ensuring the success and impact of humanitarian logistics operations in delivering aid to those in need. These indicators collectively provide a comprehensive assessment of the effectiveness of last-mile humanitarian delivery, guiding firms to enhance their strategies to make informed decisions.

2.1.4. Related Factors Affecting Humanitarian Logistics Custer

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.

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 about humanitarian logistics. These two 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 manufacturer's perspective.

In the application of Transaction Cost Theory, a higher asset specificity favors the decision for hierarchy. The total transaction costs can serve as an indicator of the outsourcing decision (Pettit and Beresford, 2015). 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. Transaction Cost Theory is based on two fundamental behavioral assumptions about the transaction partners involved: bounded rationality and opportunism. By hypothesizing that firms aim to minimize costs, the Transaction Cost Analysis theory seeks to predict which activities are internalized and which are transacted via market exchanges (Dewsnap and Hart, 2014).

2.2.2. Resource-Based View Theory

According to the resource-based view (RBV), firms can create a desired competitive advantage by combining strategic resources that are valued, scarce, inimitable, and non-substitutable (Barney, 2011), although this is conditional. One of the desired capabilities in the humanitarian supply chain is visibility, which is used to mitigate the risk of poor coordination due to asymmetric information. According to Eisenhardt (2020), resource-based theory posits that the business can be thought of as a bundle of resources that are heterogeneously dispersed across, in this case, humanitarian organizations with long-term differences. This theory suggests that a company must secure an

efficient bundle and flow of the right type of resources from its operating environment to stay relevant and pile up its performance (Wang, 2017).

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 humanitarian organizations with a competitive advantage in humanitarian operations by combining such resources and capabilities in a way that forms the core competencies of each specific humanitarian organization.

According to Zacharia (2011), Resource-Based Theory is crucial to many organizations due to its proficiency in logistics and the fact that investing in it might be costly. This is because competency is a source of long-term competitive advantage that humanitarian 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, humanitarian groups 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).

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.

2.3. Empirical Literature

A review of related literature reveals that several researches have been conducted in developing countries regarding the factors affecting the last mile of humanitarian logistics. Nonetheless, their applicability in developing countries like in Ethiopia has yet to be investigated. Several studies were conducted on the effectiveness, challenges, and practices of humanitarian logistics management, whereas Ethiopia has conducted studies on challenges and performance of humanitarian logistics management as well as factors affecting last-mile humanitarian supply chain management. Thus, the necessity of conducting the factors affecting the effectiveness of the logistics cluster in the last-mile humanitarian operation in the Ethiopian context is undeniable.

2.3.1. The effect of organizational capability on the effectiveness of last-mile delivery

Anthony (2016) studied factors affecting the humanitarian supply chain management performance of international non-governmental organizations in Kenya. An 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, teamwork, and organizational capability determine the effectiveness of humanitarian logistics responses. The author concludes that institutional capability/ capacity plays a significant role in the enhancement of last-mile logistics effectiveness. Having well-defined organizational policies and procedures with talented human resources can make a difference in efficiently and effectively responding to 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 participated in the survey. The results revealed that organizations with competent staff, well-developed structures, logistics policies, and procedures had better performance in addressing sufficient emergency aids in time. Without skilled

human resources, well 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 a descriptive research design and employed the key performance 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 the situation and location of the disaster affected.

In general, organizational capabilities are the intangible, strategic assets that an organization uses to execute its strategy, satisfy its customers, and achieve its goals. They are not derived from a single effort or by following an external template but are acquired and refined internally from multiple interactions to be organization-specific (Kovacs, 2019). These capabilities can include expertise, activities, information, knowledge, procedures, processes, skills, systems, technologies, or unique adaptive features. The strength and alignment of these assets define a company's identity and differentiate it from competitors. The organizational capability in a humanitarian logistics cluster is designed to ensure effective coordination, predictable leadership, and accountability, thereby enhancing the overall humanitarian response. Based on these arguments, the following hypothesis is proposed:

H1a - Organizational capability has a significant effect on last-mile delivery.

2.3.2. The effect of government policy on the effectiveness of last-mile delivery

Balcik (2017) studied the effectiveness of emergency responses by the UN WFP through a cluster approach. The survey was conducted on selected five countries that had experienced complex natural and man-made disasters. A descriptive research design with a 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 the political interests 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 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 political leaders. However, it seems challenging to implement the logistics schemes as the supply and distribution chain is subjected to several stakeholders with different political interests. Furthermore, the author suggests that the peculiar nature of the aid supply chains entails attaining the highest levels of coordination between the different stakeholders (either political or civilian), to achieve greater effectiveness.

Wassenhove (2016) also studied the role of political leaders in disaster risk management: in the case of Darfur's Civil War, South Sudan. An explanatory research design with a 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, the uncertainty of demand and supply, time pressure, corruption, and lack of coordination among a large number of stakeholders in politics adversely affected the effectiveness of the humanitarian responses.

In this regard, the performance of humanitarian logistics can be influenced by various government factors, which can be either external or situational. These factors include the type of regime, national policy, state efficiency, and corruption level in the host country (Tomasini, 2021). The type of regime, which refers to the political system and the level of democracy and human rights, can impact the operations of humanitarian actors. For instance, authoritarian regimes might impose restrictions on humanitarian relief activities, while democratic regimes might promote cooperation and transparency. National regulations, which encompass the laws, policies, and procedures governing humanitarian relief operations, can affect the speed, cost, and quality of humanitarian logistics. These regulations might include customs clearance, tax exemption, visa requirements, registration processes, and quality standards for humanitarian goods and services (Reiner, 2019).

State efficiency, which pertains to the capacity and performance of government institutions involved in humanitarian relief operations, can influence the availability and adequacy of government services and resources supporting humanitarian logistics. Lastly, the level of corruption, which is the extent of power and resource abuse for personal gain, can impact the integrity, accountability, and effectiveness of humanitarian logistics. Based on the above discussion, the following hypothesis is proposed:

H1b - Flexibility of government policy has a significant effect on last-mile delivery.

2.3.3. The effect of socio-cultural orientation on the effectiveness of last-mile delivery

Korpela (2016) studied the critical success factors of humanitarian logistics and supply chain management in the 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 may influence the preferences, expectations, and acceptance of humanitarian assistance, as well as the potential for social cohesion or conflict.

A study was 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 questionnaires 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 a better understanding of the cluster among the members with different socio-economic statuses. That means, national and local actors, as well as newly arriving international actors, thus have a clearer point of contact.

Scholten (2010) also conducted a study on determinants of effective humanitarian logistics and supply chain management in the case of Bangladesh, and Thailand. A mix of qualitative and quantitative research approaches 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 a questionnaire. The results

revealed that the gap between humanitarian needs and the availability of resources is often unpredictable and fluctuates rapidly, making it difficult to plan and coordinate logistics activities.

The cultural orientation of the survivors, which encompasses the social and cultural conditions of the beneficiaries in a disaster area, can significantly influence the performance of last-mile humanitarian logistics. These factors include the level of development, poverty, education, health, culture, religion, language, and more. The effectiveness of humanitarian logistics is dependent on the compatibility, cooperation, and communication between humanitarian actors and local stakeholders (Nollet, 2021). Uncertainty in demand and supply is a major challenge in estimating and forecasting the needs and availability of humanitarian goods and services in a disaster area. This uncertainty can impact the efficiency and effectiveness of humanitarian logistics, depending on the accuracy and timeliness of needs assessment, market analysis, and supply chain planning. Referring to the above arguments, the following hypothesis is proposed:

H1c - The cultural orientation has a significant effect on the last-mile delivery.

2.3.4. The effect of the infrastructural facility on the effectiveness of last-mile delivery

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 infrastructure and the 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, water, and road infrastructure reaching affected populations adversely affecting the effectiveness of the humanitarian response.

Thomas (2020) used a comprehensive literature survey to identify the factors affecting humanitarian supply chain management in the 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 can 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.

The lack of sufficient and reliable infrastructure, such as roads, railways, airports, power, warehouses, and communication lines, in disaster areas poses numerous challenges to humanitarian logistics. Wassenhove (2019) argues that a well-developed road infrastructure can enhance the efficiency and effectiveness of humanitarian logistics, while a poor road network can obstruct and delay the distribution of relief items. Additionally, high transportation costs, which are expenses for storing and moving humanitarian goods and services in the disaster area, can impact the affordability and accessibility of humanitarian logistics. This depends on the efficiency, optimization, and innovation of inventory and transportation management (Ramsden, 2019). Gray (2016) concludes that the lack of infrastructure hampers coordination and collaboration among humanitarian actors, as it restricts information sharing, communication, and supply chain visibility. The study suggests that aid organizations should adopt a contingency approach that takes into account infrastructural constraints in disaster areas and adjusts their logistics strategies accordingly Based on this, the following hypothesis is proposed:

H1d - Infrastructural facility has a significant effect on last-mile delivery.

2.3.5. The effect of stakeholder commitment on the effectiveness of last-mile delivery

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 is applied to identify the challenges and existing practices of NGOs in conflict regions of Tigray. The findings revealed that inconsistency in fundraising due to a lack of donor flexibility hindered the effective supply of humanitarian aid 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 donor characteristics and customized information systems on humanitarian response coordination in the case of the Indian earthquake. Although the information is one type of humanitarian supply chain flow, it combines the analyses of funds and information

given their close tie to each cluster involved. According to the major findings, one of the challenges to the performance of humanitarian organizations was funds delay. The author argues that most of the funds are spent on direct relief, leaving little room for strategic preparedness and investment in infrastructure and systems. Maon (2019) added that the funds from donors are often short-term and restricted, limiting the flexibility and adaptability of the organizations.

Guven and Ergen (2017) studied the impact of the sufficiency and flexibility of donors 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. There is consensus that improved sufficiency of funds and the characteristics of donors highly affect the performance of aid supply chains.

In recent years, the significance of humanitarian logistics as a key aspect of humanitarian response has been increasingly acknowledged due to its accountability and transparency (Chaikin, 2013). Operationally, these actors face numerous and overlapping constraints. These include the demand/pressure from donors for accountability and transparency, competition for limited funding resources, the marketization of the International NGO sector, high staff turnover rates and low institutional memory, and the absence of effective evaluation mechanisms. Therefore, enhancing the capacity and operational effectiveness of humanitarian logistics has become a crucial part of the global humanitarian reform undertaken by the international community and the structural manifestation of that process. In this context, donors have recently played a significant role in encouraging humanitarian organizations to consider greater donor accountability and transparency across the entire supply chain (Thomas, 2020). Referring to the above, the following hypothesis is proposed:

H1e - Stakeholder commitment has a significant effect on last-mile delivery.

2.4. Empirical Literature Gaps

The theoretical literature and empirical studies have established a clear relationship between various factors and the effectiveness of last-mile humanitarian logistics. However, upon a thorough review of the empirical literature, several potential gaps have been identified that could serve as avenues for further research in the field of humanitarian logistics chain management.

The studies have a lack of exploring the potential of last-mile delivery in determining the overall effectiveness of humanitarian logistics. This could include the influence of clustering different stakeholders like governmental and non-governmental bodies to coordinate and collaborate for the delivery of aid responses, which could significantly improve the efficiency and effectiveness of humanitarian efforts at the last mile. This implies that the literature doesn't sufficiently address the involvement and accountability of local communities, government bodies, and aid organizations in the last-mile humanitarian logistics. Understanding the impact of local knowledge, regional state government participation, and local leadership on the success of last-mile humanitarian efforts could provide valuable insights for improving the overall humanitarian logistics.

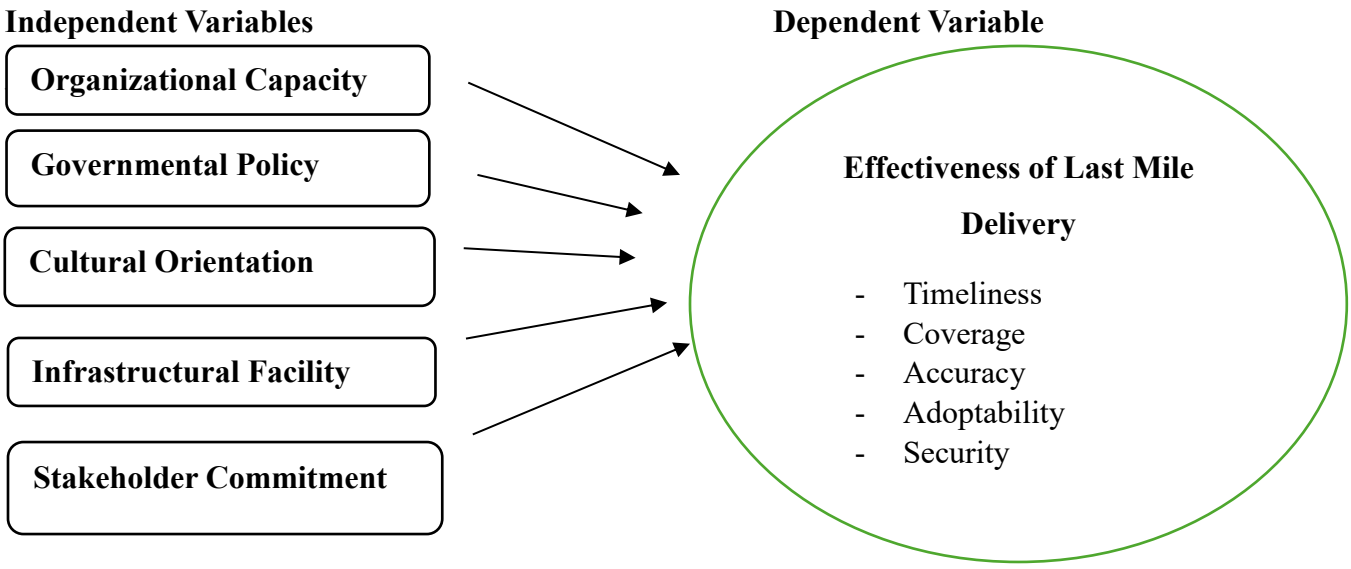
There is also a lack of studies that examine humanitarian logistics across different phases of the humanitarian logistics context. Such studies could provide insights into best practices and strategies that are most effective in specific (the connection of clustering and last-mile delivery) contexts, thereby contributing to the development of more effective and context-specific humanitarian logistics strategies. While some studies mention the impact of state regulations, a more in-depth study could be done on how different policies and regulations impact the effectiveness of humanitarian logistics at the last-mile delivery. This could provide valuable insights for policy-making and regulatory reforms to facilitate more effective humanitarian logistics at the last mile as the regional government's commitment determines the effectiveness of the logistics chain. The availability and sufficiency of infrastructure on the effectiveness of humanitarian logistics lacks a thorough investigation that focuses on last-mile delivery in particular. Understanding the impact of such a logistics phase could help in developing more effective strategies for the overall humanitarian logistics as well.

These identified gaps could serve as potential areas for further research in this field, thereby enhancing the understanding of the effective performance of last-mile humanitarian logistics. This could ultimately contribute to the development of more effective and efficient humanitarian logistics strategies and practices.

2.5. Conceptual Framework

Based on the related theoretical literature and empirical studies review, it can be summarized that factors related to the last-mile humanitarian logistics cluster namely organizational, political, cultural orientation, infrastructural facility, and stakeholder commitment have a direct relationship with the last mile of humanitarian responses. Based on this understanding, the conceptual framework is set in

such a way that factors related to the last-mile logistics cluster namely organizational capacity, the flexibility of government policy, cultural orientation, infrastructural facility, and stakeholder flexibility are considered independent variables, while the effectiveness of the humanitarian logistics cluster at the last-mile delivery is the dependent variable. As depicted in Figure - 1, the arrows indicate the direct relationship of the five independent variables with the performance of last-mile humanitarian logistics. The framework is adopted from the study by Nezih and Melissa (2019).



(Source: Nezih and Melissa, 2019)

Figure 1: Conceptual Framework of the Study

2.6. Summary of Hypothesis

Based on the theoretical literature and empirical studies, the following alternate hypotheses are proposed. The hypotheses are:

H1a - Organizational capability has a significant effect on last-mile delivery of logistics cluster

H1b - Flexibility of government policy has a significant effect on last-mile delivery of logistics cluster

H1c - The cultural orientation has a significant effect on the last-mile delivery of logistics cluster

H1d - Infrastructural facility has a significant effect on last-mile delivery of logistics cluster

H1e - Stakeholder commitment has a significant effect on last-mile delivery of logistics cluster

CHAPTER THREE

METHODOLOGY OF THE STUDY

This study aimed to investigate factors affecting the performance of last-mile delivery of emergency responses by taking selected humanitarian organizations in Addis Ababa as a case. To address the objectives, the appropriate research design and methods were 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 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 be used in this survey, are described.

3.1. Research Design

This study sought to investigate factors affecting the performance of last-mile delivery of emergency responses by humanitarian organizations clustered under UN WFP in Ethiopia. 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 have significant relationships with humanitarian logistics clusters at last-mile delivery. 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 found more appropriate as it tried to explain the cluster approach of humanitarian logistics response based on the identified factors namely institutional capacity, government policy, sociocultural orientation, infrastructural facility, and stakeholder commitment.

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 will be 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 of 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 responses at the last

mile was found 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 are selected for the reason that they have enormous experience in participating in different humanitarian aid projects implemented in 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) have together with the Government of Ethiopia (Disaster Risk Management Commission - DRMC) provided food and non-food assistance to the disadvantage groups. Out of these 170 organizations, only 44 organizations were partnered with WFP (WFP Operation overview, 2023).

Since there was no formal membership to participate in global or local Logistics Cluster activities, all organizations responding to humanitarian crises under the supervision of WFP were considered members of the cluster. Thus, a total of 44 humanitarian aid organizations were eligible to participate in this case study. According to the Authority for Civil Society Organizations (ACSO) database in 2023, there were 916 active employees, of which 479 staff who engaged in job positions of logistics managers, coordinators, and officers including executives and directors of the organizations were taken as the targeted population of the study.

3.4. Sample Size

Sampling is the process of selecting several study units from a defined study population (Saunders, 2010). Determining sample size is a 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 a census, taking a representative sample of respondents is more economical. Thus, a proportionate sample size was computed by using Yamane’s proportionate sample size determination formula. The formula is:

$$n = \frac{N}{1+Ne^2} = \frac{(479)}{1+(479*0.05^2)} = 218 \text{ respondents.}$$

Thus, the study considered a sample of 218 respondents to participate in this survey. Their distribution based on organizational ownership structure is presented in Table 1.

Table 1. Distribution of Sample Respondents

Cluster Partners	Population (a)	Proportion (b=a/479)	Sample (c=b*218)
Governmental (DRMC)	26	0.055	2
UN Agencies	59	0.124	14
International NGOs	165	0.344	123
National/Local NGOs	229	0.477	133
Total	**479**		**218**

(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). Probability sampling applies a random (equal chance) selection, while non-probability is subjective and relies on the researcher's decision or reasoning. A stratified random sampling was applied to select 218 sample respondents from a total of 479 staff of the aforementioned aid organizations. Proportional sample respondents from each stratum were selected to ensure the representativeness of the sample. To do so, the list of the sample staff from the targeted organizations was made readily available first. Then, the sample respondents were selected from each stratum proportionately by applying stratified (probability) sampling techniques. This makes probability sampling practical and makes it more appropriate to generalize the findings to the larger population.

3.6. Type of Data and Data Source

According to Catherine (2017), data may be collected as primary, secondary, or both. Primary data are originated by the researcher for the specific purpose of addressing the problem at hand. On the other hand, secondary data contains relevant data that has been collected for a different purpose, but from which the conclusion is valuable for the purpose (Saunders, 2010). In this study, only the

primary source of data from the targeted respondents was collected and used for analysis as there was no secondary data available that matched the objectives of the study.

3.7. Data Collection Instrument

The standardized questionnaire was 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 many respondents identical questions. The reason for selecting a questionnaire in this research is because it has the merit of giving adequate time for informants to respond and is also economical and allows to easily approach respondents (Wilkinson and Birmingham, 2013).

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

The questionnaire has two parts. Part One refers to the personal information of the targeted respondents. Part Two includes a total of 30 statements, of which 25 items are intended for measuring five factors affecting the effectiveness of last-mile logistics cluster in terms of organizational capacity, the flexibility of government policy, cultural orientation, infrastructural facility, and stakeholder flexibility. While 5 statements are assigned for the last-mile humanitarian logistics cluster. A 5-point Likert-scale-based questionnaire was used as a major instrument of data collection. The questionnaire is used to convert the qualitative data to quantitative data by using a Likert scale ranging from 1- for "Strongly disagreed" to 5- for "strongly agreed". Likert scale is one of the known measuring scales for categorical data (Saunders, 2010).

3.8. Data Collection Procedure

The next steps after developing the instrument were to distribute the questionnaires and collect the data back following the sampling method and technique mentioned in the previous section. For this, the locations of the chosen humanitarian organizations within the same neighborhoods were grouped to facilitate access and save time. The approval of the management from the selected companies was sought for surveying their premises after identifying their location. The respondents' consent was also

requested again. The questionnaires were given to the respondents during their tea break or any other suitable time without disrupting their operations if they agreed. Alternatively, the respondents were also reached through their email and telegram accounts and were constantly reminded to check and reply promptly.

3.9. Data Analysis Method

Data in this study were analyzed using both descriptive and inferential statistics. Descriptive statistics is used to interpret data in general and for testing hypotheses and investigating research objectives inferential method is used using the Statistical Package for Social Science (SPSS) version 22. Descriptive statistics was applied to interpret the demographic variables of the respondents, mean, and standard deviations of each study variable; whereas inferential statistics was used for testing hypothesis, correlation, and multi-regression analysis. Tables and graphs were used to present analysis results pictorially.

Model Specification – for this study, a regression model is proposed based on the identified independent (factors affecting last-mile logistics cluster) and dependent (effectiveness of last-mile humanitarian logistics cluster) variables. It is intended to examine their relationship using the multiple linear regression method. Multiple linear regression was applied to define the relationship and to evaluate the most dominant factors affecting the effectiveness of last-mile delivery of the logistics cluster. The mode is specified as:

- **Independent variables** – Factors affecting last-mile delivery of logistics cluster in terms of organizational capacity, the flexibility of government policy, cultural orientation, infrastructural facility, and stakeholder commitment.
- ***Dependent Variable* –** Performance of last mile humanitarian logistics.

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

$$LMHL = \beta_0 + \beta_1 PREP + \beta_2 COOR + \beta_3 LEAD + \beta_4 ACCT + \beta_5 IFMG + e$$

Where:

LMHL - Last Mile Humanitarian Logistics Cluster; INS - Organizational Capacity, POL- Governmental Policy, SCO- Cultural Orientation, INF- Infrastructural Facility, and STK- Stakeholder Commitment; β_0 - Constant; $\beta_{1,2,3,4,5}$ - Coefficients of Predictors

3.10. Validity Test

In the initial phase of the research initiative, a set of 30 questionnaires were distributed to specifically identified participants eligible to partake in the preliminary investigation. The study focused on personnel affiliated with the World Food Programme (WFP) in Addis Ababa who were distinct from the primary study's scope. Out of the distributed questionnaires, a total of 25 completed responses were obtained, with 5 questionnaires deemed ineligible for analysis due to incomplete data. Consequently, a total of 25 valid and sufficiently comprehensive responses were subjected to rigorous evaluation for the assessment of both reliability and validity.

To assess the validity of the questionnaire designed to collect primary data on factors affecting last-mile delivery of emergency responses among a cluster of humanitarian organizations, a sample validity test was conducted. The primary objective of this test was to determine whether the questionnaire truly measures what it is intended to measure and whether it successfully captures the relevant variables related to the last-mile humanitarian logistics in response to emergency aid in disaster areas. The scale validity test involved administering the questionnaire to a small group of experts in the field of last-mile humanitarian delivery, who were asked to provide feedback on the clarity, relevance, and comprehensiveness of the questionnaire. Additionally, the assigned thesis advisor along with experts in the field were also asked to assess the appropriateness of the questions in capturing the key factors affecting last-mile delivery practices within aid organizations clustered under the UN WFP's context. The results of this sample validity test were crucial in refining the questionnaire and ensuring its effectiveness in collecting accurate and reliable data for the intended research study. By conducting this test, the quality and validity of the data collection tools are assured, ultimately strengthening the overall findings and conclusions.

3.11. Reliability Test

In the assessment of research tools, one of the primary criteria is reliability, the extent to which an instrument yields the same results each time it is employed under identical conditions with the same subjects (John, 2013). Essentially, reliability is synonymous with consistency. In this study, Cronbach's alpha is utilized to evaluate the internal consistency of variables in the research tool. Cronbach's alpha (r) is a reliability coefficient employed to gauge the internal consistency of the scale; it is represented as a numerical value ranging between 0 and 1. Scales with a coefficient alpha falling between 0.6 and 0.7 denote fair reliability (Zikmund, 2010).

Table 2. The Outcome of the Reliability Test

Dimension	No of items	Cronbach's Alpha
Organizational Capacity	5	.796
Governmental Policy	5	.910
Cultural Orientation	5	.743
Infrastructural Facility	5	.805
Stakeholder Commitment	5	.712
Last Mile Logistics	5	.827
Total Reliability	**30**	**.925**

Source: SPSS data output, 2024

Table 2 lists five factors affecting last-mile humanitarian logistics practices, each with a specified number of items and a corresponding Cronbach's Alpha value. The Cronbach's Alpha values range from .712 to .910, indicating a satisfactory to high level of internal consistency within each dimension. The Total Reliability, encompassing all 30 items, yields a Cronbach's Alpha of .925, suggesting an excellent overall internal consistency of the survey instrument. This high level of reliability is indicative of the survey's ability to produce consistent results across various items within the same dimension, thereby affirming the dependability of the data collected through this survey. This result is a crucial component in validating the reliability of the survey, which is fundamental for academic research to ensure that the scale accurately captures the constructs intended to be assessed.

3.12. Ethical Considerations

It is important to consider ethical principles when conducting business research. Ethical issues are categorized into four different types: harm to participants, lack of informed consent, invasion of privacy, and deception (Bryman, 2011). In this study, there are descriptive questions about the respondent's age and gender but this information is not enough to identify the person. The second ethical principle to consider is the lack of informed consent. The third ethical principle concerns the invasion of privacy. In this study, the respondent has the opportunity to skip a question if it is judged sensitive. Furthermore, this study is not of a sensitive nature which enhances the respondents' willingness to answer. The fourth ethical principle refers to deception which occurs if respondents are led to believe that research is about something else than what it is. After considering these ethical principles and fully living up to the requirements, it can be classified as ethical.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

In this chapter, the collected data are presented, analyzed, and interpreted. Both descriptive and inferential analyses are conducted and the results are interpreted to address the objectives of the study. The demographic profiles of the respondents and study variables are described while the inferential analysis is carried out to show the relationship between factors affecting the performance of last-mile delivery of humanitarian logistics clustered under the UN WFP organization. The output includes correlational tests, assumption tests, and regression analysis.

4.1. Response Rate

According to the results, the total distribution of questionnaires was 218, with 11 forms not returned or declined, resulting in 207 replies, representing the overall response rate of 95.0%. However, there were 4 responses with discrepancies, leading to 203 valid and usable responses representing an effective response rate of 93.1%. These rates are significant as they reflect the level of engagement and the quality of data collected. The high response rate suggests a strong interest or obligation felt by participants, which can enhance the reliability of the study's findings. The small number of discrepancies indicates good data integrity, but it also highlights the importance of meticulous data verification processes. This result provides valuable insight into understanding participant engagement and data quality, and it serves as a crucial component in evaluating the success of the survey distribution effort.

4.2. General Information about the Respondents

The first part of the questionnaire consists of the demographic characteristics of the respondents. It requested a limited amount of information related to the personal and demographic status of the study participants. Accordingly, the following variables about the respondents were summarized and described in the subsequent tables. These variables include; gender, age, education, origin, department, position, service year, and project area. The general information about the respondents was summarized and presented in Table 3.

Table 3. Demographic Characteristics of Respondents

	Category	N	(%)
Gender	Male	117	52.6%
	Female	86	47.4%
	Total	**203**	
Age	21 – 30 years	95	46.9%
	31 – 40 years	71	34.9%
	41 – 50 years	32	15.6%
	50 – 60 years	5	2.6%
	Total	**203**	
Education	Diploma	5	2.6%
	First Degree	115	56.8%
	Masters & above	80	39.6%
	Others	2	1.0%
	Total	**203**	
Department	Planning	29	14.1%
	Program	43	21.4%
	Logistics	75	37.0%
	Procurement	35	17.2%
	Fleet	21	10.4%
	Others	0	0.0%
	Total	**203**	
Position	Director	7	2.1%
	Manager	21	8.3%
	Coordinator	43	30.7%
	Programmer	63	15.6%
	Officer	58	43.2%
	Others	0	0.0%
	Total	**203**	
Service Year	1 – 5 years	110	54.2%
	6 - 10 Years	72	35.4%
	Above 10 Years	21	10.4%
	Total	**203**	

Source: Own Survey, 2024

Upon examination of the provided data, it can be discerned that the total number of respondents amounted to 203, classified according to gender. In the context of gender distribution, male respondents represented 52.6% (117 respondents) of the total sample size, while female respondents comprised 47.4% (86 respondents). This suggests a slight preponderance of male participants in the sample. Given the scope and sample size of this study, it would be precipitous to conclude the implications of this gender disparity, beyond acknowledging the diversity of the sample. It is conceivable that future research endeavors with a specific focus on gender could explore this aspect from a gender-centric perspective.

Transitioning to the analysis of age distribution, it is discernible that the preponderance of respondents was within the age bracket of 21 to 30 years, accounting for 46.9% (95 individuals) of the total sample. The subsequent prominent age cohort was those aged between 31 to 40 years, constituting 34.9% (71 respondents) of the aggregate. Moreover, the respondents within the age ranges of 41 to 50 years and 50 to 60 years comprised 15.6% (32 individuals) and 2.6% (5 individuals) of the sample, respectively. This data provides an overview of the age demographics of the respondents.

Among the surveyed individuals, a significant percentage constituting 56.8% (115 respondents), hold a First Degree. This statistic suggests that the attainment of an undergraduate education is a prevalent milestone among the individuals included in the survey. Additionally, 80 individuals holding a Master's degree or above makeup 39.6% of the sample, indicating a noteworthy presence of postgraduate qualifications within the population. Furthermore, 5 (2.6%) of the respondents possess a Diploma, showcasing a smaller yet notable cohort of individuals who have completed a lower-tier educational program. The remaining 2 (1.0%) fall under the category of 'Others,' which could encompass a variety of educational qualifications not explicitly mentioned in the data. This breakdown of education levels highlights the diverse academic backgrounds of the surveyed individuals, reflecting a range of experiences and achievements within the realm of education.

In analyzing the breakdown of the departmental allocation percentages, it is evident that the Logistics department holds the largest share at 37.0% (75 respondents), followed by the Program department at 21.4% (43 respondents), and the Procurement department at 35 (17.2%). Furthermore, the Planning department accounts for 14.1% (29 individuals) of the total allocation, while the Fleet department 10.4% (21 respondents). This distribution highlights the significant emphasis placed on logistics within the organization, indicating the crucial role it plays in overall operations. This breakdown

serves as valuable insight for analyzing the perception of different staff from different departments, enabling us to understand their perception towards the last-mile humanitarian logistics delivery and the factors affecting their performances.

In the data provided, which lists positions and corresponding frequencies of occurrences within a certain context, the breakdown of roles is as follows: 7 (3.61%) individuals hold the title of Director. Following this, Managers make up 20.9% with a total of 22 individuals. Coordinators represent the largest portion at 22.4% with a count of 45. Programmers account for 32.8% of the total, with 67 individuals in this role. Finally, Officers make up the highest percentage at 30.2%, with a total of 61 individuals. By presenting this information in a clear and organized manner, stakeholders can easily grasp the distribution of positions within the specified dataset.

In this analysis of service years, the data reveals a distribution across three categories: 1-5 years, 6-10 years, and above 10 years. Among the total respondents, 110 individuals, accounting for approximately 54.2% of the sample, reported having a service year between 1 and 5 years. In the 6-10 years category, there were 72 respondents, constituting about 35.4% of the total. Finally, 21 individuals, representing 10.4% of the respondents, reported having a service year above 10 years. This information provides valuable insights into the tenure distribution within the surveyed population, showcasing a varied range of experience levels among the participants.

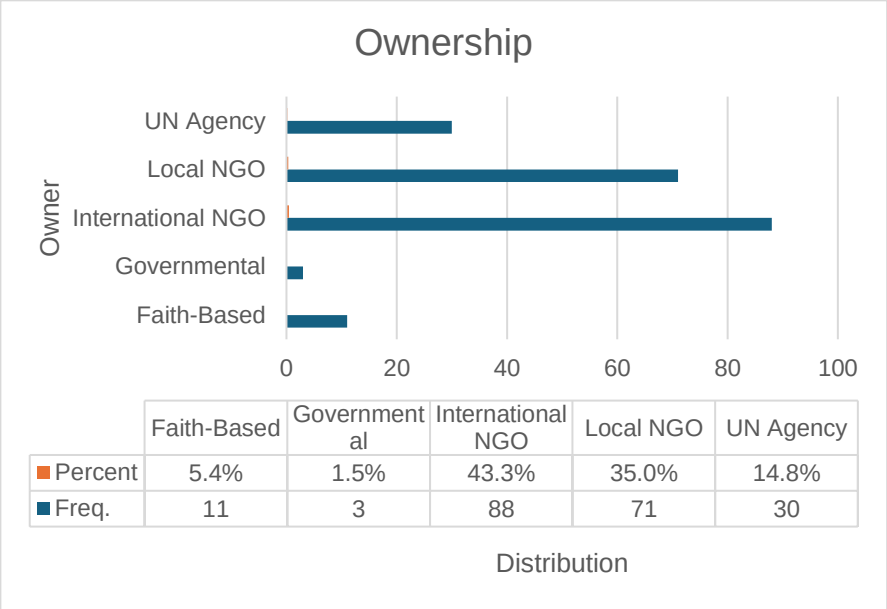


Figure 2: Types of Aid Organizations

In the analysis of organizational affiliations within the/ humanitarian logistics cluster, the data in Figure 2 reveals a diverse distribution of respondents from different types of aid organizations. The respondents from governmental organizations accounted for 3 (1.5%) individuals, and 71 (35.0%) from Local NGOs exhibit a stronger presence within the affiliations. International NGOs emerge as the largest group, comprising 88 (43.3%) respondents. UN Agencies are also notable contributors, with 30 entities, reflecting a 14.8% share. Faith-based organizations represent the smallest faction, with only 11 respondents, making up 5.4% of the total affiliations. This breakdown underscores the varied landscape of actors engaged in the delivery of humanitarian assistance.

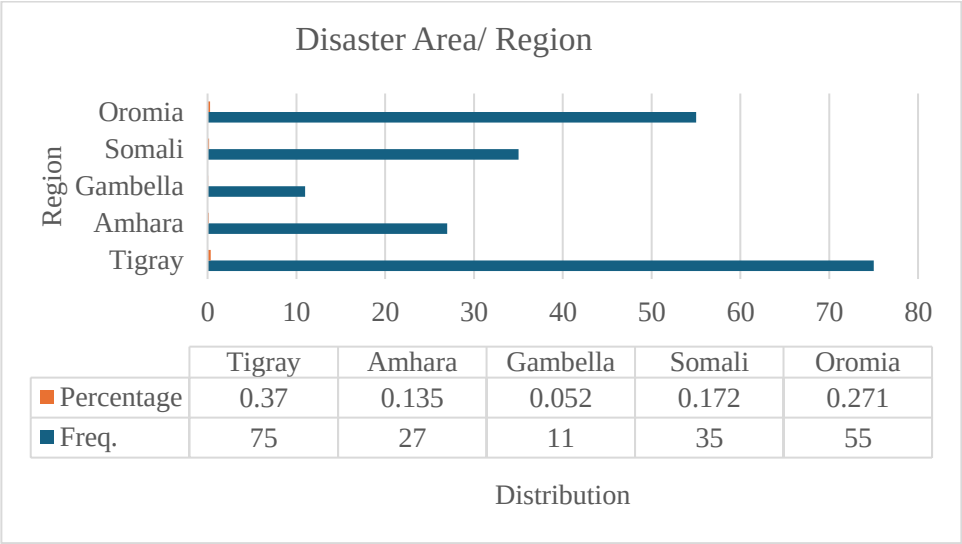


Figure 3: Most Served Disaster Region

The statistical data provided in Figure 3 highlights the most served regions in terms of humanitarian aid responses due to different disasters. The numbers indicate the head counts of the respondents who participated in a specific region's emergency response logistics served by the cluster. In this regard, a relatively high number of respondents, 75 (37.0%) have participated in response to Tigray's disaster. Following closely behind is Amhara with 27 (13.5%) respondents, while the rest 35 (17.2%), 55 (27.1%), and 11 (5.2%) individuals participated in aid logistics in Somali, Oromia, and Gambela regions respectively. This implies that the distribution of humanitarian aid responses across different regions and is evident that Tigray received the most attention, with nearly half of the respondents participating in disaster response efforts there. However, it's also important to note that each region had some level of participation, indicating a broad reach of the aid efforts.

4.3. Factors Affecting Last Mile Delivery of Humanitarian Logistics Cluster: Descriptive statistics

The description of factors namely organizational, political, cultural orientation, infrastructural facility, and stakeholder commitment, affecting last mile delivery of the humanitarian logistics cluster along with the performance of the humanitarian logistics cluster is presented in the next consecutive paragraphs accordingly. In this regard, to achieve the research objectives, a total of 25 questions were categorized into five factors influencing last-mile humanitarian logistics, and an additional five questions were dedicated to the overall performance of the logistics cluster. This was done to gather data based on the respondents' perceptions. Consequently, the analysis utilized a total of 30 questions.

Descriptive analysis can be conducted using various measures, including frequency, central tendency, dispersion, and position. However, in this instance, only central tendency (mean) and dispersion (standard deviation) were employed to compare their perceptions of the variables. The mean serves to indicate the average extent to which the respondents agree or disagree with the various statements. As per Best (2005), the scale is designed such that respondents are considered with the mean range of 1.01 – 1.80 = Very Uninfluential factor, if the mean is with the range of 1.81 – 2.60 Highly Uninfluential; with the range of 2.61 - 3.40 = Moderately Influential; with the range of 3.41 – 4.20 = Highly Influential; and if the mean is with the range of 4.21 – 5.00 = Very Highly Influential factor. Additionally, the standard deviation indicates the variability of an observed response.

4.3.1. The Effect of Organizational Capacity on Last-Mile Delivery

Table 4. Description of Organizational Capacity (n = 203)

Description	**Mean**
The organization has a clear strategy for aid logistics during emergency responses.	4.37
The organization has a well-trained staff for last-mile delivery of emergency responses.	2.50
The organization has good leadership guiding the delivery of emergency responses.	3.43
The organization has sufficient resources to carry out the logistics of emergency responses.	3.57
The organization effectively uses information and communication technology in last-mile delivery of emergency responses.	3.41
Average	**3.46**

Source: Own Survey, 2024

Referring to Table 4, in the context of examining the impact of organizational capacity on last-mile delivery, the data presented shows a diversity of mean scores across different aspects.

The grand mean of the organizational capacity descriptions, presented at 3.46, is indicative of the organization's capacity holding significant sway in last-mile delivery for emergency responses. This statistic underscores that, on average, the organization's capacity carries a substantial degree of influence on the efficiency and efficacy of last-mile delivery operations. Of particular note is the highest mean score of 4.37, attributed to the organization's clear strategy pertaining to aid logistics during emergency responses. This rating places it as a profoundly impactful aspect, signifying that the organization's strategic blueprint for aid logistics is a paramount contributor to augmenting the effectiveness of last-mile delivery in emergency scenarios. Conversely, the lowest mean score of 2.50 pertains to the readiness level of the organization's staff for executing last-mile delivery of emergency responses. This evaluation denotes it as a significantly less influential factor, hinting at the notion that the proficiency of the staff may not be playing a major role in the operational excellence of last-mile delivery in emergencies. This underscores a potential area for improvement within the organization, whereby enhancing the training regimen for staff involved in last-mile delivery of emergency responses could yield notable benefits in bolstering operational outcomes.

4.3.2. The Effect of Government Policy Flexibility on Last-Mile Delivery

Table 5. Description of Governmental Policy (n = 203)

Description	**Mean**
The government policy allows for quick emergency responses at last-mile delivery.	4.22
The government policy is adaptable to the changing needs of emergency aid at last-mile delivery.	3.51
The policy encourages innovation in last-mile delivery of emergency responses.	4.24
The policy supports carrying out last-mile delivery of emergency responses.	2.23
The officials afford necessary assistance for last-mile delivery of emergency responses.	2.36
Average	**3.31**

Source: Own Survey, 2024

The analysis of the governmental policy's impact on last-mile delivery, as reflected in Table 5, provides valuable insights into the various facets of this critical aspect of emergency responses. The grand mean of 3.31 for the governmental policy in relation to last-mile delivery of emergency

responses suggests a moderate level of influence on the overall effectiveness of this crucial aspect. This average score implies that the policy plays a moderately influential role in shaping the outcomes of last-mile delivery initiatives. The fact that, the highest mean score of 4.24, pertaining to the policy's encouragement of innovation in emergency response deliveries, signifies a highly influential, indicating that the policy's focus on promoting innovative approaches is seen as exceedingly significant in improving the efficacy of last-mile delivery efforts during emergencies. On the other hand, the level of support provided by the policy for last-mile emergency deliveries (mean 2.23), points to a significantly less influential aspect. This suggests that the policy's current level of support for implementing last-mile delivery initiatives may not be considered as impactful as desired. Therefore, there seems to be a potential gap in effectively facilitating the execution of last-mile emergency responses that could benefit from further policy enhancements and support mechanisms

4.3.3. The Effect of Cultural Orientation on Last-Mile Delivery

Table 6. Description of Cultural Orientation (n = 203)

Description	**Mean**
The organization considers the cultural aspects of the beneficiary in planning.	4.36
The logistics cluster proactively tries to understand or respect the cultural orientation of the beneficiaries.	4.27
The culture of the beneficiaries facilitates effective communication during last-mile delivery of emergency responses.	4.16
The cultural orientation of the beneficiaries encourages participation in last-mile delivery	4.35
Overall, the cultural orientation of the beneficiaries doesn’t hinder the delivery of emergency responses at the last mile.	4.01
Average	**4.23**

Source: Own Survey, 2024

Table 6 presents a detailed description of various aspects of cultural orientation and their mean ratings based on responses from 203 participants. The research findings provide how cultural factors influence the planning and execution of emergency response operations in different communities. The cultural orientation of the beneficiaries is a very highly influential factor in the planning and execution of last-mile delivery of emergency responses (grand mean 4.23). This suggests that on average, understanding and respecting the cultural orientation of the beneficiaries significantly

enhances the effectiveness of last-mile delivery. The highest mean score is 4.36, which is for the organization's consideration of the cultural aspects of the beneficiary in planning. This score categorizes it as a very highly influential factor, indicating that the organization's understanding and respect for the cultural aspects of the beneficiaries are considered extremely significant in enhancing the effectiveness of last-mile delivery in emergency responses. The lowest mean score is 4.01, which is for the statement that the cultural orientation of the beneficiaries doesn't hinder the delivery of emergency responses at the last mile. This score deems it a highly influential factor, implying that the cultural orientation of the beneficiaries, relatively high impactful compared to other aspects. This suggests that the cultural orientation of the beneficiaries is highly important to mitigate a significant barrier to the delivery of emergency responses at the last mile.

4.3.4. The Effect of Infrastructural Facility on Last-Mile Delivery

Table 7. Description of Infrastructural Facility (n = 203)

Description	**Mean**
The organization has the necessary equipment for last-mile delivery of emergency aids.	3.87
The infrastructural facilities are adequate for last-mile delivery of emergency aids.	3.65
The cluster has a reliable transportation system for last-mile delivery of aid responses.	3.95
The cluster has a robust communication system for last-mile delivery.	4.03
The infrastructural facilities are well-maintained at last-mile delivery.	3.68
Average	**3.84**

Source: Own Survey, 2024

The analysis in Table 7 focuses on evaluating the adequacy of infrastructural facilities essential for the last-mile delivery of emergency aids. The results of the infrastructural facility descriptions reveal a grand mean of 3.84, signifying that these facilities play a pivotal role in the last-mile delivery of emergency aids. This statistical figure indicates that, on average, the presence of sufficient infrastructural facilities notably improves the efficiency and success of delivering aid in crucial situations. A deeper examination unveils that the most highly rated aspect, with a mean of 4.03, is the cluster's robust communication system designed for last-mile delivery. This particular score places a spotlight on the critical nature of a reliable communication network, emphasizing its paramount significance in streamlining the delivery process during emergency responses. In contrast, the aspect

with the lowest mean score at 3.65 pertains to the adequacy of infrastructural facilities for last-mile delivery of emergency aids. While this is still deemed a moderately influential factor, the analysis suggests that its impact is comparatively less pronounced when weighed against factors like the availability of necessary equipment and a dependable transportation system for last-mile delivery.

This implies that although having adequate infrastructural facilities is crucial, it may not pose as substantial a challenge to the delivery of emergency responses at the last mile when compared to other key factors like cultural orientation. It underscores the importance of not only maintaining robust communication systems but also ensuring that all facets of infrastructural support, including equipment availability, transportation system reliability, and facility maintenance, are adequately addressed to enhance overall operational efficiency and response effectiveness. In general, the availability and accessibility of infrastructural facilities are high influential aspects of emergency aid responses that demand meticulous scrutiny and analysis.

4.3.5. The Effect of Stakeholder's Commitment on Last-Mile Delivery

Table 8. Description of Stakeholder Commitment (n = 203)

Description	**Mean**
The stakeholders are supportive of the last-mile delivery of emergency responses.	2.96
The organizations under the cluster maintain good relationships with their stakeholders.	3.45
The stakeholders actively participate in the last-mile delivery of emergency responses.	2.58
The stakeholders provide required resources for last-mile delivery of emergency aid.	2.46
The stakeholders provide useful feedback for improving logistics cluster at last-mile delivery.	3.67
Average	**3.02**

Source: Own Survey, 2024

Regarding the stakeholder commitment to the success of last-mile humanitarian logistics delivery, the results in Table 8 illustrate that the concerned stakeholders' behaviors and viewpoints concerning the final leg delivery of emergency responses are moderately influential. The analysis of stakeholder commitment descriptions reveals a grand mean of 3.02, indicating that stakeholder commitment exerts a moderately influential impact on the last-mile delivery of emergency responses. This finding implies that, on average, the level of commitment demonstrated by stakeholders plays a moderate yet discernible role in determining the efficacy of last-mile delivery operations during emergencies.

Notably, the stakeholder category receiving the highest mean score of 3.67 pertains to those offering valuable feedback for enhancing the logistics cluster associated with last-mile delivery. This particular aspect is regarded as a highly influential factor, emphasizing the pivotal role of stakeholder feedback in optimizing the efficiency of last-mile delivery efforts within emergency response scenarios. Conversely, stakeholders tasked with providing essential resources for facilitating the last-mile delivery of emergency aid received the lowest mean score of 2.46, categorizing this factor as highly uninfluential.

While the provision of resources remains a crucial element, its relative impact is perceived as lesser in comparison to other factors like fostering strong stakeholder relationships and encouraging their active involvement in the last-mile delivery process. By leveraging insights derived from the results, the organizations under the cluster can strategize to foster a more robust and comprehensive approach toward engaging stakeholders in the critical task of emergency response delivery. Ultimately, a concerted effort towards enhancing stakeholder commitment can lead to optimized outcomes and increased resilience in the face of emerging challenges within the realm of last-mile delivery.

4.3.6. Performance of Last Mile Logistics Cluster

Table 9. Description of Performance of Last Mile Logistics Cluster (n = 203)

Description	Mean
The logistics cluster ensures the security of the goods being delivered at last-mile delivery.	3.74
The logistics cluster always deliver the emergency responses on time.	3.30
The delivery of the logistics cluster covers all the required or targeted areas.	4.23
The logistics cluster accurately delivers the right items to the right places.	3.93
The logistics cluster adapts to unexpected situations or changes.	3.21
Average	**3.68**

Source: Own Survey, 2024

Table 9 elucidates a thorough statistical examination of the performance of last-mile logistics in the context of emergency response delivery. The analysis encompasses an extensive evaluation of five pivotal metrics: security, timeliness, coverage, accuracy, and adaptability. The collective findings yield an average mean score of 3.68, indicative of a generally favorable assessment of the logistics cluster's effectiveness. More specifically, the coverage metric exhibits a high rating, with a mean score of 4.23, demonstrating a strong capability to reach all necessary destinations. However, the

timeliness of the cluster, as measured by its ability to meet delivery timelines, exhibits a mean score of 3.30, suggesting mixed experiences regarding punctuality. Moreover, the adaptability metrics of the cluster, which assess its ability to effectively manage unforeseen circumstances or changes, register the lowest mean score of 3.21. This indicates potential areas that require improvement.

In conclusion, the analysis of the last mile logistics cluster's performance based on the provided data is instrumental in gauging its efficacy in delivering emergency aid. By leveraging the respondents' insights, the logistics cluster can devise strategies to fortify operational efficiency, enhance responsiveness to dynamic circumstances, and ultimately bolster the cluster's capacity to fulfill its vital role in safeguarding communities during crises.

4.4. Factors affecting last mile delivery humanitarian logistics cluster: 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 factors affecting the performance of last-mile delivery of emergency aid by selected humanitarian organizations. To do so, correlation tests, the assumption for regression model tests, and finally multi-regression analysis in terms of model summary, ANOVA test, and coefficient determination were performed to address the study objectives.

Overall, by utilizing inferential statistics techniques such as correlation tests, assumption for regression model tests, and multiple regression analysis, this study aims to provide a deeper understanding of factors affecting the performance of last-mile delivery of emergency responses by humanitarian organizations under logistics clusters. The findings derived from these statistical analyses can be used to make informed decisions and recommendations for improving last-mile delivery service by incorporating organizational, political, and cultural orientation, infrastructural facility, and stakeholder commitment.

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. The coefficient values associated with each predictor variable indicate the strength of their respective relationships.

Table 10. Pearson Correlation Matrix

	INS	**POL**	**SCO**	**INF**	**STK**	**LMHL**
Organizational Capacity - INS	1					
Governmental Policy - POL	.411**	1				
Cultural Orientation - SCO	.213**	.514**	1			
Infrastructural Facility - INF	.249**	.378**	.449**	1		
Stakeholder Commitment - STK	.497**	.337**	.175**	.316**	1	
Last Mile Logistics - LMHL	.515**	.580**	.503**	.623**	.510**	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 results of the correlation test, as outlined in Table 10, showcase a resilient and favorable correlation between the predictor variables (organizational, political, cultural orientation, infrastructural facility, and stakeholder commitment) and the dependent variable (last-mile delivery of humanitarian logistics). The analysis reveals that organizational capacity exhibits a significant positive relationship with the efficiency of the last-mile logistics cluster ($r = .515$, $p < .01$), implying that an increase in organizational capacity leads to enhanced last-mile logistics performance. Similarly, governmental policy demonstrates a robust positive correlation ($r = .580$, $p < .01$), indicating that specific policies can contribute to the effectiveness of last-mile logistics operations. Moreover, cultural orientation and infrastructural facility display strong positive relationships ($r = .503$, $p < .01$) and ($r = .623$, $p < .01$) respectively, suggesting that they offer potential avenues for improving last-mile logistics. Stakeholder commitment is also positively associated with the last-mile delivery of humanitarian logistics ($r = .510$, $p < .01$), emphasizing the intricate role that stakeholders play in shaping last-mile logistics outcomes. These results underscore the intricate interplay of institutional, political, infrastructural, and socio-cultural elements impacting the delivery of

emergency responses by logistics clusters, underscoring the necessity of considering these dynamics to optimize logistics performance.

4.4.2. The Assumptions for Testing Regression Analysis

In research, In the realm of research, the examination of assumptions holds paramount importance in the utilization of multivariate statistical methodologies. Violations of these assumptions can profoundly influence the subsequent application and interpretation of these methodologies (Hair, 2010). Assumptions act as the bedrock upon which the validity of the statistical analysis is built. Hence, any divergence from these assumptions can result in inaccurate conclusions, thereby compromising the integrity of the research outcomes. Although a plethora of assumptions exist in multivariate analysis, the researcher has chosen to focus on the primary ones that can be effectively examined using the Statistical Package for the Social Sciences (SPSS).

Focusing on the key assumptions ensures the robustness of the analysis. These key assumptions encompass but are not limited to, normality, linearity, homoscedasticity, and the absence of multicollinearity. Each of these assumptions bears specific implications for the nature of the data and the suitability of the multivariate methods employed. As a result, their validation is crucial to the successful implementation and interpretation of the multivariate analysis. In conclusion, the examination of assumptions is an essential element of academic research involving multivariate statistical methodologies. By centering on the key assumptions, researchers can bolster the validity and reliability of their findings, thereby enhancing the rigor and credibility of the study.

4.4.2.1. Multicollinearity

In regression analysis, multi-collinearity is a phenomenon that 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. It is crucial to underscore that these criteria do not represent absolute thresholds. Even if the correlation coefficients, tolerance values, and Variance Inflation Factor (VIF) values fall within the acceptable ranges, the presence of multi-collinearity can still influence the interpretation and

reliability of the regression model. Therefore, the specific context of the study and the potential implications of multi-collinearity must be taken into account when evaluating regression results.

Table 11: Collinearity Statistics

Coefficients [a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Organizational Capacity	.686	1.458
	Governmental Policy	.619	1.616
	Cultural Orientation	.657	1.523
	Infrastructural Facility	.728	1.373
	Stakeholder Commitment	.703	1.423
a. Dependent Variable: Last-mile Delivery			

Source: SPSS output, 2024

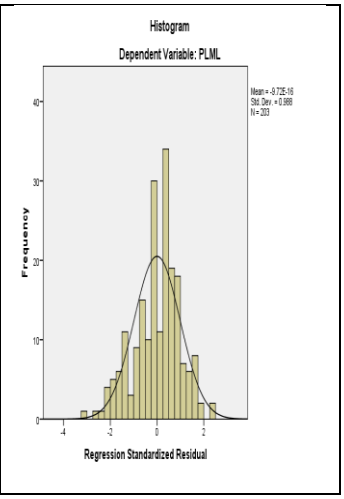
The results in Table 11, provide an analysis of multicollinearity within a regression model concerning last-mile delivery of logistics cluster. It lists five factors (organizational capacity, government policy, cultural orientation, infrastructural facility, and stakeholder commitment), each with corresponding Tolerance and Variance Inflation Factor (VIF) values. The Tolerance values, all above 0.60, suggest no excessive multicollinearity among the predictors. The VIF values, all below 2, 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 e-banking adoption. This implies that the regression coefficients can be considered reliable for interpreting the relationships between the independent and dependent variables.

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

Descriptive Statistics					
	N	Skewness		Kurtosis	
	Stat.	Statistic	Error	Statistic	Error
Organizational Capacity	203	-.544	.171	-.927	.340
Governmental Policy	203	-.380	.171	-.452	.340
Cultural Orientation	203	-1.555	.171	.771	.340
Infrastructural Facility	203	-.928	.171	-1.015	.340
Stakeholder Commitment	203	-.284	.171	-1.248	.340
Last-mile Delivery	203	-.585	.171	-.566	.340
Valid N (listwise)	203				



Source: SPSS output, 2024

As illustrated in Table 13, the values of kurtosis and skewness 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. 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. The P-P plots, as depicted in the histogram, closely resemble a straight line rather than a curve, further corroborating the assumption of normality. 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

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 variable(s).

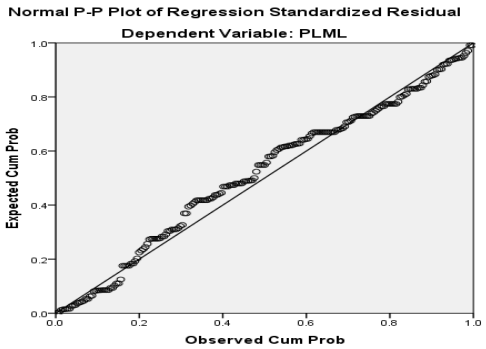


Figure 4: Frequency Distribution of Standardized Residuals.

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 variable or one of the independent variables. The text refers to a graphical presentation in Figure 3, which is not visible in the image, but it suggests that the data are normally distributed as the observed values align with a straight line on a chart. This alignment indicates that the observed values match those expected from a normally distributed dataset. Any deviation from this line would suggest a deviation from normality. The text implies 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

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 size of the error term differs across values of an independent variable.

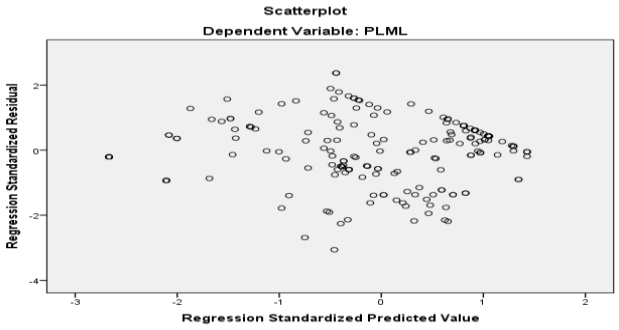


Figure 5. Scatter plot for Homoscedasticity Test

Residual scatter plots provide a visual examination of the assumption of homoscedasticity between the predicted dependent variable scores and the errors of prediction. Referring to Figure 5, 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.

4.4.3. Multiple Linear Regression Analysis

A multiple linear regression model was used to determine the explanatory power of the independent variables (organizational capacity, government policy, cultural orientation, infrastructural facility, and stakeholder commitment) and the dependent variable (last-mile delivery of humanitarian logistics).

Table 13. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795[a]	.631	.622	.73371

a. Dependent Variable: Last-mile Delivery

b. Predictors: (Constant), INS, POL, SOC, 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. Specifically, the value of R (0.795) indicates a strong relationship between the independent and dependent variables, suggesting that the linear combination of the organizational capacity, government policy, cultural orientation, infrastructural facility, and stakeholder commitment can predict the performance of the last-mile delivery of humanitarian logistics cluster quite well. The value of R-Square (0.63.1) indicates that 63.1% of the variability in the logistics cluster at last-mile delivery can be explained by the five independent variables. This means that the variables chosen in the model, such as organizational capacity, government policy, cultural orientation, infrastructural facility, and stakeholder commitment, account for a significant portion of the variance in last-mile delivery of the humanitarian logistics cluster. However, there are still other variables not included in the model that explain the remaining 35.0% of the variance.

Table 14: ANOVA Test

ANOVA [a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	181.634	5	36.327	67.481	.000[b]
	Residual	106.051	197	.538		
	Total	287.684	202			
a. Dependent Variable: Last-mile Delivery						
b. Predictors: (Constant), INS, POL, SOC, INF, STK						

Source: SPSS output, 2024

The ANOVA test, table 14, shows the overall significance/ acceptability of the model from a statistical perspective. The output of the ANOVA analysis (F-value = 67.481) signifies 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.

Finally, in this regression analysis examining the factors influencing the performance of humanitarian logistics clusters at last-mile delivery, several variables were considered, each with its unstandardized coefficients, standardized coefficients, t-values, and significance levels. From the Multiple Linear Regression equation, the interpretation is presented as follows.

Table 15: Regression analysis of independent and dependent variable

Coefficients [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.159	.213		.747	.456
	Organizational Capacity	.210	.052	.209	4.001	.000
	Governmental Policy	.225	.058	.214	3.886	.000
	Cultural Orientation	.133	.046	.154	2.876	.004
	Infrastructural Facility	.250	.035	.360	7.102	.000
	Stakeholder Commitment	.176	.047	.193	3.740	.000
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 of humanitarian logistics cluster based on the linear combination of organizational capacity, government policy, cultural orientation, infrastructural facility, and stakeholder commitment is as follows:

$$LMHL = 0.159 + 0.209\,INS + 0.214\,POL + 0.154\,SOC + 0.360\,INF + 0.193\,STK$$

Where:

LMHL - Last Mile Humanitarian Logistics Cluster; INS - Organizational Capacity, POL- Governmental Policy, SCO- Cultural Orientation, INF- Infrastructural Facility, and STK- Stakeholder Commitment; β_0 - Constant; $\beta_{1,2,3,4,5}$ - Coefficients of Predictors

The results reveal insightful B-coefficients and p-values associated with key variables. More specifically, organizational capacity emerges as a significant driver, with a B-coefficient of .209 (p = .001), indicating a notable positive influence on last-mile delivery performance. Governmental Policy displays an even stronger positive relationship, boasting a B-coefficient of .214 (p < .001). Moreover, Cultural Orientation demonstrates a moderate positive effect with a B-coefficient of .154 (p = .004). Infrastructural facility emerges as a standout contributor, showcasing a robust positive impact with a B-coefficient of .360 (p = .010). Stakeholder Commitment also plays a positive role, reflecting a B-coefficient of .193 (p = .001). Noteworthy is the insignificance of the constant term (B = .159, p = .456), indicating that when all independent variables are at zero, the expected value of the dependent variable remains close to zero. The significant B-coefficients underscore the critical nature of these factors as key levers for enhancing last-mile delivery performance.

In summary, based on these results, all five proposed hypotheses (H1 – H5) are supported, as seen in Table 17. These findings underscore the pivotal roles of organizational capacity, policy, culture, infrastructure, and stakeholder commitment in bolstering the efficiency of last-mile delivery in the humanitarian logistics cluster, highlighting the multidimensional nature of this phenomenon.

Table 16. Summary of the Research Hypothesis Test Result

	Alternate Hypothesis	**Result**	**Result**
H1	Organizational Capacity has a positive significant effect on last-mile delivery of humanitarian logistics clusters.	Beta = .209, p< .005	Accepted
H2	Governmental Policy has a positive significant effect on last-mile delivery of humanitarian logistics clusters.	Beta = .214, p< .005	Accepted
H3	Cultural Orientation has a positive significant effect on last-mile delivery of humanitarian logistics clusters.	Beta = .154, p< .005	Accepted
H4	Infrastructural Facility has a positive significant effect on last-mile delivery of humanitarian logistics clusters.	Beta = .360, p< .005	Accepted
H5	Stakeholder Commitment has a positive significant effect on last-mile delivery of humanitarian logistics clusters.	Beta = .193, p< .005	Accepted

4.5. Discussion

Logistics clusters play a critical role in ensuring the efficient and effective delivery of goods and services, particularly in the humanitarian aid sector. The performance of logistics clusters at the last-mile delivery stage is crucial in ensuring that aid reaches its intended recipients promptly. This study sought to investigate factors affecting the performance of logistics clusters at last-mile delivery by taking selected aid organizations clustered under UN WFP as a case. The study highlights several key variables and their impact on delivery efficiency, as evidenced by the B-coefficients and associated p-values. Organizational capacity, governmental policy, cultural orientation, operational facility, and stakeholder commitment emerge as significant drivers in enhancing last-mile delivery performance.

A detailed comparison with previous related studies reveals interesting insights. For instance, the positive influence of organizational capacity ($B = .209$, $p = .002$) on delivery performance aligns with prior research that emphasizes the importance of organizational capabilities in logistics operations (Jane, 2018). Building upon this, the study (Peter, 2014) similarly found a positive relationship between organizational capacity and supply chain performance, supporting the notion that robust organizational structures are key to operational success. collaboration and teamwork foster knowledge sharing and learning, which can improve the performance and resilience of humanitarian logistics. Clustering aid organizations with competent staff, well-developed structures, logistics policies, and procedures would have better performance in addressing sufficient emergency aid in time. Without skilled human resources, well well-designed and implemented policies and procedures, humanitarian operations may suffer from inefficiencies, duplication of efforts, and confusion at the last mile delivery.

Moreover, the substantial impact of governmental policy ($B = .214$, $p < .001$) on last-mile delivery performance echoes the findings of (Balcik, 2017), who highlighted the role of government regulations in shaping logistics outcomes. By contrast, earlier studies by Altay (2018) argue 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 author concludes that, in the humanitarian arena, thousands of donations are usually directed to the affected locations, however, the relief processes are not always as effective as expected due to the political interests of different stakeholders within and outside of the host country.

The moderate positive effect of cultural orientation (B = .154, p = .018) identified in the current study adds a new dimension to the literature on humanitarian logistics. While previous research by Korpela (2016) hinted at the influence of cultural factors on supply chain dynamics, the specific impact on last-mile delivery performance deserves deeper investigation to elucidate the underlying mechanisms at play. 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 may influence the preferences, expectations, and acceptance of humanitarian assistance, as well as the potential for social cohesion or conflict (Wolde, 2019).

In contrast, the robust positive impact of the infrastructural facility (B = .360, p = .010) is consistent with the findings of (Razzaque and Sheng, 2014), who emphasized the significance of infrastructure investments in improving delivery operations. Drawing parallels with Korpela's (2016) study, a lack of organizing and leading logistics at the last mile due to domestic barriers/ difficulties like electricity, water, and road infrastructure reaching affected populations adversely affects the effectiveness of the humanitarian response. Same vein, security, communication, and infrastructure are the highest contributors to the effectiveness of emergency aid responses (Thomas, 2020).

Finally, the last but not the least, the positive role of stakeholder commitment (B = .193, p = .001) in enhancing delivery performance resonates with prior studies by Baldini (2012), which highlighted the importance of stakeholder engagement in driving operational excellence, explains that one of the challenges to the performance of humanitarian organizations was funds delay. The author argues that most of the funds are spent on direct relief, leaving little room for strategic preparedness and investment in infrastructure and systems. Maon (2019) added that the funds from donors are often short-term and restricted, limiting the flexibility and adaptability of the organizations.

CHAPTER FIVE

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the major findings of the study, conclusions, and recommendations.

5.1. Summary of Major Findings

Based on the results of the analyses, the following major findings were drawn and summaries as follows. The major findings are:

The effect of organizational capacity on the performance of logistics cluster at last-mile delivery

- The respondents strongly agreed that their organizations have clear strategies for aid logistics during emergency responses (mean 4.37). Nonetheless, acknowledged the lack of well-trained staff specialized for last-mile delivery.
- Organizational Capacity exhibits a significant positive and strong relationship with the performance of the last-mile logistics cluster ($r = .515$, $p < .01$), and also contributes a significant positive effect ($B = .209$ at $p = .002$) as well.

The effect of government policy on the performance of logistics cluster at last-mile delivery

- The respondents highly value government policies that facilitate swift emergency responses and adapt to evolving needs (mean 4.22 and 4.24 respectively).
- However, it is evident that the policies' limited support for carrying out last-mile delivery of emergency responses and the inadequacy of necessary assistance from officials both point to areas requiring attention and enhancement (2.23 and 2.36) respectively.
- Flexibility of governmental policy shows a positive strong relationship ($r = 580$) as well as effect (B-.214) at $p < .001$.

The effect of cultural orientation on the performance of logistics cluster at last-mile delivery

- The socio-cultural orientation of beneficiaries in disaster areas encourages participation of the community in emergency aid delivery (mean 4.40). Nonetheless, sometimes minor impediments are evident (mean 3.97).
- Cultural Orientation has relatively the least effect ($B = .154$) despite it showing a positive and strong relationship with the last-mail humanitarian logistics ($r = .503$ at $p < .001$).

The effect of the infrastructural facility on the performance of the logistics cluster at last-mile delivery

- The robustness of the communication system tailored for the last-mile delivery of humanitarian logistics is a prominent strength within the current infrastructure framework (mean 4.03). However, the adequacy of infrastructural facilities received (mean 3.65), suggests perceived shortcomings that warrant immediate attention and remediation.
- Infrastructural facility exhibits the positive and strongest relationship (r = .623) as well as the highest effect (B = .360 at p = .010) on the performance of humanitarian logistics cluster.

The effect of stakeholder commitment on the performance of logistics cluster at last-mile delivery

- Stakeholders provide constructive feedback for improving last-mile delivery of emergency responses (mean 3.67), despite providing the required resources for last-mile delivery of emergency aid (mean 2.46).
- Stakeholder Commitment also contributes the least positive effect (B = .193 at p = .001)., despite it has a positive strong relationship (r = .510) with logistics cluster performance at last-mile.

5.2. Conclusions

In the realm of humanitarian aid, logistics clusters stand out as vital components, particularly when it comes to the intricate process of last-mile delivery. This study delves into the significance of these clusters, shedding light on how factors such as organizational capacity, governmental policies, cultural nuances, operational capabilities, and stakeholder dedication play pivotal roles in shaping delivery performance. The research not only reinforces existing knowledge but also extends it, emphasizing the necessity of strong organizational frameworks, the influence of regulatory frameworks, the impact of cultural elements, the essential nature of infrastructure investments, and the value of stakeholder involvement in enhancing operational effectiveness.

The research emphasizes the importance of strong organizational frameworks, regulatory influence, cultural impact, infrastructure investments, and stakeholder involvement in enhancing operational effectiveness. It also uncovers bottlenecks that hinder efficient aid delivery, including a lack of skilled human resources, poorly implemented policies, governmental restrictions on aid organizations, and political interference in relief efforts. The study underscores the need for a comprehensive approach that considers the intricate web of influences at play, including governmental policies and cultural orientation. It also highlights the crucial role of infrastructural facilities in ensuring the smooth flow of goods and services to those in need. Stakeholder commitment is also identified as a linchpin in the success of humanitarian logistics operations. The study emphasizes the importance of engaging with a diverse array of stakeholders, including local communities, governments, non-governmental organizations, and international agencies. Despite the evident benefits of logistics clusters in humanitarian aid, the study also sheds light on the challenges that impede optimal delivery performance. It underscores the impact of political interests on relief processes and the need for advocacy and diplomacy in navigating such challenges.

In conclusion, the study paints a nuanced picture of the role of logistics clusters in humanitarian aid, highlighting both the opportunities and challenges inherent in last-mile delivery. By addressing the complex array of factors that influence delivery performance, aid organizations can optimize their operations, strengthen their impact, and ensure that humanitarian aid reaches those in need in a timely and efficient manner. The insights gleaned from this research offer a roadmap for policymakers, aid organizations, and stakeholders to enhance their strategies and interventions, ultimately advancing the cause of humanitarian assistance worldwide.

5.3. Recommendations

Based on the major findings and conclusions, the following possible recommendations are suggested:

- Organizational Capacity: Aid organizations should invest in capacity-building initiatives, including training programs, to enhance the skills of their human resources. This could help address the identified inefficiencies and improve last-mile delivery performance.
- Governmental Policies: Advocacy efforts should be intensified to influence governmental policies that restrict aid organizations. Constructive dialogue and diplomacy could be effective in navigating such challenges and ensuring aid reaches vulnerable populations.
- Cultural Nuances: Aid organizations should strive to gain a deeper understanding of the cultural contexts in which they operate. This could involve engaging with local communities to understand their needs and preferences, thereby improving the effectiveness of aid delivery.
- Operational Capabilities: Investments should be made in infrastructural facilities and technology to enhance operational capabilities. This could involve upgrading logistics infrastructure or adopting advanced technologies to streamline the supply chain and reduce bottlenecks.
- Stakeholder Dedication: Efforts should be made to foster collaboration and coordination among diverse stakeholders. This could involve regular communication, joint planning, and shared decision-making processes to ensure all parties are aligned and dedicated to the success of humanitarian logistics operations.

5.4. Limitations and Suggestions for Future Research

In considering the limitations and suggestions for future research in humanitarian aid logistics, it is essential to acknowledge several constraints that may impact the validity and applicability of current study findings. Firstly, one major limitation lies in the scope of the study, which predominantly concentrates on last-mile delivery in humanitarian aid, potentially neglecting other critical facets of the overall logistics chain. Moreover, geographical limitations pose another challenge, as regional disparities in logistics operations, influenced by cultural, political, and infrastructural factors, may not be adequately accounted for in the research. Additionally, the reliance on data presents a significant constraint, with the quality and availability of data potentially biases the study's outcomes and compromises the depth and accuracy of the analysis.

In light of these limitations, a series of suggestions for future research can be proposed to address these gaps and enhance the understanding of humanitarian aid logistics. Firstly, there is a need for research to adopt a broader scope that encompasses various stages of the logistics chain, thus providing a more comprehensive perspective on the delivery process of humanitarian assistance. Regional studies that delve into specific geographical areas could offer more nuanced insights into the impact of local contextual factors on logistics operations. Furthermore, longitudinal studies that track changes in logistics performance over time could contribute to the identification of trends and patterns, aiding in the development of more effective strategic approaches.

In addition, a more in-depth analysis of the policy implications on humanitarian logistics could offer valuable insights for advocacy efforts, thereby facilitating the resolution of regulatory obstacles hindering aid distribution. Research focused on effective training and capacity-building initiatives is imperative to address the shortage of skilled human resources within aid organizations. Moreover, studies investigating best practices for stakeholder engagement are crucial to fostering collaboration and coordination among various stakeholders involved in humanitarian aid delivery. By incorporating these suggested avenues for exploration, future research endeavors in humanitarian aid logistics can aspire to be more comprehensive, informed, and impactful in addressing the challenges faced in delivering aid to those in need.

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Appendix

Survey Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF BUSINESS AND ECONOMICS

Questionnaire to be filled by Employees of Humanitarian Aid Organizations clustered under WFP in Ethiopia.

Dear Participant,

I am Sara Eshetu, pursuing a postgraduate degree in Project Management at the School of Commerce, Addis Ababa University, Ethiopia. My current research, titled "FACTORS AFFECTING THE EFFECTIVENESS OF LAST MILE DELIVERY: A STUDY ON SELECTED HUMANITARIAN ORGANIZATIONS IN ADDIS ABABA", aims to investigate the influence of organizational capability, governmental policy, cultural orientation, infrastructural facility, and stakeholder flexibility on the performance of last-mile humanitarian logistics cluster within the Ethiopian context. The objective is to identify and scrutinize these factors to enhance the efficiency of humanitarian emergency responses at the last-mile delivery in the Ethiopian context, ensuring the prompt delivery of essential items such as food, water, shelter, medicines, and medical equipment to survivors to the end users. Your invaluable feedback on these determinant factors will aid me in formulating insightful recommendations to improve logistics in the field of emergency humanitarian aid. This study is solely for academic purposes and will not have any impact on you. Your honest, forthright, and prompt response is vital for the success of this study. Hence, I kindly request you to answer each question diligently. Thank you for your cooperation.

Thank you in advance for your cooperation and timely response.

Sara Eshetu

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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 in the blank space provided and, in the optional items, indicate your answer by putting an "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 the performance of humanitarian logistic cluster at the last-mile delivery

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 a 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 Organizational Capacity	**1**	**2**	**3**	**4**	**5**
The organization has sufficient resources to carry out last-mile delivery of emergency responses.					
The organization has a well-trained staff for last-mile delivery of emergency responses.					
The organization has a clear strategy for last-mile delivery of emergency responses.					
The organization has a strong leadership team guiding the last-mile delivery of emergency responses.					
The organization effectively uses technology in last-mile delivery of emergency responses.					
1.2 Flexibility of Government Policy	**1**	**2**	**3**	**4**	**5**
The government policy allows for quick and efficient last-mile delivery of emergency responses.					
The government policy supports the organization in carrying out last-mile delivery of emergency responses.					
The government policy is adaptable to the changing needs of last-mile delivery of emergency responses.					

The government provides necessary assistance for last-mile delivery of emergency responses.					
The government policy encourages innovation in last-mile delivery of emergency responses.					
1.3 Cultural Orientation	**1**	**2**	**3**	**4**	**5**
The cultural orientation of the community supports the last-mile delivery of emergency responses.					
The organization understands and respects the cultural orientation of the community.					
The cultural orientation of the community facilitates effective communication during last-mile delivery of emergency responses.					
The cultural orientation of the community encourages participation in last-mile delivery of emergency responses.					
The organization takes into account the cultural orientation of the community in planning last-mile delivery of emergency responses.					
1.4 Accessibility of Infrastructure Facility	**1**	**2**	**3**	**4**	**5**
The infrastructural facilities are adequate for last-mile delivery of emergency responses.					
The organization has the necessary equipment for last-mile delivery of emergency responses.					
The infrastructural facilities are well-maintained for last-mile delivery of emergency responses.					
The organization has a reliable transportation system for last-mile delivery of emergency responses.					
The organization has a robust communication system for last-mile delivery of emergency responses.					

1.5 Stakeholder's Commitment	1	2	3	4	5
The stakeholders are flexible and supportive of the last-mile delivery of emergency responses.					
The organization maintains good relationships with its stakeholders.					
The stakeholders actively participate in the last-mile delivery of emergency responses.					
The stakeholders provide necessary resources for last-mile delivery of emergency responses.					
The stakeholders provide constructive feedback for improving last-mile delivery of emergency responses.					
2. Effectiveness of Last Mile Logistics Cluster	**1**	**2**	**3**	**4**	**5**
The organization has a high success rate in last-mile delivery of emergency responses.					
The organization can deliver emergency responses promptly.					
The organization ensures the safety of goods during last-mile delivery of emergency responses.					
The organization ensures the quality of goods during last-mile delivery of emergency responses.					
The organization ensures the satisfaction of recipients during last-mile delivery of emergency responses.					

Many Thanks for Your Valued Time!!!