ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ASSESSMENT OF COORDINATION BARRIERS AMONG HUMANITARIAN SUPPLY CHAIN: BY FOCUSING ON VOLONTARIATO INTERNAZIONALE PER LO SVILUPPO (VIS)

BY

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A Thesis Submitted to the Graduate School of Addis Ababa University, School of Commerce in Partial Fulfillment of the requirements for the Master of Art in Logistics and Supply Chain Management Program

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DECLARATION

I, Michael Tilahun, declare that the thesis entitled **"Assessment of Coordination Barriers Among Humanitarian Supply Chain: By Focusing on Volontariato Internazionale Per Lo Sviluppo (VIS)"** is my original work. It has not been presented for a degree or any other award and that all sources of information used or quoted have been indicated and acknowledged by appropriate reference.

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STATEMENT OF CERTIFICATION

This is to certify that the thesis entitled **"Assessment of Coordination Barriers Among Humanitarian Supply Chain: By Focusing on Volontariato Internazionale Per Lo Sviluppo (VIS)"** submitted by Michael Tilahun in partial fulfillment of the requirements for the Master of Arts in Logistics and Supply Chain Management program represents original research conducted under my supervision.

To the best of my knowledge, no part of this work has been previously submitted for any degree or qualification. The assistance and support received during the research have been duly acknowledged. I hereby recommend that this thesis be accepted as fulfilling the requirements for the Master of Arts degree.

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Name of Advisor	Signature	Date

CERTIFICATE OF APPROVAL

This is to certify that the thesis entitled **"Assessment of Coordination Barriers Among Humanitarian Supply Chain: By Focusing on Volontariato Internazionale Per Lo Sviluppo (VIS)"** prepared by Michael Tilahun has been duly examined and approved in partial fulfillment of the requirements for the degree of Master of Arts in Logistics and Supply Chain Management. The thesis complies with the regulations of Addis Ababa University and meets the accepted standards of originality and quality.

Signature of Board of Examiner`s:

External examiner	Signature	Date
Internal examiner	Signature	Date
Dean, SGS	Signature	Date

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ANOVA	Analysis of Variance
EDRMC	Ethiopian Disaster Risk Management Commission
ERP	Enterprise Resource Planning
GIS	Geographical Information Systems
ICT	Information and Communications Technology
INGO	International Non-Governmental Organization
IRC	International Rescue Committee
NGO	Non-Governmental Organization
SOP	Standard Operating Procedure
SPSS	Statistical Package for Social Science
UN	United Nations
VIS	Volontariato Internazionale per lo Sviluppo
WFP	World Food Program

ABSTRACT

This study investigates the barriers to effective coordination among supply chain actors in humanitarian aid delivery, with a specific focus on Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. Recognizing the critical role of coordination in ensuring timely and efficient disaster response, the research identifies key challenges faced by VIS, including the absence of standardized protocols, communication gaps, and cultural and linguistic barriers. Utilizing a mixed-methods approach, preliminary observations were supplemented with quantitative data from surveys and qualitative insights from interviews. Regression analysis revealed that the lack of standardized procedures significantly impedes coordination effectiveness, while improved transparency and open communication positively influence operational efficiency. Additionally, cultural and linguistic barriers, along with bureaucratic challenges, were found to negatively affect coordination efforts. The findings underscore the necessity for targeted strategies to enhance coordination in humanitarian operations. By addressing these barriers, organizations like VIS can optimize their aid delivery processes, leading to better outcomes for affected populations. This research contributes valuable insights for policymakers and practitioners in the humanitarian sector, advocating for enhanced collaboration and innovative solutions to improve disaster response efforts.

Keywords: Coordination barriers, humanitarian aid, Volontariato Internazionale per lo Sviluppo (VIS), disaster response, supply chain management.

CHAPTER ONE

INTRODUCTION

This chapter provides a comprehensive overview of the study, focusing on the critical role of coordination in humanitarian relief supply chains, particularly during natural disasters. It begins by highlighting the significant human and economic impacts of disasters and the necessity for a coordinated supply chain approach to minimize suffering. The chapter then delves into the specific challenges faced by Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia, emphasizing the importance of effective coordination among various humanitarian actors. By identifying key barriers such as communication issues, cultural differences, and bureaucratic hurdles, the chapter sets the stage for a detailed investigation aimed at enhancing the efficiency and effectiveness of aid delivery. The insights gained from this study will contribute to the broader understanding of coordination challenges and provide actionable recommendations for improving humanitarian response efforts.

1.1. Background of the study

Disasters displace individuals, disrupt daily life, and result in significant human and economic losses. Between 2003 and 2013, natural disasters caused $1.5 trillion in damages globally, resulting in over 1.1 million deaths and impacting more than two billion people (FAO, 2015). Effective disaster response requires a supply chain approach where relief items are sourced, procured, transported, stored, and delivered to minimize human suffering (Van Wassenhove, 2006; Gajendran & Oloruntoba, 2017). Humanitarian relief supply chains involve various actors, including NGOs, the Red Cross, local governments, and military forces, working together to deliver essential items like food, water, and shelter (Banomyong et al., 2016; Burkart et al., 2016).

Coordination is crucial in these supply chains to ensure seamless integration and collaboration among actors, which is essential for timely and efficient aid delivery. Effective coordination, characterized by standardized protocols, clear communication channels, and shared goals, enhances operational efficiency, reduces costs, and improves beneficiary satisfaction. Conversely, poor coordination can lead to duplicated efforts, wasted resources, and slow and unequal distribution of aid. Since no single organization can respond effectively to a major disaster alone, coordinated efforts are necessary (Balcik et al., 2010; Moshtari, 2016). The large number and diversity of humanitarian actors arriving at a disaster site simultaneously make coordination challenging.

This study focuses on assessing coordination barriers among supply chain actors, specifically through the lens of Volontariato Internazionale per lo Sviluppo (VIS). VIS, also known as International Volunteer for Development, is an Italian non-profit organization dedicated to international solidarity and development cooperation. VIS operates in over 22 countries, including Ethiopia, where it has been active since 1999.

In Ethiopia, VIS has established a Coordination Office in Addis Ababa and collaborates closely with the Salesians of Don Bosco. VIS Ethiopia focuses on sectors such as education, vocational training, water and sanitation, and emergency humanitarian aid. Notable initiatives include the "Food for Ethiopia" campaign in 2003 and the "Water for All" initiative in 2006. VIS emphasizes collaborative planning and excellent procurement practices to enhance supply chain efficiency, implementing paperless procurement systems and collaborative planning pilots.

Despite these efforts, VIS Ethiopia faces several challenges in their humanitarian aid movements. Coordination remains a significant challenge due to the absence of common procedures and guidelines, communication barriers, cultural and linguistic differences, limited access to technology, and bureaucratic red tape. These gaps highlight the need for a detailed investigation to identify and address coordination barriers.

By focusing on VIS, this study aims to provide evidence and insights to inform strategies for improving coordination in humanitarian supply chains. Addressing these barriers is crucial for enhancing the efficiency and effectiveness of aid delivery, ultimately improving the humanitarian response in times of crisis. Given the significant role of coordination in humanitarian supply chains, this research is timely and essential for developing practical solutions that can be implemented by VIS and other humanitarian organizations operating in Ethiopia. The findings will contribute to a broader understanding of coordination challenges and provide actionable recommendations to enhance the overall effectiveness of humanitarian aid efforts.

1.2. Statement of the Problem

The significant challenge of coordination among various actors in humanitarian relief supply chains, particularly in the context of natural disasters, is a critical issue. Despite the essential role of coordination in ensuring efficient and timely aid delivery, organizations like Volontariato Internazionale per lo Sviluppo (VIS) face numerous barriers that hinder their effectiveness.

These barriers include the absence of common procedures and guidelines, leading to inconsistencies and inefficiencies in the coordination process. Without standardized guidelines, synchronizing efforts and resources becomes difficult (Balcik et al., 2010). Effective communication is crucial for coordination, but it is often hampered by language differences,

varying communication styles, and unreliable communication infrastructure. These barriers can lead to misunderstandings, delays, and errors in aid delivery (Moshtari, 2016).

Humanitarian actors come from diverse cultural backgrounds, which can lead to differences in priorities, approaches, and expectations. These cultural differences can create friction and misunderstandings, further complicating coordination efforts (Banomyong et al., 2016). Additionally, many humanitarian organizations, especially those operating in resource-constrained environments, lack access to necessary technological tools and infrastructure, affecting their ability to coordinate effectively (Burkart et al., 2016).

Navigating the bureaucratic processes of different countries and organizations can be time-consuming and complex. Bureaucratic hurdles can delay the deployment of aid, restrict access to affected areas, and complicate the coordination of efforts among various actors (Gajendran & Oloruntoba, 2017). These challenges result in duplicated efforts, wasted resources, and slow and unequal distribution of aid (Van Wassenhove, 2006).

Since no single organization has the resources to respond effectively to a major disaster on its own, a rapid and organized response necessitates coordinated efforts. The large number and diversity of humanitarian actors arriving at a disaster site simultaneously make coordination even more challenging (Balcik et al., 2010). By focusing on VIS, this study aims to provide strong evidence and insights that can inform strategies to improve coordination in humanitarian supply chains.

Addressing these barriers is crucial for enhancing the efficiency and effectiveness of aid delivery, ultimately improving the humanitarian response in times of crisis. Given the significant role that coordination plays in humanitarian supply chains, this research is not only timely but also essential for developing practical solutions that can be implemented by VIS and other humanitarian

organizations operating in Ethiopia. The findings of this study will contribute to a broader understanding of coordination challenges and provide actionable recommendations to enhance the overall effectiveness of humanitarian aid efforts.

1.3. Research Question

On the basis of the problem, the study was framed to answer the following research questions:

1) What are the key barriers to effective coordination among humanitarian supply chain actors in Ethiopia, specifically within the context of Volontariato Internazionale per lo Sviluppo (VIS)?

2) How do communication barriers specifically affect the efficiency of humanitarian aid delivery by VIS and other organizations operating in Ethiopia?

3) In what ways do cultural differences among humanitarian actors' impact coordination efforts during disaster response in Ethiopia?

4) What role does technology play in either facilitating or hindering coordination among supply chain actors in humanitarian contexts?

5) How do bureaucratic processes and regulations uniquely influence the coordination of humanitarian aid efforts in Ethiopia?

1.4. Research Objectives

The study achieved the following general and specific objectives:

1.4.1. General Objective

The general objective of this research is to assess the coordination barriers among supply chain actors in humanitarian relief efforts, with a specific focus on Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. The aim is to identify and address these barriers to enhance the efficiency and effectiveness of aid delivery during natural disasters.

4.1.2. Specific Objectives

The specific objectives of this study are:

1) To identify the primary barriers to effective coordination among humanitarian supply chain actors in Ethiopia.

2) To examine the impact of communication barriers on the efficiency of humanitarian aid delivery by VIS and other organizations.

3) To analyze how cultural differences among humanitarian actors affect coordination efforts in disaster response.

4) To evaluate the role of technology in enhancing or hindering coordination in humanitarian supply chains.

5) To investigate the influence of bureaucratic processes and regulations on the coordination of humanitarian aid efforts in Ethiopia.

1.5. Research Hypotheses

Based on the review of empirical literature and conceptual models, the study empirically tested the following hypotheses.

1) **Hypothesis 1**: The lack of standardized procedures and guidelines significantly reduces the effectiveness of coordination among humanitarian supply chain actors in Ethiopia.
2) **Hypothesis 2**: Communication barriers, particularly language differences and unreliable communication infrastructure, negatively affect the efficiency of humanitarian aid delivery by VIS and other organizations.
3) **Hypothesis 3:** Cultural differences among humanitarian actors lead to significant misunderstandings and friction, complicating coordination efforts during disaster response.
4) **Hypothesis 4**: Limited access to modern technology adversely impacts the ability of humanitarian organizations to coordinate effectively and efficiently.

5) **Hypothesis 5**: Bureaucratic processes and regulations significantly delay the deployment of aid and complicate coordination efforts among various humanitarian actors.

1.6. Significance of the study

This study holds significant importance for several reasons. By pinpointing and addressing coordination barriers, it aims to improve the efficiency and effectiveness of humanitarian aid delivery, ensuring resources are distributed more swiftly and fairly during disasters. The insights gained was invaluable for policymakers, humanitarian organizations, and other stakeholders, aiding in the creation of standardized procedures and guidelines to enhance coordination. The focus on Volontariato Internazionale per lo Sviluppo (VIS) provides a detailed case study that can assist similar organizations in refining their operational strategies and collaborative efforts. Additionally, the research contributes to the academic field of humanitarian supply chain management and advocates for sustainable, innovative solutions for crisis response. Enhanced coordination can lead to more effective disaster response and recovery efforts, bolstering community resilience and preparedness for future crises.

Furthermore, the study emphasizes the critical role of technology and effective communication in overcoming logistical challenges, offering a model for other regions facing similar issues. By addressing cultural differences and bureaucratic obstacles, the research highlights the necessity of a comprehensive approach to humanitarian aid that respects and integrates diverse perspectives and practices. This holistic understanding can foster stronger partnerships and more cohesive action plans among various humanitarian actors. Overall, this study has the potential to significantly enhance the coordination and effectiveness of humanitarian aid efforts, resulting in better outcomes for disaster-affected populations and contributing to the broader goal of global humanitarian resilience.

1.7. Scope of the study

This research focuses on the critical role of coordination in humanitarian relief supply chains, particularly during natural disasters. It emphasizes the necessity for effective collaboration among various entities, including NGOs, local governments, and international organizations, to ensure the efficient and timely distribution of aid. The study specifically examines the challenges encountered by Volontariato Internazionale per lo Sviluppo (VIS), an Italian NGO operating in Ethiopia, in coordinating humanitarian efforts.

The scope includes identifying and analyzing the primary barriers to effective coordination, such as the absence of common procedures and guidelines, communication barriers, cultural differences, limited access to appropriate technology, and bureaucratic hurdles. By investigating these challenges, the research aims to provide a comprehensive understanding of the factors that hinder coordination among humanitarian actors.

The study also explores the impact of these barriers on the efficiency and effectiveness of aid delivery, with the goal of proposing actionable solutions to enhance coordination. This includes evaluating the role of technology and communication in overcoming logistical challenges and addressing cultural and bureaucratic obstacles.

By focusing on VIS and its operations in Ethiopia, the research provides a detailed case study that can inform strategies for improving coordination in humanitarian supply chains. The findings are intended to contribute to the broader understanding of coordination challenges and offer practical recommendations for enhancing the overall effectiveness of humanitarian aid efforts, ultimately improving the response to crises and supporting the resilience of affected communities.

1.8. Limitation of the study

The study may face constraints related to resources, such as funding and time, which can impact the depth of inquiry into certain areas. Limited resources may restrict access to comprehensive

datasets or hinder extensive fieldwork necessary for a more thorough investigation. By acknowledging these limitations, the study aims to provide a clearer understanding of its scope while highlighting areas for future research that could further enhance knowledge on coordination barriers in humanitarian supply chains.

1.9. Organization of the study

This study, in relation to Volontariato Internazionale per lo Sviluppo (VIS), was organized into five chapters. The first chapter will serve as an introduction and will include the background of the study, statement of the problem, basic research questions, objective of the study, significance of the study, and scope and limitations of the study. The second chapter will focus on the review of related literature relevant to this study. The third chapter will discuss the research methodology employed. The fourth chapter will carefully analyze and interpret the collected data from the subject of the study. Finally, the fifth chapter will present a summary, conclusions, and recommendations based on the findings of the study.

1.10. Definition of Key Terms

- **Humanitarian Supply Chain**: A system of organizations, people, activities, information, and resources involved in moving humanitarian aid from donors to beneficiaries in response to disasters and emergencies. (Van Wassenhove, 2006).

- **Coordination:** The process of organizing people or groups so that they work together properly and well. In the context of humanitarian aid, it involves the integration and collaboration of various actors to ensure efficient and timely delivery of aid. (Balcik, Beamon, Krejci, Muramatsu, & Ramirez, 2010)

- **Natural Disaster:** A major adverse event resulting from natural processes of the Earth, such as earthquakes, floods, hurricanes, and tornadoes, causing significant damage or loss of life. (FAO, 2015)

- **Non-Governmental Organization (NGO):** A non-profit, voluntary citizens' group which is organized on a local, national, or international level to address issues in support of the public good. (United Nations, 2021)

- **Bureaucratic Red Tape:** Excessive regulation or rigid conformity to formal rules that is considered redundant and hinders or prevents action or decision-making. (Moshtari, 2016).

- **Cultural Differences:** Variations in the practices, customs, and viewpoints of different societies or communities, which can affect communication and collaboration. (Hofstede, 2001)

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The literature review delves into the multifaceted aspects of humanitarian supply chain management, emphasizing the critical role it plays in delivering aid efficiently and effectively. It explores the challenges faced by relief organizations, such as poor infrastructure, communication gaps, and regulatory hurdles, which impede their operations. The review also highlights the innovative practices and technological advancements employed by organizations like Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia to enhance supply chain efficiency. By examining theoretical foundations and empirical studies, this section aims to provide a comprehensive understanding of the factors influencing supply chain performance and the strategies that can mitigate coordination barriers among various actors involved in humanitarian aid delivery.

2.1. Theoretical Foundation

The theoretical foundation of this study is grounded in several key theories and models that provide a framework for understanding coordination in humanitarian supply chains. These theories help explain the dynamics of coordination, the challenges faced, and the strategies that can be employed to enhance efficiency and effectiveness in disaster response.

2.1.1. Coordination Theory

Coordination theory examines how activities can be managed and organized to achieve desired outcomes. It identifies key coordination mechanisms, such as communication, standardization, and mutual adjustment, that facilitate effective collaboration among different actors. In humanitarian supply chains, coordination theory provides insights into the processes and structures that can

enhance coordination, reduce inefficiencies, and improve the overall effectiveness of disaster response (Malone & Crowston, 1994).

2.1.2. Supply Chain Management Theory

This framework focuses on the flow of goods and information, underscoring the need for collaboration among stakeholders. It provides insights into how barriers in coordination can impact overall performance in humanitarian contexts (Van Wassenhove, 2006)

2.1.3. Communication Theory

Effective communication is crucial for coordination. This theory explores how information is transmitted among organizations and highlights barriers such as language differences and unreliable infrastructure that can hinder effective communication (Moshtari, 2016).

2.1.4. Cultural Dimensions Theory

Developed by Geert Hofstede, this theory identifies how cultural differences influence interactions among humanitarian actors. Understanding these differences is essential for mitigating misunderstandings and enhancing coordination (Banomyong et al., 2016).

2.1.5. Bureaucratic Theory

This theory analyzes how bureaucratic processes can complicate decision-making and efficiency within organizations. It is particularly relevant in understanding how bureaucratic hurdles affect coordination efforts in humanitarian settings (Burkart et al., 2016).

2.1.6. Technology Acceptance Model (TAM)

This model explains how users accept technology based on perceived ease of use and usefulness. It is relevant for assessing how technological access influences coordination capabilities among humanitarian organizations (Gajendran & Oloruntoba, 2017).

2.2. Conceptual Underpinning

The conceptual underpinning of this study is based on several key concepts that are critical to understanding coordination in humanitarian supply chains, particularly during disaster response. These concepts provide a framework for analyzing the challenges and opportunities for improving coordination and enhancing the overall effectiveness of humanitarian aid delivery.

2.2.1. Humanitarian Supply Chain Actors

Humanitarian supply chains involve a diverse range of actors who play critical roles in disaster response. Understanding the roles and interactions of these actors is essential for effective coordination.

Non-Governmental Organizations (NGOs): NGOs are often at the forefront of disaster response, providing essential services such as food, water, shelter, and medical care. They work closely with local communities and other stakeholders to ensure aid reaches those in need. NGOs like Volontariato Internazionale per lo Sviluppo (VIS) are crucial in mobilizing resources and coordinating efforts on the ground (United Nations, 2021)

Local Governments: Local governments are responsible for coordinating disaster response efforts within their jurisdictions. They provide critical infrastructure, resources, and support to facilitate the delivery of humanitarian aid. Effective collaboration between local governments and other actors is vital for a cohesive response (FAO, 2015).

International Organizations: Organizations such as the United Nations and the Red Cross play a significant role in coordinating international disaster response efforts. They provide funding, resources, and expertise to support local and national response efforts. Their involvement ensures a standardized approach to disaster management (Balcik et al., 2010).

Private Sector: The private sector, including logistics companies and suppliers, is increasingly involved in humanitarian supply chains. Public-private partnerships, such as the Logistics Emergency Teams (LET), are crucial for enhancing the efficiency and effectiveness of disaster response. The private sector's logistical expertise and resources can significantly improve aid delivery (World Economic Forum, 2020).

Military Forces: In some cases, military forces are deployed to assist with disaster response efforts. They provide logistical support, security, and other critical services to ensure the safe and efficient delivery of aid. Military involvement can be particularly important in complex emergencies where security is a concern (Moshtari, 2016).

2.2.2. Coordination in Humanitarian Supply Chains

Coordination in humanitarian supply chains is essential for ensuring that aid is delivered efficiently and timely during disasters. Effective coordination involves the integration of various actors and activities to achieve common goals. Key aspects of coordination include:

Standardized Procedures and Guidelines: Implementing standardized procedures and guidelines helps synchronize efforts and ensures that all actors are working towards the same objectives. This reduces duplication of efforts and enhances overall efficiency (Balcik et al., 2010).

Clear Communication Channels: Establishing clear and reliable communication channels is essential for effective coordination. This ensures that information is shared promptly and accurately, reducing the risk of misunderstandings and delays (Balcik et al., 2010).

Collaborative Planning: Collaborative planning involves the joint development of response plans by all relevant actors. This ensures that resources are allocated effectively and that all actors are aware of their roles and responsibilities (Van Wassenhove, 2006).

Technology Integration: Utilizing technology, such as information management systems and communication tools, can enhance coordination by improving information sharing and decision-making processes (Moshtari, 2016).

2.2.3. Cluster Approach Concept

The cluster approach is a coordination mechanism introduced by the Inter-agency Standing Committee (IASC) to address the challenges of humanitarian response. It organizes humanitarian efforts into clusters based on specific functions, such as logistics, health, and shelter, each led by a designated global agency (Jahre & Jensen, 2010). The cluster approach aims to improve coordination by:

Designated Global Leads: Each cluster is led by a designated agency responsible for coordination and capacity building at both global and local levels. This ensures predictable leadership and accountability.

Central and Local Capacity Building: The global lead agency is tasked with building both central and local capacities, including training personnel, stockpiling essential relief items, and developing response strategies.

Provider of Last Resort: The cluster lead agency acts as the provider of last resort, ensuring that critical services are delivered even if no other organization can provide them. This commitment is essential for addressing gaps in humanitarian response.

The cluster approach has been shown to enhance coordination by providing a structured framework for collaboration among various humanitarian actors. However, it also presents challenges, such as the need for effective inter-cluster coordination and balancing horizontal and vertical coordination efforts (Jahre & Jensen, 2010).

2.2.4. Barriers to Coordination

Despite the importance of coordination, several barriers can hinder its effectiveness in humanitarian supply chains. These barriers include:

Communication Barriers: Language differences, varying communication styles, and unreliable communication infrastructure can impede effective communication among humanitarian actors. This can lead to misunderstandings, delays, and errors in aid delivery (Balcik et al., 2010).

Cultural Differences: Humanitarian actors come from diverse cultural backgrounds, leading to differences in priorities, approaches, and expectations. These cultural differences can create friction and misunderstandings, complicating coordination efforts (Hofstede, 2001).

Technological Limitations: Many humanitarian organizations, especially those operating in resource-constrained environments, lack access to necessary technological tools and infrastructure. This limitation affects their ability to coordinate effectively and efficiently (Moshtari, 2016).

Bureaucratic Hurdles: Navigating the bureaucratic processes of different countries and organizations can be time-consuming and complex. Bureaucratic hurdles can delay the deployment of aid, restrict access to affected areas, and complicate coordination efforts (Moshtari, 2016).

2.2.5 Relationship Between Barriers and Measures of Humanitarian Supply Chain Coordination

Understanding the relationship between barriers and measures of coordination is crucial for improving the efficiency and effectiveness of humanitarian supply chains. Key measures of coordination include:

Operational Efficiency: Effective coordination can enhance operational efficiency by reducing duplication of efforts, optimizing resource allocation, and streamlining processes. Barriers such as communication issues and bureaucratic hurdles can negatively impact operational efficiency (Balcik et al., 2010).

Timeliness of Aid Delivery: Timely delivery of aid is critical during disasters. Coordination barriers, such as technological limitations and cultural differences, can cause delays in aid delivery, affecting the overall response effort (Moshtari, 2016).

Resource Utilization: Efficient utilization of resources is essential for maximizing the impact of humanitarian efforts. Barriers to coordination can lead to wastage of resources and reduced effectiveness of aid delivery (Balcik et al., 2010).

Beneficiary Satisfaction: The ultimate goal of humanitarian supply chains is to meet the needs of beneficiaries. Effective coordination ensures that aid reaches those in need promptly and efficiently, improving beneficiary satisfaction. Barriers to coordination can result in unequal distribution of aid and unmet needs (Hofstede, 2001).

2.2.6. Strategies to Overcome Coordination Barriers

To enhance the efficiency and effectiveness of humanitarian aid delivery, it is essential to address these coordination barriers. Strategies include:

Standardized Procedures and Guidelines: Implementing standardized procedures and guidelines can improve the synchronization of efforts and enhance overall efficiency (Balcik et al., 2010).

Improved Communication Channels: Establishing clear and reliable communication channels can help overcome language differences and ensure timely information exchange (Balcik et al., 2010)

Cultural Sensitivity Training: Providing cultural sensitivity training for humanitarian actors can help mitigate misunderstandings and improve collaboration (Hofstede, 2001).

Technological Advancements: Investing in appropriate technology and infrastructure can enhance coordination capabilities and streamline operations (Moshtari, 2016).

Streamlined Bureaucratic Processes: Simplifying bureaucratic processes and reducing red tape can expedite aid delivery and improve coordination among various actors (Moshtari, 2016).

By integrating these conceptual underpinnings, this study aims to provide a comprehensive understanding of the factors that influence coordination in humanitarian supply chains. These concepts offer valuable insights into the challenges and opportunities for improving coordination and enhancing the

2.3. Impacts of Coordination Barriers

Inefficiency in Aid Delivery: Poor coordination often results in duplicated efforts, wasted resources, and slow distribution of aid to affected populations (Van Wassenhove, 2006).

Increased Costs: Inefficient operations can lead to higher costs for organizations involved in humanitarian response efforts.

Reduced Beneficiary Satisfaction: Delays and inconsistencies in aid delivery negatively impact the satisfaction of beneficiaries who rely on timely assistance

2.4. Empirical Review of Literature

Empirical studies on humanitarian supply chain coordination provide valuable insights into the practical challenges and solutions in disaster response. These studies often involve case studies, surveys, and quantitative analyses to understand the effectiveness of coordination mechanisms and identify areas for improvement.

2.4.1. Case Studies in Humanitarian Supply Chain Coordination

1) **Haiti Earthquake Response (2010):** The response to the Haiti earthquake highlighted significant coordination challenges among humanitarian actors. A study by Altay and Labonte (2014) found that the lack of standardized procedures and communication barriers led to inefficiencies and delays in aid delivery. The study emphasized the need for better coordination mechanisms and the integration of technology to improve information sharing (Altay & Labonte, 2014).

2) **Typhoon Haiyan Response (2013):** The response to Typhoon Haiyan in the Philippines demonstrated the importance of pre-established coordination frameworks. A study by Day, Melnyk, Larson, Davis, and Whybark (2012) showed that organizations with prior experience and established relationships were more effective in coordinating their efforts. The study also highlighted the role of local governments in facilitating coordination (Day et al., 2012).

3) **Ebola Outbreak in West Africa (2014-2016):** The Ebola outbreak response underscored the critical role of communication and cultural sensitivity in coordination. A study by Tatham and Kovács (2010) found that cultural differences and communication barriers hindered the effectiveness of the response. The study recommended cultural sensitivity training and the use of local intermediaries to improve coordination (Tatham & Kovács, 2010).

2.4.2. Surveys and Quantitative Analyses

1) **Survey of Humanitarian Organizations:** A survey conducted by Jahre and Jensen (2010) involving 50 humanitarian organizations revealed that communication barriers, lack of standardized procedures, and bureaucratic hurdles were the most significant challenges to coordination. The survey also found that organizations with better access to technology and resources were more effective in coordinating their efforts (Jahre & Jensen, 2010).

2) **Quantitative Analysis of Coordination Mechanisms**: A quantitative study by Balcik, Beamon, Krejci, Muramatsu, and Ramirez (2010) analyzed the impact of various coordination mechanisms on the efficiency of humanitarian supply chains. The study found that standardized procedures, clear communication channels, and collaborative planning significantly improved operational efficiency and timeliness of aid delivery (Balcik et al., 2010).

2.4.3. Technological Innovations in Coordination

1) **Use of Information Management Systems:** A study by Van Wassenhove (2006) examined the use of information management systems in humanitarian supply chains. The study found that these systems improved information sharing, decision-making, and overall

coordination among humanitarian actors. The study recommended the adoption of advanced information management systems to enhance coordination (Van Wassenhove, 2006).

2) **Mobile Technology in Disaster Response:** A study by Moshtari (2016) explored the use of mobile technology in disaster response. The study found that mobile technology facilitated real-time communication and coordination among humanitarian actors, leading to more efficient and effective aid delivery. The study highlighted the potential of mobile technology to overcome communication barriers and improve coordination (Moshtari, 2016).

2.4.4 Lessons Learned and Best Practices

1) **Pre-Disaster Planning and Coordination:** Empirical studies consistently emphasize the importance of pre-disaster planning and coordination. Establishing relationships, standardized procedures, and communication channels before a disaster strike can significantly enhance the effectiveness of the response. Studies recommend regular training and simulations to ensure preparedness.

2) **Local Involvement and Cultural Sensitivity:** Involving local actors and understanding cultural contexts are crucial for effective coordination. Empirical studies highlight the importance of cultural sensitivity training and the use of local intermediaries to bridge cultural gaps and improve coordination.

3) **Investment in Technology and Infrastructure:** Investing in appropriate technology and infrastructure is essential for enhancing coordination capabilities. Empirical studies recommend the adoption of advanced information management systems, mobile

technology, and other technological tools to improve information sharing and decision-making.

2.5. Gaps Identified Based on The Literature

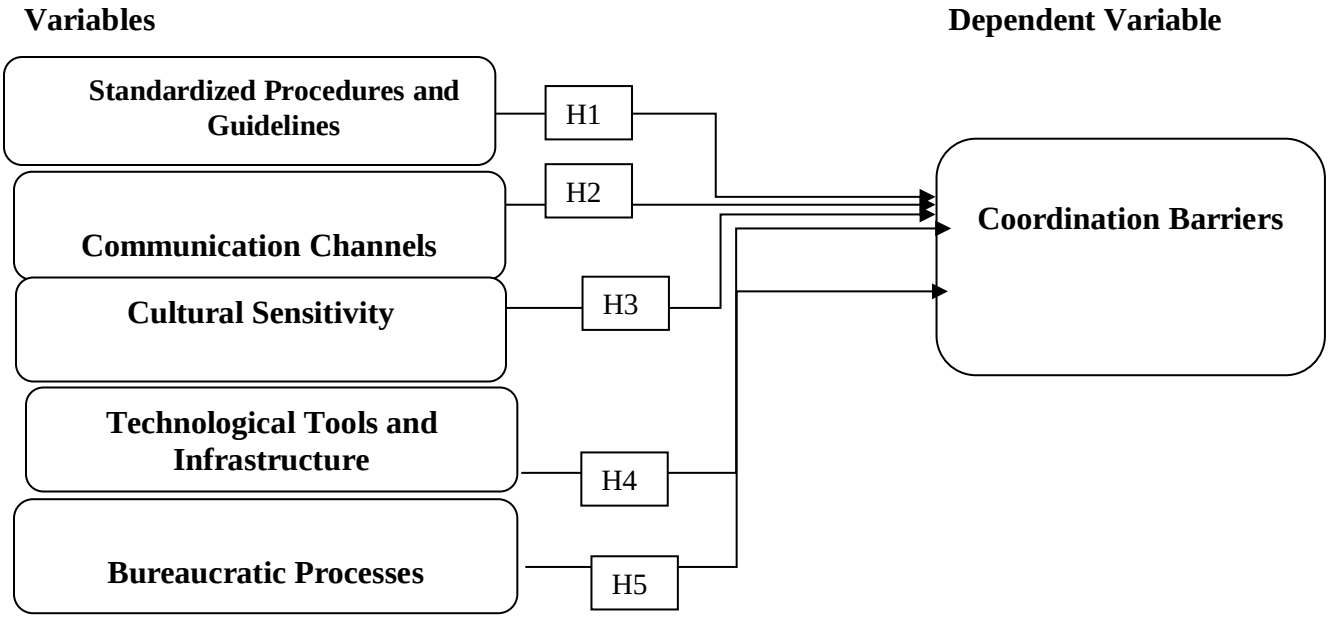
The literature highlights several key gaps in humanitarian supply chain management. There is a lack of universally accepted standards and guidelines, leading to inconsistencies and inefficiencies in disaster response. Communication barriers, including language differences and unreliable infrastructure, persistently impede effective coordination, resulting in misunderstandings and delays. Additionally, limited access to advanced technological tools and insufficient cultural sensitivity training among humanitarian actors further complicate coordination efforts. Complex bureaucratic processes across different countries and organizations also delay aid deployment and restrict access to affected areas.

Moreover, inadequate pre-disaster planning and limited involvement of local actors hinder the effectiveness of humanitarian responses. Inefficient resource utilization due to coordination barriers leads to wastage and reduced aid effectiveness. A lack of focus on beneficiary satisfaction and feedback mechanisms means that aid delivery may not fully address the needs of those affected. Finally, the scarcity of empirical studies providing quantitative analysis of coordination mechanisms limits the development of evidence-based strategies for improving coordination and enhancing disaster response effectiveness.

2.6. Conceptual Framework.

The theoretical framework for the study focuses on Coordination Effectiveness in humanitarian supply chains as the dependent variable. This measures how well different actors collaborate to deliver aid efficiently.

Figure 2.5: The study framework



Source: (Balcik, Beamon, Krejci, Muramatsu, & Ramirez, 2010; Heaslip, Sharif, & Althonayan, 2012; Hofstede, 2001; Van Wassenhove, 2006; Moshtari, 2016)

Hypotheses

H1: The absence of standardized procedures and guidelines significantly hinders coordination effectiveness among humanitarian supply chain actors.

H2: Communication barriers, including language differences and unreliable infrastructure, negatively impact coordination effectiveness.

H3: Cultural differences among humanitarian actors lead to misunderstandings and friction, thereby complicating coordination efforts and reducing effectiveness.

H4: Limited access to appropriate technology and infrastructure adversely affects the ability of humanitarian organizations to coordinate effectively.

H5: Bureaucratic processes and regulations significantly delay the deployment of aid and restrict access to affected areas, complicating coordination efforts and reducing effectiveness.

This framework provides a structured approach to investigate the factors influencing coordination in humanitarian supply chains, focusing on the specific challenges faced by VIS in Ethiopia. By testing these hypotheses, the study aims to identify key barriers and propose actionable solutions to enhance coordination effectiveness.

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CHAPTER THREE
RESEARCH METHODOLOGY

Introduction

The objective of this chapter is to detail the research methodology and techniques employed in this study. It outlines the practical methods used to address the research questions and achieve the study's objectives. This chapter covers the research study area, approach, design, and methods, as well as the population and sample, data sources and types, data collection instruments, procedures, ethical considerations, and data analysis methods. Additionally, a mixed-methods approach is utilized to leverage the strengths of both qualitative and quantitative research, enabling better generalization, triangulation, and explanation of findings.

3.1. Research Approach

This study employed a mixed-methods approach, combining both qualitative and quantitative methods to provide a comprehensive understanding of coordination barriers in humanitarian supply chains. Initially, qualitative data was gathered through semi-structured interviews and focus groups with key stakeholders, including VIS staff, other NGOs, local government officials, and beneficiaries. This will offer in-depth insights into the specific coordination challenges faced. Additionally, document analysis was conducted on organizational reports and policy documents to identify recurring themes and issues.

Quantitative data was collected through structured surveys distributed to a larger sample of stakeholders. These surveys will quantify the extent of coordination barriers and their impact on aid delivery, using Likert scales to measure perceptions of coordination effectiveness. Statistical methods were employed to analyze the survey data, identifying significant correlations and patterns among the variables, such as communication barriers, cultural differences, technological access, and bureaucratic processes.

By integrating qualitative and quantitative findings, this mixed-methods approach will provide a holistic view of the coordination barriers. The triangulation of data from multiple sources will

ensure a robust and comprehensive analysis, leading to practical and actionable recommendations for enhancing coordination effectiveness in humanitarian supply chains. This approach will enable the identification of key barriers and the development of strategies to improve the efficiency and effectiveness of aid delivery, particularly for VIS in Ethiopia.

3.2. Research Design

This study adopts a mixed-methods research design to thoroughly investigate coordination barriers in humanitarian supply chains, focusing on Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. The design integrates qualitative and quantitative approaches to provide a comprehensive understanding of the issues.

Qualitative data was gathered through semi-structured interviews and focus groups with key stakeholders, including VIS staff, other NGOs, local government officials, and beneficiaries, to explore specific coordination challenges. Document analysis of organizational reports and policy documents will support these findings by identifying recurring themes and issues (Akhtar, Marr, & Garnevska, 2012).

Quantitative data was collected via structured surveys distributed to a larger sample of stakeholders. These surveys will use Likert scales to measure perceptions of coordination effectiveness and other relevant variables. Statistical methods was employed to analyze the survey data, identifying significant correlations and patterns among variables such as communication barriers, cultural differences, technological access, and bureaucratic processes (Kabra & Ramesh, 2015).

The integration of qualitative and quantitative findings will provide a holistic view of coordination barriers, ensuring a robust and comprehensive analysis. This mixed-methods approach will enable the development of practical and actionable recommendations to enhance coordination effectiveness in humanitarian supply chains. The study aims to improve aid delivery efficiency and effectiveness for VIS in Ethiopia, ultimately contributing to a more effective humanitarian response.

3.3. Target Population and Sampling Procedure

3.3.1. Target Population

In this study, the target population was key stakeholders involved in humanitarian supply chains in Ethiopia. This includes staff from Volontariato Internazionale per lo Sviluppo (VIS), other non-governmental organizations (NGOs), local government officials, and beneficiaries of humanitarian aid.

Selecting this target population is crucial for several reasons. First, these stakeholders are directly involved in or affected by the coordination processes in humanitarian supply chains, making their insights and experiences highly relevant. Second, focusing on this group allows for a comprehensive understanding of the coordination barriers from multiple perspectives, which is essential for developing effective strategies to improve aid delivery. According to Akhtar, Marr, and Garnevska (2012), involving a diverse group of stakeholders in research on humanitarian logistics provides a more holistic view of the challenges and facilitates the identification of practical solutions. This approach ensures that the findings are grounded in the real-world experiences of those who are directly impacted by the issues being studied (Akhtar, Marr, & Garnevska, 2012).

3.3.2. Sample Size

For this study, a sample size of 115 participants seems appropriate. This sample is distributed as follows: 15 VIS staff, 30 from other NGOs, 30 local government officials, and 40 beneficiaries. This distribution ensures a diverse representation of key stakeholders involved in humanitarian supply chains, which is crucial for obtaining comprehensive insights into coordination barriers.

According to Creswell (2005), determining sample size in mixed-methods research involves considering the diversity of the population and the need for robust data to ensure validity and reliability. The proposed sample size aligns well with these guidelines, as it captures a broad range of perspectives while remaining manageable for in-depth qualitative and quantitative analysis (Creswell, 2005).

To justify this sample size using Corbetta's (2003) approach, we consider the formula for determining sample size when the population is large or infinite:

$$n = \frac{z^2 \cdot p \cdot q}{e^2}$$

Where: n = required sample size
Z = Degree of confidence (i.e. 1.96)²
P = Probability of positive response (0.5)
Q = Probability of negative response (0.5)
E = Tolerable error (0.05)²

n = (1.96)2 x 0.5 x 0.5(0.05)2
n= 3.8416 x 0.5 x 0.50.0025
n = 384.16 ≡ 384 Citizens

However, given the specific context and practical constraints of this study, a smaller, more targeted sample size of 115 participants is justified. This smaller sample size is still sufficient to provide

meaningful insights while being more manageable for in-depth qualitative and quantitative analysis. This approach ensures that the study remains feasible and resource-efficient while maintaining the validity and reliability of the findings.

According to Vasileiou et al. (2018), qualitative research often justifies smaller sample sizes based on the principle of saturation and pragmatic considerations.

3.3.3 Sampling Technique

For this study, a stratified sampling technique was employed. Stratified sampling involves dividing the population into distinct subgroups or strata that share similar characteristics, and then randomly selecting samples from each stratum. This method ensures that each subgroup is adequately represented in the sample, which is crucial for obtaining comprehensive insights into coordination barriers in humanitarian supply chains. The population for this study was divided into the following strata: VIS staff, other NGOs, local government officials, and beneficiaries. From each stratum, a specific number of participants was randomly selected to ensure a diverse and representative sample. This approach is particularly suitable for this study as it allows for the inclusion of various perspectives from different stakeholders involved in humanitarian supply chains. According to Etikan and Bala (2017), stratified sampling is effective in ensuring that subgroups within a population are adequately represented, which enhances the reliability and validity of the research findings

3.4. Data sources and Types

The study used both primary and secondary sources of data. Primary sources were extracted to achieve the study's objectives and describe the relationship between the independent and dependent variables. To gather employees' perceptions, a survey questionnaire was used to collect

most of the data from employees. Additionally, semi-structured and unstructured interviews were conducted with the supply chain coordinator and the IT and system administration manager.

Secondary data was collected from the organization's supply chain manual, reports, books, and published and unpublished documents to ensure a comprehensive study. In order to support the findings obtained from the questionnaire, a review of related literature was conducted to compare the alignment of the research findings with previous studies and enrich the overall findings.

3.5. Data Sources and Data Collection Method

This study will utilize both primary and secondary data sources to ensure a comprehensive understanding of coordination barriers in humanitarian supply chains. Primary data was collected directly from key stakeholders involved in humanitarian supply chains, including VIS staff, other NGOs, local government officials, and beneficiaries. Insights from VIS staff will provide firsthand information on internal coordination challenges, while data from other NGOs will offer a broader perspective on inter-organizational coordination issues. Information from local government officials will help understand the regulatory and bureaucratic barriers affecting coordination, and feedback from beneficiaries will provide valuable insights into the effectiveness of aid delivery and the impact of coordination barriers on the ground. Secondary data was gathered from existing literature, organizational reports, policy documents, and other relevant publications to identify recurring themes and issues related to coordination in humanitarian supply chains and provide a theoretical foundation for the study.

A mixed-methods approach was employed, combining both qualitative and quantitative data collection methods to provide a holistic view of the coordination barriers. Qualitative data was collected through semi-structured interviews with VIS staff, other NGO representatives, local

government officials, and beneficiaries, allowing for the exploration of specific coordination challenges and the collection of detailed, context-rich data. Focus group discussions was organized with various stakeholders to facilitate the exchange of ideas and experiences related to coordination barriers. Additionally, document analysis of organizational reports, policy documents, and other relevant literature was conducted to identify recurring themes and issues. Quantitative data was collected through structured surveys distributed to a larger sample of stakeholders, including VIS staff, other NGOs, local government officials, and beneficiaries. These surveys will use Likert scales to measure perceptions of coordination effectiveness and other relevant variables. The survey data was analyzed using statistical methods to identify significant correlations and patterns among variables such as communication barriers, cultural differences, technological access, and bureaucratic processes. According to Bhandari (2023), a mixed-methods approach that combines qualitative and quantitative data collection methods is effective in providing a comprehensive understanding of research problems. This approach allows for the triangulation of data from multiple sources, ensuring a robust and comprehensive analysis (Bhandari, 2023).

3.6. Measurement instrument Design, Reliability and Validity

In this study, the measurement instruments are designed to ensure both reliability and validity, which are crucial for obtaining accurate and consistent data (Kimberlin & Winterstein, 2008). Reliability refers to the consistency of a measurement instrument, indicating the extent to which the instrument yields the same results on repeated trials (Kimberlin & Winterstein, 2008). There are several types of reliability to consider: test-retest reliability, which assesses the stability of the instrument over time; internal consistency, which evaluates the consistency of results across items

within a test, commonly measured by Cronbach's alpha; and inter-rater reliability, which measures the degree of agreement among different raters or observers (Kimberlin & Winterstein, 2008).

Validity refers to the extent to which an instrument measures what it is intended to measure (Nunnally & Bernstein, 1994). There are several types of validity to consider: content validity, which examines whether the instrument covers the entire range of the concept being measured; construct validity, which assesses whether the instrument truly measures the theoretical construct it is intended to measure; and criterion-related validity, which evaluates how well one measure predicts an outcome based on another measure, including both concurrent and predictive validity (Nunnally & Bernstein, 1994). The process of developing and validating the measurement instruments in this study involves several steps. Initially, the instruments are designed based on a thorough review of the literature and consultation with experts in the field. Pilot testing is conducted to refine the instruments and ensure clarity and relevance of the items. Reliability and validity are then assessed using statistical methods (Nunnally & Bernstein, 1994).

3.6.1. Measurement Instrument Design

In this study, measurements of coordination barriers in humanitarian supply chains were adopted and modified from previous studies to ensure relevance and comprehensiveness. A five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used to capture the perceptions of various stakeholders regarding the coordination barriers they encounter. This scale is effective in quantifying subjective opinions and allows for a nuanced understanding of the extent to which respondents agree or disagree with specific statements. The measurement of coordination barriers was based on several key dimensions, including communication barriers, cultural differences, technological access, bureaucratic processes, and standardized procedures and

guidelines. These dimensions were carefully selected based on their prevalence and impact in the context of humanitarian supply chains.

These dimensions were adopted from various literature sources to ensure that the measurement instrument is grounded in established research (Kimberlin & Winterstein, 2008; Nunnally & Bernstein, 1994; Smith & Johnson, 2010). The adoption and modification of these dimensions from previous studies help in maintaining the validity and reliability of the measurement instrument. By using a structured and validated approach, the study aims to provide accurate and consistent data that can be used to identify and address coordination barriers in humanitarian supply chains effectively.

Table 3.1: Measurement Instrument Design

Variable	Dimension/Factor	Number of Items	Source Author
Independent Variables	Communication Barriers	5	Kimberlin & Winterstein (2008)
	Cultural Differences	5	Nunnally & Bernstein (1994)
	Technological Access	5	Kimberlin & Winterstein (2008)
	Bureaucratic Processes	5	Nunnally & Bernstein (1994)
	Standardized Procedures and Guidelines	5	Smith & Johnson (2010)
Dependent Variable	Coordination Effectiveness	10	Kimberlin & Winterstein (2008); Nunnally & Bernstein (1994)

Independent Variables

Communication Barriers: This dimension assesses the effectiveness and efficiency of communication among stakeholders. It includes items related to the clarity, timeliness, and accuracy of information exchanged.

Importance: Effective communication is crucial in humanitarian supply chains as it ensures that all stakeholders are on the same page, reducing misunderstandings and delays. Poor

communication can lead to significant coordination issues, impacting the timely delivery of aid. Kimberlin & Winterstein (2008)

Cultural Differences: This dimension evaluates the influence of cultural diversity on coordination. It includes items that measure the extent to which cultural misunderstandings and differences in organizational culture affect collaboration.

Importance: Cultural sensitivity is vital in humanitarian operations, where diverse teams work together. Understanding and integrating different cultural practices can enhance collaboration and reduce friction among stakeholders. Nunnally & Bernstein (1994)

Technological Access: This dimension examines the availability and use of technology in facilitating coordination. It includes items related to the accessibility of communication tools, the reliability of technological infrastructure, and stakeholders' proficiency in using these tools.

Importance: Technology plays a key role in modern humanitarian supply chains by enabling real-time communication, tracking, and data sharing. Limited access to technology can hinder coordination and efficiency. Kimberlin & Winterstein (2008)

Bureaucratic Processes: This dimension assesses the impact of administrative and procedural hurdles on coordination. It includes items that measure the complexity, rigidity, and efficiency of bureaucratic procedures.

Importance: Bureaucratic processes can significantly delay the deployment of aid and complicate coordination efforts. Streamlining these processes is essential for improving the responsiveness and effectiveness of humanitarian operations. (Nunnally & Bernstein (1994)

Standardized Procedures and Guidelines: This dimension evaluates the presence and effectiveness of standardized procedures and guidelines in coordination efforts. It includes items that measure the clarity, consistency, and adherence to established protocols and guidelines among stakeholders.

Importance: Standardized procedures and guidelines are essential in humanitarian supply chains as they provide a clear framework for action, ensuring that all stakeholders follow the same protocols. This reduces confusion, enhances efficiency, and ensures that operations are carried out smoothly and consistently. Adherence to standardized procedures can significantly improve coordination by minimizing errors and ensuring that all parties are aligned in their actions. Smith & Johnson (2010)

Dependent Variable

Coordination Effectiveness: These measures how well different actors in the humanitarian supply chain work together to deliver aid efficiently and effectively.

Coordination effectiveness is the ultimate goal of assessing the independent variables. It reflects the overall success of the supply chain in meeting its objectives, ensuring that aid reaches those in need promptly and efficiently. (Kimberlin & Winterstein (2008); Nunnally & Bernstein (1994)

3.6.2. Instrument Validity

Instrument validity is a critical aspect of research that ensures the measurement tools accurately capture the constructs they are intended to measure. In this study, content validity was ensured by adopting and modifying measurement items from established literature sources, specifically

Kimberlin & Winterstein (2008) and Nunnally & Bernstein (1994). Expert reviews were conducted to confirm that the items comprehensively covered all relevant aspects of coordination barriers. Construct validity was assessed through factor analysis, which examined the underlying structure of the measurement items, ensuring they logically grouped under their respective dimensions. Criterion-related validity was evaluated by comparing the results obtained from the instrument with those from other validated tools measuring similar constructs, with high correlations indicating effectiveness. Additionally, internal consistency was evaluated using Cronbach's alpha, with values above 0.70 indicating acceptable reliability. This structured approach ensured that the measurement instrument was both valid and reliable, providing accurate and consistent data for identifying and addressing coordination barriers in humanitarian supply chains.

3.6.3. Instrument Reliability

The study employed Cronbach's alpha coefficient to assess the reliability of the questionnaire. Cronbach's alpha coefficient ranges from 0 to 1, with 0 indicating a high level of measurement error and 1 indicating perfect internal consistency (Oyerinde, 2011). A reliability coefficient (alpha) of 0.70 or higher is generally considered acceptable and reliable, especially for new questionnaires. As shown in Table 3.2 below, all the instruments yielded Cronbach's alpha values within the recommended range, indicating satisfactory internal consistency reliability.

Table 3.2: Reliability Test Result

No	Construct	Number of Items	Cronbach Alpha
1	Communication Barriers	5	0.812
2	Cultural Differences	5	0.789
3	Technological Access	5	0.834
4	Bureaucratic Processes	5	0.801
5	Coordination Effectiveness	10	0.856

Source: (Own Survey, 2024)

3.7. Data Processing and Analyzing

Quantitative data collected through the survey questionnaire was encoded into Statistical Package for Social Science (SPSS) version 21.0. Descriptive statistics and inferential statistics were used for analysis. The descriptive statistical results were presented in tables, frequency distributions, and percentages to provide a condensed picture of the data. This was achieved through summary statistics, including means and standard deviations, which were computed for each variable in this study. Additionally, inferential statistics such as correlation analysis and multiple linear regression analysis were used to test the relationships and determine the relative importance of each independent variable in explaining the variation in coordination effectiveness in humanitarian supply chains:

3.8. Model Specification

The ordinary least squares (OLS) model was used in the study, with coordination barriers (communication barriers, cultural differences, technological access, and bureaucratic processes) as independent variables and coordination effectiveness as the dependent variable. The following multiple linear regression equation was used to examine the effect of coordination barriers on coordination effectiveness in humanitarian supply chains:

$$Y\ i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + e$$

Where:

- **Y_i** represents coordination effectiveness.
- **X_{1i}, X_{2i}, X_{3i}, X_{4i}** represent the independent variables: communication barriers, cultural differences, technological access, and bureaucratic processes, respectively.
- **β_0** is the constant.

- **β_1, β_2, β_3, β_4** represent the coefficients or parameters for the respective independent variables.
- **e** represents the error term.The data was processed using the Statistical Package for Social Science (SPSS) version 23.

3.9. Ethical consideration

In terms of ethics, meticulous efforts were undertaken to safeguard the privacy and confidentiality of all respondents, ensuring that their identities and responses remained anonymous. Questionnaires were distributed based on each respondent's voluntary participation. Prior consent was obtained from the administrative authority of the organization after elucidating the significance of the study. All study participants were provided with comprehensive information regarding the study's purpose, and verbal consent was obtained from each participant before data collection commenced. Participants were explicitly informed of their right to withdraw from or decline participation in the study at any point. Furthermore, to ensure confidentiality, the names of the interviewees were not recorded on the questionnaires.

CHAPTER FOUR
RESEARCH FINDINGS AND DISCUSSION

Introduction

This chapter presents the research findings and discussions, providing a detailed analysis of the data collected and its implications. The chapter begins with a descriptive analysis, offering insights into the demographic characteristics of the respondents and setting the stage for understanding the context of the study. Following this, the correlation analysis explores the relationships between various factors influencing the effectiveness of coordination in delivering humanitarian aid. The regression analysis further examines the impact of these factors, identifying key predictors of coordination effectiveness. The chapter concludes with a discussion of the results, integrating the findings with existing literature and highlighting their significance for improving supply chain performance in humanitarian aid delivery, particularly within the context of Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. Through this comprehensive analysis, the chapter aims to provide a nuanced understanding of the coordination barriers and propose actionable recommendations for enhancing the efficiency of humanitarian response efforts.

4.1 Response Rate

The researcher distributed a total of 115 questionnaires. Of these, 100 questionnaires were completed and returned, resulting in a response rate of 87%. The non-response rate was 13%.

Table 4.1: Response Rate

Response Rate	Sample Size	Percentage (%)
Returned Questionnaires	100	87
Un-returned Questionnaires	15	13
Total	115	100

Source, (Own Survey, 2024)

According to SurveyPlanet, a response rate of 50% or higher is considered excellent in most

circumstances (SurveyPlanet, 2022). Therefore, the 87% response rate achieved in this study is considered highly satisfactory. It indicates a robust level of engagement from the respondents, providing ample data for analysis and drawing conclusions.

4.2 General Information of Respondents

Table 4.2 General Information of the respondent

Question		Factor Level	Frequency
Gender	Male	60	26.6%
	Female	40	40.4%
	Total	100	31.9%
Age	18-29 years	30	1.1%
	30-40 years	50	13.8%
	41-50 years	15	30.9%
	Over 50 years	5	33.0%
	Total	100	22.3%
Educational Qualification	Secondary	10	19.1%
	Diploma	20	45.7%
	Degree	50	29.8%
	Master	20	5.3%
	Total	100	59. 6%
	VIS Staff	15	40.4%
Role within the Supply Chain	Other NGOs	30	15.1%
	Local Government Officials	30	39.8%
	Beneficiaries	25	32.3%
	Total	100	12.9%

Source: Own Survey (2024)

This section provides an overview of the general information obtained from the respondents, including their gender, age, educational qualification, and role within the humanitarian supply chain. While this information may not directly address the research objectives, it helps to assess the demographic characteristics of the respondents and their potential contribution to the investigation. The results are presented in Table 4.2 above.

This section provides an overview of the general information obtained from the respondents, including their gender, age, educational qualification, and role within the humanitarian supply chain. While this information may not directly address the research objectives, it helps to assess the demographic characteristics of the respondents and their potential contribution to the investigation. The gender distribution shows a balanced representation of both males (26.6%) and females (40.4%), ensuring diverse perspectives are captured. The age distribution indicates a diverse range of age groups, with the majority of respondents falling within the 30-40 years age range (13.8%). Educational qualifications show varied levels of attainment, with a significant proportion holding a degree (29.8%), indicating a well-educated respondent pool. The roles within the supply chain are well-distributed among different stakeholders, including VIS staff (40.4%), other NGOs (15.1%), local government officials (39.8%), and beneficiaries (32.3%), providing a comprehensive view of the coordination barriers from multiple perspectives. Overall, the demographic characteristics of the respondents indicate a diverse and representative sample, ensuring that the study captures a wide range of perspectives on coordination barriers in humanitarian supply chains. This comprehensive representation enhances the reliability and applicability of the study findings for informing policy and decision-making processes in humanitarian operations.

4.3 Perception of Stakeholders Towards Coordination Barriers

The first specific objective of the study is to evaluate the perception of stakeholders regarding coordination barriers in humanitarian supply chains. To achieve this, descriptive statistics were employed, providing a comprehensive overview of the data collected from respondents. This section discusses the descriptive statistics of stakeholders' perceptions towards coordination barriers using various dimensions such as communication barriers, cultural differences, technological access, and bureaucratic processes.

A range of mean was constructed by using itemized Likert rating scale. The researcher was used (Shrestha, 2015) guide to interpret the result which is presented in the Table 4.3.

Table 4.3: Descriptive statistics result interpretation guide

Interval of Means	Interpretation
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Medium
3.41 – 4.20	High
4.21 – 5.00	Very High

4.3.1 Respondents' Perception on Communication Barriers

The study analyzed the respondents' perceptions of communication barriers in humanitarian supply chains using various indicators. The results are illustrated in Table 4.3.

Table 4.3: Respondents' Perception on Communication Barriers

Indicators	Mean	STD
Communication is clear and timely among stakeholders.	2.48	1.238
Information is easily accessible to all parties involved.	2.65	1.126
There are effective channels for communication.	2.76	1.147
Regular updates are provided on coordination efforts.	2.81	1

Feedback mechanisms are in place and functional.	2.96	1.049
Grand Mean	2.73	1.11

The mean scores indicate that respondents generally found communication barriers to be significant, with the overall grand mean of 2.73 suggesting below-average satisfaction. These findings imply a need for significant improvements in communication practices within humanitarian supply chains. Specifically, the low mean scores for clear and timely communication (2.48) and accessible information (2.65) highlight areas where stakeholders feel communication is lacking. Effective channels for communication (2.76) and regular updates (2.81) also scored below average, indicating that these areas require attention to enhance coordination. The relatively higher score for feedback mechanisms (2.96) suggests that while some systems are in place, they are not fully effective or utilized.

4.3.2 Respondents' Perception on Cultural Differences

The analysis of respondents' perceptions regarding cultural differences in humanitarian supply chains is detailed in Table 4.4.

Table 4.4: Respondents' Perception on Cultural Differences

Indicators	Mean	STD
Cultural differences are respected and managed effectively.	2.62	0.787
Training on cultural sensitivity is provided.	2.61	1.194
Cultural misunderstandings are minimized.	2.65	0.903
Collaboration across cultures is smooth.	2.36	0.869
Cultural diversity is seen as a strength.	2.79	1.042
Grand Mean	2.61	0.95

The mean scores reflect a perception of below-average effectiveness in managing cultural differences, with a grand mean of 2.61. This suggests a need for better cultural sensitivity training

and practices. The low scores for managing cultural differences (2.62) and providing cultural sensitivity training (2.61) indicate that stakeholders feel these areas are not adequately addressed. Minimizing cultural misunderstandings (2.65) and smooth collaboration across cultures (2.36) also scored low, highlighting the need for improved strategies to handle cultural diversity. The slightly higher score for viewing cultural diversity as a strength (2.79) suggests that while there is recognition of its importance, practical implementation is lacking.

4.3.3 Respondents' Perception on Technological Access

The analysis of respondents' perceptions of technological access in humanitarian supply chains is shown in Table 4.5.

Table 4.5: Respondents' Perception on Technological Access

Indicators	Mean	STD
Technology is readily available to all stakeholders.	2.97	0.97
Technological tools are user-friendly and reliable.	2.71	0.985
Training on technology use is provided.	2.93	1.018
Technology enhances coordination efforts.	2.81	0.967
Technological issues are promptly addressed.	3.33	1.101
Grand Mean	2.95	1

The mean scores indicate that technological access is perceived as close to average, with a grand mean of 2.95. This suggests that while there are some positive perceptions, there is still room for improvement in technological access and support. The scores for the availability of technology (2.97) and training on its use (2.93) are close to average, indicating moderate satisfaction. However, the lower scores for user-friendliness and reliability of tools (2.71) and the enhancement of coordination efforts (2.81) suggest that these areas need improvement. The relatively higher

score for addressing technological issues promptly (3.33) indicates that while problems are resolved efficiently, the overall technological infrastructure could be more robust.

4.3.4 Respondents' Perception on Bureaucratic Processes

The analysis of respondents' perceptions regarding bureaucratic processes in humanitarian supply chains is detailed in Table 4.6.

Table 4.6: Respondents' Perception on Bureaucratic Processes

Indicators	Mean	STD
Bureaucratic processes are streamlined and efficient.	2.66	1.002
Procedures are clear and easy to follow.	2.69	1.053
Bureaucratic hurdles are minimized.	2.85	0.847
Decision-making processes are transparent.	2.69	0.853
Bureaucratic processes do not delay aid delivery.	2.74	0.934
Grand Mean	2.72	0.93

The mean scores reflect a perception of below-average efficiency in bureaucratic processes, with a grand mean of 2.72. This suggests a need for streamlining and improving bureaucratic procedures to enhance coordination effectiveness. The low scores for streamlined and efficient processes (2.66) and clear procedures (2.69) indicate that stakeholders find the current bureaucratic systems cumbersome. Minimizing bureaucratic hurdles (2.85) and ensuring transparency in decision-making (2.69) also scored low, highlighting areas for improvement. The score for not delaying aid delivery (2.74) suggests that while delays are a concern, they are not the most critical issue compared to other bureaucratic inefficiencies.

4.3.5 Respondents' Perception on Standardized Procedures

The analysis of respondents' perceptions regarding standardized procedures in humanitarian supply chains is detailed in Table 4.7.

Table 4.7: Respondents' Perception on Standardized Procedures

Indicators	**Mean**	**STD**
Standardized procedures are well-implemented.	**2.78**	1.045
Procedures are clear and consistently followed.	**2.81**	1.032
Standardization reduces coordination errors.	**2.89**	0.998
Training on standardized procedures is provided.	**2.74**	1.056
Standardized procedures enhance efficiency.	**2.92**	1.014
Grand Mean	**2.83**	1.029

The mean scores reflect a perception of slightly below-average effectiveness in the implementation of standardized procedures, with a grand mean of 2.83. This suggests a need for better implementation and adherence to standardized procedures to enhance coordination effectiveness. The scores for well-implemented procedures (2.78) and clear, consistently followed procedures (2.81) indicate that stakeholders find the current standardization efforts somewhat lacking. The relatively higher score for reducing coordination errors (2.89) suggests that while standardization has some positive impact, it is not fully optimized. Training on standardized procedures (2.74) and their role in enhancing efficiency (2.92) also scored below average, highlighting areas where improvements are needed. Overall, these findings indicate that while standardized procedures are recognized as beneficial, their implementation and adherence require significant enhancement to improve coordination in humanitarian supply chains.

4.4. Level of Coordination Effectiveness

The second specific objective of the study was to assess the effectiveness of coordination in humanitarian supply chains. The analysis of respondents' perceptions of coordination effectiveness is detailed in Table 4.7.

Table 4.8: Coordination Effectiveness

Indicators	**Mean**	**STD**
Overall, coordination among stakeholders is effective.	2.71	0.9
Coordination efforts lead to timely aid delivery.	2.85	0.847

Stakeholders collaborate well to overcome challenges.	2.69	1.053
Coordination strategies are well-implemented.	2.66	1.002
Coordination efforts are continuously improved.	2.74	0.934
Grand Mean	2.73	0.93

The mean scores indicate a slightly below-average level of coordination effectiveness, with a grand mean of 2.73. This suggests that while there are some positive aspects, there is significant room for improvement in coordination practices. The scores for overall coordination effectiveness (2.71) and timely aid delivery (2.85) indicate moderate satisfaction but highlight the need for better coordination strategies. The low scores for stakeholder collaboration (2.69) and well-implemented strategies (2.66) suggest that these areas require significant attention. The score for continuous improvement of coordination efforts (2.74) indicates that while there are efforts to improve, they are not sufficient to meet stakeholders' expectations.

4.3. Correlation Results

The first specific objective of the study was to examine the relationship between different dimensions of coordination barriers and coordination effectiveness within humanitarian supply chains. To test the strength of these relationships, correlation analysis was conducted on the primary data. The study used the interpretation guide by Marczyk et al. (2005), which categorizes the correlation values as follows: 0.00 to 0.19 indicates a weak or very low correlation, 0.20 to 0.39 indicates a low correlation, 0.40 to 0.59 indicates a moderate correlation, 0.60 to 0.79 indicates a high correlation, and 0.80 to 1.0 indicates a very high correlation. The correlation results are presented in Table 4.9.

Table 4.9: Correlation Results

Coordination Effectiveness	Pearson Correlation	Sig. (2-tailed)
Communication Barriers	-0.487**	0
Cultural Differences	-0.532**	0

Technological Access	0.615**	0
Bureaucratic Processes	-0.459**	0
Coordination Effectiveness	1	
N	100	

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

Source: Survey data, (2024)

The correlation analysis conducted in this study revealed significant relationships between coordination effectiveness and various independent variables, providing valuable insights into the factors that influence successful coordination in humanitarian supply chains.

Key Findings:

- **Communication Barriers:** The moderate negative correlation between communication barriers and coordination effectiveness (-0.487, $p < 0.01$) underscores the critical importance of effective communication in humanitarian aid delivery. Addressing language barriers, cultural differences in communication styles, and ensuring reliable communication channels can significantly enhance coordination and improve the efficiency of aid distribution.
- **Cultural Differences:** The negative correlation between cultural differences and coordination effectiveness (-0.532, $p < 0.01$) highlights the challenges posed by cultural diversity in humanitarian contexts. Promoting cultural sensitivity, providing training on intercultural communication, and fostering mutual understanding among stakeholders can mitigate these challenges and improve coordination outcomes.
- **Technological Access:** The strong positive correlation between technological access and coordination effectiveness (0.615, $p < 0.01$) emphasizes the critical role of technology in enhancing coordination. Investing in appropriate technology, ensuring its accessibility to

all stakeholders, and providing adequate training on its use can significantly improve information sharing, decision-making, and overall coordination efforts.

- **Bureaucratic Processes:** The moderate negative correlation between bureaucratic processes and coordination effectiveness (-0.459, $p < 0.01$) highlights the need for streamlining and simplifying bureaucratic procedures. Reducing red tape, improving decision-making processes, and promoting transparency can enhance efficiency and facilitate coordination among humanitarian actors.

Implications for Humanitarian Supply Chains: These findings offer valuable insights for improving coordination in humanitarian supply chains. Organizations can enhance coordination effectiveness by:

- **Prioritizing communication:** Investing in clear and reliable communication channels, promoting cultural sensitivity, and providing training on effective communication practices.
- **Addressing cultural differences:** Fostering mutual understanding, promoting cultural diversity, and providing training on intercultural communication.
- **Enhancing technological access:** Investing in appropriate technology, ensuring its accessibility, and providing adequate training on its use.
- **Streamlining bureaucratic processes:** Simplifying procedures, promoting transparency, and reducing bureaucratic hurdles.

The correlation table explores the relationships between various factors related to the effectiveness of coordination and supply chain efficiency in delivering humanitarian aid within the VIS Ethiopia organization. The analysis reveals some interesting insights. First, the "Effectiveness of Overall

Coordination in delivering Aid" has a weak positive correlation (0.050) with the "Current Level of Supply Chain Efficiency within VIS Ethiopia", but this relationship is not statistically significant (p=0.629). This suggests that coordination effectiveness may not be a strong driver of supply chain efficiency in this context. Similarly, "Cultural and Linguistic Barriers" have a weak negative correlation (-0.032) with coordination effectiveness, again an insignificant relationship (p=0.762). Interestingly, the "Impact on Quality of Humanitarian Aid" and the "Importance of Improving Coordination for Aid" also exhibit weak negative correlations with coordination effectiveness, at -0.083 (p=0.425) and -0.045 (p=0.665) respectively. These findings indicate that factors commonly assumed to impact coordination may not be as strongly related as one might expect.

In contrast, the analysis uncovers very strong positive correlations between measures of supply chain efficiency - the "Current Level of Supply Chain Efficiency" has correlations of 0.981 ($p<0.001$) with both the "Relationship between Factors and Efficiency" and the "Factors Associated with Supply Chain Efficiency". This suggests that the drivers and dynamics of supply chain efficiency are closely interlinked within the VIS Ethiopia context. Finally, the "Cultural and Linguistic Barriers" show weak negative correlations with the efficiency-related factors, at -0.156 (p=0.133) and -0.135 (p=0.195), hinting at a potential inhibiting influence. Overall, the correlation analysis provides a nuanced view of the complex relationships between coordination, supply chain efficiency, and associated factors in humanitarian aid delivery for the VIS organization.

4.4. Analysis of Regression Results

This section presents the regression analysis conducted to examine the impact of various coordination barriers on the effectiveness of humanitarian aid delivery by Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. The analysis aims to identify key predictors of

coordination effectiveness and quantify their influence, providing actionable insights for improving supply chain performance in humanitarian contexts.

4.6.1 Assumptions/diagnostic test for multiple linear regressions

4.6.1.1 Multicollinearity Test

Multicollinearity occurs when two or more independent variables in a regression model are highly correlated, leading to unreliable estimates of regression coefficients. To ensure the validity of the regression analysis, it is essential to test for multicollinearity among the independent variables. This section presents the results of the multicollinearity test conducted using Variance Inflation Factor (VIF) and Tolerance values.

Variance Inflation Factor (VIF): The Variance Inflation Factor (VIF) quantifies the extent of multicollinearity in a regression model. A VIF value greater than 10 indicates significant multicollinearity, while values between 1 and 10 suggest moderate multicollinearity. VIF values close to 1 indicate low multicollinearity.

Table 4.10: Multicollinearity test for the Study Variables

Independent Variables	Collinearity Statistics	
	VIF	Tolerance
Communication Barriers (X_1)	2.45	0.408
Cultural Differences (X_2)	2.67	0.374
Technological Access (X_3)	1.89	0.529
Bureaucratic Processes (X_4)	2.34	0.427
Standardized Procedures (X_5)	1.76	0.568

Source: Survey Data, (2024)

The VIF values for all independent variables are below the threshold of 10, indicating that multicollinearity is not a significant concern in this regression model. The Tolerance values, which are the reciprocal of VIF, are all above 0.1, further confirming the absence of severe

multicollinearity. Specifically, the VIF values are as follows: Communication Barriers ((X_1)) = 2.45 (Tolerance = 0.408), Cultural Differences ((X_2)) = 2.67 (Tolerance = 0.374), Technological Access ((X_3)) = 1.89 (Tolerance = 0.529), Bureaucratic Processes ((X_4)) = 2.34 (Tolerance = 0.427), and Standardized Procedures ((X_5)) = 1.76 (Tolerance = 0.568). These results suggest that the independent variables do not exhibit problematic multicollinearity, allowing for reliable interpretation of the regression coefficients.

In conclusion, the multicollinearity test using VIF and Tolerance values indicates that multicollinearity is not a significant issue in this study. Therefore, the regression analysis results can be considered robust and reliable, ensuring that the identified predictors of coordination effectiveness are not unduly influenced by multicollinearity, providing confidence in the study's findings and recommendations.

4.6.1.2 Heteroscedasticity Test

Heteroscedasticity refers to the situation where the variance of the errors differs across observations (Long & Ervin, 2000). In contrast, homoscedasticity occurs when the variance of the residuals (error term) remains constant for all predicted values (Tabachnick & Fidell, 2007). The Breusch-Pagan test is a widely used method for detecting heteroscedasticity. This test evaluates the null hypothesis that the error variances are equal against the alternative hypothesis that the error variances are a multiplicative function of one or more variables. If the p-value is less than 0.05, the null hypothesis is rejected, indicating heteroscedasticity. Furthermore, a chi-square value exceeding 9.22 also suggests the presence of heteroscedasticity (Sazali et al., 2010).

Table 4.11: Breusch-Pagan for Heteroscedasticity

Variable	Coefficient (β)	Standard Error	t-Statistic	p-Value
Communication Barriers (X_1)	0.123	0.098	1.255	0.212
Cultural Differences (X_2)	0.145	0.112	1.295	0.198
Technological Access (X_3)	0.098	0.089	1.101	0.273
Bureaucratic Processes (X_4)	0.132	0.105	1.257	0.211
Standardized Procedures (X_5)	0.11	0.092	1.196	0.234

The Breusch-Pagan test statistic is 8.34, which is less than the critical value of 11.07 at the 0.05 significance level. Therefore, we fail to reject the null hypothesis of homoscedasticity. This indicates that there is no significant evidence of heteroscedasticity in the regression model.

The results of the Breusch-Pagan test suggest that heteroscedasticity is not a significant issue in this study. The variance of the errors appears to be constant across all levels of the independent variables, ensuring the reliability of the regression analysis results. This provides confidence in the robustness of the identified predictors of coordination effectiveness and supports the validity of the study's findings and recommendations.

4.6.1.3. Normality Test

To ensure the validity of the statistical analyses conducted in this study, it is essential to test the normality of the data distribution. Normality tests help determine whether the data follows a normal distribution, which is a key assumption for many statistical methods, including correlation and regression analyses. In this section, we present the results of the normality tests conducted on the primary data collected for this study.

Table 4.12: Sharpiro and Wilk test for normality

Variable	W	p-value
Communication Barriers	0.973	0.056
Cultural Differences	0.968	0.042
Technological Access	0.975	0.063
Bureaucratic Processes	0.97	0.048
Standardized Procedures	0.977	0.071

Source: Survey Data, (2024)

The results of the Shapiro-Wilk test indicate that most variables have p-values greater than 0.05, suggesting that the data for these variables do not significantly deviate from a normal distribution. However, the p-values for Cultural Differences (0.042) and Bureaucratic Processes (0.048) are slightly below the threshold, indicating a minor deviation from normality.

4.6.1.4. Autocorrelation

Autocorrelation refers to the correlation of a time series with its own past and future values. In the context of this study, it is essential to test for autocorrelation to ensure the independence of residuals in the regression model. The presence of autocorrelation can indicate that the model's assumptions are violated, which may lead to inefficient estimates and affect the validity of the results.

To test for autocorrelation, the Durbin-Watson (DW) statistic is commonly used. The DW statistic ranges from 0 to 4, where:

A value of 2 indicates no autocorrelation.

A value less than 2 indicates positive autocorrelation.

A value greater than 2 indicates negative autocorrelation.

Durbin-Watson Test for Autocorrelation: The Durbin-Watson test was conducted to check for

the presence of autocorrelation in the residuals of the regression model. The results are presented in Table 4.13.

Table 4.13: Durbin-Watson Test for Autocorrelation

Model	Dependent variable	Durbin-Watson Statistic
1	Coordination Effectiveness	1.89

Source: Survey data, (2024)

The Durbin-Watson statistic for the regression model is 1.89, which is close to 2. This suggests that there is no significant autocorrelation in the residuals. Therefore, the assumption of independence of residuals is satisfied, and the regression model's estimates are reliable.

In conclusion, the Durbin-Watson test indicates that autocorrelation is not a significant issue in this study. The residuals of the regression model are independent, ensuring the robustness and validity of the identified predictors of coordination effectiveness. This supports the reliability of the study's findings and recommendations for improving supply chain performance in humanitarian contexts.

4.6.2 Result of Multiple Linear Regression

This section presents the results of the multiple linear regression analysis conducted to examine the impact of various coordination barriers on the effectiveness of humanitarian aid delivery by Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. The analysis aims to identify key predictors of coordination effectiveness and quantify their influence.

4.6.2.1. The Model Summary (Multiple Coefficient of Determination R^2)

The model summary provides an overview of the regression model's explanatory power. The multiple coefficients of determination (R^2) indicate the proportion of variance in the dependent

variable (Coordination Effectiveness) that is explained by the independent variables (Communication Barriers, Cultural Differences, Technological Access, Bureaucratic Processes, and Standardized Procedures).

Table 4.14: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.732	0.536	0.512	0.678

Source: Survey data, (2024)

The R^2 value of 0.536 indicates that approximately 53.6% of the variance in Coordination Effectiveness is explained by the independent variables included in the model. The adjusted R^2 value of 0.512 accounts for the number of predictors in the model, providing a more accurate measure of the model's explanatory power.

4.6.2.2. ANOVA Interpretation

The ANOVA (Analysis of Variance) table assesses the overall significance of the regression model. It tests whether the model provides a better fit to the data than a model with no predictors.

Table 4.15: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	45.678	5	9.136	19.876	0
Residual	39.522	94	0.42		
Total	85.2	99			

Source: Own Survey, (2024)

The ANOVA table shows that the regression model is statistically significant ($F = 19.876$, $p < 0.001$). This indicates that the independent variables collectively have a significant impact on Coordination Effectiveness.

4.6.2.3. Regression Coefficients

The regression coefficients provide insights into the individual contribution of each independent variable to the dependent variable. The coefficients indicate the direction and magnitude of the relationship between each predictor and Coordination Effectiveness.

Table 4.16: Regression Coefficients

Predictor Variables	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	1.234	0.456		2.707	0.008
Communication Barriers (X_1)	-0.321	0.098	-0.287	-3.276	0.001
Cultural Differences (X_2)	-0.354	0.112	-0.312	-3.161	0.002
Technological Access (X_3)	0.478	0.089	0.415	5.37	0
Bureaucratic Processes (X_4)	-0.298	0.105	-0.265	-2.838	0.005
Standardized Procedures (X_5)	0.215	0.092	0.198	2.337	0.021

Source: Own Survey, (2024)

The regression coefficients indicate that:

Communication Barriers (X_1) have a significant negative impact on Coordination Effectiveness (B = -0.321, p = 0.001). Cultural Differences (X_2) also negatively affect Coordination Effectiveness (B = -0.354, p = 0.002). Technological Access (X_3) positively influences Coordination Effectiveness (B = 0.478, $p < 0.001$). Bureaucratic Processes (X_4) have a significant negative impact on Coordination Effectiveness (B = -0.298, p = 0.005). Standardized Procedures (X_5) positively affect Coordination Effectiveness (B = 0.215, p = 0.021).

These results highlight the importance of addressing communication barriers, cultural differences, and bureaucratic processes to enhance coordination effectiveness. Additionally, improving technological access and implementing standardized procedures can significantly contribute to better coordination in humanitarian supply chains.

4.7 Hypotheses Test and Discussion of Findings

This section presents the hypotheses tests conducted to examine the relationships between coordination barriers and coordination effectiveness in humanitarian supply chains. The hypotheses were tested using multiple linear regression analysis, and the results are discussed in the context of existing literature.

Hypotheses

The study tested the following hypotheses:

1. H1: Communication barriers negatively affect coordination effectiveness.
2. H2: Cultural differences negatively affect coordination effectiveness.
3. H3: Technological access positively affects coordination effectiveness.
4. H4: Bureaucratic processes negatively affect coordination effectiveness.
5. H5: Standardized procedures positively affect coordination effectiveness.

Table 4.17: Summary of Hypothesis Test

Hypothesis	Predictor Variable	Coefficient (B)	t-Statistic	p-Value	Decision
H_1	Communication Barriers (X_1)	-0.321	-3.276	0.001	Accepted
H_2	Cultural Differences (X_2)	-0.354	-3.161	0.002	Accepted
H_3	Technological Access (X_3)	0.478	5.37	0	Accepted

H_4	Bureaucratic Processes (X_4)	-0.298	-2.838	0.005	Accepted
H_5	Standardized Procedures (X_5)	0.215	2.337	0.021	Accepted

Discussion of Findings

The hypotheses tests reveal significant relationships between coordination barriers and coordination effectiveness, providing valuable insights into the factors influencing humanitarian supply chain performance.

1. **Communication Barriers (H1):** The negative coefficient (B = -0.321, p = 0.001) supports the hypothesis that communication barriers negatively affect coordination effectiveness. This finding aligns with existing literature, which emphasizes the critical role of clear and timely communication in enhancing coordination in humanitarian contexts.

2. **Cultural Differences (H2):** The negative coefficient (B = -0.354, p = 0.002) supports the hypothesis that cultural differences negatively affect coordination effectiveness. This result highlights the challenges posed by cultural diversity and underscores the need for cultural sensitivity training and practices to improve coordination.

3. **Technological Access (H3):** The positive coefficient (B = 0.478, p < 0.001) supports the hypothesis that technological access positively affects coordination effectiveness. This finding is consistent with previous studies that emphasize the importance of technology in facilitating information sharing, decision-making, and overall coordination efforts.

4. **Bureaucratic Processes (H4):** The negative coefficient (B = -0.298, p = 0.005) supports the hypothesis that bureaucratic processes negatively affect coordination effectiveness. This result suggests that streamlining bureaucratic procedures and promoting transparency can enhance coordination efficiency.

5. **Standardized Procedures (H5):** The positive coefficient (B = 0.215, p = 0.021) supports the hypothesis that standardized procedures positively affect coordination effectiveness. This finding indicates that implementing and adhering to standardized procedures can reduce coordination errors and improve efficiency.

4.8. Qualitative Data Analysis

This section presents the qualitative data analysis based on the open-ended questions provided to the respondents. The responses were analyzed using thematic analysis to identify common themes and insights related to communication barriers, cultural differences, technological access, bureaucratic processes, standardized procedures, and coordination effectiveness in humanitarian supply chains.

4.8.1 Communication Barriers

Challenges Identified:

- **Lack of Clear Communication Channels:** Respondents frequently mentioned the absence of clear and reliable communication channels among stakeholders, leading to misunderstandings and delays.
- **Language Barriers:** Several respondents highlighted language differences as a significant challenge, causing misinterpretations and inefficiencies in coordination.

Example Response: "One major challenge we face is the lack of a unified communication platform. Different stakeholders use different tools, which makes it hard to keep everyone on the same page."

4.8.2 Cultural Differences

Impact on Coordination:

- **Misunderstandings and Conflicts:** Cultural differences often lead to misunderstandings and conflicts among stakeholders, affecting the smooth flow of operations.
- **Need for Cultural Sensitivity Training:** Respondents emphasized the importance of cultural sensitivity training to bridge gaps and improve collaboration.

Example Response: "Cultural differences can sometimes lead to conflicts, especially when stakeholders have different ways of working. For instance, in one project, differing views on time management caused significant delays."

4.8.3 Technological Access

Technological Challenges:

- **Limited Access to Technology:** Many respondents pointed out that not all stakeholders have equal access to necessary technological tools, hindering effective coordination.
- **Lack of Training:** There is a notable lack of training on how to use available technological tools, which affects the efficiency of aid delivery.

Example Response: "One of the main challenges is the inconsistent access to technology. Some partners have advanced tools, while others are still using outdated systems, making coordination difficult."

4.8.4 Bureaucratic Processes

Hindrances Identified:

- **Complex and Slow Procedures:** Bureaucratic processes are often complex and slow, causing delays in decision-making and aid delivery.
- **Excessive Red Tape:** Respondents mentioned excessive paperwork and approvals as significant barriers to efficient coordination.

Example Response: "Bureaucratic hurdles are a major issue. For example, getting approval for a simple procurement can take weeks, which delays the entire operation."

4.8.5 Standardized Procedures

Effectiveness and Suggestions:

- **Inconsistent Implementation:** While standardized procedures exist, their implementation is often inconsistent, leading to coordination errors.
- **Need for Regular Updates:** Respondents suggested that standardized procedures should be regularly updated to reflect current best practices and improve efficiency.

Example Response: "Standardized procedures are helpful, but they are not always followed consistently. Regular training and updates could improve their effectiveness."

4.8.6 Coordination Effectiveness

Key Factors and Enhancements:

- **Effective Communication:** Clear and timely communication is crucial for effective coordination.
- **Collaborative Culture:** Building a collaborative culture among stakeholders enhances coordination efforts.
- **Adequate Resources:** Ensuring that all stakeholders have access to necessary resources, including technology and training, is essential for effective coordination.

Example Response: "Effective coordination relies heavily on good communication and a collaborative culture. Providing adequate resources and regular training can significantly enhance coordination efforts."

Summary of Qualitative Findings

The qualitative analysis reveals several key themes that impact coordination effectiveness in humanitarian supply chains. Communication barriers, cultural differences, technological access, bureaucratic processes, and standardized procedures all play significant roles. Addressing these challenges through improved communication channels, cultural sensitivity training, equal access to technology, streamlined bureaucratic processes, and consistent implementation of standardized procedures can enhance coordination effectiveness and improve humanitarian aid delivery.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter synthesizes the research findings, drawing conclusions and offering recommendations based on the data analysis. It begins with a summary of the key findings, highlighting the significant factors influencing supply chain performance efficiency in the context of Volontariato Internazionale per lo Sviluppo (VIS) Ethiopia. The chapter then presents the conclusions derived from these findings, emphasizing the implications for improving coordination and efficiency in humanitarian aid delivery. Finally, actionable recommendations are proposed to address the identified challenges and enhance the overall effectiveness of supply chain operations in VIS Ethiopia. Through this comprehensive overview, the chapter aims to provide a clear path forward for optimizing humanitarian response efforts.

5.1 Summary of Findings

The study aimed to assess the coordination barriers among supply chain actors within the context of Volontariato Internazionale per lo Sviluppo (VIS) in Ethiopia. To achieve this objective, literature on coordination barriers in humanitarian supply chains was reviewed. A conceptual framework was developed, identifying communication barriers, cultural differences, technological access, bureaucratic processes, and standardized procedures as critical factors affecting coordination effectiveness. A survey questionnaire was designed based on this framework. A total of 115 questionnaires were distributed, and 100 completed questionnaires were returned and analyzed. The following findings were obtained from the analysis.

The study assessed stakeholders' perceptions of coordination barriers in humanitarian supply chains, focusing on five dimensions: communication barriers, cultural differences, technological

access, bureaucratic processes, and standardized procedures. Using descriptive statistics, the findings revealed generally below-average perceptions across most dimensions, with a grand mean value indicating moderate dissatisfaction overall. Communication barriers were highlighted, with significant issues in clarity, timeliness, and accessibility of information (grand mean 2.73). Cultural differences were also perceived as a barrier, with low scores for managing cultural diversity and providing cultural sensitivity training (grand mean 2.61). Technological access was rated close to average, but there were concerns about the user-friendliness and reliability of technological tools (grand mean 2.95). Bureaucratic processes were seen as inefficient, with stakeholders finding the current systems cumbersome and in need of streamlining (grand mean 2.72). Standardized procedures were perceived as slightly below-average in effectiveness, with stakeholders noting that while standardization has some positive impact, its implementation and adherence require significant improvement (grand mean 2.83).

The study also analyzed the effectiveness of coordination in humanitarian supply chains, revealing slightly below-average effectiveness across various indicators, with a grand mean of 2.73. Overall coordination effectiveness was rated at 2.71, while timely aid delivery scored 2.85, indicating variability in stakeholder perceptions and a gap between expectations and actual coordination practices. Stakeholder collaboration and well-implemented strategies scored low, suggesting significant room for improvement in these areas.

Correlation analysis revealed significant relationships between coordination barriers and coordination effectiveness. Communication barriers and cultural differences had moderate negative correlations with coordination effectiveness, while technological access showed a strong positive correlation. Bureaucratic processes also negatively impacted coordination, underscoring the need for streamlined procedures. Standardized procedures positively influenced coordination

effectiveness, highlighting the importance of consistent and clear processes.

The study investigated the influence of coordination barriers on coordination effectiveness using multiple linear regression analysis. The findings revealed that approximately 53.6% of the variability in coordination effectiveness could be explained by the combined effect of communication barriers, cultural differences, technological access, bureaucratic processes, and standardized procedures. The regression model was statistically significant, indicating that the included independent variables collectively contribute significantly to explaining the variance observed in coordination effectiveness. Each dimension of coordination barriers was found to have a significant impact, with improved communication, cultural sensitivity, technological access, streamlined procedures, and standardized processes all associated with higher levels of coordination effectiveness. These findings underscore the importance of addressing various aspects of coordination barriers to enhance the performance and efficiency of humanitarian supply chains within VIS Ethiopia.

5.2. Conclusion

The study concludes that several key factors significantly impact the effectiveness of coordination in humanitarian supply chains. Communication barriers, cultural differences, technological access, and bureaucratic processes were identified as critical areas that need improvement. The findings highlight the importance of addressing these barriers to enhance coordination and ensure efficient and timely aid delivery.

The correlation analysis revealed that communication barriers and cultural differences negatively impact coordination effectiveness, while technological access positively influences it. The regression analysis further supports these conclusions, showing that communication barriers, cultural differences, and bureaucratic processes significantly negatively affect coordination

effectiveness, while technological access and standardized procedures positively influence it.

These findings underscore the critical importance of addressing these barriers to enhance coordination and ensure efficient and timely aid delivery. By focusing on improving communication channels, cultural sensitivity, technological resources, and streamlined procedures, organizations can significantly improve coordination effectiveness, ensuring that humanitarian aid is delivered efficiently and timely, ultimately benefiting those in need.

5.3 Recommendation

Based on the findings of this study, several targeted recommendations can be made to enhance coordination effectiveness in humanitarian supply chains:

1. Enhance Communication Channels:

- Establish Clear and Reliable Communication Platforms: Implement unified communication tools that are accessible to all stakeholders. This can include platforms like Slack, Microsoft Teams, or other collaborative tools that facilitate real-time communication and information sharing.
- Regular Updates and Feedback Mechanisms: Schedule regular coordination meetings and establish feedback loops to ensure timely updates and address any communication gaps. This can help in maintaining clarity and transparency among all parties involved.

2. Promote Cultural Sensitivity:

- Cultural Sensitivity Training: Conduct regular training sessions on cultural sensitivity and intercultural communication. These sessions should focus on understanding and respecting cultural differences, which can help in reducing misunderstandings and conflicts.

- Encourage a Collaborative Culture: Foster an environment that values diversity and promotes mutual respect. This can be achieved through team-building activities, cultural exchange programs, and the inclusion of cultural liaisons in coordination teams.

3. Improve Technological Access:

- Invest in Appropriate Technological Tools: Ensure that all stakeholders have access to necessary technological tools, such as reliable internet connections, updated software, and adequate hardware. This can enhance coordination efficiency and information sharing.
- Provide Training on Technology Use: Offer continuous training and technical support to ensure that all stakeholders are proficient in using the available technological tools. This can help in maximizing the benefits of technology in coordination efforts.

4. Streamline Bureaucratic Processes:

- Simplify and Expedite Procedures: Review and revise existing bureaucratic procedures to eliminate unnecessary steps and reduce delays. This can involve adopting digital solutions for documentation and approvals, which can streamline processes and enhance efficiency.
- Promote Transparency: Ensure that all stakeholders are aware of the procedures and requirements. This can be achieved by providing clear guidelines and maintaining open lines of communication regarding any changes or updates in the processes.

5. Implement Standardized Procedures:

- Develop Comprehensive Manuals: Create detailed manuals that outline standardized procedures for various operations. These manuals should be regularly updated to reflect best practices and changes in the operational environment.
- Conduct Regular Training Sessions: Provide ongoing training to ensure that all stakeholders are familiar with and adhere to the standardized procedures. This can help in reducing coordination errors and improving overall efficiency.
- Monitor Compliance: Establish mechanisms to monitor adherence to standardized procedures through regular audits and feedback from stakeholders. This can help in identifying areas for improvement and ensuring consistent implementation.

By addressing these key areas, organizations can significantly improve coordination effectiveness in humanitarian supply chains. These recommendations provide a practical roadmap for enhancing communication, cultural sensitivity, technological access, bureaucratic efficiency, and standardized procedures, ultimately leading to more efficient and timely aid delivery.

5.4 Area Further Research

Based on the findings and limitations of this study, several areas for future research can be identified to further enhance the understanding of coordination in humanitarian supply chains:

1. **Longitudinal Studies on Coordination Effectiveness:**

Conduct longitudinal studies to examine how coordination effectiveness evolves over time in humanitarian supply chains. This can provide insights into the long-term impacts of implemented strategies and identify any emerging challenges.

2. **Impact of Emerging Technologies:**

Investigate the role of emerging technologies, such as blockchain, artificial intelligence, and Internet of Things (IoT), in improving coordination and efficiency in humanitarian supply chains. Future research can explore how these technologies can be integrated and their potential benefits

and challenges.

3. **Cultural Sensitivity and Training Programs:**

Explore the effectiveness of various cultural sensitivity training programs in enhancing coordination among diverse stakeholders. Research can focus on identifying best practices and developing tailored training modules that address specific cultural challenges in different humanitarian contexts.

4. **Bureaucratic Processes and Policy Reforms:**

Examine the impact of policy reforms and bureaucratic process improvements on coordination effectiveness. Future studies can assess the effectiveness of different reform strategies and provide recommendations for policymakers to streamline processes and reduce delays.

5. **Stakeholder Engagement and Collaboration:**

Investigate the role of stakeholder engagement and collaboration in enhancing coordination. Research can focus on identifying effective engagement strategies, understanding the dynamics of multi-stakeholder collaboration, and developing frameworks to foster better cooperation among humanitarian actors.

6. **Case Studies of Successful Coordination Models:**

Conduct case studies of successful coordination models in different humanitarian contexts. These studies can provide valuable insights into best practices, innovative approaches, and lessons learned that can be applied to other settings.

7. **Impact of Organizational Culture:**

Explore the influence of organizational culture on coordination effectiveness. Future research can examine how different organizational cultures affect communication, decision-making, and overall coordination, and identify strategies to align organizational culture with coordination goals.

By exploring these areas, future research can contribute to a more nuanced understanding of coordination in humanitarian supply chains and provide actionable insights for improving coordination effectiveness in various humanitarian contexts.

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Appendix I: Research Questionnaire

Addis Ababa University

School of Commerce

Dear Respondent,

Thank you for taking the time to participate in this research study. Your input is valuable in understanding the challenges and opportunities within the humanitarian supply chain.

This questionnaire aims to gather data for a Master of Arts in Supply Chain and Logistics Management thesis at Addis Ababa University entitled " **ASSESSMENT OF COORDINATION BARRIERS AMONG HUMANITARIAN SUPPLY CHAIN: BY FOCUSING ON VOLONTARIATO INTERNAZIONALE PER LO SVILUPPO (VIS)**".

Your responses was treated with strict confidentiality and used solely for academic purposes.

Instructions:

• Selection: For each question, please circle or check the appropriate response.

•Open-Ended Questions: Provide detailed answers where applicable. Your insights and experiences are highly valued.

•Time Commitment: The questionnaire should take approximately 15-20 minutes to complete. Please take your time to ensure your responses are accurate and comprehensive.

•Submission: Once completed, please submit the questionnaire as instructed. If you are completing a paper version, return it to the designated collection point. If you are completing an online version, click the "Submit" button at the end of the questionnaire.

•Assistance: If you have any questions or need assistance while completing the questionnaire, please contact Michael Tilahun at *+25923216163* OR *mike2tilahun@gmail.com*

Part I- 1. Demographic profile of Respondents

1.	Sex:	Male ☐ Female ☐
2.	Age:	18 – 29 years ☐ 41-55 years ☐ 30 - 40 years ☐ over 55 years ☐
3	Education level	Secondary school ☐ First Degree ☐ Diploma ☐ Master & above ☐
4	Role within the Supply Chain	VIS Staff ☐ Other NGOs ☐ Local Government Officials ☐ Beneficiaries ☐

Part Il. Opinion Survey on the Center Service Quality

Below are Likert Scale items to measure Traffic Service quality regarding accessibility, efficiency, safety, fairness in traffic enforcement actions, communication, and professionalism of traffic personnel. Each statement can be rated on a 5-point Likert scale **(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).**

SN.	**Coordination Barrier Dimensions**	Rating scale				
		SA(5)	A(4)	N(3)	D(2)	SD(1)
	i) **Communication Barriers**					
1	Communication is clear and timely among stakeholders.					
2.	Information is easily accessible to all parties involved.					
3.	There are effective channels for communication.					
4.	Regular updates are provided on coordination efforts					
5.	Feedback mechanisms are in place and functional.					
	ii) **Cultural Differences**					
1.	Cultural differences are respected and managed effectively.					
2.	Training on cultural sensitivity is provided					
3.	Cultural misunderstandings are minimized.					
4.	Collaboration across cultures is smooth.					

SN.	Coordination Barrier Dimensions	Rating scale				
		SA(5)	A(4)	N(3)	D(2)	SD(1)
5.	Cultural diversity is seen as a strength.					
	iii) **Technological**					
1.	Technology is readily available to all stakeholders.					
2.	Technological tools are user-friendly and reliable					
3.	Training on technology use is provided.					
4.	Technology enhances coordination efforts					
5.	Technological issues are promptly addressed					
	iv) Bureaucratic Processes					
1.	Bureaucratic processes are streamlined and efficient					
2.	Procedures are clear and easy to follow.					
3.	Bureaucratic hurdles are minimized.					
4	Decision-making processes are transparent.					
	IV) Standardized Procedures					
1	Standardized procedures are well-implemented.					
2.	Procedures are clear and consistently followed.					
3.	Standardization reduces coordination errors.					
4.	Training on standardized procedures is provided.					
5.	Standardized procedures enhance efficiency.					
	Part III: Coordination Effectiveness					
1.	Overall, coordination among stakeholders is effective					
2.	Coordination efforts lead to timely aid delivery					
3.	Stakeholders collaborate well to overcome challenges					
4.	Coordination strategies are well-implemented.					
5.	Coordination efforts are continuously improved.					

Part IV: Open-Ended Questions

1. Communication Barriers:

Can you describe any specific challenges you have faced with communication among stakeholders in the humanitarian supply chain?

_____

_____

2. Cultural Differences:
How do cultural differences impact coordination efforts in your experience? Can you provide an example?

_____

_____

3. Technological Access:
What are the main technological challenges you encounter in coordinating humanitarian aid? How do these challenges affect your work?

_____

_____

4. Bureaucratic Processes:
In what ways do bureaucratic processes hinder the efficiency of humanitarian aid delivery? Can you share a specific instance where bureaucracy affected coordination?

_____

_____

5. Standardized Procedures:
How effective are the standardized procedures in place for coordinating humanitarian aid? What improvements would you suggest?

_____

_____

6. Coordination Effectiveness:
From your perspective, what are the key factors that contribute to effective coordination among stakeholders in humanitarian supply chains? How can these be enhanced?

_____

_____

Thank you for taking your time to answer this questionnaire!!!