

MEKELLE UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT



**DETERMINANTS OF THIRD-PARTY LOGISTICS (3PLs)
PERFORMANCE: IN THE CASE OF HUMANITARIAN AID
OPERATIONS OF INGOs & UN AGENCIES IN TIGRAY,
ETHIOPIA**

**RESEARCH THESIS SUBMITTED TO DEPARTMENT OF LOGISTICS AND
SUPPLY CHAIN MANAGEMENT IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR MASTER OF SCIENCE DEGREE IN LOGISTICS AND
SUPPLY CHAIN MANAGEMENT**

BY: AREGAWI G/MARIAM WELDESAMUEL

ID NO. CBE/LSCME/0026/12

ADVISOR: TESHAY KELALI (PhD)

December, 2025 G.C

Mekelle

Declaration

This is to certify that this thesis entitled as “determinants of third-party logistics (3PLs) performance: in the case of humanitarian aid operations of INGOs & UN agencies in Tigray” is my original work or any part thereof has not been previously submitted in any form to the University or to any other body whether for the purpose of assessment, publication or for any other purpose. All sources of materials used in the thesis have been duly acknowledged. I confirm that except for any express acknowledgements, reference cited in the work, the original work is the result of my own efforts.

Declared By: Aregawi G/mariam Weldesamuel

DATE: Oct, 2025

SIGNATURE: _____

ADVISOR'S NAME: Tesfay Kelali /PhD/

SIGNATURE: _____

DATE: _____

Place of Submission:

School of Management

Department of Logistics ad Supply Chain Management

Statement of Certification

This is to certify that this thesis entitled “determinants of third-party logistics (3PLs) performance: in the case of humanitarian aid operations of INGOs & UN agencies in Tigray”, submitted in partial fulfillment of the requirements for the degree of Master of Science in Logistics and Supply Chain Management to the School of Business and Economics of Mekelle University, done by Aregawi G/mariam Weldesamuel is an authentic work carried by him under our guidance. The theme embedded in this thesis has not been submitted earlier for the award of any degree or diploma in any other university to the best of our knowledge.

Advisor Signature Date Place

Tesfay Kelali (PhD) _____ _____ Mekelle, Tigray, Ethiopia

Approval

The thesis entitled “determinants of third-party logistics (3PLs) performance: in the case of humanitarian aid operations of INGOs & UN agencies in Tigray” is approved for the Master of Science in Logistics and Supply Chain Management.

As a member of the board of examiners of the Master in Logistics and Supply Chain thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Aregawi G/mariam Weldesamuel and examined the candidate. We recommend that the thesis be accepted as fulfilling the thesis requirement for the master's degree of Science in Logistics and Supply Chain Management.

Approved by Board of Examiners

| Name of Advisor. | Signature. | Date |
|---------------------|------------|-------|
| Tesfay Kelali (PhD) | _____ | _____ |

| Name of Internal Examiner. | Signature. | Date |
|----------------------------|------------|-------|
| _____. | _____. | _____ |

| Name of External Examiner. | Signature. | Date |
|----------------------------|------------|-------|
| _____. | _____. | _____ |

Acknowledgement

First of all, I would like to present my hearty thanks go to Almighty God for his blessing on me so as to have full effort and knowledge, inspiration and diligence that required for successful completion of this thesis work and for making my dream goes to a reality of successful completion of this work. Besides, it would not have been possible completing without the advising, support, encouragement and cooperation from my advisor and other bodies provided friendly and professional persistent support from the beginning to the end of the study.

Mainly, I would like to express my heartfelt and sincere gratitude to my principal advisor Tesfay Kelali (PhD) for his diligent paternal and professional assistance and dedication of his precious time in advising and correcting the research work from commencement to the end.

Last but not least, I am happy to give my special thanks to the management bodies of 3PLs companies, INGOs & UN agencies in Tigray as well as my friends who have fundamental roles and participations to accomplish the research work.

Abstract

Third-party logistics (3PLs) service providers have the pivotal role toward facilitating in delivery of humanitarian aids to save lives and alleviate suffers of vulnerable society in crisis areas like Tigray. This study aimed to identify the internal and external factors influencing the performance of third-party logistics (3PLs) service providers in delivering humanitarian aids from INGOs and UN agencies in Tigray. The study employed mixed-methods of quantitative and qualitative approaches, and it selected 84 respondent samples by using purposive sampling from INGOs, UN agencies, and 3PLs providers. Quantitative data were collected via Likert-scale surveys and analyzed using descriptive statistics and multiple linear regressions (MLR) model, while qualitative data were analyzed through content analysis method. The MLR tested ten hypotheses regarding to factors affecting 3PLs performance. Results confirmed that firm experience, organizational capacity, long-standing relationships, and risk management significantly and positively affect performances of 3PLs service providers while Political instability was found to have a significant negative impact. Other factors such as service quality, technology usage, and cost-effectiveness were not statistically significant. The model explained 78.6% of the variance in 3PLs performance, indicating strong explanatory power. Qualitative findings highlighted political instability, infrastructure damage, resource constraints, managerial weaknesses, and regulatory challenges as major barriers. Implications suggest that improving logistics performance requires strengthening firm capacities, fostering strategic collaborations, advancing risk management, upgrading fleets and infrastructure, incorporating technology, and advocating for political stability. Overall, this comprehensive analysis of the study provides actionable empirical insights and actionable strategies for humanitarian actors and policymakers to optimize the performances of 3PLs service providers to deliver humanitarian aids in the complex operational conditions effectively in conflict-affected regions like Tigray.

Key Words: *Tigray, 3PLs, humanitarian, MLR model*

TABLE OF CONTENTS

| | |
|--|--------------|
| CONTENTS | pages |
| Declaration | ii |
| Statement of Certification | iii |
| Approval | iv |
| Acknowledgement | v |
| Abstract | vi |
| List of tables..... | xi |
| List of figures | xii |
| List of acronyms | xiii |
| CHAPTER ONE: INTRODUCTION | 1 |
| 1.1 Background of the Study..... | 1 |
| 1.2 Statement of the problem | 3 |
| 1.3 Research Questions | 5 |
| 1.4.1 General Objective | 6 |
| 1.4.2 Specific Objectives | 6 |
| 1.5 Significance of the Study | 6 |
| 1.6 Delimitation of the Study | 7 |
| 1.7 Organization of the Study | 8 |
| CHAPTER TWO: LITERATURE REVIEW OF THE STUDY | 10 |
| 2.1 Introduction | 10 |
| 2.2 Concepts of logistics performance | 10 |
| 2.2.1 Logistics..... | 10 |
| 2.2.2 Third-party logistics (3PLs)..... | 11 |
| 2.2.3 Third-party logistics (3PLs) performance | 11 |

| | |
|---|----|
| 2.2.4 Third-Party Logistics (3PLs) in Humanitarian Operations | 12 |
| 2.3 Theoretical Frameworks of the study | 12 |
| 2.3.1 Resource-Based View (RBV)..... | 13 |
| 2.3.2 Transaction Cost Economics (TCE) theory | 13 |
| 2.3.3 Social Network Theory..... | 14 |
| 2.3.4 Contingency Theory | 15 |
| 2.3.5 Institutional Theory | 15 |
| 2.4 Empirical frameworks of the study | 16 |
| 2.4.1 Empirical Reviews on 3PLs Performance | 16 |
| 2.4.2 Contribution of the study | 18 |
| 2.5 Conceptual framework of the study | 19 |
| 2.5.1 Determinants of 3PLs performances | 19 |
| 2.5.2 Hypotheses designs of the Study | 23 |
| 2.5.3 Conceptual Design of the Study | 24 |
| CHAPTER THREE: METHODOLOGY OF THE STUDY | 25 |
| 3.1 Introduction | 25 |
| 3.2 Description on the site of the Study | 25 |
| 3.3 Research Philosophy of the study | 26 |
| 3.4 Research Design of the study | 27 |
| 3.5 Population, Sampling and sample size..... | 28 |
| 3.5.1 Target population of the study | 28 |
| 3.5.2 Sampling method of the study | 28 |
| 3.5.3 Sample sizes of the study..... | 29 |
| 3.6 Data types and sources of the study | 32 |
| 3.6.1 Data type of the study..... | 32 |

| | |
|--|----|
| 3.6.2 Data sources of the study..... | 32 |
| 3.7 Data Collection Methods..... | 32 |
| 3.7.1 Survey questionnaires..... | 32 |
| 3.7.2 Semi-structured Interviews..... | 33 |
| 3.8 Data Analysis | 33 |
| 3.8.1 Quantitative Data Analysis..... | 33 |
| 3.8.2 Econometric Model of the study | 34 |
| 3.8.3 Qualitative Data Analysis..... | 35 |
| 3.9 Research validity and reliability..... | 35 |
| 3.9.1 Validity | 35 |
| 3.9.2 Reliability | 36 |
| 3.10 Ethical Considerations..... | 37 |
| CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION | 38 |
| 4.1 Descriptive analysis of the study..... | 38 |
| 4.1.1 Demographic Characteristics of Respondents..... | 38 |
| 4.1.2 Determinants of 3PLs performances | 46 |
| 4.2 Explanatory analysis of the study..... | 47 |
| 4.2.1 Model Specification..... | 48 |
| 4.2.2 Assumptions of MLR model of the study | 48 |
| 4.2.3 Multi-Linear Regression (MLR) results & interpretations..... | 49 |
| 4.2.4 Testing to the formulated hypotheses..... | 53 |
| 4.2.5 Decision on the result of the hypotheses test..... | 54 |
| 4.3 Qualitative analysis of the study | 55 |
| 4.4 Interpretation and Implication of the study..... | 57 |
| 4.4.1 Interpretation of findings..... | 58 |

| | |
|---|----|
| 4.4 .2 Implications of the results..... | 59 |
| 4.5 Discussion on the results of the study | 60 |
| CHAPTER FIVE: CONCLUSION AND RECOMMENDATION | 63 |
| 5.1 CONCLUSION | 63 |
| 5.2 RECOMMENDATION | 64 |
| References..... | i |
| Appendixes | xi |

List of tables

| | |
|--|----|
| Table 3.1: Proportion of sample size of the study..... | 31 |
| Table 3.2: Table 2: Measurement of Reliability Analysis..... | 77 |
| Table 4.1: Gender distribution..... | 38 |
| Table 4.2: Age of respondents..... | 39 |
| Table 4.3: Educational level of respondents..... | 40 |
| Table 4.4: Work experiences of respondents..... | 41 |
| Table 4.5: Job position of respondents..... | 42 |
| Table 4.6: Types of organizations of the respondents..... | 43 |
| Table 4.7: Main services outsourced by INGOs/UN agencies..... | 43 |
| Table 4. 8: Internal and external determinants..... | 44 |
| Table 4.9: Model Summary | 57 |
| Table 4.10: parametric coefficients estimation of SPSS output..... | 58 |
| Table 4.11: Decisions on the significant variables..... | 60 |
| Table 4.12: Decisions on the significant variables..... | 61 |

List of figures

| | |
|--|----|
| Figure 2.1: Conceptual design..... | 24 |
| Figure 4.1 Gender of respondents..... | 38 |
| Figure 4.2 Age of respondents..... | 39 |
| Figure 4.3 educational levels of respondents..... | 40 |
| Figure 4.4 Work experiences of respondents..... | 41 |
| Figure 4.5: Main services outsourced by INGOs/UN agencies..... | 44 |
| Figure 4.6: Internal and external determinants..... | 45 |

List of acronyms

3PLs = Third-Party Logistics

ACFTA= African Continental Free Trade Area

ANOVA= Analysis Of Variance

CSCMP= Council of Supply Chain Management Professionals

DCC= Dedicated Contract Carriage

DEA= Data Envelopment Analysis

GPS= Global Positioning System

IDP= Internally Displaced People

INGOs= International Non-Governmental Organizations

KPIs= Key Performance Indicators

MLR= Multi-Linear Regression analysis

SEM= Structural Equation Modelling

SPSS= Statistical Package for Social Science

TCE= Transaction Cost Economics

TMS= Transportation Management Systems

UN= United Nations

WMS= Warehouse Management Systems

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Third party Logistics (3PL) refers to outsourcing logistical services such as transportation, warehousing, inventory management, and distribution to an external service provider which is using a third-party. Most providers are involved in providing transport, storage of products and materials, managing the product inventory, and distributing products to facilitate the timely provision of assistance and support to vulnerable groups (Gossler et al., 2020). Within the context of humanitarian assistance, logistics providers play a vital role in providing assistance to populations who are at-risk as quickly as possible (Munovi, 2015). Furthermore, outsourcing logistical services helps to improve supply chain performance by reducing a number of challenges associated with having to transport goods through networks that may be experiencing negative conditions such as, poor infrastructure and limited resources (Abed et al., 2024). The performance of a 3PLs provider is then monitored using important metrics such as the timing of the delivery, cost-effectiveness, quality of service, and other adaptive abilities in difficult environments. In humanitarian operations, performance also means overcoming challenges such as poor infrastructure and security risks while remaining coordinated with humanitarian actors (Emerald Insight, 2021).

Humanitarian logistics involves the processes of mobilizing resource, people, and skill to provide assistance for natural disasters or complex emergency. Logistical activities span procurement, transportation, customs clearance, warehousing, and last-mile delivery (European Commission, 2022). This study looks closely at the humanitarian logistics operations of international non-governmental organizations (INGOs) and UN agencies in Tigray. INGOs and UN organizations are the key players in the humanitarian operations. They partner with 3PLs providers to deliver key services like food distribution, healthcare delivery, and other emergency responses. Their efficiency relies on logistics systems to achieve their mission in damaged areas like Tigray (World Economic Forum, 2024).

Since the last impacts of the global economic slowdown, arrayed with the increasing of global competition was the need of supply chain management to be more efficient and cost-effective by applying various functions like multi-modal transportation, warehousing, inventory management,

order fulfilment through third-party logistics (3PLs) service providers for scalability, global market reach, financials advantage, and specialized expertise access (Krishnakumare, 2025). It has been more attractive to be part of all functions of supply chain management. Due to the increasing need for companies to leverage the expertise of 3PLs service providers while it was focusing on their core competencies that is the trend of outsourcing logistics activities on the global front has been huge practices (Gunalan, 2015). Various studies have claimed that fruitful collaboration with 3PLs service providers have arguments in service quality and customer satisfaction while minimizing lead times and operational costs (Vaidyanathan, 2005). However, insufficient infrastructure, poor management, and a lack of trust hamper the performance of 3PLs on a global scale (Sohail & Sohal, 2003).

In Africa, the role of 3PLs service providers is one of the most vital that is given the continent's underdeveloped infrastructure coupled with frequent logistical challenges that complex logistics environment and infrastructure limitation highlights as critical challenges (Mvubu, 2024). The research in Nigeria highlights how relationship management and logistics capability are key drivers of 3PLs performance in helping mitigate supply chain risks and improving resilience (Business Perspectives, 2023). Still, in many parts of Africa, lack of technological adoptions combined with poor road networks and regulatory constraints impede the effectiveness of 3PLs operations (Sohail et al., 2006). Though this may pose challenges, they will not quell the growing demand for 3PLs services in an era when organizations are looking at providing cost-effective and smart solutions for managing complex supply chain managements.

The offering of logistic services in Ethiopia was long problematic because of outdated and deficient infrastructure and poor management of the supply chain. The articulation of these challenges served as a primary motivator for the resort to third-party logistics (3PLs) service providers for better service delivery (Abebe, 2024). A study done in Ethiopia on healthcare logistics revealed that the importance of digital logistics information technology system in 3PLs operations by enhancing performances through clear stakeholder communication and coordination (Mekonen, 2025). With that said, logistics performance still suffers greatly due to obstacles like customs delays, fuel shortages, and limited warehouse capacity that need in-depth assessments on the performance of logistics in Ethiopia (Desalegn, 2024).

Conditioned by raging conflict and humanitarian disaster, in Tigray, Ethiopia constitutes peculiar logistic challenges. Since the outbreak of conflict in Tigray late in 2020, over five million people

have needed emergency assistance. Infrastructure destruction, restricted access routes, and fuel shortages have severely curtailed the provision of assistance (Amnesty International, 2022). In Tigray to overcome these obstacles, international NGOs and UN agencies operating heavily rely on the 3PLs service providers. Relationship-based trust with logistics partners, technology adoption, and flexibility to adapt to variable circumstances are utmost importance in the improvement of aid delivery in the region (Business Perspectives, 2023). So, research on such areas of logistical operations is under-theorized with limited coverage on how other factors mandate 3PLs players driving operations in Tigray.

Despite the significant importance of providing humanitarian aids by third-party logistics (3PLs) service providers globally and more especially in developing conflict-affected regions like Tigray, little research exists that discusses the effects of certain factors on the performances of 3PLs in conflict contexts. IN contrast to this, Tesema & Kinfu, (2021) said that by using Effective management and ICT of 3PLs service providers have been demonstrated to improve logistical performance in the context of Tigray's post-conflict rehabilitation, which benefits the region by the INGOs and UN agencies.

Thus, identifying the principal operative barrier coupled with some opportunities for enhancement on the global, regional, national, and local scale, would aim at contributing to be accomplishing other giant steps by the humanitarian logistics. This study aims to identify different internal and external factors that influencing the performance of third-party logistics (3PLs) service providers in serving humanitarian aids with INGOs and UN agencies to the vulnerable society in Tigray regional state.

1.2 Statement of the problem

The third-party logistics (3PLs) service providers are pivotal to success in supply chain operations, especially in humanitarian operations where timely and effective delivery of aids is an utmost priority. The 3PLs service providers are affected with challenges causing an impediment to their performances, especially in conflict-affected areas like Tigray, Ethiopia. Such challenges include destruction of infrastructure, inaccessibility, and risks along the supply chain, placing humanitarian aid at the tipping point such that vulnerable people suffer more (Amnesty International, 2022). Regarding to Supply chain management risks, Gebremedhin & Tsegaye (2023) noted that supply chain management risks are limited access, and infrastructure

degradation have an influences in delivering of humanitarian logistics in Tigray. It is also emphasizing how these issues hinder 3PLs service providers have worsened suffering among vulnerable communities. Despite INGOs and UN agencies depending on 3PLs, scanty information exists relating to particular factors that have a direct impact on their successful operation in conflict-challenged areas.

The need for the relationship management and logistics ability need for better performance of 3PLs service providers. For instance, a research conducted in Nigeria has shown that strong relationship management tends to reduce supply chain risks associated with logistics outcomes through the ideas of trust and collaboration among stakeholders (Ewuzie et al., 2023). Likewise, digital transformation and advanced technology adoption have been viewed as paramount enablers of operational efficiency for 3PLs globally (Jansson & Johansson, 2020). But, similar findings stand inapplicable to conflict zones such as Tigray, where political instability and resource scarcity constitute unique challenges.

In Africa, poor infrastructure and regulatory barriers further complicate logistics operations. Studies conducted in South Africa have shown that social sustainability practices and innovative practices are evident in finding ways to overcome this challenge (Makhetha, M. and Kele, T.P., 2023). However, there are some African countries where such solutions cannot be effectively implemented due to a lack of resources. These undoubtedly include fuel shortages, delays in customs clearance, and insufficient storage capacity in Ethiopia, all of which have an effect on how effectively INGOs and UN agencies provide overall aid (Gebremedhin & Tsegaye, 2024). Besides, these clearly include delays in customs clearance, fuel shortages, and inadequate warehousing capacity, collectively impacting the overall efficiency of aid delivery by INGOs and UN organizations (Relief Web, 2024).

In Tigray, the ongoing conflict has created one of the most challenging environments for humanitarian aid logistics. It requires a great deal of support from third-party logistics providers (3PLs) in the navigation of shattered infrastructure and restricted access. However, Weak stakeholder coordination, restricted technology use, and a lack of operational competence to properly employ or exploit these resources all worsen 3PLs providers' performance (Mensah & Osei-Tutu, 2021).

Despite the pivotal role of third-party logistics (3PLs) service providers toward facilitating delivery of humanitarian aids in Tigray, the region is seriously hindered with logistics

performance challenges. These include customs-related delays, fuel availability, security risks, truck shortages, and coordination challenges that inhibit timely and effective delivery of essential humanitarian aid materials (Yemane, 2024). Besides, Atakilti, (2025) identified universal humanitarian logistics problems in conflict areas like Tigray, such as a specific knowledge gap regarding to the key determinants that influence 3PLs performances under the complex operational environment for addressing humanitarian aid. Thus, to fulfill this gap to be increasing humanitarian logistics performances, 3PLs service providers need to enhance efficiency and effectiveness of humanitarian aids delivery of INGOs and UN agencies to the intended vulnerable groups or communities who suffered due to the devastated war in a volatile regional setting, like Tigray.

Therefore, this research aims to identify ten factors which are classified as clustered factor-based description, namely internal factors for INGOs/UN agencies and 3PLs service providers that are identified by the resource-based view (RBV) theory (Barney, 1991), transaction cost theory (TCT) (Williamson, 1979), and relational factors Burt (1992); and external factors related factors to the contingency theory of Donaldson (2001) which identifies the effects of the security and funding of INGOs and UN performance in volatile areas in Tigray. the ten variables are; capacity, long-standing relationships, technology, service quality, cost effective, experience, and risk management categorized as internal capability. Whereas, infrastructure accessibility, political instability & insecurity and Compliance & governmental regulatory are external factors. So, addressing this issue seeks to contribute to building more effective and efficient humanitarian logistics systems in the region.

1.3 Research Questions

In doing so, the study answered the following fundamental research questions:

1. What are the internal factors that affect the performance of third-part logistics (3PLs) service providers in relation to INGOs and UN agencies in Tigray?
2. What are the external factors that affect the performance of third-party logistics (3PLs) service providers regarding to INGOs and UN agencies in Tigray?
3. What are the most dominant factors that affect the performance of third-party logistics (3PLs) service providers regarding to INGOs and UN agencies in Tigray?

1.4 Research Objectives

1.4.1 General Objective

The general aim of this study is to identify the key factors that affect the performance of third-party logistics (3PLs) service providers in regard to delivering of humanitarian aids from INGOs and UN agencies to the vulnerable society in Tigray.

1.4.2 Specific Objectives

Based on the general objective of the above, specific objectives of the study are:

1. To analyze the internal factors that affect the performance of third-part logistics (3PLs) service providers in relation to INGOs and UN agencies in Tigray?
2. To examine the external factors that affect the performance of third-party logistics (3PLs) service providers regarding to INGOs and UN agencies in Tigray?
3. To identify the most dominant factors that affect the performance of third-part logistics (3PLs) service providers regarding to INGOs and UN agencies in Tigray.

1.5 Significance of the Study

The contribution of this study is significant to address crucial gaps in an understanding the internal and external factors influencing third-party logistics (3PLs) performance, within the context of humanitarian aids in Tigray, Ethiopia. The results will be critical to enhance logistic services humanitarian aids operations to give efficient and effective services by the 3PLs in delivering of aids from the selected INGOs and UN agencies to the society in the region.

Formerly, enhancing humanitarian aid delivery in Tigray that has been troubled with severe logistical problems due to conflict, infrastructure destruction, and restricted access into the area which resulted in delayed provision of much-needed supplies such as food, medicines, and fuel for giving to reduce widespread malnutrition and preventable deaths (Thomas & Kopczak, 2005). The internal and external different factors which influence on performance of 3PLs service providers can give insights into the solutions. This study hopes would pursue optimization of the distribution of aids and easing logistical bottlenecks reflective of similar

humanitarian contexts where life-saving logistics was found to be essential (Kovács & Spens, 2007).

Next, addressing infrastructure limitations is also a significance of the study in the fact that Tigray has destroyed bridges and restricted access roads has posed a sizable barrier to humanitarian aid flows in Tigray, challenging the adaptability of logistics strategies (Balcik et al., 2010). Improved understanding of the challenges faced by the 3PLs providers will enable INGOs and UN organizations to build more resilient logistics systems, in line with recent studies disaster contexts should be on resilience in supply chains (Christopher & Peck, 2004).

Thirdly, improving coordination among stakeholders is relevant for the Poor coordination of humanitarian aiding organization that has been a nagging problem in any humanitarian operation, contributing greatly to the waste of efforts put into a great deal of aid (Van Wassenhove, 2006). The study has implications for better cooperation among 3PLs providers and humanitarian aiding actors with a view to be fostering integrated systems to support efficient supply chain management according to the collaborative logistics research in humanitarian circumstances (Kovács & Spens, 2007).

Fourth, supporting post-conflict recovery in the region by Continuing rehabilitation and the restoration of basic services-also in health care and nutrition programs is to plan a truly long-term logistic approach in Tigray (Tatham & Houghton, 2011).

Last but not least significance is contributing to academic knowledge. Apparently, limited previous work had discussed the specific factors affecting the performance of 3PLs companies in areas afflicted by conflict like Tigray (Balcik et al., 2010). This study fills a seriously critical gap by way of evidenced-based recommendations applicable to similar humanitarian aids contexts in the world, to contribute to the wide body of literature on humanitarian aid logistics.

1.6 Delimitation of the Study

The conceptual delimitation of this study is focusing on the internal and external factors that influence the performances of 3PLs service providers regarding to delivering aids of INGOs and UN agencies in Tigray.

Geographically, the study confines itself in Tigray region that has expressed significant logistical challenges due to conflict, destruction of infrastructure, and limitation access. Therefore, a focus on one area gives good prospects for a greater investigation of how the 3PLs providers work

amid extreme circumstances (Trade Council, 2021). Besides, organizational scope examined the selected INGOs and UN agencies that rely on 3PLs service providers for operational humanitarian activities. This delimitation allows the exclusion of private-sector and local NGOs since it reviews the peculiar issues of big international humanitarian actors (World Economic Forum, 2024).

Thematically, the study covers operational, technological, and relational elements that affect 3PLs performance. Issues like political contexts or donor funding mechanisms are beyond the scope of the research because of the extensive and broad investigations required (Emerald Insight, 2018). Timeframe includes recent logistics operations cross-sectional to ensure relevance to current challenges, issues, and challenges regarding humanitarian logistics taken into consideration for Tigray (Relief Web, 2018). Methodological boundaries also delimited the research by applying qualitative methods, done primarily through interviews and survey with representatives of key informants selected from INGOs, UN organizations and 3PLs service providers' realm. Where existing and pertinent, data supports on various identified components of logistics performance are undertaken (Emerald Insight, 2021).

The specification of this boundary thus allows for a focused analysis of the causes of variation on the performances of 3PLs in the humanitarian operations in Tigray while also estimation of the possible contribution made by the system to some of the variation.

1.7 Organization of the Study

This study is composed of five chapters, which explain in a sequential manner the factors affecting the performance of third-party logistics in relation to selected INGOs and UN agencies in Tigray. In this way, each chapter describes different aspects relating to the research problem in a clearly understandable way.

Chapter one is an introduction part that incorporated with background, the statement of the problem, research objectives, research questions, significance of the study, scope, and limitations of the study. Next Chapter Two is a Literature Review; this chapter reviews the existing literature on 3PLs performance, challenges in humanitarian logistics, and factors that contribute to logistics efficiency in conflict-stricken areas. It has theoretical frameworks and empirical studies discussing operational, technological, and relational factors impacting 3PLs. Thirdly,

Chapter Three is a Research Methodology part that describes the research design, data collection methodologies, sampling methods, and data analysis processes used in the study. A qualitative approach is adopted to gather insight from selected representatives of INGOs/ UN organizations, and 3PLs service providers.

Chapter Four is a Data analysis and Discussion part; this chapter presents the findings of the study derived from interview and survey analysis data. Finally, Chapter Five is Conclusion and Recommendations part that summarizes the key findings of the study and provides practical recommendations aiming to leverage 3PLs performance in humanitarian operations in Tigray. It discusses implications for policy and practice as well as argues for areas of future research to address lingering questions.

This study is organized into chapters that move logically from defining the research problem to offering solutions to enhance 3PLs performance in humanitarian logistics in Tigray.

CHAPTER TWO: LITERATURE REVIEW OF THE STUDY

2.1 Introduction

This chapter presents a literature review that seriously considers past research on the performance of Third-Party Logistics (3PLs) providers, particularly focusing on their hornlike beast-even as caves serve to prolong the quantity taught- within the context of humanitarian aids. The influence on operations of effectiveness, the focus of 3PLs understood in the context of collaboration with INGOs and UN agencies are expounded in detail. This review focuses on how, in the context of Tigray, unique conditions affecting 3PLs performance and consequent service delivery are brought to bear in the process of delivering aid and critical services.

2.2 Concepts of logistics performance

2.2.1 Logistics

Logistics involves planning, implementing, and controlling the efficient cost-effective flow of goods, services, and related information from origin to consumption to meet customer requirements. As an integral part of supply chain management, logistics deals with the forward and reverse movement of goods and services (Ballou, 2007; Christopher, 2016). Logistics, being one of the core business functions, includes transportation, warehousing, inventory management, and distribution, all of which are fundamental to acquiring operational efficiency (Rushton, Croucher & Baker, 2017).

According to Chen (2023), on behalf of the Council of Supply Chain Management Professionals (CSCMP), logistics is described as the coordination and management of flows into and out of the business to deliver goods in the right quantity, condition, time, and place to meet customer expectations. This definition emphasizes the integration of logistics to maximize the efficiency of elements within the supply chain.

These are different areas of Logistics; First, Business Logistics, on the flow of materials inside organizations to the advantage of profits and customer satisfaction (Burity, 2021). Second, Military Logistics refers to lines of supply to food, equipment, and ammunition to the troops for the conduct and performance of operations (Encyclopaedia Britannica, 1999). Thirdly,

Humanitarian Logistics includes operations to assist during emergencies and disaster situations for efficient delivery of aid to affected populations (Economic Times, 2025).

2.2.2 Third-party logistics (3PLs)

Third-party logistics includes a wide variety of ways that 3PLs providers outsource of the overall activities such as transportation, warehousing, inventory management, and order fulfillment. Overall third-party logistics encompasses a span of activities that are related to how 3PLs providers enable supply chain performance optimization, reduced costs, customer satisfaction, and ergonomics or balancing performance and scalability (Adopted from Lieb et al., 1993; Pinard, 2023).

Regarding to this, Novack, Gibson, & Langley, (2023) and Miebach & Müller, (2025), third-party logistics (3PLs) can perform many processes depending on the requirements of the business. There are basic services that allow for dedicated contract carriage (DCC), domestic and international transportation management, cross-docking, reverse logistics, and supply chain consulting. 3PLs have enhanced technology that merges real-time tracking systems with predictive analytics to improve supply chain visibility and operational efficiency.

Besides, cost savings and operational efficiencies, 3PLs provide users with access to a higher degree of flexibility in managing their supply chains, and they provide scalable solutions based on the types of services they receive and shifts in demand, as well as access to a global network of carriers and warehouses. This additional flexibility is especially important for companies to develop new or international markets that are complicated in terms of supply chains (Sunmola, 2024; Huo, Haq, & Gu, 2015).

2.2.3 Third-party logistics (3PLs) performance

The performance of third-party logistics (3PLs) is a multidimensional phenomenon that requires measurement frameworks that can address the multifaceted nature of 3PL activities. Domingues, Reis and Macário (2015) developed a novel performance measurement framework for 3PLs service providers which categorizes key performance indicators (KPI) into three dimensions by activity (e.g., transport, warehousing, customer service), decision level (operational, tactical, strategic), and actors (carriers, 3PLs, consolidation location). Their framework is adapted to address the idiosyncrasies of 3PLs activity rather than the traditional logistics metrics, of which they identified the 25 most relevant to 3PLs service providers.

Moreover, Kumar and Rahman (2015) examined variables that influence 3PLs performance, including service quality, organizational effectiveness, and relationships management. This was corroborated by the empirical nature of 3PL research and the application of more sophisticated measurement tools like particularly Structural Equation Modelling (SEM) and Data Envelopment Analysis (DEA) for performance measurement.

Collectively, the studies demonstrate the importance of forming a comprehensive view of 3PLs performance measurement which incorporates operational efficiency, customer satisfaction, financial performance, and supply chain strategy to fully evaluate the performance of 3PLs service providers.

2.2.4 Third-Party Logistics (3PLs) in Humanitarian Operations

Because the 3PLs can deliver specialized services, expand operations, and provide increased efficiency, their usage in humanitarian logistics has seen appreciable growth (Van Wassenhove, 2006). Besides, Jahre & Jensen (2010) said that among the different 3PLs services provider are transportations, warehousing, inventory management, and distribution, thus allowing humanitarian organizations to devote their resources and attention to their mission of providing aid. However, the effectiveness of 3PLs in humanitarian settings is influenced by several variables.

The very act of selecting and managing 3PLs is paramount since it requires that one clearly understand their specific capabilities, in line with the peculiar needs of the humanitarian organization (Gully & Kilincci, 2017).

2.3 Theoretical Frameworks of the study

The Resource-Based View (RBV), Transaction Cost Economics (TCE), Social Network Theory, Institutional theory, and Contingency theory are all good ways to analyze 3PLs (Third-Party Logistics) performances, specifically in relation to humanitarian aid operations in post-conflict areas in an integrated way with each other. Each of the above theories connected for the specific processes and resources within the humanitarian supply chain logistics to have a measurable outcome in speed of delivery, control of costs, and level of service that are impacted by the constraints of conflict areas. All those theories have been developed from existing literature in

both supply chain management and humanitarian logistics as well as from empirical researches in the field. The theories are:

2.3.1 Resource-Based View (RBV)

According to the Resource-Based View (RBV), a theory developed by Barney (1991), companies create competitive advantages by using resources and capabilities that are both their internal to (as opposed to being part of their competitive environment) that are valuable, rare, inimitable, or non-substitutable (VRIN) resources; as well as Structural differences such as location, experience, and cultural knowledge are provided a firm with advantages over its competitors by allowing a firm's internal capabilities to be able to produce higher outcomes. The 3PLs service providers have demonstrated to take contracts to deliver humanitarian logistics from International Non-Governmental Organizations (INGOs) and the United Nations (UN) agencies in Tigray.

These capabilities can include specifically designed vehicles to navigate over the damaged roads, access negotiation through local ethnic knowledge, cold-chain equipment for perishable items as well as information technology for tracking shipments in real time. 3PLs who possess VRIN resource collectively excel over their competitors on the agility and cost efficiency measures of performance. Additionally, 3PLs have positioned themselves in the humanitarian logistics environment as the primary contributors to their agile and cost-efficient performance by relying on internal resources as determinants in humanitarian operations. Those dynamic capabilities mean that Tigray will be forced to adapt its resources (RBV), which provides enhanced performance in timely delivery & cost effectiveness.

2.3.2 Transaction Cost Economics (TCE) theory

TCE, developed by Williamson (1979), accounts for organizations' to be outsourcing of logistics activities based on reducing transactional costs using methods of contracting, monitoring, and enforcing contracts. INGOs and UN agencies operating in the dynamic conflict-ridden damaged environment of Tigray exposed to higher transaction costs due to unpredictable settings, security risks, regulatory obstacles, and infrastructure limitations. Outsourcing logistics to specialized 3PLs providers might be a strategic alternative to minimize the operating inefficiencies and costs.

TCE analyzes the logistics and supply chain performance of the INGO/UN agency on provision of humanitarian operations by using 3PLs service providers. They also balance the use of both long-term contracts and short-term agreements along with performance guarantees in possible audits as a means of reducing the risks associated with hold-ups uncertainties in conflict settings (McIvor, 2008). Research on the use of humanitarian outsourcing will include using TCE as a connection to governance, which provides both lower transaction costs and improved reliability of 3PLs through the monitoring and use of very detailed Service Level Agreements (SLAs) and monitoring aspects.

In the humanitarian context of Tigray, transaction costs are relevant due to the dynamic and volatile environment surrounding that complicates the operations of logistics activities. In the humanitarian logistics performance context of Ethiopia, Selam Fitsum, (2024) said that contracting supply chain activities to 3PLs allows INGOs and UN agencies to manage these costs while focusing on humanitarian core functions like delivering of aids. Thus, TCE provides a robust framework to analyze how transaction cost variables influence the performance and selection of 3PLs, including contract management, risk mitigation, and flexibility in an increasingly dynamic logistics environment due to the following.

First, Asset Specificity and Uncertainty: The theory of TCE contends that higher asset specificity and uncertainty in transactions dictate governance alternatives. Humanitarian aid in Tigray is likely to require special handling capacity, customized arrangements, and timely shipment reduce the transaction costs. Next, Bounded Rationality and Opportunism: The theory also encompasses behavioral assumptions where participating actors are faced with informational limitations and opportunistic hazards. Competent 3PLs service providers are able to overcome these problems using local knowledge, flexibility, and contractual safeguarding. Thirdly, Cost Minimization Focus is evaluating logistics outsourcing options based on TCE that aligned with the humanitarian propositions of making effective use of resources available to maximize the impact of assistance delivery.

2.3.3 Social Network Theory

Social Network Theory mediates by creating something new in connections between UN agencies and INGOs with 3PLs for filling the information gaps and allowing the pooling of resource supports less opportunistic behavior as TCE theory predicts. It investigates how many

actors connect each other in their locations in the structure of networks to operate the transmission of resources and information by coordinating the actions of individuals (Borgatti et al., 2009). The theory specifically focus on how the ability of 3PLs links with humanitarian clusters INGOs, UN, and local officials for access to transportation routes, better communications on disruptions of the routes, and the ability to plan jointly for contingencies.

It can assist the organizations for better coordination on logistics to improve the efficiency and effectiveness of their responses in humanitarian operations (Pallotti et al., 2020). Research on humanitarian logistics applying Social Network Theory also shows how the presence of strong communication among each other facilitates and enhances logistical network improvements when 3PLs operate humanitarian logistics within fragile environments.

2.3.4 Contingency Theory

According to Contingency Theory, Organizational Effectiveness depends on a convenience between the organization's structural and procedural components, and their contextual factors like environmental, technological, and size. As such, Contingency Theory rejects the notion of the "best" or exclusive set of practices for all organizations (Donaldson, 2001). Using a Contingency Theory as a framework explains the performances of third-party logistics (3PLs) in Tigray that, it becomes evident logistics strategies such as modular staffing or alternative routing adapted to the contingencies of insecurity and infrastructure deficits. When there is a failure to fit the logistics strategy to the contingency, it occurs donor volatility and delay in the humanitarian operations (Tachizawa & Thomsen, 2015). In humanitarian research, the Contingency Theory framework is used to promote tailored logistics strategy configurations for the best possible results rather than standard configurations or one size fits for all strategy.

2.3.5 Institutional Theory

Institutional Theory posits the legitimacy of organizations that is obtained by complying with certain external pressures. Those pressures can be categorized as Coercive (Regulations, Normative (Industry Standards), and Mimetic (following the practices of other Companies) (DiMaggio & Powell, 1983). Institutional Theory provides a way to understand how 3PLs have standard Tigray-based operating procedures, whether by complying with Ethiopian Government

Policies, UN cluster mandates, donor reporting requirements, and sphere of humanitarian principles, thereby increasing levels of accountability.

However, it diminishes the flexibility of 3PLs operating within an area of political instability (Kovács, 2019). Humanitarian Supply Chain Researches employ institutional theory to demonstrate that 3PLs abide by following the practices and procedures of INGOs and the UN agencies to obtain the contracts and maintain legitimacy, though the local environment is in turbulences.

2.4 Empirical frameworks of the study

This segment from the present scenario involves a comparative and empirical assessment of third-party logistics (3PLs) performance against the backdrop of the global scene, in Africa, Ethiopia, and specifically in the region of Tigray. This section is all about the essential outcomes of a few recent studies and considers, among other things, the variables affecting 3PLs performance in varied contexts. This section comprises both the empirical review (from global to the specific location) and specific contribution of the study.

2.4.1 Empirical Reviews on 3PLs Performance

The efficiency of the supply chain has direct consequences in the performance of third-party logistics providers (3PLs) which, globally, is a fundamental driver of supply chain effectiveness and competitive position. The companies' performance can be measured by a number of logistics service providers' performance indicators (KPIs). Meanwhile, the criteria of cost efficiency, delivery accuracy, and customer satisfaction are the main objectives of performance evaluation of 3PLs performance (Tang & Sodhi, 2021). Besides, Sheffi (2023) said that the enormous growth of the 3PLs service in global markets has been enhanced by e-commerce and the process of globalization, and the market has been expected by 2031 to be worth 2.8 trillion.

Igor Tovstolis (2024) states that new technological innovations, including automation solutions like Transportation management systems (TMS), warehouse management systems (WMS) improves operations and supply chain visibility in 3PLs management. Technological integration is a critical factor influencing 3PLs performance. TMS, WMS, and real-time tracking systems are advanced tools trigger visibility and efficiency in supply chains. As noted by Butt, Ali, and Govindan (2024), green logistics and reverse logistics are sustainable practices gaining

worldwide attention regarding the environmental and customer concerns of 3PLs service providers. On the other hand, issues such as geopolitical uncertainties or supply chain interruptions from the COVID-19 pandemic have heightened focus on agility and resilience in 3PLs operations (Ivanov, 2020).

Africa as a continent remains under immense pressure due to infrastructural challenges, regulatory restrictions, low technological adoptions, and many other concerns. Africa's logistics sector has historically endured high costs of transportation, inefficient road systems, and shortcomings regarding customs procedures (Mageto & Luke, 2024). For example, logistics costs in sub-Saharan Africa can amount up to forty percent of the product prices, while the world average is roughly ten percent (Barayandema et al., 2023).

It is believed that the African Continental Free Trade Area (ACFTA) will improve cross-border transportation and lower logistics costs by expediting customs and enhancing infrastructure connections. The like of ACFTA seeks to improve regional trade integration and logistics effectiveness (Ncube & Ndou, 2023). Also, mobile tracking applications and digital freight services are raising visibility and decreasing hold-ups in the African supply chains (Munyua & Wanyoike, 2022).

Ethiopia's logistics industry is crucial to the nation's expanding economy, yet it faces many obstacles that impair its effectiveness. Due to issues like insufficient infrastructure, ineffective customs processes, expensive transportation, and a slow adoption of technology that the nation performs poorly on international logistics performance indexes (Eshetu, 2020; Kemeshi, 2024).

Moreover, Tadesse & Gebremedhin (2023) said that Ethiopia is now more connected because to state investments in transportation infrastructure, especially in the building of roads and railroads. For instance, the transportation of commodities between the capital of Ethiopia and the principal port of Djibouti has been greatly enhanced by the Addis Ababa–Djibouti railway.

In Tigray, INGOs and UN organizations that depend on third-party logistics providers to deliver humanitarian aids face significant challenges due to the conflict in the state, including blocked roads, security issues, and damaged infrastructure (Gebremedhin & Desta, 2024). Thus, study conducted regarding humanitarian supply chains in Ethiopia recognized the necessity of collaboration between humanitarian organizations and local actors to relieve logistical bottlenecks in conflict settings such as Tigray. Better stakeholder coordination facilitates better resource use and ensures that aid reaches the programs in the field quickly (Yemane, 2024).

Additionally, the logistics of humanitarian aid in Tigray are further hampered by the absence of access to cutting-edge technologies like real-time tracking systems. Delays brought on by infrastructure deficiencies and security threats may be reduced with the deployment of digital solutions to improve supply chain visibility (Gebremedhin & Abebe, 2023).

To conclude this empirical review highlights that while global advancements in technology and sustainability have improved 3PLs performance worldwide, Africa-and specifically Ethiopia-are facing challenges, including poor infrastructure and regulatory inefficiencies that are detrimental to the logistics operation.

Specifically in Tigray, conflict-induced disruptions have further complicated the situation for NGOs and UN organizations working with third-party Logistics providers. Addressing these challenges entails a coherent combination of investments in infrastructure, technology adoption, planning practices, and improved collaborative practices involving stakeholder engagement.

2.4.2 Contribution of the study

In what ways does this study differ from other related studies? This study differs from other previous related researches that conducted on the area of logistics and supply chain performances in the case of INGOs and UN Organizations in Tigray, are presented below:

First, Existing research in the area mainly addresses general humanitarian aids such as food insecurity and health crises caused by the conflict (Kahsay, 2021; Annys et al., 2021). These studies tend to overlook the operational performance of third-party logistics (3PLs) service providers. In contrast, this research specifically analyzes factors that influence 3PLs performance, like infrastructure, technology, and long-stand relationships to deliver humanitarian aids from INGOs and UN organizations to the society in the region so as to fill a gap by focusing on logistics efficiency and effectiveness in conflict affected zones.

Next, Majority of the existing Researches in the area concentrates on logistical challenges like damaged infrastructure and limited access to impacted areas. Third-part logistics performance metrics are frequently not used to evaluate logistics efficiencies from the viewpoint of logistics providers (Ismael, 2017; Annys et al., 2021). However, this study focuses on examining the factors that affect 3PLs success in relation to addressing humanitarian aids from the selected INGOs and UN organizations to the destinations, fulfilling issues such as trust, regulatory issues

and service quality. It offers useful information that may be applied to enhance logistical processes.

Finally, Existing Researches that are currently available in Tigray frequently ignores the particular roles that groups like INGOs or UN agencies play in addressing the country's general humanitarian needs, such as food security and health problems (Annys, Vandenbrempt, Negash, De Sloover, & Nyssen, 2021; Kahsay, 2021). Instead of taking a broad approach, this study focuses on analyzing how the performance of third-party logistics (3PLs) affects INGOs and UN organizations activities in addressing humanitarian aids in Tigray.

Therefore, this research is unique in its focus on identifying factors that influence 3PLs performance in addressing humanitarian aids from INGOs and UN organizations after the war context in Tigray. It encompasses structured performance metrics, highlights digitization, benchmarks against other geographies, and provides recommendations about the determinants that can be implemented by INGOs and UN organizations. All of these, therefore, make this document quite valuable to the literature.

2.5 Conceptual framework of the study

2.5.1 Determinants of 3PLs performances

This paper presents determinants affecting performances of 3PLs service providers contracting with international non-governmental organizations (INGOs) and United Nations (UN) agencies in Tigray, Ethiopia. These factors are classified into two categories of clustered factor-based description, namely internal factors for INGOs/UN agencies and 3PLs service providers that are identified by the resource-based view (RBV) theory (Barney, 1991), transaction cost theory (TCT) (Williamson, 1979), and relational factors Burt (1992); and external factors related to the contingency theory of Donaldson (2001) which identifies the effects of the security and funding of INGOs and UN performance in volatile areas in Tigray.

The researcher identifies ten determinants that influence the performances of 3PLs service providers in operating humanitarian aid of INGOs and UN organizations in Tigray. Such as; capacity related factors, long-standing relationships, technology, service quality, cost effectiveness, experience, risk management, infrastructure accessibility, Compliance &

governmental regulatory and political instability & insecurity based on the employed empirical theories.

2.5.1.1 Internal factors affecting 3PLs performance

A. Firm's capability factors

Using the concepts of the core structure/framework of RBV for internal determinants (the VRIN resources) as Internal Capabilities (RBV: Barney, 1991) and TCT as the basis for determining the outsourcing of resources via network densities and resources via contingency, this study demonstrates how to effectively utilize these theoretical frameworks in order to make use of dynamic capabilities (Teece et al., 1997) for the successful staging of humanitarian logistics or operations in response to the conflict affected areas like Tigray. Thus, strong capabilities can be dynamically reconfigured to bolster resilience to crisis disruptions. Such as;

1. Capacity: It uses to measure the capacity of the 3PLs service providers in shouldering of INGOs and UN organizations to address humanitarian aid to the intended destination. It incorporates factors like managerial capacity, financial capacity, and technical skills.

2. Technology utilization: Use of GPS tracking, mobile apps, and cloud platforms provide better visibility and coordination in the supply chain (Sundarakani et al., 2010). It includes Use of tracking systems, Inventory management systems, and Communication tools.

3. Service Quality: The service quality of 3PLs determines the success of humanitarian supply chains (Mentzer et al., 2001). Vital dimensions of service quality are: reliability is the main point to assure delivery of goods on time, in the right quantity and quality and is very important to satisfy the needs of beneficiaries (Bienstock et al., 2008). Responsiveness is readiness to react quickly to the new demands in a competent way and is associated with trust and confidence (Grant, 2003). Flexibility is very important to guarantee certain unforeseen demand in humanitarian operations to be able to react to situations that arise, with demand surges or supply disruptions (Pettit et al., 2010). Timeliness of deliveries and Accuracy of order fulfillment are part of service quality.

4. Experience: that is affecting the consistency of service quality of the 3PLs providers' performance. In contrast, INGOs and UN organizations need timely delivery of humanitarian aid with fewer mistakes by having expansive experiences and agile 3PLs of the service providers.

5. Risk Management: is a vital factor in logistics and supply chain management of conflict affected areas. They used to address proactively the challenges and to increase their performance by reducing delays and assuring safe delivery of goods.

B. Outsourcing Economics factors

Outsourcing economics: cost justification enables outsourcing, but it is important to put safeguards in place and use formal contracts to ensure success (TCT: Williamson, 1979, 1985). Thus, cost justification is categorized as outsourcing economic factor in the study.

6. Cost-Effectiveness: is to be served with less cost for maximum utilization of scanty resources (Christopher & Ryals, 1999). Limited funding from INGOs and UN organizations would directly inhibit the efficiency with which 3PLs providers can operate, in which the threshold limits lead to delays in procurement and transport activities or affect the overall quality of 3PLs performance.

C. Relational mediation factors

Social Network Theory describes the importance of long-term, trust-based relationships of INGOs and the UN with 3PLs to reduce opportunism and increase information sharing, the potential for revenue sharing through resource pooling and bridging of structural line. The primary impact of social network theory is how these relationships create the possible existence of digital connections, which allows organizations to connect with others who are developing similar capabilities.

7. Long-term Partnerships: efficient coordination and information sharing among INGOs/UN organizations and 3PLs are crucial if timely and reliable delivery of humanitarian assistance is to be achieved (pire & Van Wassenhove, 2009). It enhanced and strengthened the degrees of trust between 3PLs providers and their clients. Also, it comprises Information sharing, Collaboration during operations, trust, and Clarity of communication.

2.5.1.2 External factors affecting 3PLs performances

External Moderators, such as government interference, donor funding volatility, and conflict-related infrastructure disruption, can negatively affect the Performance of 3PLs in Humanitarian aid Operations, and disrupt the alignment of Logistics and Structure (Tewelde, 2025).

D. Contextual factors

Contingency Theory suggests external moderators are those uncontrollable environmental variables that limit the ability to achieve a perfect fit for effective organizational performance. Common examples of external moderators in the humanitarian context include government regulations and market instability (Donaldson, 2001). External factors serve to neutralize the impact of internal contingencies (size, technology, etc.) on the level of structure of an organization, and therefore, require adaptive fits (e.g., organic structures in rapidly changing environments) (Çakır, 2020). The external factors of the study are:

8. Infrastructure accessibility: Challenges with Infrastructures is one of the fundamental constraints to the efficient functioning of 3PLs in the developing world and in conflict affected zones (Tomasini & Van Wassenhove, 2009). The inability to provide a smooth supply chain is mainly attributed to a faulty road structure, inadequate warehousing facilities, and networks (Olorunjoba & Gray, 2006).

9. Political instability and Insecurity: Security risks and political instability greatly hinder the logistics functions of 3PLs in conflict-affected regions (Kovács and Spens, 2007). Such risks incorporate mainly the armed conflict, risk of theft, and instability.

10. Compliance and regulatory: Compliance and regulatory problems negatively affect the performances of 3PLs service provider operations negatively, that includes delay, increased cost, and decreased quality of services. Implementing stiff and complex regulations, especially on customs, safety, and industry requirements, typically leads to increased transit time, increased administrative weight, and operational disruption, which impede effective supply chain management (Janné, 2022). In addition, such regulatory concerns can erode the responsiveness and adaptability of 3PLs providers, which limits their ability to modify with evolving market demands. In worst-case scenarios, regulatory violations can result in the termination of partnerships or operational disruptions that compromise the overall supply chain performance (Kithae, 2024). Thus, regulatory issues negatively affect 3PLs performance by causing time lags,

increased costs, and diluted service consistency, supporting the need for robust compliance management systems to guarantee efficient logistics operations.

2.5.2 Hypotheses designs of the Study

From the analysis of literatures, ten variables are identified to formulate for the research hypotheses in ways that these variables affect 3PLs performance in delivering aid in Tigray during the humanitarian crisis experienced due to the conflict. The theories behind these hypotheses are Contingency Theory and Information Processing Theory (IPT). Contingency Theory would suggest that because there is no universal method of providing logistics in all situations, the optimal performance of Third Party Logistics regardless of context (Tigray's war-damaged environment) can occur only when the internal structure is compatible with the external conditions (Donaldson, 2001). IPT supports this assertion by requiring an increase in the need for information processing due to increased uncertainty caused by the conflicts occurring in that area (Atakilti, 2025).

H1. Capacity affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H2. Good service quality affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H3. Strong long-stand relationships affect the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H4. Technology utilization affects the performance of 3PLs service providers in term of humanitarian aid operations in Tigray significantly.

H5. Good cost-effectiveness affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H6. Firm experience affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H7. Good risk management affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H8. Infrastructure access affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

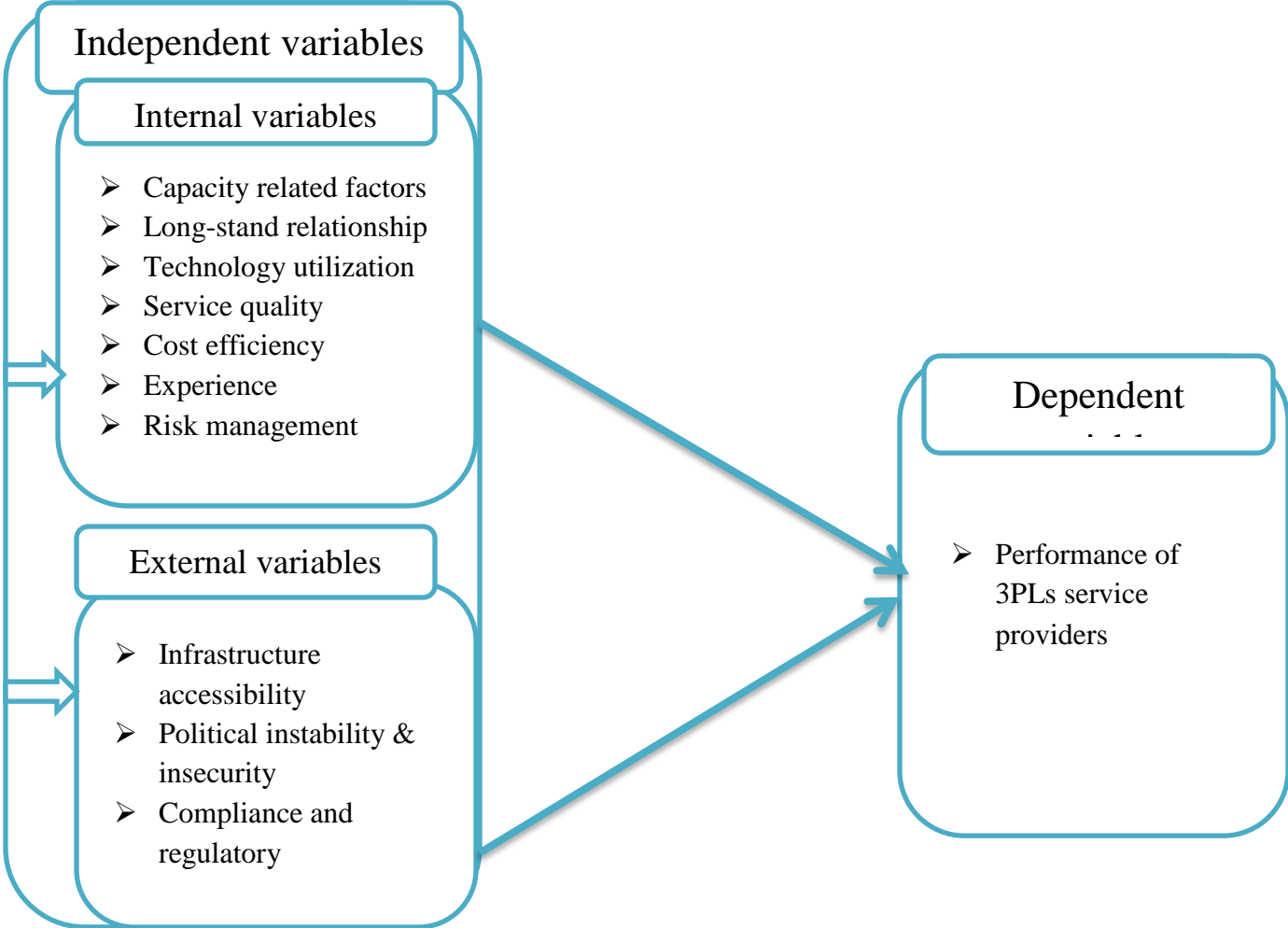
H9. Political instability affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

H10. Compliance and regulatory affects the performance of 3PLs service providers in terms of humanitarian aid operations in Tigray significantly.

2.5.3 Conceptual Design of the Study

The conceptual design of this research involves the factors that serve to measure the influencing factors of the 3PLs performance on INGOs and UN organizations. Therefore, based on the above literatures, the researcher has designed conceptualized ten variables that can be affected 3PLs providers' performance.

Figure 2.1: Conceptual design of variables of the study



Source: designed from the variables of the study, (2025)

CHAPTER THREE: METHODOLOGY OF THE STUDY

3.1 Introduction

The method used in this study is helpful to identify factors affecting the performance of Third-Party Logistics (3PLs) providers relating to the selected International Non-Governmental Organizations (INGOs) and United Nations (UN) organizations in Tigray region. It covered research design, data collection methods, sampling techniques, and data analysis procedures employed for achieving the research objectives.

3.2 Description on the site of the Study

Tigray is a regional state located in the northern part of Ethiopia. It has 7 administrative zones which are southern, southeastern, eastern, central, Northwestern, western and Mekelle city administration. In Tigray, there were about 52 ‘Woreda’ administrations and cities in the state. However, Tigray had restructured its former administration organizational structures into 33 city administrations and 60 rural woredas administrations aggregately 93 structural administrations of woredas and cities level within the seven zonal administrations since 2010 E.C.

In Tigray, heavy devastative war happened by different external and internal actors (Federal government, Amhara Fano and militants, Eritria government and others) that caused for death of many people and atrocities, damaged of infrastructures and natural resources, collapse of state administrations as government, and place of warlords and so on.

Then after, different international and local organizations came to the regional state to support vulnerable society for about 4.5 million people that live in different internal displaced people (IDP) centers, and own home. The international and local charity organizations have provided different kinds of humanitarian aids for the vulnerable people like human protection shelters, food distribution, health supplies, school feeding supplies, materials and facilities, public infrastructure facilities, protecting children and gender issues. However, many challenges have been seen in the delivery of humanitarian operations to the targeted destinations, such as delays, misusing, and other problems.

Therefore, this study conducted to fulfill the gap of delivering humanitarian operations into the designated community through participating 3PLs service providers into the operations,

specially, to address the large logistics of aids from the international (INGOs and UN) charity organizations. However, local non-governmental organizations are not part of this research because of the overall capacity and low demands for provision of the humanitarian logistics for third-part logistics (3PLs) service providers to deliver humanitarian supplies into the vulnerable people. Therefore, this study focused on 5 selected third-part logistics (3PLs) service providers, 6 international non-governmental organizations (INGOs) and 5 UN organizations.

The 5 selected third-part logistics (3PLs) service providers are taken as complimentary idea for the research results relating to the humanitarian performances in war-affected areas like Tigray. These are; Farus Ethiopia tour and car rental, Covenant Ethiopia Tour and car rental, Haftom Gebremedhin car rental, Fetan freight transport and Sindayo Mehari freight transport. Those 3PLs (Third-Party Logistics) service providers have been engaging through contractual agreements on the outsourced humanitarian logistics and supply chain operations from the six international non-governmental organizations (INGOs) and five UN agencies for provision of scalable, customized services, and coordinating the shipments by using trucks and light fleets in delivering of humanitarian logistics to the targeted community.

Finally, the selected six international non-governmental organizations (INGOs), are Save the Children International, world vision international (WVI), Catholic Relief service (CRS), Concern worldwide, Action Against Hunger (AAH), and Plan International (PI) as well as the selected five UN agencies are United Nations High Commissionaire for Refugee (UNHCR), World food Programme (WFP), International Organization for Migration (IOM), United Nations Office for Project Services (UNOPS), and United Nations Children's Fund (UNICEF), which have been actively participating in the humanitarian responses in Tigray. While compared to other INGOs and UN agencies working in Tigray, those international charity organizations have provided huge humanitarian aids like food, water, shelter, medicine and other services for the people who were affected by war crises to save lives, and minimize suffering via delivering immediate relief before the longer-time recovery programs.

3.3 Research Philosophy of the study

The research philosophy adopted in this study is the pragmatism philosophy, emphasizing utilizing research findings to solve actual problems (Goldkuhl, 2012). Pragmatism accepts and embraces different views and methods of investigation to portray the research phenomenon

holistically (Creswell & Plano Clark, 2017). Pragmatism philosophy is most frequently used in researches, because it places more priority on the research questions and practical solutions. It applied to accommodate both qualitative and quantitative methods flexibly in the data analysis regarding to 3PLs performance in humanitarian logistics. Besides, it helps to focus on solutions, methodological flexibility or mixed-approach, and integration of insights. Humanitarian aid logistics service in Tigray is a very complex and multifaceted phenomenon reminded of the devastative war, hence a pragmatic approach is judged best.

3.4 Research Design of the study

Research design is the general plan how you will go about answering your research question(s) and the importance of clearly defining the research question cannot be over emphasized (Lewis & et al., 2011). Research design is used as a guide for gathering and analyzing data of the study. Research design means all the issues involved in planning and executing of a research. It represents the framework for collecting and analyzing data (Bryman, 2008). This study utilized the mixed- method of both qualitative and quantitative research approaches to analyze the data which gathered from the 84 respondent samples. Besides, the researcher applied both descriptive and explanatory research designs which are relevant to investigate the effects of key independent variables on the dependent variable of 3PLs performance respecting to be delivering of humanitarian aids to war affected areas like Tigray.

A descriptive design is undertaken in order to ascertain and be able to describe the characteristics of the variables of interest in a situation (Sekaran and Bougie. 2009). In this case, it applied to describe and interpret the data analysis in quantitative and qualitative methods. Next, explanatory research design tries to investigate and explain the relationship of the 10 independent variables and dependent variable (3PLs performance) of the study. It looks for explaining the nature of certain relationship of variables in the MLR model of data analysis. Thirdly, the researcher also used a cross-sectional design to gather data during the research time at one point of time via the questionnaire survey and structured-interview from the selected five 3PLs service provider companies and eleven humanitarian international agencies that provide humanitarian services in Tigray regional state.

3.5 Population, Sampling and sample size

3.5.1 Target population of the study

In this study, the target population incorporates five selected 3PLs service providers and eleven international agencies. . The five selected third-part logistics (3PLs) service providers included in the study are Farus Ethiopia Tour and Car Rental, Covenant Ethiopia Tour and Car Rental, Haftom Gebremedhin Car Rental, Fetan Freight Transport and Sindayo Mehari Freight Transport. Secondly, the six selected INGOs are Save the Children International (SCI), World Vision International (WVI), Catholic Relief Services (CRS), Concern Worldwide, Action Against Hunger (AAH), and Plan International. As well, the five UN organizations which are part of the study and are involved in providing humanitarian aids in Tigray include United Nations High Commissioner for Refugees (UNHCR), World Food Programme (WFP), and International Organization for Migration (IOM), UN Office for Project Services (UNOPS), and United Nation Children’s Fund (UNICEF).

The selected 3PLs service providers provide humanitarian aids (materials and services) by using their key personnel with direct involvement in logistics and supply chain management of the selected organizations. Thus, the sum of all the personnel of the selected 3PLs providers, INGOs and UN agencies are target population of the study.

Local organizations are not part of this research because of their overall logistics capacity and lack of demand to outsource humanitarian logistics for third-part logistics (3PLs) service providers to deliver to the people who have suffered due to the war.

3.5.2 Sampling method of the study

The study selected sample respondents from employees and management bodies of five third-party logistics (3PLs) service providers, six international non-governmental organizations (INGOs), and five United Nations (UN) agencies, making a total of sixteen organizations involved in the delivery of humanitarian aid in Tigray. These sixteen organizations were selected from the target population of 3PLs service providers and international organizations operating in Tigray using a non-probability purposive sampling method.

Purposive sampling was applied to select five 3PL service providers from those operating in the region, as well as six INGOs and five UN agencies from the international organizations present

in Tigray. The five 3PLs service providers were purposively chosen based on several criteria, including the frequency of their contractual engagements with INGOs and UN agencies, their active involvement in humanitarian aid delivery, and their experience in operating in high-risk and infrastructure-damaged areas resulting from the conflict. These factors justified their selection as representative samples for the study.

In addition, purposive sampling was used to select six INGOs and five UN agencies (a total of eleven international organizations) based on the scale and geographical coverage of their humanitarian logistics operations, as well as the size of their workforce involved in humanitarian supply chain activities. Accordingly, the study included five 3PLs service providers and eleven major international organizations that play significant roles in delivering various forms of humanitarian assistance in the Tigray Regional State.

Furthermore, the purposive sampling method was also employed to select key informants from the five selected 3PLs service providers and the eleven international organizations. These key informants were chosen based on their departmental roles and professional experience in humanitarian logistics, as they were expected to possess in-depth and relevant knowledge. This approach ensured the inclusion of participants with rich and valuable insights for the qualitative component of the study.

3.5.3 Sample sizes of the study

An optimum sample is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility (Kothari, 2004). The samples of the study are key informants who could provide rich-content information in the research topic regarding to 3PLs providers' performances in relation to international NGOs and UN agencies in Tigray. The samples of the study have been taken from the management bodies, department heads and officers of logistics and supply chain management departments of the selected organizations. The researcher believes that the job nature of the departments and management bodies as well as officers of the samples could have strong relationship with the topic of the study so as to provide valuable information on logistics and supply chain management.

Therefore samples of the study selected from the 16 sample organizations of the five selected 3PLs service providers and eleven international agencies (six NGOs and five UN) that can have close contact regarding to delivering humanitarian aids in Tigray. The sample size took from the

target population of the study which determined by using Yamane (1967) statistical formula. This intended to take proportional sample sizes among the 16 sample organizations of the five selected 3PLs service providers and eleven international agencies (six NGOs and five UN) of the study. According to Yamane (1967) sample sizes are determined by using statistical instrument formula from the target population.

$$n = \frac{N}{1+N(e)^2}$$

$$n = \frac{721}{1+721(0.05)^2}$$

$$n = 100$$

Where;

N= the total population (total sum of the workers of the international organization)

n = sample size and

e = margin error

Here, the study has a 5% margin of error and 95% confidence level or error free for the sampling. According to Kothari, (2004) while selecting a sampling procedure, researcher must ensure that the procedure causes relatively small sampling error and helps to control the systematic bias in a better way.

The samples selected from the five selected 3PLs service providers and eleven international organizations (six NGOs and five UN) provided aiding service in Tigray in proportionate by using the formula in the above. This shows that all the 3PLs service providers and humanitarian international organizations have equal sample representations or sample proportion based on their number of workers which is conducted by multiplying the population of one company by hundred and dividing to the total population of the study (look in the table below).

Table 3.1: Proportion of sample size of the study

| no. | List of 3PLs, INGOs & UN agencies | staff workers | samples in % | sample size | collected questionnaire |
|-----|--|---------------|--------------|-------------|-------------------------|
| 1 | United Nations High Commissionaire for Refugee (UNHCR) | 51 | 6.8% | 7 | 6 |

| | | | | | |
|----|--|-----|-------|-----|----|
| 2 | World food Programme (WFP) | 46 | 6.1% | 6 | 5 |
| 3 | International organization for Migration (IOM) | 43 | 5.7% | 5 | 4 |
| 4 | United Nations Office for Project Services (UNOPS) | 22 | 2.9% | 3 | 3 |
| 5 | United Nations Children's Fund (UNICEF) | 56 | 7.5% | 7 | 6 |
| 6 | Save the Children International | 61 | 8.2% | 8 | 7 |
| 7 | world vision international (WVI) | 65 | 8.7% | 9 | 8 |
| 8 | Catholic Relief service (CRS) | 80 | 10.7% | 10 | 8 |
| 9 | Concern the world international | 120 | 16.1% | 16 | 13 |
| 10 | Action Against Hunger (AAH) | 112 | 15% | 15 | 12 |
| 11 | Plan International (PI) | 65 | 8.7% | 9 | 7 |
| 12 | Farus Ethiopia tour and car rental | 6 | 0.8% | 1 | 1 |
| 13 | Covenant Ethiopia Tour and car rental | 5 | 0.67% | 1 | 1 |
| 14 | Haftom Gebremedhin car rental | 3 | 0.47% | 1 | 1 |
| 15 | Fetan freight transport | 4 | 0.53% | 1 | 1 |
| 16 | Sindayo Mehari freight transport | 3 | 0.47% | 1 | 1 |
| | Total | 742 | 100% | 100 | 84 |

Source; own survey design from the organizations data, (2025)

To take samples from each of the selected international organizations apply the following formula,

$$\text{Sample sizes percentage of one organization} = \frac{\text{population of an organization} * 100}{\text{Total Population of the study}}$$

Example, UNHCR = $51 * 100 / 721$

$$= 7\% \text{ or } 7 \text{ sample sizes}$$

Based on the formula each of the organizations has proportional samples presented in the above table. Therefore, the respondent samples of the study were selected from save the children International (SCI) 8, World Vision International (WVI) 9, Catholic Relief Services (CRS) 10, Concern Worldwide 16, Action Against Hunger (AAH) 12, and Plan International 7, United Nations High Commissioner for Refugees (UNHCR) 7, World Food Programme (WFP) 6, International Organization for Migration (IOM) 5, UN Office for Project Services (UNOPS) 3,

and United Nation Children’s Fund (UNICEF) 7 as well as one from the five 3PLs service providers each. Thus, 100 samples were selected aggregately as key respondents for the designed survey questionnaire and semi-structured interview of the study.

3.6 Data types and sources of the study

3.6.1 Data type of the study

According to Mc Givern (2006) explanation, quantitative research is useful for describing the characteristics of a population or market or object. Quantitative data of the study gathered from 84 respondent samples. It is presented in statistical or numerical form and analyzed simply using the quantitative method of composite mean in the regression analysis. The qualitative data was gathered from primary data sources through the interviewing data collection method.

3.6.2 Data sources of the study

The data of this study was gathered from 84 respondents who were selected from the five 3PLs service providers and eleven humanitarian international agencies that participate in humanitarian support in Tigray. Thus the 84 respondent samples are the primary sources of data for this study. The primary data of the study is a first-hand data that is obtained from the primary data sources.

3.7 Data Collection Methods

3.7.1 Survey questionnaires

The research questionnaires have closed-ended and open-ended questions for the 100 samples of the study that includes: demographic information of respondents, infrastructural challenges that come up with 3PLs (e.g. road conditions, warehousing facilities), security and political risks affecting 3PLs operations, coordination and information sharing practices that affects performances of 3PLs providers in delivering of humanitarian aids from INGOs and UN organizations to beneficiaries, 3PLs service quality (e.g. reliability, responsiveness, flexibility), and also overall performance of 3PLs in Tigray region.

The questions designed based upon Likert Scale (for instance, 1 = strongly disagree to 5 = strongly agree) manner for measuring attitude and perception towards 3PLs performance (Joshi et al., 2015). The questionnaire tested on a small group of respondents for clarity and validity (Teijlingen & Hundley, 2001).

3.7.2 Semi-structured Interviews

As part of in-depth collection insights on factors affecting performance of 3PLs, semi-structured interviews conducted with 11 key informants of the organizations and 5 heads of the 3PLs service providers who are parts of the total sample size of the study. The interview guide developed according to the research objectives and outputs from the qualitative phase. Interview topics include: 3 basic questions which are, what are the biggest challenges you face in operations of 3PLs providers in Tigray? How does your organization evaluate the performance of 3PLs for emergencies on supply operations? As well as what improvements would you recommend on the performance aspects of 3PLs providers working with INGOs/UN organizations in Tigray? all those focuses on biggest challenges, improvements and fundamental recommendations in the practices of linking and sharing information between INGOs & UN agencies, perceptions of quality of service by 3PLs and its effect on humanitarian supply chains, and suggestions for improving 3PLs performance in Tigray region.

3.8 Data Analysis

3.8.1 Quantitative Data Analysis

The qualitative data was collected through the survey questionnaire. It analyzed using descriptive and explanatory research after converting the data into quantitative data in composite mean by using SPSS software package. Descriptive statistics included summary measures such as means, standard deviations, and frequencies in reporting the characteristics across the chosen sample and major variables within the samples. Inferential statistics used for the relationship between independent variables (including infrastructural challenges, security risks, and coordination practices) and the dependent variable (3PLs performance) after converting the qualitative data into quantitative data by using the composite mean method.

Consequently, regression analysis Multivariate regression analysis which predicts the 3PLs performance used to determine the relative impact of each independent variable predicting the performances of 3PLs service providers. According to Hair et al. (2010), Relevance and fit of the MLR model for the data or variables designed in the study was SPSS output values for R² and "adjusted R²" should exceed 70% with significant statistics from an ANOVA test based on results from an F-test and P-Values less than 0.05 in the regression analysis. Furthermore,

fundamental assumptions of MLR model made a realistic or a successful analysis strategy for explanatory variables.

3.8.2 Econometric Model of the study

3.8.2.1 Model specification:

According to Habb and McConnell (2002), the main objective of estimating econometric model in survey is to calculate mean performance of the company and to allow inclusion of respondents' socio-economic factors in to functions which supports the researcher to obtain information on the validity and reliability of results and hence increasing confidence in application of results obtained from the contingent valuation empirical analysis.

The researcher used the multiple linear regressive (MLR) method of analysis through reviewing literatures on the determinants of 3PLs providers' performance by investigating explanatory variables in the study. This model summary indicated the relevance and fitness of the MLR model for the designed data or variables of the study. Thus, for having good of fit model for the study, the SPSS output values of R2 and adjusted R2 should be greater than 70% as well as significant values of statistic ANOVA test results of F-test and P-values (less than 0.05) should be relevant for the multi linear regression analysis model.

3.8.2.2 Regression equation of the study

The regression analyses were conducted to determine by how much the identified independent variables explained the dependent variable which is 3PLs providers' performance in the international organizations which providing humanitarian supports in Tigray regional state. Thus, it can be mathematically expressed as the following;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_n X_n + e$$

Where the terms stands for;

- ✓ β_0 = constant coefficient
- ✓ $\beta_1 - \beta_n$ = are the parameters used by the mode or coefficients for each variables
- ✓ e = is the disturbance/ error / stochastic/ residual term

- ✓ X_1-X_n = independent/ predictor variables of the study
- ✓ Y = 3PLs performance as dependent variable

To conclude, MLR Linearity is roughly straight line with some obvious distances of residuals from the regression line-in the scatter plot test. Multi collinearity of the explanatory variables that are tested by VIF and tolerance tests of statistic coefficients (VIF value is below 10 and tolerance is greater than 20% but greater than 10% is not high risk). Another assumption is homoscedasticity that shows the constant or equal variance of variables in the regression line and will be successful if straight line. Stochastic are uncorrelated and No influential cases which is assured by using Durbin-Watson statistics test (its value should be between 1 and 2) and cook's distance test (its values should be below 1) respectively tested in the analysis.

3.8.3 Qualitative Data Analysis

The semi-structured interview generated qualitative data which subjected to thematic analysis (Braun and Clarke, 2006) on key informants, which consists of the following steps: First, familiarization is transcribing and reading the interview transcripts to gain an overall understanding of the data. Secondly, coding is Identifying and coding recurrent themes and patterns in the data. Thirdly, theme Development is aggregating the codes into broader themes corresponding to the key issues raised by the participants. Finally, interpreting the content and drawing conclusions based on the data to be applying the content analysis method in this study.

3.9 Research validity and reliability

3.9.1 Validity

To establish content validity in this study, 3PL performance items were developed from both theoretical and empirical 3PLs performance frameworks which pointed to internal factors (capacity, service quality, long relationship duration, technology usage, cost efficiency, experience, risk management) and external factors (infrastructure access, political and security instability, compliance and regulations). In addition, to verify construct validity within the constructs of Resource Based View, Transaction Cost Economics, Social Network Theory, Contingency Theory and Institutional Theory, each latent variable had multiple, theory-consistent indicators. This connection between the theoretical framework and the questionnaire

section enhanced the construct validity of the study as the measures of 3PLs performance have provided a logical indication of the variables affecting the 3PLs performance.

In order to establish face validity, the draft questionnaire and interview guide were evaluated by the thesis advisor along with other expert practitioners of humanitarian logistics regarding to clarity, relevance, and completeness. The reviewers' feedback resulted in clarifying the scale used to assess the same (1=strongly disagree to 5=strongly agree) was appropriate for measuring perceptions of the determinants contributing to 3PLs effectiveness.

3.9.2 Reliability

Cronbach's Alpha was used to assess the reliability of the Likert scale items and to determine the internal consistency of items for each construct and the overall scale. The items were assessed after collecting data from 84 respondents who completed the survey; the item responses were entered into SPSS for data analysis purposes. Composite indices for all of the determinants affects 3PLs performance internal factors (capacity, service quality, long-term relationships, technology use, cost effectiveness, experience, risk management), and external factors (infrastructure accessibility, political instability & insecurity, compliance & regulatory) as well as the performance of the 3PLs were then created in SPSS. In accordance with standard methodological practices (e.g., Hair et al., 2010), an alpha greater than or equal to .70 is considered acceptable for internal consistency.

Table 3.2: Table 2: Measurement of Reliability Analysis

| variables | Number of items in the scale | Cronbach's Alpha Result | Total Case Valid N | Excluded list-wise | Total | % | Remark |
|-------------------------|-------------------------------------|--------------------------------|---------------------------|---------------------------|--------------|----------|---------------|
| Capacity | 5 | .702 | 84 | 0 | 84 | 100% | Good |
| Service quality | 6 | .813 | 84 | 0 | 84 | 100% | Very good |
| Long-stand relationship | 4 | .978 | 84 | 0 | 84 | 100% | Excellent |
| Technology | 4 | .70 | 84 | 0 | 84 | 100% | Good |

| | | | | | | | |
|-------------------------|----|------|----|---|----|------|------------|
| Cost effective | 5 | .782 | 84 | 0 | 84 | 100% | Good |
| Experience | 5 | .756 | 84 | 0 | 84 | 100% | Good |
| Risk management | 4 | .699 | 84 | 0 | 84 | 100% | Acceptable |
| Infrastructure | 6 | .841 | 84 | 0 | 84 | 100% | Very good |
| Political instability | 3 | .712 | 84 | 0 | 84 | 100% | Good |
| Compliance & regulation | 3 | .728 | 84 | 0 | 84 | 100% | Good |
| total | 45 | .906 | 84 | 0 | 84 | 100% | Excellent |

Source: own survey SPSS analysis, (2025)

The reliability analysis of the 3PLs performance scale, comprising 10 constructs with 45 items tested on 84 valid cases (100% response rate, no exclusions), demonstrates excellent overall internal consistency (Cronbach's $\alpha = .906$), surpassing the rigorous .90 threshold recommended for established scales in supply chain and logistics research (Nunnally, 1978). Exceptional reliability is evident in Long-stand relationship ($\alpha = .978$) and Infrastructure ($\alpha = .841$), consistent with prior 3PLs studies highlighting relational stability and infrastructural robustness as key dimensions (e.g., Marlow & Casaca, 2003; Rafele, 2004). Most constructs exhibit good reliability (.70–.782) for Service quality (.813), Cost effective (.782), Capacity (.702), Technology (.70), Experience (.756), Political instability (.712), and Compliance & regulation (.728), while Risk management (.699) meets the acceptable, affirming the scale's validity for NGOs contexts with minor optimization potential for borderline items (Hair et al., 2010).

3.10 Ethical Considerations

Before commencing data collection processes, ethical approval is acquired from the appropriate institutional review board (IRB) providing approval for research. Participants are well-informed consent prior to participation on the study. The subjects are informed of the fact that they entitled to cease participation in the study at any time without any negative consequences. Confidentiality and anonymity will be preserved using pseudonyms and aggregating data where appropriate (Israel & Hay, 2006).

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

The data collected from the study has been presented, interpreted and discussed in detail analysis under this chapter. In doing so, this section depicts the process of data analysis and formulation of findings from the quantitative and qualitative analysis methods. In short, the key points of this chapter are descriptive analysis, explanatory analysis, and econometrics of regression analysis, interpretation and implication, as well as discussion on results of the study.

4.1 Descriptive analysis of the study

This section encompasses the demographic Characteristics of respondents from the INGOs and UN organizations, and 3PLs service providers' Performances related to humanitarian aids in Tigray regional state. Thus, all the subtopics have detail analysis in frequency and percentage with supporting & clear figures and tables in both quantitative and qualitative analysis.

Table 4.1: Respondents' response rate of the study

| No | Description | Respondents | remarks |
|----|------------------------------------|-------------|---------|
| 1 | Designed sample Size (number) | 100 | |
| 2 | Distributed questionnaire (number) | 100 | |
| 3 | Returned Questionnaire (number) | 84 | |
| 4 | Response Rate (%) | 84% | |
| 5 | Used Response ((number) | 84 | |

Source: computed of own survey, 2025

4.1.1 Demographic Characteristics of Respondents

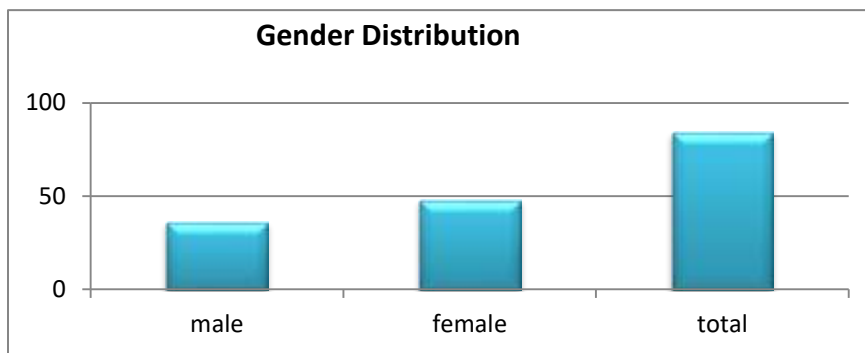
4.1.1.1 Gender Distribution Aspect of Respondents

| Table 4.1: Gender distribution | | | | | |
|--------------------------------|--------|-----------|---------|---------------|------------|
| | | Frequency | Percent | Valid Percent | Cumulative |
| Valid | Male | 36 | 42.9 | 42.9 | 42.9 |
| | Female | 48 | 57.1 | 57.1 | 100.0 |
| | Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

According to the above table, the sample size contains 84 complete cases that shows gender distribution in the INGOs, UN organizations and 3PLs service provider companies. The gender distribution is 48 females (57.1%) and 36 male (42.9%) from the total 84 respondents of the study. This gender distribution exhibits those females are more than males with the deference of 12 (14.2%) coverage in the organizations. Therefore, this result indicates a female-to-male ratio of 1.33:1 roughly from the descriptive analysis that shows simply gender distribution coverage between females and males in the 16 sample organizations that participated in humanitarian operations, but not as determinant factor for 3PLs performance.

Figure 4.1 Gender of respondents



Source: own survey of SPSS output, 2025

The analytical insight of this descriptive analysis has indicated that females have over representation in humanitarian operations in the INGOs/UN and 3PLs organizations in Tigray. Demographically, females have higher coverage than males in the distribution ratio in the participation of providing logistics and supply chain services.

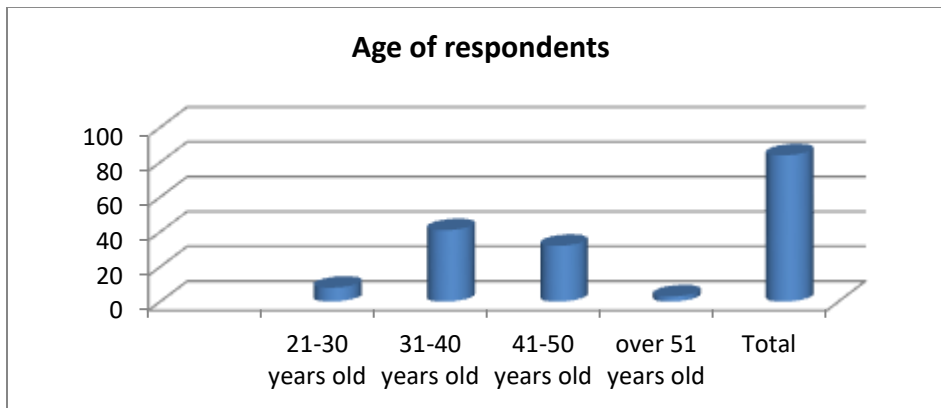
4.1.1.2 Age Distribution Aspect of Respondents

| | | Frequency | Percent | Valid % | Cumulative |
|-------|-------------------|-----------|---------|---------|------------|
| Valid | 21-30 years old | 8 | 9.5 | 9.5 | 9.5 |
| | 31-40 years old | 41 | 48.8 | 48.8 | 58.3 |
| | 41-50 years old | 32 | 38.1 | 38.1 | 96.4 |
| | over 51 years old | 3 | 3.6 | 3.6 | 100.0 |
| | Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

The above table shows 84 respondents of the study are categorized by age. Therefore, larger representation of the samples presented within the range of early-to-mid adulthood. Almost half of the respondents 41 (48.8%) are between 31–40 years, which is the modal category. Next, a significant percentage also lay between 41–50 years old are 32 (38.1%), so the overall percentage less than 51 years is 96.4% from the total respondents. Youth working-age individuals in the 21–30 age groups form a smaller minority of 8 (9.5%), while those above 51 years old are also the least represented 3 (3.6%) in the age distribution analysis.

Figure 4.2 Age of respondents



Source: own survey of SPSS output, 2025

Therefore, the age distribution of INGOs/UN and 3PLs organizations in Tigray suggests that the findings are mainly generalizable to mid-career working-age individuals, but small ratio for the youngest and oldest groups of the study. In the analytical insights suggested that middle age experienced professionals dominated the age distribution aligning with the demands of 3PLs service providers in the humanitarian operations aspects in Tigray.

4.1.1.3 Educational Level Analysis of Respondents

The above table depicts that from the 84 respondents, the evident data of the INGOs/UN and 3PLs organizations in Tigray skewed towards the undergraduate level of education. A slight majority 45 (53.6%) have a first degree, which confirms that more than half of the sample has completed undergraduate education but not postgraduate holders. Next, 30 (35.7%) respondents have a second degree that is indicating a reasonable proportion of higher or graduate-level education among the samples. Doctorate degree holders constitute 5 (6%), which though small,

they have higher level academic qualifications. Less than 4 (4.8%) indicate diploma as lowest qualification, showing scant presence of sub-degree qualifications in this category.

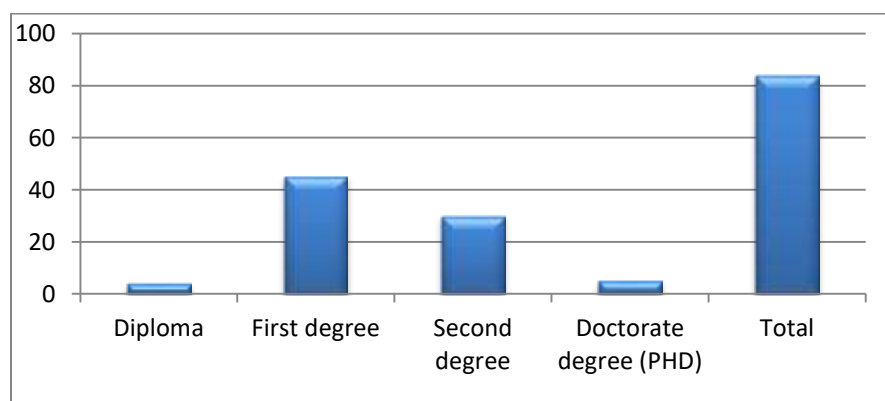
Table 4.3: Educational level of respondents

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------------------|-----------|---------|---------------|--------------------|
| Diploma | 4 | 4.8 | 4.8 | 4.8 |
| First degree | 45 | 53.6 | 53.6 | 58.3 |
| Valid Second degree | 30 | 35.7 | 35.7 | 94.0 |
| Doctorate degree (PHD) | 5 | 6.0 | 6.0 | 100.0 |
| Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

Distributional curve identifies steep rise across first categories-within first-degree holders, and second degree that covers up to 89.3% with a minimal tail at doctoral level. Combined, the profile indicates an educated group skewed towards undergraduate and postgraduate qualification that implies the moderate section to perform the objectives of the INGOs/UN and 3PLs organizations in Tigray regarding delivering of humanitarian aids to the vulnerable society.

Figure 4.3 educational levels of respondents



Source: own survey of SPSS output, 2025

According to Yemane (2024), education level relates positively to the ability to operate effectively in a post-conflict environment, such as Tigray, Ethiopia. A major factor affecting the overall distribution of respondents is the fact that 89.3% of respondents have either a

bachelor’s degree or a master’s degree; therefore, there is less opportunity for lower qualifications driven bias in terms of reporting from this sample, which allows for improved reliability in terms of regression or ANOVA use on explanatory variables related to performance.

4.1.1.4 Work experiences Analysis of Respondents

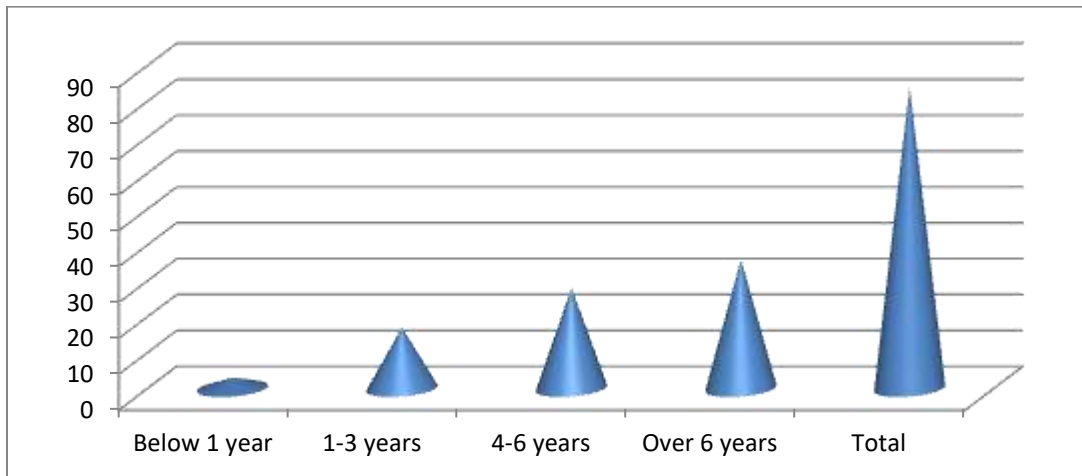
| | | Frequency | Percent | Valid Percent | Cumulative % |
|-------|--------------|-----------|---------|---------------|--------------|
| Valid | Below 1 year | 3 | 3.6 | 3.6 | 3.6 |
| | 1-3 years | 17 | 20.2 | 20.2 | 23.8 |
| | 4-6 years | 28 | 33.3 | 33.3 | 57.1 |
| | Over 6 years | 36 | 42.9 | 42.9 | 100.0 |
| | Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

Based on the above table, the category is an indicative of work-experiences of the respondents from the INGOs/UN and 3PLs organizations in Tigray, 6 years’ experience are 36 participants (42.9%) which is the biggest, followed to that 4–6 years’ work of experiences are 28 (33.3%). Together, both categories represent 76.2% of the respondents of the study, indicative of highly experienced population. Early-career representation is minimal, with 1–3 years are 17 (20.2%) and less than 1 year a negligible 3 (3.6%).

This work experience shows that it looks large enough to identify a clear right-skewing group of experienced professionals who are working in the INGOs/UN and 3PLs organizations in Tigray. Let’s translate the categories of work-experiences into approximate midpoints like (0.5, 2, 5, and 7.5 years) that a rough average would likely fall well above the mid-career mark, consistent with the dominance of the 4 and above years of wok experiences. In this descriptive analysis, there are high proportion of respondents with more than four years of experience (76.2%), it provides validation for the study's conclusions regarding to factors affecting the performance of 3PLs' within a post-conflict context, like Tigray

Figure 4.4 Work experiences of respondents



Source: own survey of SPSS output, 2025

Some methods of cross-tabulation analysis and ANOVA (analysis of variance) using SPSS can help to look for moderating effects of experience on performance factors, similar to analyses conducted in Red Cross situations (Shemelis, 2024). Practically, this would mean that policies, training, and employment can be focused on high-level ability and in-field expertise as well as new hires is relatively small in the international organizations to perform humanitarian logistics effectively.

4.1.1.5 Job position analysis of Respondents

The table presented below shows that the composition of job position among the 84 respondents' job distribution is prevailing in Logistics/Supply Chain Officers, covers 34 (40.5%) which directly implements in the daily logistics activities. Operational Officers are second level in the job position by 17 (20.2%), and this helps in operations-based profile in the daily humanitarian aid activities. Thirdly, logistics/Supply Chain Managers consists of 13 (15.5%) that reflects a lower, but they have more significant role in leadership level than officers in the humanitarian logistics operations. Fleet Officers is the other job position which consists of 10 (11.9%), reflecting a focus category on fleet management, and transport coordination and asset management. Finally, finance Officers and 3PLs owners/workers each consist of 5 (6.0%) individuals, reflecting very low representation in the demographic job position distribution of the study.

Table 4.5: Job position of respondents

| | Frequency | Percent | Valid Percent | Cumulative | |
|-------|--------------------------------|---------|---------------|------------|-------|
| Valid | Logistics/supply chain Manager | 13 | 15.5 | 15.5 | 15.5 |
| | Logistics/supply chain officer | 34 | 40.5 | 40.5 | 56.0 |
| | Operational officer | 17 | 20.2 | 20.2 | 76.2 |
| | Fleet officer | 10 | 11.9 | 11.9 | 88.1 |
| | Finance officer | 5 | 6.0 | 6.0 | 94.0 |
| | 3PLs owners and workers | 5 | 6.0 | 6.0 | 100.0 |
| | Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

In analytical insights, the percentages of job position of the sample INGOs/UN and 3PLs organizations in Tigray indicate that higher concentration in execution level in comparison to high level logistics and supply chain managers in the humanitarian operations. Whereas less proportion devoted to strategic management, finance, or third-party leadership job positions by putting small figures of the humanitarian operations.

4.1.1.6 Types of organizations of the Respondents

Table 4.6: Types of organizations of the respondents

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------|---------|---------------|--------------------|
| Valid | INGOs | 56 | 66.7 | 66.7 |
| | UN Agencies | 23 | 27.4 | 94.0 |
| | 3PLs service providers | 5 | 6.0 | 100.0 |
| | Total | 84 | 100.0 | 100.0 |

Source: own survey of SPSS output, 2025

Based on the table presented above, from the overall respondents of the study, the majority are from INGOs, representing two-thirds of the counts from international organizations, 56 (66.7%). This means the entire dataset is highly skewed toward the INGO view, that they have

large coverage in the humanitarian operations in Tigray. UN Agencies represent slightly more than a quarter of the total respondents 23 (27.4%) and offer a strong but secondary voice in the participating role of humanitarian aid activities. On the other hand, 3PLs service providers are under-represented 5 (6.0%), and hence perspectives from logistics service providers are relatively small for those conclusions drawn particularly in the supply chain services segment. Cumulative distribution reveals that INGOs and UN Agencies, 94.0% of the dataset have been reached, observing that basically all analysis can be susceptible to these two segments. Overall, the sample in the survey is a vast majority humanitarian- and development-focused with limited representation of 3PLs private-sector logistics that needs to be considered when projecting trends, and best practices in performances of logistics service provision in the INGOs and UN organizations in Tigray.

4.1.1.7 Main services outsourced analysis

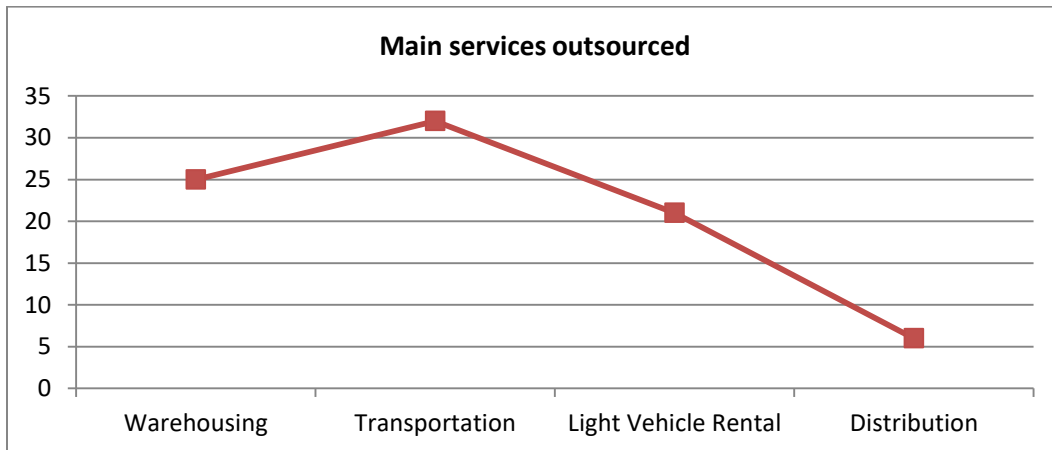
Table 4.7: Main services outsourced by INGOs/UN agencies

| | Frequency | Percent | Valid Percent | Cumulative |
|----------------------------|-----------|---------|---------------|------------|
| Warehousing | 25 | 29.8 | 29.8 | 29.8 |
| Transportation | 32 | 38.1 | 38.1 | 67.9 |
| Valid Light Vehicle Rental | 21 | 25.0 | 25.0 | 92.9 |
| Distribution | 6 | 7.1 | 7.1 | 100.0 |
| Total | 84 | 100.0 | 100.0 | |

Source: own survey of SPSS output, 2025

According to the above table, the main services outsourced by the INGOs and UN organizations in Tigray for 3PLs service providers are presented from the highest to lowest based on the scale of measurements of 84 respondents. The most outsourced service is transportation 32 (38.1%) of the total respondents. Secondly, Warehousing has the next share of outsourcing of logistics and supply chain activities by 25 (29.8%) to the service providers external organizations (3PLs). Light vehicle rental stands third level outsourcing task of humanitarian aid of the INGOs and UN organizations in Tigray at 21 (25.0%) respondents. Lastly, distribution is the lowest, 6 (6.1%) coverage of outsourcing in the humanitarian aspects.

Figure 4.5: Main services outsourced by INGOs/UN agencies



Source: own survey of SPSS output, 2025

This indicates that the INGOs and UN organizations in Tigray mainly outsource transportation and warehousing activities for the 3PLs providers to address humanitarian aids like food items, equipment/materials, medicine, non-food items and other humanitarian logistics to the vulnerable society. Besides, light vehicle rental is fundamental to transport the key experts, officers, management and observer bodies of the INGOs and UN organizations to the place where distribution of humanitarian supplies takes place to conduct supervision and follow up of the operations.

4.1.2 Determinants of 3PLs performances

The target of this descriptive statistic is to identify the determinant variables category of either internal or external once. The descriptive statistics used a consistency in the number of units of respondents per single observation (N = 84) for measurement of all 10 internal and external variables.

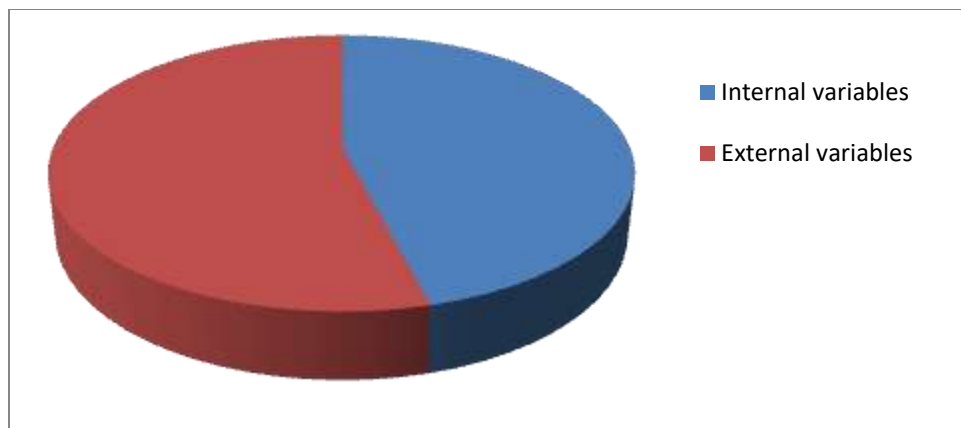
Table 4. 8: Internal and external determinants

| | N | Sum | Mean | Std. Deviation | Variance | Skewness | |
|---------------------|-----------|-----------|-----------|----------------|-----------|-----------|------------|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Internal variables | 84 | 247.13 | 2.9421 | .72865 | .531 | .183 | .263 |
| External variables | 84 | 290.61 | 3.4597 | .64260 | .413 | -.223 | .263 |
| Valid N (list wise) | 84 | | | | | | |

Source: own survey of SPSS output, 2025

External variables have somewhat higher influences with the aspects of mean values and average sum that is greater by the sum (290.61) and the mean (3.4597), whereas the values of internal variables are sum (247.13) and the mean is (2.9421). This implies that on average value, external factors do score slightly stronger than internal variables in this dataset. Besides, the shapes of distribution are mildly asymmetric and in opposite directions that is a moderate right-skew for internal variables (skewness= 0.183) and moderate left-skew for external variables (skewness= -0.223), which can be interpreted as, the internal scores have a relatively weight on its positive end, whereas for the external scores lie a little more on the negative end in relation to their means, but the magnitude of external variables is still higher.

Figure 4.6: Internal and external determinants



Source: own survey of SPSS output, 2025

To conclude, this descriptive analysis depicts that external variables are more affecting the performances of 3PLs service providers than the internal variables in addressing humanitarian aids of INGOs and UN organizations in Tigray. The reason why, the data analysis exhibits a value of higher central tendency with a lower dispersion for external variables as compared to that of the internal variables due to the effects of infrastructure, political instability and government regulatory factors.

4.2 Explanatory analysis of the study

This explanatory analysis investigates the relationship of the identified ten independent variables with the dependent Variable (3PLs performance) based on the primary data analysis using the detail quantitative analysis method. It comprises the analysis of the Likert scale ordinal data

converting into composite mean by using the SPSS 21 version package for each internal and external variable of 3PLs performances on providing humanitarian services for INOGs and UN organizations in Tigray.

The researcher reviewed relevant analysis methods and tools applied for having appropriate econometric results by supporting the analysis strategy with evidence-based interpretations. Thus, the researcher deployed multiple linear regressions (MLR) model to analysis the cross-sectional primary data which gathered through research survey data gathering tool which is a Likert scale survey. The SPSS version 21 computer programming software or package carried out in this study to apply MLR Model.

This section comprised the basics econometric analysis of the study like as model specification, assumptions of MLR model, MLR model results and checking or testing of the significant variables with the designed hypotheses in detail and precis evidences. Specially, each of the paramount statistic coefficients provided with appropriate interpretations accurately.

4.2.1 Model Specification

Independent variables are explanatory variables that help to predict the changes on the dependent variable due to changes in its coefficient magnitude in the regression analysis strategy. Thus, regression analysis applied to predict 3PLs performance by the changes of independent variables of the study.

The researcher designed to use MLR model from the various optional models of regression analyses to analyze for the identified 10 independent variables and help to predict their influences on the 3PLs performance. Another reason to select MLR model is nature of the collected data which is cross-sectional primary data that should be analyzed by using MLR model. This data gathered from 84 respondents by providing five optional points of Likert scale (from strongly disagree to strongly agree) questionnaire. Thus, in this MLR model, the researcher applied enter method to enter or remove the variables of the model to conduct data analysis (look the enter method table at annexes).

4.2.2 Assumptions of MLR model of the study

The dataset of the study tested using the fundamental assumptions of MLR model before the researcher applied practical analysis for the explanatory variables. This makes the model to hold true or successful analysis strategy for the explanatory variables. The researcher tests the

following seven fundamental assumptions of MLR model to meet successful research regression analysis based on their requirements.

Linearity is one assumption that shows the relationship between the 10 independent variables and dependent variables (3PLs performance). Thus, there is roughly straight line with some obvious distances of residuals from the regression line-in the scatter plot test (look the p-p plot annexes). Next, assumption is multicollinearity, in this study the correlation of the explanatory variables are tested by values of VIF test that all predictors are below 10 and tolerance tests greater than 10%. Thus, this study has no multicollinearity among the variables based on the VIF and tolerance test outputs (look test results at annexes). Thirdly, homoscedasticity shows the constant or equal variance or fairly constant in the regression line of the model. According to the scatter plot test output of SPSS of this study, the spots of the plot are scattered or diffused which mean there is no funneled or belled shape results. Thus, this indicated that the regression analysis model is successful for the data of the study with no heteroscedasticity problem.

Fourth assumption is values error or stochastic of residuals are uncorrelated each other which measured by using Durbin-Watson statistics test with its value is between 1 and 2, in this case (DW = 1.18), this shows fair uncorrelated stochastic. Fifth assumption is normal distribution of residuals that is checked by “shopiro-wilk” test with the output of both statistics and p-values (Sig.) are greater than 0.05 (0.976 and 0.123), so you would not reject normality. Thus, it can conclude that residuals of the study are normally distributed and the normality assumption for regression residuals is reasonably satisfied.

Sixth assumption is outliers or no influential cases that helps to avoid biases of external factors for the model. So, the result of the box plot doesn't have any circles or signs on its either sides that indicates there is no outliers in the data series of the study. Thus, the test of outliers satisfied for the regression analysis model of the study. Lastly, mean of residuals should be zero. So, based on this study residuals table of the analysis, the mean value of residuals is 0 for each variable (look all tests results at annexes).

4.2.3 Multi-Linear Regression (MLR) results & interpretations

The MLR mode results obtained from the computer programing software of SPSS version 21 as depicted in the following coefficient table. The types of coefficient results of the model that comprise in this section are; the constant and slope value of each predictors of the regression equation, T-test values and P-values of the 10 independent variables clearly in the MLR results.

4.2.3.1 Interpretation of Model Summary

Table 4.9: Model Summary ^b

| Model | R | R Square | Adjusted R Square | Std. Error Estimate | R Change | F Change | df | df2 | Sig. F Change | Durbin-Watson |
|-------|-------------------|----------|-------------------|---------------------|----------|----------|----|-----|---------------|---------------|
| 1 | .887 ^a | .786 | .757 | .45842 | .786 | 26.885 | 10 | 73 | .000 | 1.179 |

Source: own survey of SPSS output, 2025

From a substantive standpoint, the predictors set as organizational capabilities (Capacity, Technology Utilization, Experience of Firm), relationship and quality factors (Service Quality, Long-Stand Relation), cost and infrastructure considerations (Cost Effective, Infrastructure Access), and contextual risks (Political Instability, Compliance and Regulatory, Risk Management). Thus, the strong model fit implies that performance is multi-determined across these operational and environmental dimensions.

The regression model demonstrates a strong overall fit, as indicated by an R of 0.887, which suggests a high degree of linear association between the set of predictors and the dependent variable, 3PLs performance. The R Square value of 0.786 implies that approximately 78.6% of the variance of 3PLs performance is explained collectively by the 10 predictors which are compliance and regulatory, capacity, technology utilization, political instability, service quality, risk management, long-stand relation, experience of firm, cost effective, and infrastructure access. However, the remained value of 21.4% variance is explained by other unknown variables that weren't included in this study that can be suggested for further other researches. This is a substantial proportion in most applied contexts, indicating the model captures the majority of the explainable variation. The Adjusted R Square of 0.757, slightly lower than the raw R Square, accounts for the number of predictors in the model and sample size; its proximity to R Square suggests that the variables included in the study contribute meaningful status good fit of the model.

The corresponding F Change of 26.885 with $df_1 = 10$ and $df_2 = 73$ is large and statistically significant (Sig. F Change= 0.000), confirming that the set of predictors, as a group, significantly

improves prediction over an intercept-only model. In other words, there is strong evidence that at least one of the predictors is associated with 3PLs performance when controlling for the others. Since the dataset of the study is cross-sectional data, the Durbin–Watson statistic of 1.179, with no meaningful or less consequential effect that there is no meaningful autocorrelation between the independent variables and the residuals practically. Therefore, the model is statistically robust with high explanatory power and a significant overall effect of good fit (look the model summary and ANOVA^a test tables at annexes).

4.2.3. 2 Regression coefficients interpretation

Table 4.10: parametric coefficients estimation of SPSS output

| Model | | Unstandardized Coefficients | | Standardize Coefficients | t | Sig. | Collinearity Statistics | |
|-------|---------------------------|-----------------------------|------------|--------------------------|--------|------|-------------------------|-------|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -1.447 | .548 | | -2.639 | .010 | | |
| | Capacity | .172 | .053 | .206 | 3.260 | .001 | .731 | 1.367 |
| | Service Quality | .116 | .072 | .144 | 1.618 | .110 | .370 | 2.705 |
| | Long-Stand Relation | .278 | .113 | .316 | 2.465 | .016 | .178 | 5.608 |
| | Technology utilization | .137 | .120 | .116 | 1.137 | .259 | .281 | 3.553 |
| | Cost Effective | .018 | .185 | .015 | .097 | .923 | .117 | 8.533 |
| | Experience of Firm | .885 | .193 | .842 | 7.684 | .000 | .133 | 7.546 |
| | Risk Management | .251 | .125 | .203 | -2.001 | .049 | .284 | 3.527 |
| | Infrastructure Access | .089 | .205 | .070 | .435 | .665 | .112 | 8.948 |
| | Political Instability | -.322 | .148 | -.195 | -2.183 | .032 | .368 | 2.721 |
| | Compliance and Regulatory | -.271 | .155 | -.218 | -1.755 | .083 | .190 | 5.256 |

Source: own survey of SPSS output, 2025

The coefficients table indicates that there is a multiple regression between the 3PLs performance with a mix of operational, relationship, and contextual predictors. There are significant variables of the study which are Experience of Firm (0.00), Capacity (0.001), Long-Stand Relation (0.016), political instability (0.032), Risk Management (0.03) each have variety coefficient magnitudes with p-values under 0.05 or 5% magnitude. Besides, since p-value with 0.05 – 0.10 is categorized under the near-significant group.

The predictors with the highest beta values contribute the most changes of effect to explain the variance of dependent variable (3PLs performances) of this study. Based on the SPSS output of the regression analysis, the standardized coefficients of the predictors affects the performances of 3PLs service providers either positively or negatively in different magnitudes. In the beta coefficient the highest magnitude value indicates the strongest change of effects on the variance of the dependent variable (performance of 3PLs service providers) on the operations of humanitarian aids. Thus from the 5 significant variables experience of the firm has the highest effect on the performance of 3PLs service providers by 84.2% (0.842), next long-stand relation is 31.6% (0.31), capacity 20.6%(0.206), and risk management 20.3% (0.203) as well as political instability have the smallest share of effect on the dependent variable by -19.2% (-0.192) in magnitude.

To conclude, experience of firm, capacity, long-stand relationship and risk management all have positive effects on the dependent variable (3PLs performance) of the study. This indicates as the values of the 4 variables increase, the value of 3PLs performance also increases in the same direction. However, political instability has a negative effect on the dependent variable that has a vice versa relations as on increase the other move to opposite direction.

4.2.3.3 Regression equation of the study

The regression analyses conducted to determine by how much the identified independent variables which explained the dependent variable which is 3PLs performance. Thus, it can be mathematically expressed as the following;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_{10} X_{10} + e$$

Where the terms stands for;

- ✓ β_0 = constant coefficient
- ✓ β_1 - β_{10} = are the parameters used by the mode or coefficients for each variables
- ✓ e = is the disturbance/ error / stochastic/ residual term
- ✓ X_1 - X_{10} = independent/ predictor variables of the study

✓ Y= 3PLs performance as dependent variable

Therefore, the mathematical representation of the regression equation of the MLR model and its coefficient values (β -values) are presented in the following way.

$$\text{PERFOR} = \beta_0 + \beta_1\text{CAP} + \beta_2\text{SQ} + \beta_3\text{LSR} + \beta_4\text{TECH} + \beta_5\text{COSTEFF} + \beta_6\text{EXPERFI} + \beta_7\text{RM} + \beta_8\text{INFRAS} + \beta_9\text{POLITINS} + \beta_{10}\text{COMPLI} + \epsilon t$$

Where:

| | |
|-----------------------------|---------------------------------|
| PERFOR= 3PLs performance | EXPERFI= Experience of Firm |
| CAP= Capacity | RM= Risk Management |
| SQ= Service Quality | INFRA= Infrastructure Access |
| LSR= Long-Stand Relation | POLIT= Political Instability |
| TECH=Technology Utilization | COMP= Compliance and Regulatory |

4.2.4 Testing to the formulated hypotheses

This section checked the 10 independent variables of the study based on the results of regression analysis by using the SPSS version 21 package. The variables have stated with precisely and clear descriptions.

Table 4.11: Decisions on the significant variables

| No | Variables | Descriptions of variables | Sig. | Sign | Result |
|----|------------------------|--|------|------|---------------|
| 1 | Capacity | As capacity increase 3PLs performance also increase directly. | .001 | + | Significant |
| 2 | Service Quality | As Service Quality increase 3PLs performance also increase directly. | .110 | + | Insignificant |
| 3 | Long-Stand Relation | As Long-Stand Relation increase 3PLs performance also increase directly. | .016 | + | Significant |
| 4 | Technology utilization | As Technology utilization increases 3PLs performance also increase directly. | .259 | + | Insignificant |
| 5 | Cost Effective | As Cost-Effective increase 3PLs performance also increase directly. | .923 | + | Insignificant |
| 6 | Experience of | As Experience of Firm increase 3PLs performance | .000 | + | Significant |

| | | | | | |
|----|-------------------------|--|------|---|---------------|
| | Firm | also increase directly. | | | |
| 7 | Risk Management | As Risk Management increase 3PLs performance also increase directly. | .049 | + | Significant |
| 8 | Infrastructure Access | As Infrastructure Access increase 3PLs performance also increases directly. | .665 | + | Insignificant |
| 9 | Political Instability | As Political Instability increase 3PLs performance also decrease oppositely. | .032 | - | Significant |
| 10 | Compliance & Regulatory | As Compliance and Regulatory increase 3PLs performance also decrease oppositely. | .083 | - | Insignificant |

Source: own survey on the hypotheses output, 2025

4.2.5 Decision on the result of the hypotheses test

In this part, the five significant independent variables are checking their relevance with each designed hypotheses set previously. As the signs of the hypothesis of the variables are fit with the signs of the coefficient values of each corresponding independent variable, those variables would be taken as determinant factors for 3PLs performance in humanitarian aids operations in Tigray. The rationales behind is, the effect of each significant independent variable has a consonance with the conceptual description of each variable in the designed hypothesis.

So, the significant independent variables are experience of firm, capacity, long-stand relationship, risk management, and political instability are determinants of this study in both their P-value (below 0.05) and conceptual signs that influence for 3PLs performance as summarized in the table presented below.

Table 4.12: Decisions on the significant variables

| No | Significant Variables | Significance level (p-value) | Coefficient & sign | Decision |
|----|-------------------------|------------------------------|--------------------|-------------|
| 1 | Experience of firm | 0.00 | 0.842 | Determinant |
| 2 | Capacity | 0.01 | 0.206 | Determinant |
| 3 | Long-stand relationship | 0.016 | 0.316 | Determinant |
| 4 | Risk management | 0.049 | 0.203 | Determinant |
| 5 | Political instability | 0.032 | -0.195 | Determinant |

Source: own survey on significant variables, 2025

4.3 Qualitative analysis of the study

This section presented the detail qualitative analysis of the collected data from the 16 samples of the study through the 3 open-ended interview questions. Content analysis applied to analyze the qualitative data set systematically by providing interpretation and meaning via counting the frequency of words, phrases, or concepts that are given by respondents. The content of the three types of open ended survey questions are focusing on top challenges faces the 3PLs service providers in Tigray, evaluation methods of the performance of 3PLs for emergency operations, and Recommendations to improve the performance of 3PLs providers working with INGOs/UN organizations in humanitarian operations in Tigray.

4.3.1 Top challenges affecting the performance of 3PLs service providers working with INGOs/UN organizations in humanitarian operations in Tigray

The qualitative data gathered from 16 respondents by using the open-ended interview questions reveal that there are several key challenges affecting the performance of 3PLs service providers in humanitarian logistics and supply chain operations in Tigray. The most prevalent challenge of the 3PLs service providers in Tigray is political instability and insecurity, as enduring conflict and political tensions have significantly interfering with transport routes, risking personnel, organized robbing and creating widespread security risks to cargo and humanitarian resources. Repetitive Checkpoints, access controls, lack of responsive regional government and vulnerabilities of post-war remaining thoughts severely hinder operations which are cited by respondents as the most barriers.

Infrastructure damage is the second challenge, often cited in relation to poor road conditions, blown-up bridges, and limited warehouse capacity. Many respondents cited lack of access to remote locations due to ruined infrastructures. Moreover, the respondents also stressed on internet and telecom shutdown as a high a contributor of poor performance through disruption of coordination among the service provider and the customer. Limited resources and fuel shortage in the market are also usually mentioned as basic challenges in the logistics system. The respondents from the 3PLS were more concerned about the non-availability of car spare parts, shortage of quality trucks and poor provision of GPS-equipped trucks and advanced logistics equipment, all of which restrict operational effectiveness. Besides, managerial and operational

capacity challenges such as weak internal organizational capacity, ineffective leadership, unorganized management, low employee motivation, inflexible operations, and dissatisfaction with low remuneration repeatedly mentioned by the respondents to be significant 3PLs performance deterrents. Technical and technological capacity limitations were also common, where the majority reported minimal knowledge and experience of logistics technology, supply chain visibility being hindered by obsolescence, and a general lack of automation and digital infrastructure. Common regulatory and compliance issues were bureaucratic hindrances, unclear government regulations, inefficient contract administration, documentation problems, and specific compliance issues in humanitarian logistics.

Lastly, long-stand relationship barriers frequently observed, as geographic distance, lack of cooperation among logistics players, specification Issues, over-reliance on a single supplier, and shortage of skilled manpower & poor communication with partners, and all inhibiting effective logistics performance by 3PLs service providers of humanitarian aids observed after the destructive conflict in Tigray.

4.3.2 Evaluation methods for the performance of 3PLs service providers working with INGOs/UN organizations in humanitarian operations in Tigray

According to the assessment of 3PLs Performances on emergency supply operations has been described as mixed, with overall performance being described by most organizations as average or poor due to failures in contractual compliance and low responsiveness levels.

Some of the key evaluation criteria to evaluate for 3PLs Performances on emergency supply operations are company experience based on-time delivery, with the key success indicators like order and inventory accuracy, adherence to specifications, giving accurate quantity and good stock records, effectiveness in sharing of information & problem resolving capacities, one that is responsive and flexible enough to cope with changing situations and emergency demands.

For the monitoring purpose, organizations generally apply high-tech methods by real-time tracking systems utilization such as GPS and Transportation Management Systems (TMS) for vehicle movements. Also, key performance indicators (KPIs) present visual tracking tools. Performance and financial reviews that are periodic, usually biannual, are the most common methods for evaluating and giving feedback on the 3PLs humanitarian service providers but still the performance of the 3PLs is very weak in Tigray context.

4.3.3 Recommendations to improve the performance of 3PLs providers working with INGOs/UN organizations in humanitarian operations in Tigray

The most commonly recommended for improvements of 3PLs service providers working with INGOs and UN agencies in Tigray is the issue of internal capacity building and human development. Several respondents indicated that the need for staff training and development in humanitarian logistics, documentation, and emergency response as well as the increase of managerial and technical skills capacity via different workshops and mentorship programs.

Fleet and infrastructure development is also a high priority for improvement. Generally, respondents give more stress on the upgrading of fleets with quality trucks, like refrigeration trucks for medical supplies, regular maintenance, and improving last-mile delivery using agile transport modes, such as light fleet and motorbikes.

Building long-stand relationships and communication is a key variable that recommended by the respondents to have closer relationships between 3PLs with INGOs and UN organizations and other partners through mutual joint logistics centers and merged warehouses to reduce duplication and improve coordination, and responsiveness. Besides, the necessity of a strong risk management plan observed repeatedly with the necessity to develop contingency plans, decentralize storage of supplies, and diversify service providers, suppliers and route transport to manage the disruptions.

Finally, raising awareness of political instability and insecurity in the aspect of addressing humanitarian aids to risky environment was also a less frequent but important recommendation. Training for 3PLs is mandatory by UN agency and INGOs to achieve their mission, encouraging ethical provision of services, and gaining community trust at all.

4.4 Interpretation and Implication of the study

This section provides a comprehensive analysis on the performance of third-party logistics (3PLs) service providers on humanitarian organizations from UN agencies and INGOs which are working in humanitarian responses in Tigray. The study investigates both internal and external variables, those contextual factors, and respondents' opinion that ends with key implications that present as follows:

4.4.1 Interpretation of findings

This study focuses on identifying internal and external factors that influencing performance of 3PLs efficiency in delivering humanitarian aids. Thus, the quantitative results of this study confirms that the internal organizational factors like as firm experience, capacity, long-term relations, and risk management are positive significant determinants of 3PLs performances that worked with humanitarian aids delivery with INGOs and UN agencies in Tigray. This supports the broader humanitarian logistics literature, where organizational capacity and effective partnerships have consistently been found key to operational efficacy (Kent, 2004; Overstreet et al., 2011). The high explanatory power of the regression model ($R^2 = 0.786$) depicts that these independent variables cumulatively explain variations on the dependent variable of 3PLs performance by 78.6% which is very determinant.

On the other hand, relating to the demographic data of respondents reflect that highly experienced, higher education level, average age, and mid-career of INGOs and UN agencies workers have high operations profile to support for 3PLs owners and workers in humanitarian operations. The results of the data analysis indicate that external factors, like political instability and infrastructural destruction, play a significant role in affecting logistics performance of 3PLs in Tigray. Here, political instability and insecurity stands as the highly distinguished negative external factor that affects 3PLs performance. The finding is consistent with other related studies on logistics in conflict environments, including the Ethiopian Tigray crisis itself (Phillips, 2022), where armed fighting, insecurity, and blockades severely restrict movement and dangers for staff safety. The study additionally invokes damage to infrastructures and resource scarcity like fuel as main challenges capturing localized characteristics of the Tigray crisis, where bridges, roads, and warehouses have been destroyed or severely damaged by the war.

Finally, Challenges & Opportunities of the results of the study are in sighted as among key challenges of the qualitative data identifies insecurity, infrastructure devastation, limitation of resources and fuel, bureaucratic misbehaving, and low technological adoption. Points for improvement are suggested by respondents to be capacity development, enhancements in fleet, coordination improvement, and contingency planning.

4.4 .2 Implications of the results

The implications of this research are very applicable related to its purpose, research design, and findings in comparison with other current similar studies in humanitarian logistics, particularly in war-damaged regions like Tigray.

The study aimed to establish the internal and external variables affecting third-party logistics (3PLs) performance in the delivery of humanitarian aid, explore how the variables are related to logistics outcomes, and present pragmatic solutions on how 3PLs performance can be improved in Tigray. The study brings to light the success of firm-level capabilities (capacity, experience, and risk management), and relational factors (long-term relationships) are significant factors towards better improvements of 3PLs performance.

Conducting a mixed-method design that combined quantitative Likert-scale data tested with multiple linear regressions (MLR) and qualitative content analysis, strong triangulation of findings was achieved. The 84 respondent samples from INGOs, UN agencies, and 3PLs providers provided rich data on perceptions and quantifiable impact of internal and external variables on the 3PLs performance. This is consistent with methodological approaches used in other Ethiopian humanitarian logistics studies (Beyene, 2018; Melkamu, 2018), further confirming the usability of mixed designs in capturing combined, and multi-faceted problems characteristic of fragile settings.

Implications relative to other similar studies: studies in humanitarian logistics in similar fragile contexts have displayed similarity and differences. First, in post-conflict Biafra, studies emphasize the necessity of a systems approach to be integration in the interfaces among logistics, nutrition care, and health services (Phillips, 2022). This current study, even as it is indirectly confirming coordinated capacity development and integration, is more sharply focused on operational and security concerns about the post-conflict rehabilitation.

Next, In Amhara and elsewhere, research identifies environmental hazards like drought and climatic disruptions as factors of performance externalities (Overstreet et al., 2011), whereas in this study, political instability and insecurity has a dominate role as an external performance barrier in logistics in Tigray. Based on, Beyene (2018) said that in Amhara region found those government situational factors and donor funding were key external predictors of humanitarian logistics, whereas this study reflects political instability as importantly determinant factor.

Policy & Operational Implications: Strategic partnerships, capacity building, and risk management are essential. Removing political and infrastructure bottlenecks can make logistics more efficient and responsive in humanitarian operations. The findings indicate a need for multi-faceted responses: overall humanitarian logistics best practice such as organizational capacity and risk management does exist (Philips 2022), but the context demands particular political lobbying and rehabilitation of infrastructure, upgrading of fleet service are recommended, in addition to reforms to addresses bureaucratic impediments of a common issue in much humanitarian context in the current situation of Tigray. Thus, Harmonization of policies is fundamental by the government and development partners, facilitating better coordination among stakeholders, and investing in infrastructure and security can practically enhance effective performance of 3PLs service providers. Besides, in terms of research & practice aspect, the findings highlight the importance of consolidating qualitative expertise with quantitative frameworks, establishing an equilibrium understanding of contextual factors driving logistics performance that can impact subsequent interventions and policymaking in conflict zones.

Overall, the findings of the study necessitate that humanitarian actors invest significantly in capacity development, strategic relational networking, risk management adjusted to political and infrastructural uncertainty and infrastructure rehabilitation. This context-specific approach enriches and adds to existing knowledge by demonstrating how the severity of conflict changes the relative priority and salience of factors of logistics performance.

4.5 Discussion on the results of the study

This discussion part of the study provided an extended explanation of the key findings on determinants influencing third-party logistics (3PLs) performance in the humanitarian assistance aspects in Tigray context. The approach integrates quantitative regression analysis results and qualitative remarks to depict a complete finding of the operational and environmental factors.

The quantitative results revealed that organizational capability, long-term relations, firm experience, and risk management have positive and significant impacts on 3PLs performance in Tigray. This is why internal capabilities and strategic partnerships are critical in enhancing logistics efficiency. Experienced firms possess greater institutional knowledge and operating know-how, enabling them to more effectively tackle the complex humanitarian environment.

Similarly, strong abilities encompassing resources, manpower, and organizational infrastructures enable 3PLs to respond suitably to be evolving delivery of humanitarian demands.

Long-term relationship enables the establishment of trust, coordination, and effective cooperation among 3PLs and humanitarian agencies (INGOs and UN) in support of coordinated provision of aids in unstable contexts like in Tigray. Risk management initiatives mitigate uncertainties concerning political unrest and logical disruption and enhancing the consistency of services.

On the other hand, political instability was seen to be a key external factor hindering performances of 3PLs service providers. This is an indicator of the environmental vulnerability impact for operating 3PLs service providers effectively, where conflict, insecurity, and checkpoint controls directly for the logistics activities like transport hinder, make personnel at risk, and compromise cargo security.

The qualitative data of the study explained that emphasizing how recurring conflict and infrastructure damage seriously hinder operations, delays on delivery, incur additional costs, and create higher risks on 3PLs performances. Infrastructure difficulties, including poor roadways, broken bridges, and a lack of warehousing, also add to these difficulties and limiting access to communities who need humanitarian assistance.

Infrastructure repair and modernization of fleets are priorities that must be addressed in order to increase access and operational dependability. Although technology uptake must be encouraged, that needs to be invested along with investments in digital competence and underpinning infrastructure. At the policy level, regulatory streamlining and improved coordination among government institutions, humanitarian organizations, and 3PLs are essential for controlling bureaucratic hurdles in logistics performances.

The resultant implications focus on improving 3PLs performance by strengthening internal organizational competencies and addressing external environmental constraints. Capacity building through training, leadership, and resource capacity was essential. Strong relationships and formalized partnerships can generate synergy and reduce duplication and confusions. Successful risk management measures like contingency planning and route diversification are essential in addressing political turbulence and security risks.

Finally, political instability and security challenges highlight the need for humanitarian responders to facilitate peacebuilding and security stabilization efforts as drivers of sustainable

logistical achievements. This comprehensive model of capability, relational, and political factors offers a compelling blueprint for enhancing humanitarian logistics performance in post-wart areas like Tigray. The study discussion focuses on the complexity of humanitarian operations in performances of 3PLs service providers and the necessity of context-based strategies that balance internal capacity development and external risk reduction to maximally contribute towards humanitarian aids delivery in fragile environments.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

In this study, the determinant variables that are influencing the performance of third-party logistics (3PLs) service providers contracted by INGOs and UN agencies to deliver humanitarian aids in Tigray have been thoroughly investigated. The findings reveal that 3PLs performance is affected with interplay of internal organizational factors and external environmental determinants. Experience, capacity, long-term relationships, and risk management are found to be company-level variables that significantly and positively impact the effectiveness of logistics service delivery to the intended destinations. These drivers reflect the necessity of competency in operations, maturity of the organization, and strategic partnerships for sustaining and growing logistics operations in humanitarian issues by INGOs and UN agencies in Tigray.

Conversely, political instability is a significant negative determinant undermining logistics performance of 3PLs service providers to address humanitarian supplies to war-affected areas like Tigray. Infrastructure destruction, political insecurity, resource constraints, and bureaucratic hurdles also compounded operational impediments which are revealed by qualitative findings of the study. These exogenous variables are barriers that limit route accessibility, delay delivery schedules, increase costs, and reduce overall service reliability of 3PLs performances of the INGOs and UN agencies in addressing humanitarian aids in Tigray.

The high explanatory power of the multiple linear regressions (MLR) model, the 10 identified independent variables of the study collectively explained the variances of the dependent variable (performance of 3PLs) by 78.6% that reinforces the validity of the factors. This is rendering them as critical determinants of 3PLs performance in this humanitarian setting; whereas the remaining 21.4 % variance of the dependent variable is covered by other variables which are not part of this study. Certain logistics factors such as service quality, cost effectiveness, and technology utilization had little direct impact in this study, possibly because of major company capacity difficulties and external huge infrastructural and insecurity problems.

Finally, the internal variables of experience, capacity, long-term relationships, and risk management, and the external variable political instability are significant variable of the study that determines the performance of 3PLs service providers in humanitarian operations in Tigray.

Besides, based on the qualitative data analysis, infrastructure access has a big role in influencing performance of logistics by 3PLs in Tigray context. Thus, the 6 variables mentioned in the above are the determinant factors that affect performances of 3PLs in delivering of humanitarian logistics in Tigray. Whereas, in this study, the rest variables like technology utilization, service quality, cost-effective, and compliance & regulatory are not significant that have little effects on performance of 3PLs in humanitarian issues delivery in Tigray. This study implies that achieving efficient and reliable humanitarian logistics in Tigray involves a two-pronged approach in addressing both the internal competences of 3PLs firms and the reducing external risks and limitation factors in the operation environment. The research provides valuable empirical observations that can inform strategic planning, operational reform, and policy development for stakeholders involved in enhancing the delivery of humanitarian aids in conflict and fragile settings presented in the recommendation section.

5.2 RECOMMENDATION

Based on the findings of the study, the determinants of third-party logistics (3PLs) performance for addressing humanitarian aids of INGOs and UN agencies to the conflict affected areas in Tigray are suggested the following recommendations directly to the concerned bodies who can participate in logistics and humanitarian operations:

Developing Organizational Capacity and Experience: Capacity building needs to be conducted at multiple levels in the 3PLs service providers of humanitarian aid delivery. First, development of internal managerial & technical capacity through formal training programs in humanitarian logistics and supply chain management, emergency response protocol, contract management requirements and financial management are recommended to improve the operating knowledge and competencies of 3PLs service providers.

Second, developing financial capabilities of the 3PLs through integrating with financial service providers will further reaffirm organizational effectiveness in logistics performances. Third, humanitarian organizations are recommended to consider technical capabilities and work experience of the 3PLs throughout their procurement & selection process to ensure that the right service providers are participating on the humanitarian logistics services.

Building Long-Term Strategic Relationships: this study highlights the value of long-term relationships among humanitarian organizations (INGOs & UN agencies) with 3PLs providers as key performance drivers to ensure effective and efficient humanitarian logistics services. Thus, the stakeholders can promote greater cooperation through formal partnership agreements, collaborative planning and meetings, and sharing of required information. Moreover, the Humanitarian organizations are recommended to work closely with 3PLs service providers mainly on providing training on the requirements of their organization, sharing of updated information to all service providers, practicing of prequalification and long term framework agreements , providing of valid and timely feedback on service quality and creating channels of communication that ensures greater trust and confidence building in the strategic alliances of the partners.

Strengthening Risk Management and Contingency Planning: In view of the overarching challenges posed by political instability and insecurity, 3PLs firms and humanitarian organizations must implement coordinated risk management measures. These must incorporate detailed contingency plans with alternative transport routes, diversified sources of supply, arrangement of decentralized storage facilities, and emergency response practice drills. Investment in real-time monitoring and reporting equipment for 3PLs can enable early to predict, identify and respond to security risks and infrastructure breakdowns. Moreover, the humanitarian logistics actors are recommended to work closely with local government security focal persons and United Nations Department of Safety and Security to ensure safety and security of their personal and property.

Improving Transportation Infrastructure and Fleet Capability of 3PLs: Infrastructure damage remains the largest barrier to quality logistics performance. All the efforts should be made to regain comprehensive road networks, bridges, and warehouse facilities through partnerships with the government and other donor agencies. Concurrently, 3PLs need investment in fleet assets; especially the addition of specialized fleets such as refrigerated trucks for sensitive medicines and vehicle maintenance on a regular basis enhances delivery quality. Collaboration between government and humanitarian organizations (INGOS and UN agencies) on regular maintenance and modification of roads and communication infrastructures are more

recommended to enhance the performance of the 3PLs service providers and delivery of humanitarian aids in general.

Fostering Technological utilization: Although technology use seemed less significant in the quantitative results of this study, it was important in the qualitative findings. New logistics technologies remain fundamental for promoting supply chain transparency and coordination. Investing in digital tools such as GPS tracking, Transportation Management Systems (TMS), and computerized stock systems designed to logistics and supply chain management on humanitarian settings should be considered as critical priority. Equipping 3PLs and humanitarian organization staff to effectively operate these technologies ensures maximum value and enables data-driven decision-making and use smooth communications among the service provider and the customers.

Simplifying Regulatory and Compliance Systems: Bureaucratic barriers and unclear government rules negatively influence performances of 3PLs in the humanitarian contract implementation and responsiveness to the operational requirements. Humanitarian players and governmental decision makers must work together to streamline customs processes, standardize document requirements, and establish transparent compliance guidelines for humanitarian logistics by increasing coordination and policy harmonization frameworks. Standardized contracts and enhanced oversight systems can reduce administrative barriers to increase response time and enhance accountability. Saying that, 3PLs service providers are also recommended to comply with the minimum requirement of the government, the customer and donor requirements to participate on the delivery of humanitarian aids to the crises affected areas.

Encouraging Security and Political Stability: it is a significant factor for addressing the root causes of political insecurity and instability in humanitarian logistics and supply chain improvements. Humanitarian actors and government policy makers must encourage peacebuilding measures, prevention of conflict, and enhanced security arrangements to create a safer operating environment to create convenient conditions for sustainable humanitarian logistics performances.

Moreover, the federal and regional governments should collaborate with humanitarian organizations to facilitate the overall logistics and supply chain operations and on protection of INGO, UN and 3PLs staff and properties as per the international humanitarian principles.

Expanding Research and Inclusive Monitoring Mechanisms: Future research should focus on greater representation of 3PLs service providers, particularly private-sector organizations who currently have no significant representation and the other variables to cover 21.4% variance of the 3PLs performances that independent variables not included in this study. Incorporating inputs from stakeholder voices, such as those of beneficiary communities, can enhance representations more effectively to meet beneficiary needs. Furthermore, investigating the basic challenges from the perspective of 3PLs service providers on INGO and UN agencies needs future attention of researchers on the area. In other hand, implementing continues monitoring and evaluation programs with the assistance of key performance indicators (KPIs) that are appropriate for humanitarian logistics can facilitate improvements of 3PLs performance.

In short, based on the empirical facts and quantitative multiple linear regression analysis identified by the study, firm experience, capacity, long-term relations, and risk management positively affect 3PLs performance while political instability negatively. By implementing the recommendations, stake holders like INGOs and UN agencies can enhance 3PLs service providers to increase their responsiveness, operational resilience, and efficiency, ultimately to ensure the timely and effective delivery of humanitarian aids to the intended vulnerable communities in conflict-affected areas like Tigray.

References

- Abebe, T. (2024). *The practice and challenges of logistics outsourcing in Ethiopia: Evidence from the banking sector* [Master's thesis, Addis Ababa University, School of Commerce]. Addis Ababa University Repository.
- Abed, M. S., Ballantyne, E. E. F., & de la Torre, G. (2024). *Factors affecting third-party logistics services in the humanitarian supply chain* [Doctoral dissertation, Addis Ababa University]. <https://etd.aau.edu.et/items/0fd4a67d-bddc-45d1-a04e-f1fdf4bcb024>.
- Aitken, J. (2003). Measuring and managing performance in the supply chain. *International Journal of Operations & Production Management*, 23(6), 622–633.
- Atakilti, T. (2025). *Factors affecting humanitarian logistics performance in the case of the Red Cross Society, Tigray Regional State, Ethiopia* [Master's thesis, Mekelle University]. <https://repository.mu.edu.et/items/cbb9666b-63af-42ab-bc15f20b5d4d55b5/full>.
[repository.mu.edu]
- Ardekani, A., & Naim, M. M. (2012). A system dynamics model for humanitarian relief logistics. *European Journal of Operational Research*, 223(3), 754–768.
- Balcik, B., & Beamon, B. M. (2008). Facility location in humanitarian relief. *International Journal of Logistics: Research and Applications*, 11(2), 101–121.
- Banomyong, R & Wahab, M. A. (Eds.), *Relief supply chain management for disasters: Humanitarian aid and emergency logistics* (pp. 48–65). <https://doi.org/10.4018/978-1-60960-824-8.ch003igi-global+1>
- Barayandema, J., Abaho, G. G., Mensah, H. K., Samuel, D., Straube, F., & Nitsche, B. (2023). *Challenges and opportunities of logistics in African countries*. Berlin University of Technology, Chair of Logistics.

- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Beamon, B. M., & Balcik, B. (2008). Performance measurement in humanitarian relief chains. *International Journal of Public Sector Management*, 21(1), 4–25.
- Beyene, M. (2018). The external factors that affect the performance of humanitarian logistics in Amhara National Regional State, Ethiopia. *International Journal of African and Asian Studies*, 53, 21–31.
- Bienstock, C. C., Mentzer, J. T., & Bird, M. M. (2008). Measuring physical logistics service quality. *Journal of Business Logistics*, 29(1), 109–131.
- Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). Network analysis in the social sciences. *Science*, 323(5916), 892–895.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Business Perspectives. (2023). *Stimulators of third-party logistics performance of supply chains in the Nigerian manufacturing industry*.
- Butt, A. S., Ali, I., & Govindan, K. (2024). The role of reverse logistics in a circular economy for achieving sustainable development goals: A multiple case study of retail firms. *Production Planning & Control*, 35(12), 1490–1502.
- Çakır, A. E. (2020). Applying contingency theory to international organizations: The case of European integration. *Journal of International Organization Studies*, 11(1), 7–18
- Chen, H. (2023). *Logistics definition and supply chain integration* [Online article].
- Christopher, M. (2016). *Logistics & supply chain management* (5th ed.). Pearson education, London. [nibmehub+1](#)

- Christopher, M., & Ryals, L. (1999). Supply chain strategy: Its impact on shareholder value. *International Journal of Logistics Management*, 10(1), 1–15.
- Desalegn, F. (2024). *Determinants of logistics performance of selected logistics and freight forwarding companies in Addis Ababa, Ethiopia* [Master's thesis, Addis Ababa University]. Addis Ababa University Repository.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.
- Domingues, M. L., Reis, V., & Macário, R. (2015). A comprehensive framework for measuring performance in a third-party logistics provider. *Transportation Research Procedia*, 10, 662–671.
- Donaldson, L. (2001). *The contingency theory of organizations*. Sage Publications.
- Dubey, R., Gunasekaran, A., Childe, S. J., Bryde, D. J., & Papadopoulos, T. (2021). Developing a resilience framework for managing supply chain disruptions in humanitarian crises. *International Journal of Logistics Management*, 32(3), 567–589.
- Emerald Insight. (2018). *Outsourcing in humanitarian logistics: Status quo and future directions*. Emerald Publishing Limited.
- Emerald Insight. (2021). *Humanitarian aid distribution logistics with accessibility constraints: A systematic literature review*. Emerald Publishing Limited.
- Eshetu, T. (2020). *Assessment on challenges and prospects of freight logistics: The case of Ethiopian Shipping and Logistics Services Enterprise* [Master's thesis, Addis Ababa University]. Addis Ababa University Repository.

- Gebremedhin, B. T., & Tsegaye, D. T. (2023). Humanitarian logistics challenges in conflict-affected regions: The case of Tigray, Ethiopia. *Journal of Humanitarian Logistics and Supply Chain Management*, 13(2), 145–162.
- Gebremedhin, S., & Abebe, T. (2023). Challenges and opportunities in humanitarian logistics: A case study of the Tigray conflict in Ethiopia. *International Journal of Supply Chain Management*, 12(4), 215–228.
- Gebremedhin, S., & Desta, H. (2024). Humanitarian logistics challenges in conflict zones: The case of Tigray, Ethiopia. *Journal of Humanitarian Logistics and Supply Chain Management*. Advance online publication.
- Gossler, T., Kovács, G., & Spens, K. M. (2020). Outsourcing in humanitarian logistics – Status quo and future directions. *Journal of Humanitarian Logistics and Supply Chain Management*, 10(1), 76–95. <https://doi.org/10.1108/JHLSCM-12-2018-0090>
- Gunalan, N. (2015). *Factors influencing third-party logistics performance based on manufacturer's perspective: The role of trust*.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Prentice Hall.
- Huo, B., Haq, I. U., & Gu, M. (2015). Impact of 3PL outsourcing on supply chain management. *International Journal of Production Economics*, 170, 1–10.
- Ivanov, D. (2020). Predicting the impacts of epidemic outbreaks on global supply chains: A simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case. *Transportation Research Part E: Logistics and Transportation Review*, 136, Article 101922.

- Jahre, M., Fransoo, J., & Jensen, L. K. (2020). How humanitarian organizations can build a more resilient supply chain. *Journal of Business Logistics*, 41(3), 265–276.
- Jaleta, T. (2019). *Factors affecting logistics performance: The case of Ethiopian logistics service providers* [Master's thesis, Addis Ababa University]. Addis Ababa University Repository.
- Janné, M. (2022). *Effects of employing third-party logistics arrangements in supply chains*.
- Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403.
- Kahsay, B. G. (2021). Spectates from the frontline: Humanitarian assistance, aid coordination, and challenges in the Tigray crisis. *International Journal of Sociology and Anthropology*, 13(4), 71–83.
- Kemeshi, K. (2024, April). *Navigating logistics challenges and opportunities in Ethiopia* [Conference paper].
- Kilinci, O. (2017). Humanitarian supply chain performance measurement: A balanced scorecard approach. *International Journal of Production Economics*, 183, 270–285.
- Kithae, P. P. (2024). Third-party logistics and service provision in selected manufacturing firms in Kenya. *African Journal of e-commerce, Logistics and Transportation Studies*, 1(2), 44–57.
- Kovács, G. (2019). *Stakeholder theory in humanitarian logistics* [Working paper]. Hanken School of Economics.
- Kovács, G., & Falagara Sigala, I. (2021). Lessons learned from humanitarian logistics to manage supply chain disruptions. *Journal of Supply Chain Management*, 57(1), 41–49.
- Krishnakumar, V. P. (2025). The strategic role of 3PL in modern supply chain management. *World Journal of Advanced Engineering Technology and Sciences*, 15(1), 1029–1036.

- Kumar, S., & Rahman, Z. (2015). Performance framework in third party logistics: A cross-national literature review. *Benchmarking: An International Journal*, 22(6), 1168–1194.
- Kunz, N., & Reiner, G. (2012). A framework for risk management in humanitarian logistics. *Journal of Business Logistics*, 33(4), 329–349.
- Kwame Nkrumah University. (2021). *The effect of outsourcing logistics to third party providers on performance of healthcare delivery: A moderating role of information technology* [Unpublished master's thesis]. Kwame Nkrumah University.
- Lieb, R. C., Randall, W. S., & Magel, K. J. (1993). Third-party logistics: A definition and overview. *International Journal of Physical Distribution & Logistics Management*, 23(8), 35–46.
- Mageto, J., & Luke, R. (2024). Freight logistics in Africa: Information and technology as beacons. *The Business and Management Review*, 15(1), 107–114.
- Makhetha, M., & Kele, T. P. (2023). Third-party logistics businesses and social sustainability practices: The case of South Africa. *Expert Journal of Business and Management*, 11(1), 22–33.
- Marlow, P., & Casaca, A. C. P. (2003). *Measuring lean ports performance*. *International Journal of Transport Management*, 1(4), 189–202.
- Mbah, M. F., Ayetor, G. A., & Darku, A. B. (2021). An evaluation of road transport challenges on supply chain performance: Evidence from a developing economy. *International Journal of Logistics Research and Applications*, 24(5), 456–472.
- McIvor, R. (2008). Outsourcing: Transaction cost economics and supply chain management. *Journal of Supply Chain Management*, 44(3), 5–16.

- Mekonen, Z. T. (2025). End users' perspective of digital logistics management information system performance at public health facilities of Amhara Region, Ethiopia. *World Journal of Advanced Engineering Technology and Sciences*, 15(1), 1029–1036.
- Melkamu, B. (2018). The external factors that affect the performance of humanitarian logistics: Government situational factors and donor funding influence. *International Journal of Supply Chain Management*, 7(5), 387–395.
- Mensah, S. A., & Osei-Tutu, E. (2021). Challenges affecting third-party logistics providers: A study on operational capacity, technology adoption, and stakeholder coordination. *Journal of Logistics and Supply Chain Management*, 9(2), 45–62.
- Miebach, M., & Müller, T. (2025). *Supply chain trends and technologies: The future of 3PLs*. Miebach Consulting Industry Report.
- Munovi, N. K. (2015). *Logistics outsourcing and performance of humanitarian organizations in Kenya*. <https://erepository.uonbi.ac.ke/handle/11295/93033> [erepository.uonbi.ac]
- Munyua, H., & Wanyoike, D. (2022). Digital transformation in African logistics: Impact of mobile tracking and freight platforms. *Logistics and Supply Chain Management Review*, 8(3), 18–29.
- Mvubu, M. (2024). Digital transformation at third-party logistics providers in South Africa: Challenges and best practices. *Journal of Transport and Supply Chain Management*, 18, Article 65. <https://doi.org/10.4102/jtscm.v18i0.65>
- Ncube, M., & Ndou, V. (2023). Regional trade integration and infrastructure development in Africa: The role of the African Continental Free Trade Area. *Journal of African Trade*, 10(1), 1–15. <https://doi.org/10.1007/s41920-022-00150-4>

- Novack, R. A., Gibson, B. J., & Langley, C. J. (2023). *Transportation: A supply chain perspective* (9th ed.). Cengage Learning.
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), Article 1609406917733847.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.
- Overstreet, R. E., Hanna, J. B., Moon, M. A., & Benedetti, M. (2011). An examination of logistics capabilities in humanitarian supply chains. *International Journal of Physical Distribution & Logistics Management*, 41(3), 214–232.
- Pallotti, M., et al. (2020). Social capital in humanitarian supply networks. *Journal of Humanitarian Logistics and Supply Chain Management*. Advance online publication.
- Phillips, B. (2022). The international humanitarian response to famine in conflict zones: Challenges and lessons learned. *Disasters*, 46(4), 856–874.
- Rafele, C. (2004). Logistic service measurement: A reference framework. *International Journal of Logistics: Research and Applications*, 7(4), 335–348.
- Rushton, A., Croucher, P., & Baker, P. (2017). *The handbook of logistics and distribution management* (6th ed.). Kogan Page.
- Selam, F. (2024). *Practices and factors affecting humanitarian logistics performance in Ethiopia* [Master's thesis, Addis Ababa University]. Addis Ababa University Repository.
- Sheffi, Y. (2023). The impact of e-commerce and globalization on third-party logistics markets. *Logistics Journal*, 45(2), 101–118.

- Shemelis, S. (2024). *Factors affecting the humanitarian supply chain performance of the Ethiopian Red Cross Society* [Master's thesis, Addis Ababa University]. Addis Ababa University Repository.
- Sohail, M. S., & Sohal, A. S. (2003). The use of third-party logistics services: A Malaysian perspective. *International Journal of Physical Distribution & Logistics Management*, 33(7), 582–592.
- Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53–80.
- Stapleton, O., Blackman, D., & Banomyong, R. (2017). Building trust in humanitarian supply chains. *Journal of Humanitarian Logistics and Supply Chain Management*, 7(1), 2–22.
- Sundarraman, K. V., & Mohamed Mustafa, M. F. A. (2024). *Enhancing warehouse efficiency of 3PL warehouse: Suggesting key performance indicators for quality and productivity* [Master's thesis, Chalmers University of Technology].
- Sunmola, P. A. (2024). *Significance of third-party logistics in supply chain management* [Bachelor's thesis, Haaga-Helia University of Applied Sciences].
- Tachizawa, E. M., & Thomsen, C. G. (2015). Contingency theory in humanitarian supply chains. *International Journal of Physical Distribution & Logistics Management*, 45(6), 526–549.
- Tadesse, D., & Gebremedhin, B. (2023). The impact of transport infrastructure development on trade facilitation in Ethiopia: A case study of the Addis Ababa-Djibouti railway. *Journal of African Infrastructure and Development*, 9(2), 78–92.
- Tang, C. S., & Sodhi, M. S. (2021). Managing supply chain performance: Key metrics for 3PLs. *Journal of Supply Chain Management*, 57(4), 12–29.

- Tatham, P., & Houghton, L. (2011). The wicked problem of humanitarian logistics and supply chain management. *Journal of Humanitarian Logistics and Supply Chain Management*, *1*(1), 15–29. <https://doi.org/10.1108/20426741111129022>
- Tatham, P., Ovenden, K., & Burton, R. (2017). Four theories for research in humanitarian logistics. *Journal of Humanitarian Logistics and Supply Chain Management*.
- Tesema, A. G., & Kinfu, Y. (2021). Reorienting and rebuilding the health system in war-torn Tigray, Ethiopia. *BMJ Global Health*, *6*(8), Article e007088.
- Tewelde, A. (2025). *Factors affecting humanitarian logistics performance in the case of the Red Cross Society, Tigray Regional State, Ethiopia* [Master's thesis, Mekelle University].
- Thomas, A. S., & Kopczak, L. R. (2005). *From logistics to supply chain management: The path forward in the humanitarian sector* (Fritz Institute technical report). Fritz Institute.
- Van Wassenhove, L. N. (2006). Humanitarian aid logistics: Supply chain management in high gear. *Journal of the Operational Research Society*, *57*(5), 475–489.
- Williamson, O. E. (1979). Transaction-cost economics: The governance of contractual relations. *Journal of Law and Economics*, *22*(2), 233–261.
- Williamson, O. E. (1985). *The economic institutions of capitalism: Firms, markets, relational contracting*. Free Press.
- Yemane, S. (2024). *Factors affecting third-party logistics services in the humanitarian supply chain: The case of World Food Programme, Ethiopia* [Master's thesis, Addis Ababa University]. <https://etd.aau.edu.et/items/0fd4a67d-bddc-45d1-a04e-f1fdf4bcb024>. Addis Ababa University Repository.
- .

Appendixes

Appendix one: Questionnaire of the study

MEKELLE UNIVERSITY

FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Introduction part; DETERMINANTS OF THIRD-PARTY LOGISTICS (3PLs) PERFORMANCE: IN THE CASE OF HUMANITARIAN AID OPERATIONS OF INGOs & UN AGENCIES IN TIGRAY

Dear Participant, I am conducting a research study titled “Determinants of Third-Party Logistics (3PLs) Performance: In the case of Humanitarian Aid operations of INGOs & UN Agencies in Tigray.” This study aims to understand the key factors that influence the effectiveness and efficiency of third-party logistics (3PLs) service providers working with humanitarian organizations in the region.

Your responses will provide valuable insights to improve logistics operations and support timely delivery of aid and services. The questionnaire is designed to gather your professional opinions and experiences related to 3PLs performance. Your participation is voluntary, and all information provided will be kept strictly confidential and used only for academic purposes. The questionnaire includes three key sections: Demographic Information, Likert Scale Statements (based on the defined variables and sub-factors), and Open-Ended Interview Questions.

Please answer all questions honestly based on your knowledge and experience. The questionnaire should take approximately 15–30 minutes to complete.

Thank you very much for your cooperation and valuable contribution to this research.

Sincerely,

Aregawi G/mariam

phone number:+251914117927

Section I: Demographic Information

Instruction: Please answer the following questions.

1. Gender:

- a. Male b. Female

2. Age:

- a. Less than 20 year
b. 21–30 years
c. 31–40 years
d. 41–50 years
e. More than 50 years

3. Educational level:

a. Diploma

First degree

Master and above

PHD

If other specify-----

4. Type of your organization:

- a. INGO b. UN c. Third-party logistics service provider

5. What is your role/position in the organization?

Logistics/supply chain Manager

Logistics/supply chain Officer

Operations Officer

Fleet Officer

3PLs Owners & workers

6. Work experience:

Less than 1 year

1–3 years

4–6 years

More than 6 years

7. Main types of services outsourced to 3PLs service providers:

Warehousing

Transportation

Light Vehicle rental

Distribution

Section II: Likert Scale-Based Evaluation of 3PLs Performance Determinants

Instruction: Please put a mark /√/ on the space provided to answer the following questions at one space only under the five options, where: (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree & 5 = Strongly Agree) based on your agreement.

A. Internal factors (variables) that affect the performance of 3PLs service Providers

| No. | Statements that describe the performance of 3PLs service Providers in Tigray. | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|-----|---|-------------------|----------|---------|-------|----------------|
| 1 | Capacity | | | | | |
| 1.1 | The 3PLs provider has experienced and skilled leadership in logistics and supply chain management. | | | | | |
| 1.2 | The 3PLs effectively plans and coordinates logistics operations. | | | | | |
| 1.3 | The 3PL maintains financial stability to ensure uninterrupted services. | | | | | |
| 1.4 | The 3PL uses modern vehicles, warehousing systems, and logistics tools based on technical skill. | | | | | |
| 1.5 | The 3PL has well-trained staff to manage our logistics requirements efficiently. | | | | | |
| 2 | Service Quality | | | | | |
| 2.1 | 3PLs staff responsiveness promptly to inquiries. | | | | | |
| 2.2 | Deliveries are consistently accurate in quantity, destination, and timing to assure reliability. | | | | | |
| 2.3 | 3PLs can handle diverse types of cargo (medical, food, shelter, etc.) based on need in flexibly. | | | | | |
| 2.4 | Timely delivery is consistent regardless of destination or season. | | | | | |
| 2.5 | 3PLs provide quality of truck and vehicles promptly as per the technical requirements of the requester. | | | | | |
| 2.6 | Regular performance reports are provided by 3PLs without needing reminders in time and accurate manner for having good communication and documentation purpose. | | | | | |

| | | | | | | |
|-----|---|--|--|--|--|--|
| 3. | Long-Standing Relationships | | | | | |
| 3.1 | Long-term partnerships with 3PLs improve responsiveness and flexibility. | | | | | |
| 3.2 | Trust built over time enhances 3PL service delivery. | | | | | |
| 3.3 | Long-term relation reduces operational friction of 3PLs with the requesters. | | | | | |
| 3.4 | Long-term contracts reduce operational redundancy and delays of humanitarian responses by 3PLs. | | | | | |
| 4 | Technology Utilization | | | | | |
| 4.1 | The 3PLs uses GPS, Real-time tracking systems, Automated inventory management, Electronic Data Interchange (EDI), and Data analytics for demand, and digital platforms effectively. | | | | | |
| 4.2 | The 3PLs utilizes inventory management software to track stock levels, expiry dates, and movement. | | | | | |
| 4.3 | The 3PLs uses effective digital communication tools (e.g., mobile apps, radios, satellite phones). | | | | | |
| 4.4 | The use of integrated technologies has improved the overall efficiency of logistics operations. | | | | | |
| 5 | Cost Effectiveness | | | | | |
| 5.1 | The 3PLs provides services at a reasonable cost without compromising quality. | | | | | |
| 5.2 | The 3PLs helps to reduce overall operational costs through efficiency. | | | | | |
| 5.3 | The 3PL provider offers transparent and predictable pricing. | | | | | |
| 5.4 | The 3PL provider regularly proposes cost-saving initiatives. | | | | | |
| 5.5 | The 3PL services contribute to better budget utilization in logistics operations. | | | | | |
| 6 | Firm Experience | | | | | |
| 6.1 | Lack of humanitarian logistics experience affects 3PLs performance. | | | | | |

| | | | | | | |
|-----|--|--|--|--|--|--|
| 6.2 | Inexperienced staff within 3PLs causes operational delays. | | | | | |
| 6.3 | The 3PL providers are familiar with the operational challenges in conflict-affected regions. | | | | | |
| 6.4 | The 3PL provider has long-standing presence in the region. | | | | | |
| 6.5 | The 3PL provider shares best practices based on their previous work in similar contexts. | | | | | |
| 7 | Risk Management | | | | | |
| 7.1 | The 3PLs has contingency plans for disruptions (e.g., insecurity, weather, delays). | | | | | |
| 7.2 | The 3PLs complies with safety and security standards humanitarian operations. | | | | | |
| 7.3 | The 3PLs proactively identify and mitigate operational risks. | | | | | |
| 7.4 | The 3PLs respond effectively to supply chain when interruptions occurred. | | | | | |
| 8 | Performance dimensions | | | | | |
| 8.1 | The 3PL delivers goods and services consistently and on time with minimal errors in in reliability. | | | | | |
| 8.2 | The 3PL quickly responds to emergency demands and changes with effective communication to assure responsiveness. | | | | | |
| 8.3 | The 3PL can adapt quickly to changing operational activities without delay in a good agility. | | | | | |
| 8.4 | The 3PL manages warehouse inventory, equipment and transportation assets effectively to assure asset management. | | | | | |
| 8.5 | The 3PL offers competitive pricing for transportation and warehousing in good cost-efficiency. | | | | | |

B. External factors (variables) that affect the performance of 3PLs service Providers

| No. | Statements that describe the performance of 3PLs service Providers in Tigray. | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|------|--|-------------------|----------|---------|-------|----------------|
| 9 | Infrastructure accessibility | | | | | |
| 9.1 | Road infrastructure in the operational areas supports timely and safe delivery. | | | | | |
| 9.2 | The 3PLs has access to well-located warehouses for loading and off-loading humanitarian aids. | | | | | |
| 9.3 | Warehousing conditions of the customers should be secured in (e.g., security, climate control) to meet operational requirements. | | | | | |
| 9.4 | The 3PLs is able to adapt to infrastructure disruptions (e.g., damaged roads, seasonal barriers). | | | | | |
| 9.4 | Reliable communication and internet connectivity support coordination with the 3PLs. | | | | | |
| 9.5 | The provider demonstrates logistical flexibility in areas with poor infrastructure. | | | | | |
| 10 | Political Instability & Insecurity | | | | | |
| 10.1 | Political instability causes major disruptions to 3PLs operations. | | | | | |
| 10.2 | Security concerns in high-risk areas limit 3PLs service providers to access and delivery of aids. | | | | | |
| 10.3 | The 3PLs are often unprepared for politically volatile environments. | | | | | |
| 11 | Compliance and Regulatory issues | | | | | |
| 11.1 | The 3PLs comply with local customs, laws, and donor regulations during humanitarian crisis. | | | | | |
| 11.2 | Regulatory delays negatively affect 3PLs service performance (fuel subsidize, insurance etc). | | | | | |
| 11.3 | The 3PLs are transparent in documentation and reporting for compliance. | | | | | |

Section III: Open-Ended Interview Questions

What are the biggest challenges you face in operations of 3PLs providers in Tigray? -----

How does your organization evaluate the performance of 3PLs for emergency on supply operations? -----

What improvements would you recommend on the performance aspects of 3PLs providers working with INGOs/UN organizations in Tigray? -----

Thank you very much

Appendix Two

Tables of multiple linear regression analysis outputs

Variables Entered/Removed^a

| Model | Variables Entered | Variables Removed | Method |
|-------|--|-------------------|--------|
| 1 | Compliance and Regulatory , Capacity , Technology utilization , Political Instability , Service Quality , Risk Management , Long-Stand Relation , Exprience of Firm , Cost Effective , Infrastructure Access ^b | . | Enter |

a. Dependent Variable: performance

b. All requested variables entered.

Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .887 ^a | .786 | .757 | .45842 | .786 | 26.885 | 10 | 73 | .000 | 1.179 |

a. Predictors: (Constant), Compliance and Regulatory , Capacity , Technology utilization , Political Instability , Service Quality , Risk Management , Long-Stand Relation , Exprience of Firm , Cost Effective , Infrastructure Access

b. Dependent Variable: performance

ANOVA^a

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|--------------|----------------|----|-------------|--------|-------------------|
| 1 Regression | 56.497 | 10 | 5.650 | 26.885 | .000 ^b |
| Residual | 15.341 | 73 | .210 | | |
| Total | 71.838 | 83 | | | |

a. Dependent Variable: performance

b. Predictors: (Constant), Compliance and Regulatory , Capacity , Technology utilization , Political Instability , Service Quality , Risk Management , Long-Stand Relation , Exprience of Firm , Cost Effective , Infrastructure Access

Coefficients^a

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | | Collinearity Statistics | |
|---------------------------|-----------------------------|------------|---------------------------|--------|------|---------------------------------|-------------|-------------------------|-------|
| | B | Std. Error | Beta | | | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 (Constant) | -1.447 | .548 | | -2.639 | .010 | -2.539 | -.354 | | |
| Capacity | .172 | .053 | .206 | -3.260 | .002 | -.278 | -.067 | .731 | 1.367 |
| Service Quality | .116 | .072 | .144 | -1.618 | .110 | -.260 | .027 | .370 | 2.705 |
| Long-Stand Relation | .278 | .113 | .316 | -2.465 | .016 | -.502 | -.053 | .178 | 5.608 |
| Technology utilization | .137 | .120 | .116 | 1.137 | .259 | -.103 | .376 | .281 | 3.553 |
| Cost Effective | .018 | .185 | .015 | .097 | .923 | -.351 | .387 | .117 | 8.533 |
| Exprience of Firm | 1.485 | .193 | .842 | 7.684 | .000 | 1.100 | 1.871 | .133 | 7.546 |
| Risk Management | .251 | .125 | .203 | -2.001 | .049 | -.501 | -.001 | .284 | 3.527 |
| Infrastructure Access | .089 | .205 | .070 | -.435 | .665 | -.497 | .319 | .112 | 8.948 |
| Political Instability | -.322 | .148 | -.195 | 2.183 | .032 | .028 | .617 | .368 | 2.721 |
| Compliance and Regulatory | -.271 | .155 | -.218 | 1.755 | .083 | -.037 | .580 | .190 | 5.256 |

a. Dependent Variable: performance

Residuals Statistics^a

| | Minimum | Maximum | Mean | Std. Deviation | N |
|-----------------------------------|----------|---------|---------|----------------|----|
| Predicted Value | 1.4123 | 4.8466 | 3.4048 | .82504 | 84 |
| Std. Predicted Value | -2.415 | 1.748 | .000 | 1.000 | 84 |
| Standard Error of Predicted Value | .102 | .332 | .160 | .043 | 84 |
| Adjusted Predicted Value | 1.0909 | 4.9166 | 3.4093 | .83416 | 84 |
| Residual | -.89071 | 1.01069 | .00000 | .42992 | 84 |
| Std. Residual | -1.943 | 2.205 | .000 | .938 | 84 |
| Stud. Residual | -2.054 | 2.338 | -.004 | 1.002 | 84 |
| Deleted Residual | -1.19588 | 1.13613 | -.00455 | .49649 | 84 |
| Stud. Deleted Residual | -2.102 | 2.414 | -.002 | 1.013 | 84 |
| Mahal. Distance | 3.118 | 42.611 | 9.881 | 6.585 | 84 |
| Cook's Distance | .000 | .325 | .015 | .038 | 84 |
| Centered Leverage Value | .038 | .513 | .119 | .079 | 84 |

a. Dependent Variable: performance

Explore residuals

Descriptives

| | | Statistic | Std. Error |
|-----------------------|----------------------------------|-------------|------------|
| Standardized Residual | Mean | .0000000 | .10232523 |
| | 95% Confidence Interval for Mean | Lower Bound | -.2035208 |
| | | Upper Bound | .2035208 |
| | 5% Trimmed Mean | -.0083292 | |
| | Median | -.2048446 | |
| | Variance | .880 | |
| | Std. Deviation | .93782625 | |

| | | |
|---------------------|----------|------|
| Minimum | -1.94300 | |
| Maximum | 2.20473 | |
| Range | 4.14773 | |
| Interquartile Range | 1.36238 | |
| Skewness | .317 | .263 |
| Kurtosis | -.438 | .520 |

Tests of Normality

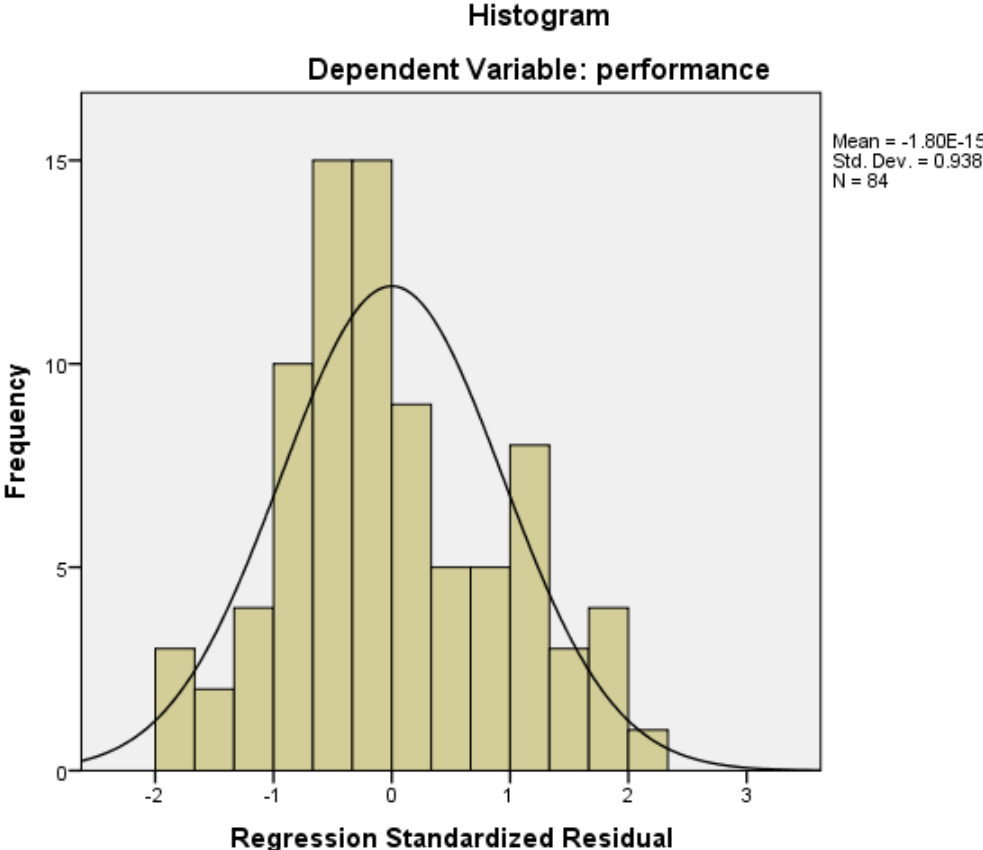
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|-----------------------|---------------------------------|----|------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Standardized Residual | .093 | 84 | .068 | .976 | 84 | .123 |

a. Lilliefors Significance Correction

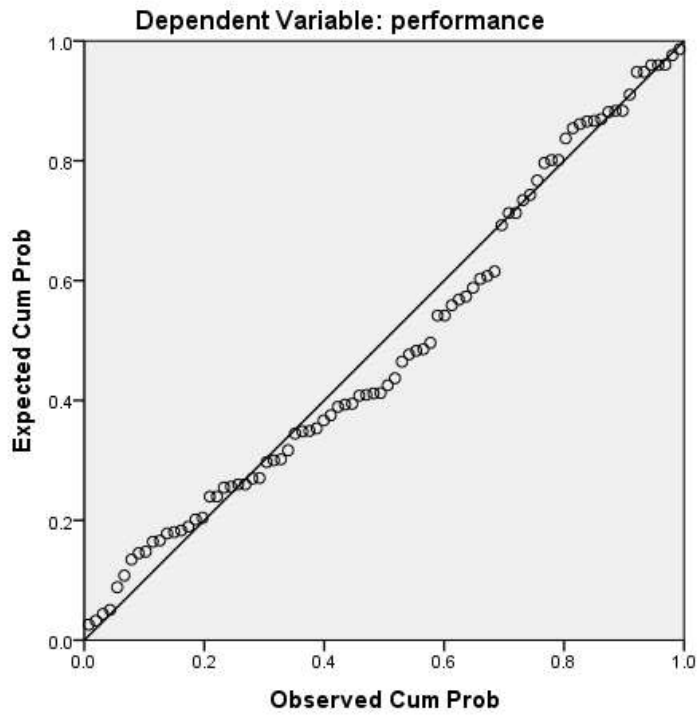
Descriptive Statistics

| | N | Sum | Mean | Std. Deviation | Variance | Skewness | |
|--------------------|-----------|-----------|-----------|----------------|-----------|-----------|------------|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Internal variables | 84 | 247.13 | 2.9421 | .72865 | .531 | .183 | .263 |
| External variables | 84 | 290.61 | 3.4597 | .64260 | .413 | -.223 | .263 |
| Valid N (listwise) | 84 | | | | | | |

Charts of outputs



Normal P-P Plot of Regression Standardized Residual



Scatterplot

