

Addis Ababa University School of Commerce

Logistics and Supply Chain Management Graduate Program

The Role of Information and Communication Technology (ICT) in Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)

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JULY, 2026

ADDIS ABABA, ETHIOPIA

THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN ENHANCING HUMANITARIAN LOGISTICS EFFICIENCY and DECISION-MAKING: THE CASE OF THE ETHIOPIAN DISASTER RISK MANAGEMENT COMMISSION (EDRMC)

A THESIS SUBMITTED TO THE ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ART IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

JULY, 2026

ADDIS ABABA, ETHIOPIA

Addis Ababa University School of Commerce

Logistics and Supply Chain Management Graduate Program

This Is to Certify That the Thesis Prepared by Zemachu Worku Tilint, Entitled THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN ENHANCING HUMANITARIAN LOGISTICS EFFICIENCY and DECISION-MAKING: THE CASE OF THE ETHIOPIAN DISASTER RISK MANAGEMENT COMMISSION (EDRMC). In partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply Chain Management, complies with the regulations of the university and meets the accepted standard with respect to originality and quality.

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DECLARATION

I, Zemachu Worku declare that the work which is presented in this thesis entitled "The Role of Information and Communication Technology (ICT) in Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)" in partial fulfillment of the requirements for the Degree of Masters of Art in Logistics and Supply Chain Management at Addis Ababa University, is the original work of my own effort and done under the guidance of Shiferaw Mitiku (PhD), and that all the sources of materials used for the study have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other university for the purpose of earning any degree.

Name: **Zemachu Worku**

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CONFIRMATION

This is to certify that Zemachu Worku has carried out this research work on the topic entitled "The Role of Information and Communication Technology (ICT) in Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)" under my supervision. This work is original in nature and has not been presented for a degree in any University and it can be submitted for the partial fulfillment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management.

Name: **Dr. Shiferaw Mitiku**

Signature _____

Date _____

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List of Abbreviation and Acronyms

ICT:	Information and Communication Technology
EDRMC:	Ethiopian Disaster Risk Management Commission
NDRMC:	National Disaster Risk Management Commission
GIS:	Geographic Information Systems
LIS:	Logistics Information Systems
LMIS:	Logistics Management Information Systems
EWS:	Early Warning Systems
EWI:	Early Warning Information
MDC:	Mobile Data Collection Tools
CCP:	Communication and Collaboration Platforms
TAM:	Technology Acceptance Model
RBV:	Resource-Based View
DCT:	Dynamic Capability Theory
SPSS:	Statistical Package for Social Sciences
ADPC:	Asian Disaster Preparedness Center
UNDRR:	United Nations Office for Disaster Risk Reduction
UNDP:	United Nations Development Programme
WFP:	World Food Programme
LEAP:	Logistics Emergency Assistance Platform
HL:	Humanitarian Logistics

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Acknowledgement

My special thanks go to my advisor, Shiferaw Mitiku (PhD) for his patience, advice and constant guidance to make this work a reality. I am also grateful for my family for their understanding and patience all rallied behind me and gave me their encouraging and motivational words that helped me to boost my morale when I needed it, I am grateful to you. Finally, I offer my most sincere thanks to all those individuals, both named and unnamed, who supported me in any capacity during the course of my studies

Thank you so much for your encouragement and support.

I am grateful to everyone else who made this thesis a reality in one way or another,

God bless you all so much.

Zemachu Work

Abstract

The research has been done under the title ''The Role of Information and Communication Technology (ICT) in Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)''. This research applies a quantitative method, descriptive statistics, and regression model as the research methodology. Similarly, out of the total 136 EDRMC employees taken as a population of the study, questionnaires were made available to 101 selected employees working in logistics, supply chain, ICT, warehouse, transport, and field operations using purposive sampling technique. Out of the total distributed questionnaires, 74 responses were obtained with a response rate of 73.3%. Data obtained through questionnaire has been analyzed using descriptive statistics, Pearson correlation, and multiple regression analysis supported by SPSS software. The result of the analysis revealed that Logistics Information Systems (LIS), Geographic Information Systems (GIS), Early Warning Systems (EWS), Mobile Data Collection Tools, and Communication and Collaboration Platforms were actively utilized in EDRMC humanitarian logistics operations. The analysis also identified that ICT utilization has a positive and statistically significant effect on humanitarian logistics efficiency and Decision-Making. Empirical findings of the study showed that EDRMC uses ICT tools to manage logistics planning, coordination, early warning activities, field data collection, communication, and information sharing processes. The study further identified that coordination and visibility were the strongest performing dimensions, while last-mile delivery and cost-effectiveness remained major operational challenges. However, there are also some challenges affecting effective ICT utilization in EDRMC operations. The study found that infrastructure limitations, inadequate staff training and user capacity, poor system integration, and low organizational ICT readiness were the major barriers affecting ICT implementation. In addition to this, the study recommends that EDRMC should improve internet infrastructure and expand the use of offline-capable digital platforms to support humanitarian operations in remote areas. Moreover, providing continuous ICT training for logistics and field staff, strengthening integration between Early Warning Systems and Logistics Information Systems, and expanding the application of GIS technologies in last-mile delivery planning are also recommended to improve humanitarian logistics efficiency and Decision-Making performance.

Key Words: ICT, Humanitarian Logistics, Logistics Efficiency, EDRMC, GIS, Early Warning Systems, Decision- Making.

CHAPTER ONE

1. INTRODUCTON

1.1 Background of the Study

Disasters hit every part of the globe, developing and developed, causing deaths and destruction. Hurricanes, fires, earthquakes, tsunamis, floods, droughts, volcanic eruptions, landslides, cyclones, wars, oil spills, and acts of terrorism are among the natural and man-made disaster events that have resulted in untold suffering to millions in worldwide (Cvetkovic, Renner, Aleksova, & Lukic, 2024).

Disasters are increasing in frequency and severity around the world, from natural hazards to conflicts, which means that humanitarians need to be more efficient and responsive (Tatham & Pettit, 2010). ICT interventions such as Geographic Information Systems (GIS), early warning systems, mobile-based applications, cloud computing and digital tracking platforms have been shown to improve situational awareness, allowing for the sharing of data in real-time and increasing the visibility of the supply chain during relief operations (Maric, Galera-Zarco & Opazo-Basáez, 2021).

Humanitarian logistics refers to the provision of timely and effective help to disaster-affected populations. The effective movement of relief products such as food, medication, shelter materials and other important supplies is an essential part of this aid. This involves procurement, transportation, warehousing, distribution, and coordination among humanitarian actors to relieve human suffering in emergency situations (Thomas & Kopczak, 2005).

The rising incidents of disasters in Ethiopia demand the adoption of ICT in humanitarian logistics. Traditional manual procedures are characterized by delays, poor coordination and lack of transparency (UNDRR, 2023). delay emergency response time.

This is particularly the case for countries such as Ethiopia, which are vulnerable to periodic natural disasters and complicated humanitarian concerns. In such instances, there is a need for improved management of supply chains to offer life-saving support to the most vulnerable (Amenu, 2018).

The ongoing armed conflict in Tigray has led to one of the worst humanitarian crises in Ethiopia and revealed the fragility of humanitarian logistical infrastructure in conflict-affected areas. Ground relief personnel faced major hurdles, including restricted access, failing infrastructure, fuel shortages, and communication breakdowns, which disrupted supply chains and delayed the timely delivery of crucial goods to those most in need (Kahsay, 2021).

The National Disaster Risk Management Commission, currently called the Ethiopian Disaster Risk Management Commission (EDRMC), plays a major role in disaster preparedness, coordination, and response (EDRMC, 2024). In recent years, the EDRMC had established ICT solutions in several woredas to facilitate data collection, beneficiary registration, communication and coordination with humanitarian partners. These tech-driven efforts are designed to help tackle challenges around data accuracy, reporting lags, and the coordination complexities that are part of Ethiopia's humanitarian logistics landscape.

The Ethiopian Disaster Risk Management Commission (EDRMC) has transitioned from traditional manual, paper-based logistics and reporting to more digitized platforms. In the past, humanitarian logistics operations were paper based with requests and communication often delayed and little visibility and coordination. To solve these problems, digital systems, such as the Logistics Information System (LIS) have been introduced to enhance information sharing and coordination. But even with these efforts it is not clear how much these ICT tools can help in improving efficiencies of humanitarian logistics and further research is required. Although ICT has been increasingly used in disaster management and humanitarian response, empirical research that specifically focuses on the impact of ICT on the efficiency of humanitarian logistics is limited. However, most of the existing literature on disaster management is based on broad disaster management themes rather than logistics specific issues and the role of ICTs in addressing them (Tatham & Pettit, 2010).

1.2 Problem Statement

The use of Information and Communication Technology (ICT) in humanitarian logistics has grown significantly over the last few years, but there is no guarantee that it will improve operational performance. There is evidence that the benefits of using ICTs depend on the availability of appropriate infrastructure, staff capacity, system integration, and organizational readiness, which are often limited in developing country setting (Teye & Duah, 2022).

This disconnect between the availability of ICTs and their performance is a reality at EDRMC. Although a number of digital platforms have been introduced, such as the Logistics Emergency Assistance Platform (LEAP), GIS-based tools and an Early Warning System, there are still documented inefficiencies. (UNDRR, 2023) indicates that the time taken to respond to an emergency can be 12 to 48 hours, the logistics data can be delayed in arrival at the coordination units, and the interoperability between digital platforms is less than 35%. These are indicative of the fact that there is no evidence that the deployment of ICTs has solved fundamental operational inefficiencies.

This is further exacerbated by the humanitarian complexity in Ethiopia. Logistics infrastructure in conflict-affected areas like Tigray has been shown to be fragile, with communication failures and limited access causing disruptions in supply chains despite the presence of digital systems (Kahsay, 2021). This makes questions regarding the integration of the existing ICT tools in the logistics operations of Ethiopian Disaster Risk Management Commission (EDRMC).

Empirically, the studies available in the Ethiopian context have mainly focused on general coordination and operational challenges (Jafero, 2016), without systematic assessment of the impact of ICT tools on logistics performance. The current study attempts to fill this gap by assessing the role of Information and Communication Technologies (ICT) in humanitarian logistics efficiency. Particularly, the impact of ICT upon the core operational aspects and the barriers that might prevent its effective utilization in the EDRMC.

1.3 Research Questions

- What types of Information Communication and Technology (ICT) tools and systems are currently utilized within the humanitarian logistics operations of the EDRMC?
- How has ICT adoption influenced key humanitarian logistics efficiency indicators such as Lead Time(timeliness), coordination, communication, data accuracy, visibility, Cost-effectiveness and last-mile delivery within the operations of the EDRMC?
- What challenges hinder the effective use of ICT in enhancing humanitarian logistics efficiency within the EDRMC?
- How does Information Communication and Technology (ICT) support decision-making and resource allocation among humanitarian logistics stakeholders within the EDRMC?

1.4 Objectives of the Study

1.4.1 General Objectives

The general objective of this research is to examine the role of Information and Communication Technology (ICT) on Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)

1.4.2 Specific Objectives

- To identify the major ICT tools used in humanitarian logistics operations within the EDRMC.
- To evaluate the influence of ICT adoption on key humanitarian logistics efficiency indicators including Lead Time(timeliness), coordination, communication, data accuracy, visibility, Cost-effectiveness and last-mile delivery within the EDRMC.
- To examine the challenges that limit the effective utilization of ICT in humanitarian logistics at the EDRMC.
- To analyze how Information Communication and Technology (ICT) support decision-making and resource allocation among humanitarian logistics stakeholders within the EDRMC.

1.5 Significance of the Study

This research is academically and practically relevant as it studies the effect of Information and Communication Technology (ICT) on the effectiveness of humanitarian logistics and decision-making in the Ethiopian Disaster Risk Management Commission (EDRMC). In humanitarian emergencies, effectiveness depends on the timely provision of assistance, accurate information, and coordination of operations (Tinsae Eshetu, 2024). More importantly, it is important to understand the role of digital tools in these aspects in Ethiopia, where the increasing frequency of disasters is straining response systems.

Ethiopia is still battling natural calamities such as drought, flooding, pest invasion and displacement due to conflict, putting a severe strain on humanitarian logistical operations. The EDRMC has introduced a range of ICT technologies such as digital databases, logistical information systems and early warning models to better coordination, planning and Decision-Making.

Challenges such as lack of digital skills among staff, late data processing, lack of interaction across systems, and lack of infrastructure especially outside urban areas, still affect the efficiency

of humanitarian logistics operations (HELP Logistics & Kühne Foundation, 2024). These difficulties imply a gap between the availability of ICT technologies and their efficient use for logistics efficiency at the operational level.

Therefore, this study is important because it aims to provide empirical evidence on the actual effects of ICT on the efficiency of humanitarian logistics and decision-making at the EDRMC. Specifically, it examining how ICT contributes to timeliness, coordination, communication, data accuracy, visibility, and last-mile delivery in humanitarian logistics. By investigating both the benefits and challenges of ICT utilization in humanitarian logistics, the study aims to support improved and decision-making, staff capacity development, infrastructure planning and digital system integration. The results will provide practical guidance to humanitarian organizations policymakers and donors on how to aligning ICT investments with operational priorities and strengthening national disaster response mechanisms.

From an academic point of view the study adds to the scarce research literature on humanitarian logistics in the African and developing country context where ICTs are applied. Empirical studies in fragile settings have shown that real-time data, coordination through information and communication technology (ICT), staff capability and system compatibility are all important factors affecting logistics efficiency (Tatham & Pettit, 2010). The study contributes to filling a knowledge gap in the EDRMC environment, enabling progress towards digital transformation in humanitarian logistics in Ethiopia.

The findings of this research will have a significant contribution to and Decision-Making. The knowledge we acquire from this could help the EDRMC in improving its ICT integration plans, making interdepartmental collaboration smooth and improving staff skills through training programs that are tailored especially to their needs. This can lead to better use of technology and better results in general. The findings of this study will contribute towards the development of a better humanitarian logistics system in Ethiopia.

1.6. Scope of the Study

The study examined the role of Information and Communication Technology (ICT) in improving humanitarian logistics efficiency and decision-making of the Ethiopian Disaster Risk Management Commission (EDRMC). The study was conducted at the EDRMC headquarters in

Addis Ababa and selected regional branches engaged in humanitarian logistics and field operations in the country.

The primary unit of analysis consists of organizational staff engaged in ICT-supported humanitarian logistics activities, including personnel from logistics, information management, disaster response coordination, and related operational units at both headquarters and selected regional levels.

The study examines the operation of EDRMC but we did not visit all woreda offices. Instead we talked to staff at some of the regional branches who manage and coordinate humanitarian aid efforts on the ground so that we could get a sense of what is going on the ground.

The study takes a multi-construct analytical approach, as EDRMC's mandate is national level, with preparedness, response coordination and resource mobilization in various operational contexts. Every ICT construct is targeting a different operational function and every efficiency dimension is measuring a different dimension of logistics performance. This is in line with similar humanitarian logistics research, which has looked at several ICT tools and performance indicators at once, to capture the interdependency of logistics functions in a complex institutional context (Paciarotti, Piotrowicz and Fenton, 2021)

The study focused on practices and ICT adoption over the past five years 2018–2023, a period marked by increased digitalization of disaster management processes in Ethiopia. The study excluded detailed evaluations of field-level operations by external humanitarian actors unless directly related to EDRMC.

1.7. Operational Definitions

Information and Communication Technology (ICT): Refers to digital systems, tools, and platforms used for collecting, processing, managing, and disseminating information, including computers, software applications, mobile communication devices, databases, and geospatial systems in disaster management contexts (UNDP, 2015).

Humanitarian Logistics: The planning, implementation, and control of efficient flows and storage of goods, information, and resources from origin to point of consumption to meet the needs of affected populations during emergencies (Kovács & Spens, 2007).

Efficiency: The ability of humanitarian logistics operations to achieve desired outcomes timely delivery, accurate information, coordinated operations, and optimal resource use while minimizing time, effort, and costs (Bealt & Mansouri, 2018).

EDRMC / NDRMC: The national Ethiopian institution responsible for disaster risk management, including preparedness, early warning, response coordination, and resource mobilization

Accuracy: The correctness and reliability of logistics information, including needs assessments, inventory levels, and distribution data (Van Wassenhove, 2006).

Timeliness: The degree to which logistics operations and ICT-enabled processes ensure that aid reaches affected populations within the shortest possible time after a disaster event (Van Wassenhove, 2006).

Coordination: Coordination is defined as the degree to which the planning, implementation and monitoring of logistics activities are agreed and cooperation is applied within EDRMC and its operational units (Kovács & Spens, 2007).

Interoperability: Interoperability is the capability of different systems, programs or organizations to readily communicate, exchange information, and function together even if they are made by different companies, or utilize a different language, interface or execution platform (Wegner, 1996).

Early Warning System (EWS): ICT enabled integrated framework for risk detection and monitoring, hazard forecasting and timely dissemination of alerts to decision makers and communities. Effective EWS enhances readiness levels allows a proactive response and prompts early activation of logistics operations, thus decreasing consequences of disasters (Basher, 2006).

Woreda: a district-level governmental unit in Ethiopia, below zones and regions, and divided into kebeles. It is the basic unit of local government with elected councils responsible for governance, development and service delivery (Soluap, 2024).

1.8. Organization of the Study

The thesis is organized into five chapters: Chapter one contains the introduction part dealing with the background of the study, the research problem, objectives of the study, significance, and

scope of the study. The second chapter focuses on the literature review about the subject matter. The third chapter presents methods of the study. Chapter four provides an analysis of the data and the presentation of the findings. Finally, chapter five focuses on the summary, conclusion, and recommendations.

1.9. Limitations of The Study

This study has several limitations. First, data were collected only through self-reported questionnaires. Objective operational records such as actual delivery lead times and distribution accuracy data were not included due to limited availability of standardized records at EDRMC. Second, the study used a cross-sectional survey design, meaning findings reflect staff perceptions at one point in time only. Third, the study was limited to EDRMC headquarters and selected regional branches. Woreda-level operations and external humanitarian actors were not included. Fourth, since all variables were measured from the same respondents using the same questionnaire, common method bias may have influenced the results. Finally, purposive sampling, while appropriate for the study objectives, limits the generalizability of the findings beyond the study population.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presented a review of related literature that examines the relationship between Information Communication Technology (ICT) and humanitarian logistics efficiency and decision-making. The review systematically explored existing studies to identify key efficiency indicators and to examine how ICT has been applied within humanitarian logistics operations in different contexts. In addition, the chapter reviewed best practices related to ICT integration in humanitarian logistics systems, with particular emphasis on decision-making, lead-time, coordination, data accuracy, visibility, Cost-effectiveness and last-mile delivery.

2.2 Theoretical Framework of the Study

This study is grounded in the Technology Acceptance Model (TAM), Resource-Based View (RBV) Framework and Dynamic Capability Theory (DCT).

2.2.1 The Technology Acceptance Model (TAM)

TAM explains the impact of the attitude and perception of users on the adoption of technology. The main determinants are perceived usefulness and perceived ease of use (Davis, 1989), TAM explains how user attitudes and perceptions influence technology adoption emphasizing perceived usefulness and perceived ease of use as key determinants. These factors shape whether ICT systems are successfully embraced. Within the EDRMC, this highlights the importance of staff training, organizational support, and user willingness in ensuring ICT adoption translates into improved logistics efficiency (Teye and Duah, 2022).

2.2.2 Resource-Based View (RBV) Theory

The RBV theory emphasizes that the internal resources and capabilities are the key factors in a firm's competitive advantage (Barney & Hesterly, 2019). In the context of this research, RBV theory could be applied to understand how the unique IT resources and capabilities possessed by Ethiopian humanitarian organizations contribute to enhancing their humanitarian logistics efficiency, ICT systems including digital communication tools, GIS mapping, logistics information platforms, and early warning systems (EWS) can be considered strategic resources when they are properly utilized and integrated with organizational capabilities. Their

effectiveness however depends on whether the EDRMC develops the institutional, human, and technological capacity to exploit these resources. *ICT alone is insufficient efficiency gains require integration with organizational processes and capabilities* (Dubey, Bryde, Foropon, Graham, Giannakis and Mishra, 2022).

2.2.3. Dynamic Capability Theory (DCT)

(Teece, Pisano and Shuen, 1997), Dynamic Capability Theory explains the processes of adaptation, integration and reconfiguration of organizational competencies in response to changing environments. Disaster response is about rapid decision making under emergency conditions, real-time coordination and the cost-effective distribution of relief supplies. Examples of ICT solutions that can enhance an organization's coordination include digital tracking platforms, GIS-based monitoring, and early warning systems (Heaslip, Vaillancourt, Tatham, Kovács, Blackman & Henry, 2019).

The main theoretical framework used in this study is TAM, which is used to describe the relationship between the usefulness and ease of use of ICTs, and how these perceptions influence the adoption of ICTs in the logistics operations of EDRMC. RBV is complementary to TAM because it elucidates the importance of the availability and quality of ICT resources (infrastructure, digital platforms, technical capacity, etc.) in the capacity of the organization to deliver logistics performance gains. DCT takes this one step further by providing a clear understanding of how EDRMC is adapting and reconfiguring its ICT capabilities to meet the evolving humanitarian demand. The three theories collectively explain the core relationship of the study, namely, the conditions that enable the use of ICTs to lead to more efficient humanitarian logistics, at the user level (TAM), the resource level (RBV), and the organizational level (DCT).

2.3. Theoretical Literature Review

2.3.1. Information and Communication Technology (ICT)

Information Systems are defined by (Kenneth, Laudon and Laudon, 2020), as a combination of hardware, software, networks and data resources that an organization uses to gather, process, store and share information. These elements are seen as part of the Information and Communication Technology (ICT) in this study.

Information and Communication Technology (ICT) describe as a digital systems, tools and platforms that are used to collect, process, manage and disseminate information, such as computers, software applications, mobile communication devices, databases and geospatial systems in disaster management settings (UNDP, 2015).

Considering these definitions ICT is widely accepted to have a number of elements that facilitate coordinate operations and real-time communication this include Early warning platforms, Geographic information systems (GIS), Emergency communication systems, Logistics tracking platforms, and digital dashboards. These parts work in concert to ensure the accuracy of data, accessibility of information, and structured reporting in complex operational settings. Humanitarian operations are dependent on timely and accurate information and ICT is the backbone of information management systems that are widely used in development and disaster response settings.

2.3.2. Humanitarian Logistics Efficiency

The efficiency of humanitarian logistics is defined as the capacity of humanitarian organizations to deliver the right aid to the right beneficiaries at the right time using the available resources in the most efficient way (Balcik & Beamon, 2008). Unlike commercial logistics, humanitarian logistics operates under severe restrictions, such as uncertain demand, destroyed infrastructure, tight schedules, and limited resources which makes efficiency a broad concept. The goal of humanitarian supply chains is to reduce human suffering rather than maximize profit, efficiency is assessed using performance metrics that reflect both operational quality and the timeliness of relief delivery. These indicators serve as benchmarks for assessing how well humanitarian organizations handle emergencies, independent of the enabling or limiting influence of ICT. *key indicators commonly identified in the humanitarian logistics.*

Lead Time

Lead time in humanitarian logistics refers the amount of time that takes between starting operational or preparation procedures and finishing the delivery of aid to impacted communities it is a crucial performance measure because longer lead times increase vulnerabilities and delay assistance while shorter lead times improve responsiveness, minimize bottlenecks, and boost efficiency in procurement, transportation, and distribution activities (Yan, Sohn, & Kovács, 2022).

Accuracy

Accuracy in humanitarian logistics refers the degree to which relief supplies delivered to recipients precisely match the stated needs, the anticipated amounts, and the chosen destinations. It is a critical efficiency dimension because inaccurate deliveries can lead to waste, shortages, or excess (Lu, Goh, & De Souza, 2016).

Coordination

One of the major issues in coordination of humanitarian logistics is the efficiency of cooperation and information exchange between different players such as international organizations, government agencies, donors and non-governmental organizations. Coordination is a critical mechanism for the optimization of resource use and the reduction of duplicated efforts (Tatham & Kovács, 2010) coordination of humanitarian responses in disaster settings is facilitated by (swift trust) which allows diverse actors to work together efficiently.

Visibility

Visibility is the ability to track supplies, data and logistics operations all the way through the supply chain from procurement and storage, through transportation, to ultimate delivery. Visibility allows organizations to predict shortages, track pipeline status, and identify bottlenecks, which increases total supply chain transparency and accountability (Jahre, & Jensen, 2010).

Responsiveness

In humanitarian logistics, responsiveness is the ability of a supply chain to respond to changing operational conditions, unforeseen problems and changing needs, promptly and efficiently. Organizations with high responsiveness are able to re-route supply, update plans and change resource allocation in real time (Oloruntoba & Gray, 2006).

Cost-effectiveness

Cost-effectiveness It shows how well financial, material and human resources are employed in humanitarian logistics operations. Cost-effectiveness ensures that the highest possible quantity of

resources reach beneficiaries while removing unnecessary operational costs (Balcik & Beamon, 2008).

Last-Mile Delivery

Last mile delivery is the final part of humanitarian logistics, which refers to the transport of relief items from the local distribution site to the afflicted people. As one of the most difficult and most crucial element of humanitarian logistics efficiency, due to poor infrastructure, accessibility problems and lack of information (Van Wassenhove, 2006).

2.3.3. Information Communication Technology (ICT) in Humanitarian Logistics Efficiency

Good information management is critical for humanitarian logistics, since decisions often have to be taken rapidly and under unclear situations. Needs assessment, inventory monitoring, transportation and distribution planning, among other things, require accurate and timely data. Information and Communication Technology (ICT) facilitates these procedures by allowing humanitarian organizations to share information efficiently and better plan, organize and manage their logistics operations (Kenneth, Laudon and Laudon, 2020).

Humanitarian logistics ICTs are a broad term used to describe various technologies that are used to assist in information management in the supply chain. They are all related to logistics management, corporate resource planning software, mobile data collection and geographic information systems (GIS). These technologies have been shown to enhance logistics performance in the past by providing information and increasing awareness of operating conditions and communication between teams in different locations (Altay & Green, 2006). But most of the benefits are context-dependent, However, a limitation of much of this literature is its reliance on case studies from well-resourced international organizations, which may not adequately reflect the operational realities of government-led institutions in low-income settings (Paciarotti, Piotrowicz and Fenton, 2021).

There is no indication from available research that the use of ICT will inevitably improve the efficiency of humanitarian logistics processes. While digital technologies can streamline operational tasks and improve the decision-making environment, they are only effective if they can be supported by a number of factors, such as reliable connectivity, stable power supply, user

skills and interoperability of the systems. However, these benefits can be constrained by inadequate ICT governance, by some groups using ICTs less than others, and by poorly integrated ICT platforms, in some instances causing new operating difficulties for humanitarian organizations (Jahre, & Jensen, 2010). Consequently, the impact of ICT on logistics efficiency cannot be viewed as inherently beneficial or detrimental rather, it is determined by the manner in which technologies are deployed, managed, and utilized within organizational contexts.

Logistics Information Systems (LIS)

Logistics Information Systems (LIS) or Logistics Management Information Systems (LMIS) are computerized systems designed to support logistics planning, procurement, inventory management, transportation and distribution activities. Such systems incorporate logistics related data into central platforms. This enables organizations to monitor stock levels, manage supplies movements, and coordinate logistics activities across different operational units (Overstreet, Hall, Hanna & Rainer, 2011).

LIS are expected to improve the flow and structure of logistics information and thus enhance the efficiency of humanitarian logistics in theory. Timely and standardized data availability can reduce uncertainty in planning, facilitate coordination among humanitarian actors and enable informed decision making. LIS are conceptually linked to efficiency dimensions such as time reduction, better visibility and improved coordination of humanitarian supply chains(Tatham & Pettit, 2010).

Early Warning Systems (EWS)

The Early Warning Systems (EWS) are mechanisms of ICT solutions to monitor hazards, assess risks and give timely alerts to support preparedness and response actions. In humanitarian contexts, EWS often combine meteorological, hydrological and socio-economic data to support anticipatory planning and resource mobilization (Kovács & Spens, 2007).

Geographic Information Systems (GIS)

Geographic Information Systems (GIS) are Information and Communication Technology (ICT) tools that involve the collection, management, analysis and visualization of geographically referenced information. In humanitarian logistics, GIS has been used to map affected areas,

analyze accessibility, plan a transportation route and locate a suitable warehouse and/or distribution point (Van Wassenhove, 2006).

Theoretically, GIS enhances the efficiency of humanitarian logistics by providing more situational awareness and capacity to make decisions based on spatial information. The use of GIS for humanitarian actors can enable them to predict access limitations, map out distribution lines and overcome last-mile access challenges by combining geographic, infrastructural, and logistical information. Theoretically, GIS is related to efficiency parameters like responsiveness, visibility, and effectiveness of last-mile delivery (Heaslip, Sharif & Althonayan, 2012).

Mobile Data Collection Tools

Mobile data collecting tools include digital survey software, handheld devices and mobile reporting platforms used to acquire real-time information from the field. These technologies are widely used for needs assessments, distribution monitoring, and reporting on operational circumstances in humanitarian contexts (Altay & Labonte, 2014).

Theoretically, the use of mobile data gathering tools is intended to improve the efficiency of humanitarian logistics through improving data accuracy, minimizing lag in reporting and faster flow of field level information. Such solutions can help to promote more prompt decision-making and better demand estimation as they reduce the need on manual paperwork. Conceptually, mobile data gathering is associated with efficiency measures such as accuracy, responsiveness, and information flow (Gunasekaran & Ngai, 2012).

Communication and Collaboration Platforms

Communication and collaboration platforms are the ICT technologies that allow humanitarian players to share information, coordinate and plan together. These platforms could include shared dashboards, coordination portals, and digital communication systems that facilitate interaction across organizations and operational levels (Tatham & Kovács, 2010).

2.3.4. Information Communication Technology (ICT) Challenges in Humanitarian Logistics

The literature on the use of ICT in humanitarian operations shows that the application of this technology is often accompanied by a series of obstacles that may impair logistics efficiency.

Humanitarian contexts are often distinguished by unstable conditions, damaged infrastructure and limited institutional capacity that might prevent the successful deployment and utilization of digital technology (Van Wassenhove, 2006). This implies that ICT is not the only factor that ensures better performance in logistics.

Humanitarian operations are often carried out in places without access to regular electricity, reliable internet and suitable hardware, which compromises the continuous and effective use of ICT systems (Peter Tatham & Luke Houghton, 2011). In such cases, organizations may be forced to resort to a mix of digital and manual processes resulting in disruptions in the flow of information and inefficiencies in operations.

Other research has suggested human capacity constraints as well. Availability of suitable technical abilities, appropriate training and familiarity of the user with digital systems are important factors for effective use of ICT. Humanitarian organizations often use short-term staff or external partners with different ICT capacity, which might have an adverse effect on data quality and systematic usage of information system (Jahre, & Jensen, 2010).
Multiple information systems that are not fully connected across the organizations can lead to duplication of data, delays in the sharing of information, and discrepancies in reporting methods (Altay & Green, 2006). Such deficiencies can undermine ICT's capacity to enable efficient coordination and planning. These concerns imply that ICT offers enabling prospects and practical constraints depending on the choices of technologies, their implementation and governance.

2.4. Empirical Literature Review

2.4.1. Information Communication Technology (ICT) in Humanitarian Logistics Efficiency

This research examines the ICT tools such as GIS, logistics information systems, mobile data collection platforms and digital communication systems which becomes important to enhancing situational awareness, coordination, and information sharing among humanitarian stakeholders (Banomyong, Oloruntoba & Laosirihongthong, 2017).

(Paciarotti, Piotrowicz and Fenton, 2021) A systematic review reveals that the adoption of ICT in humanitarian logistics improves supply chain visibility and helps make faster decisions in emergencies. Similarly, (Altay and Pal, 2014) argue that information systems allow humanitarian

agencies to align supply and demand more effectively through improved needs assessment and monitoring of relief flows.

The impact of ICT is not the same across contexts, some studies suggest that the effectiveness of ICT is influenced by variables such as system integration, staff capacity, availability of infrastructure and organizational readiness (Heaslip, Vaillancourt, Tatham, Kovács, Blackman & Henry, 2019). ICT tools may exist in resource-limited settings but are not used to their full potential due to lack of technical skills or weak institutional support. Notable, the results of these studies are not consistent; some studies have shown that ICT adoption has a significant positive impact on logistics performance, while others have shown that there is no significant positive impact or impact varies based on context (Heaslip, Vaillancourt, Tatham, Kovács, Blackman & Henry, 2019).

Studies on disaster risk management and early warning systems show a growing use of ICT-based tools for preparedness and response (Tesfaye, 2021) by highlight the role of ICT in strengthening early warning systems and risk communication, while (ADPC, 2023) describe efforts to upgrade digital platforms for disaster preparedness. However, these studies are primarily concerned with early warning and preparedness as opposed to logistics efficiency outcomes.

2.4.2. Information Communication Technology (ICT) and Humanitarian Logistics Efficiency

A Few empirical studies have specifically examined the relationship between ICT adoption and humanitarian logistics efficiency indicators. Previous research indicates that ICT increases efficiency by reducing information delays, facilitating coordination and increasing visibility of the supply chain (Tatham & Pettit, 2010).

The empirical data suggest that logistics information systems and digital tracking tools contribute to lead time reductions by allowing faster communication and real-time monitoring of relief items (Overstreet, Hall, Hanna & Rainer, 2011). Digital dashboards and GIS-based systems help to improve visibility in procurement, warehousing, and distribution activities, leading to better planning and resource allocation (Jahre, & Jensen, 2010).

However, several research show that the adoption of ICT by itself does not lead to increased efficiency ICT gains during disaster response can be hampered by fragmented data platforms and poor system interoperability (Bharosa, Janssen & Lee, 2010), fragmented data platforms and inadequate system interoperability can limit the benefits of ICT during disaster response. Similarly, (Dubey, Gunasekaran, Childe, Papadopoulos, Luo, Roubaud & Wamba, 2022) contend that ICT increases performance only when organizations have organizational and human resources to effectively use digital tools.

Unfortunately, there is scarce evidence from Ethiopia that directly links the adoption of ICT with increased efficiency in the field of humanitarian logistics. The available research carried out in Ethiopia has focused either on logistics management or on ICT-related projects in the Ethiopian region separately and did not directly measure their impact on logistical efficiency in areas of Lead Time reduction, improved coordination and enhanced last-mile delivery performance within the context of Ethiopian disaster relief management efforts. This points to an important research gap in the management of disasters in Ethiopia.

2.4.3. Information Communication Technology (ICT) Challenges in Humanitarian Logistics

Empirical literature such as (Tatham & Kovács, 2010), identify various challenges to the efficient use of ICT in humanitarian logistics. Common obstacles reported are poor digital infrastructure, lack of personnel training, poor integration of systems, issues with data interoperability and opposition to technological change.

In developing countries, empirical studies such as (Oloruntoba & Gray, 2006), show that the effectiveness of ICT is limited by connectivity problems, power outages, and unequal sharing of digital infrastructure among regions. Moreover, organizational issues like insufficient sustained training and technical skills are also a limiting factor in the effective use of ICT systems during emergencies.

Studies in Ethiopia such as (Jafero, 2016) identify communication gaps and coordination challenges among humanitarian entities. Furthermore, there are capacity gaps and challenges in integrating systems of disaster risk as reported in the recent reports by (UNDRR, 2023) indicate capacity constraints and challenges in integrating systems of disaster risk management

institution. The findings indicate that ICT adoption is inadequate without investments in human capacity and organizational systems.

2.5. Research Gap

The existing literature has several studies that focus on the use of Information and Communication Technology (ICT) to improve the performance of supply chain and logistics, especially in commercial and private sector. These studies frequently emphasize efficiency gains from information systems, data integration and digital coordination tools. By contrast, comparatively less research has focused on the adoption of ICTs in humanitarian logistics systems, which are subject to uncertainty, urgency and resource limitations.

While there is an emerging literature on the use of ICT in humanitarian logistics, the majority of the literature focuses on international organizations like the World Food Program (WFP), and other non-governmental actors. These studies tend to be conducted in environments that are well resourced and have relatively advanced technological infrastructures. There is, however, little empirical evidence that investigates the role and effectiveness of ICT in government-led humanitarian institutions, especially in developing country settings like Ethiopia.

Humanitarian research in past works tends to deal with a narrower range of themes such as the issues around humanitarian logistics, aid coordination and the operational constraints of the humanitarian organizations. Whilst it acknowledges the enabling factor of ICT adoption, research fails to address a critical research gap relating to empirical evidence in a framework of support of understanding the influence of ICT adoption on humanitarian logistics effectiveness. To this end, research on humanitarian aid focuses more on issues such as operational bottlenecks. The focus is skewed towards identifying the issues faced by Humanitarian organizations, neglecting the empirical verification of the effect of using information and communication technology tools on key logistics efficiency indicators that range from lead times to coordination, visibility, responsiveness, accuracy, cost-effectiveness and lastly last-mile delivery.

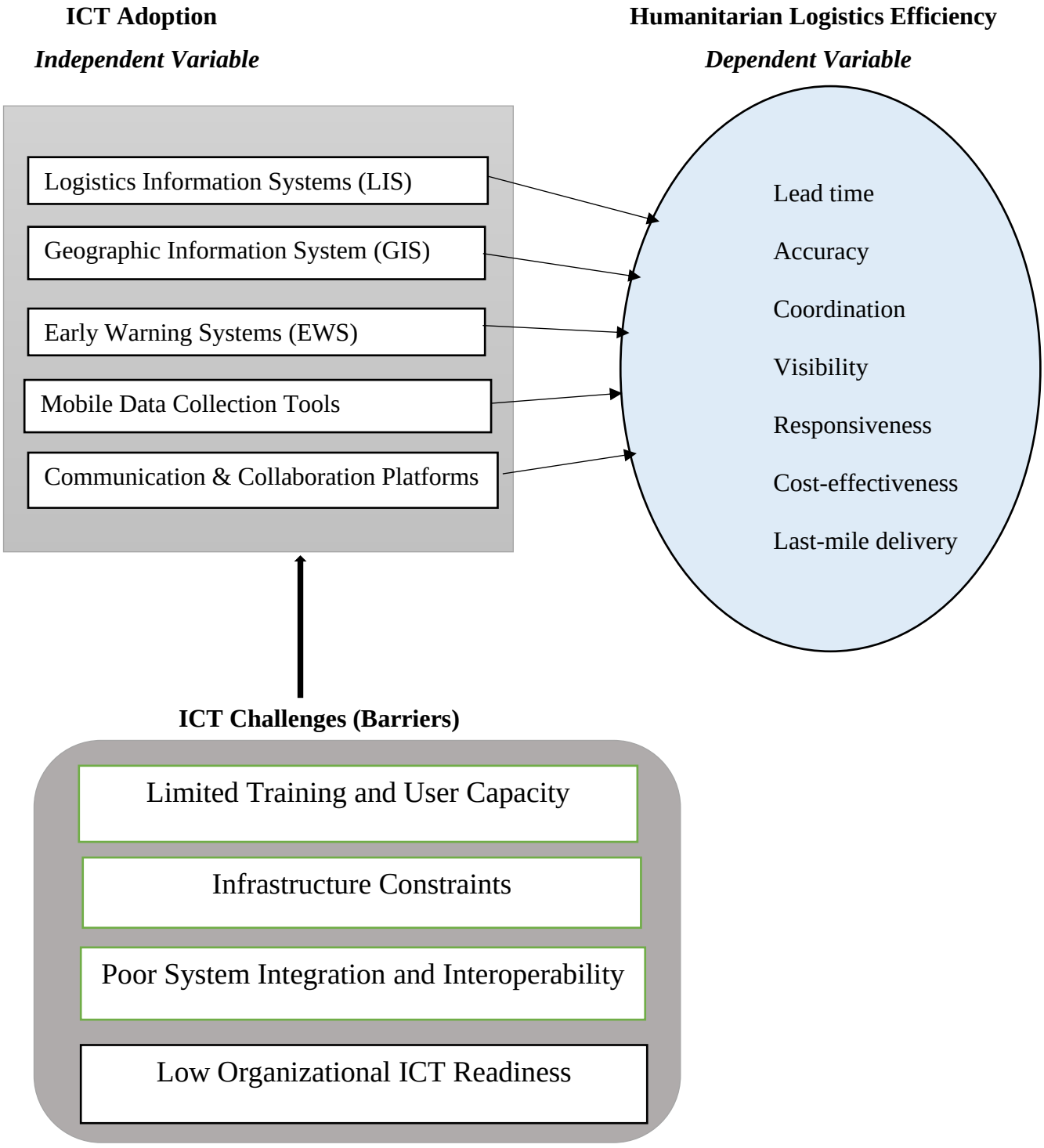
Previous studies on humanitarian logistics and disaster management in the Ethiopian context have mainly been on institutional coordination, challenges in emergency response and policy frameworks. Empirical research on the use of ICTs in government led humanitarian institutions is still limited, especially in the context of logistics efficiency outcomes. It is still being examined and clarified how ICT systems are implemented by institutions such as the EDRMC.

In terms of Ethiopia's national disaster response management structure and leadership, not much is known about the contribution of ICT to logistics and the current use of these systems and their effectiveness remains unclear to the author. This suggests that there is a definite gap in the literature in the context. Hence, this study aims to address this gap by offering empirical evidence of the contribution of ICT to the efficiency of humanitarian logistics in a government-led institutional environment.

In addition to the contextual gap, the literature also shows theoretical and methodological shortcomings. In theory, most studies use TAM alone, without incorporating resource-based or dynamic capability perspectives, and thus provide explanations for user adoption rather than organizational performance outcomes (Dubey, Bryde, Foropon, Graham, Giannakis and Mishra, 2022). Methodologically, the majority of studies on humanitarian logistics research are qualitative and case-based, which reduces the applicability of the results and the lack of quantitative relationships between the use of ICTs and the dimensions of logistics performance (Paciarotti, Piotrowicz and Fenton, 2021). Moreover, there are inconclusive findings in the literature: some studies show that the use of ICTs has led to efficiency gains, while others show that benefits are limited due to infrastructure constraints and low institutional capacity, which have not yet been resolved (Heaslip, Vaillancourt, Tatham, Kovács, Blackman & Henry, 2019). This study therefore addresses not only a contextual gap but also contributes to resolving these theoretical and methodological limitations by applying an integrated multi-theory framework within a quantitative research design.

2.6. Conceptual Framework

Figure 2.6.1: The Role of Information Communication Technologies on HL Efficiency



CHAPTER THREE

3. METHEDOLOGY OF THE STUDY

This study was conducted on the Role of Information and Communication Technology (ICT) in Enhancing the Efficiency in Humanitarian Logistics and decision-making in the Ethiopian Disaster Risk Management Commission (EDRMC). The objective was to understand the use of ICT tools by humanitarian logistics operations and its relation to operational efficiency. The overall methodological framework used to guide the study was presented in this chapter. It described how data would be collected and analyzed to meet the research objectives. Specifically, the chapter described the research design, research approach, study population and sampling design, data collection methods, data analysis techniques, procedures for validity and reliability and ethical considerations for the study.

3.1. Research Approach and Design

The purpose of this study was to examine the role of Information and Communication Technology (ICT) on humanitarian logistics efficiency and decision-making within the Ethiopian Disaster Risk Management Commission (EDRMC). A research design provided the overall structure that guided the study and ensured that the different components of the research worked together to address the research questions. According to (Trochim, 2005). research design serves as the framework that connects the research problem, data collection procedures, measurement methods, and analysis techniques in a coherent manner. It shows how the major elements of a study such as the target population, variables, instruments, and analytical methods are organized to achieve the study objectives (Trochim, 2005).

This study adopted a quantitative research approach to examine the role of Information and Communication Technology (ICT) in humanitarian logistics efficiency and decision-making within the Ethiopian Disaster Risk Management Commission (EDRMC).

The study used survey research design. Data was collected through structured questionnaires from staff involved in logistics and ICT supported operations. This approach enabled the collection of measurable data and the use of statistical techniques to analyze the relationship between ICT utilizations and humanitarian logistics performance.

3.2.Population and Sampling Technique

3.2.1. Population

The employees in this study were chosen because they play a key role in humanitarian logistics operations and ICT-supported activities. The study specifically focused on staff working in logistics, warehousing, field operations, transportation, emergency response coordination, strategic planning, commodity management, and ICT-related units at the EDRMC headquarters and selected operational locations.

These employees were considered suitable for the study since they were directly involved in the humanitarian logistics processes and were exposed to the ICT systems used for coordination, communication, information management, and logistics operations within the organization. The organization indicated that the overall target population was around 136 staff members. This includes logistics personnel, staff working in ICT, personnel involved in commodity management and staff involved in strategic planning and field operations.

3.2.2. Sampling Technique

The purposive sampling technique was used to select respondents from the relevant functional units in the EDRMC. Purposive sampling was suitable when the participants are selected based on their participation, experience and knowledge related to the subject under investigation (Creswell, 2014).

For this study, therefore, the sample included staff members at headquarters and selected operational locations who are directly involved in humanitarian logistics operations and activities supported by ICTs.

The purposive sample was used to collect data from the respondents who are in a position to provide relevant information on the utilization of ICT, humanitarian logistics efficiency and decision-making indicators, methods and operational problems relating to ICT at the EDRMC.

Purposive sampling was used to find respondents who had direct experience in ICT-supported humanitarian logistics operations, but Yamane's (1967) formula was used to determine the minimum sufficient sample size in the defined target population of 136 staff members. This is in line with the studies that employ purposive sampling in addition to size estimation that employs

formula to achieve adequate statistical representation within a bounded institutional population (Creswell, 2014)

3.2.3. Sample Size Determination

The formula developed by (Yamane, 1967) was used as a guideline to determine an adequate minimum sample size within the purposively defined population. This formula is commonly used in survey research to determine adequate sample size for a finite population.

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

Where:

n =the sample size

N=the population size

e = the margin of error (commonly 0.05 for 95% confidence level

The total target population was 136 employees working in humanitarian logistics and ICT supported operations in the EDRMC based on the information collected from the organization.

The sample size is therefore calculated as follows:

$$n = \frac{136}{1 + 136(0.05)^2}$$

$$n = \frac{136}{1.34}$$

$$n = 101.49$$

Therefore, the study used a sample size of **approximately 101** respondents selected purposively from relevant functional units at the EDRMC headquarters and selected operational locations.

3.3. Sources of Data

To achieve the objectives of this study, primary data were used. The data were collected from employees of the Ethiopian Disaster Risk Management Commission (EDRMC) who are engaged in logistics, supply chain, and ICT-related activities. Data were gathered using a structured questionnaire.

Primary data were based on staff perceptions of ICT utilization and logistics efficiency. Objective operational records such as delivery lead times, stock-out rates, and distribution accuracy data were not included due to the limited availability of standardized performance records at EDRMC.

3.4. Data Collection Methods

Data for this study were collected from relevant staff of the Ethiopian Disaster Risk Management Commission (EDRMC) working at different operational levels, particularly those involved in logistics, supply chain, and ICT-related functions. Since the necessary permission has already been secured from the Commission, structured questionnaires were directly administered to the selected respondents. The questionnaires were distributed and collected in a manner that ensured clarity of instructions, confidentiality of responses.

3.5. Method of Data Analysis

Data collected from the structured questionnaires were coded and entered into SPSS software for analysis. Descriptive and inferential statistical methods were used. Descriptive statistics such as frequencies, percentages, means and standard deviations were used to analyze responses on demographics, ICT use level and the role ICT in disaster relief. within the EDRMC.

Inferential statistical test was conducted using correlation and multiple linear regression to determine the relationship between the use of ICT and the efficiency indicators of humanitarian logistics. This analysis has helped to assess the role and impact of ICT on key performance dimensions. Results were summarized in tables and figures and discussed according to the aims of the study.

The multiple linear regression model used to examine the effect of ICT utilization on humanitarian logistics efficiency was specified as follows:

$$HL\ Efficiency = \beta_0 + \beta_1(LIS) + \beta_2(GIS) + \beta_3(EWS) + \beta_4(MDC) + \beta_5(CCP) + \varepsilon$$

The dependent variable is the overall humanitarian logistics efficiency, which is the mean score of seven efficiency dimensions: lead time, coordination, information accuracy, visibility, responsiveness, cost-effectiveness, and last-mile delivery. The five ICT utilization constructs (LIS, GIS, EWS, MDC, and CCP) were measured as the mean score of four Likert-scale items, which are independent variables. According to the theoretical framework of this study, the relationships between each of the ICT constructs and humanitarian logistics efficiency are expected to be positive and significant.

3.6. Validity and Reliability

3.6.1. Validity

Validity is the degree to which a research instrument measures what it is expected to measure (Blumberg, Cooper & Schindler, 2005). In this study, validity was focused on whether the questionnaire items accurately represent the concepts of ICT use, efficiency of humanitarian logistics and challenges related to ICT.

To increase content validity, the questionnaire will be developed based on the literature and conceptual framework described in Chapter Two. A pilot test was also conducted with a small number of respondents with similar characteristics to the target population. Its purpose was to detect ambiguous or unclear questions and to confirm that the items were comprehensible and in accordance with the objectives of the study. In this study, the formal factor analysis procedures like Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were not conducted, but content validity was obtained by systematically developing the questionnaire items based on the literature and the conceptual framework of the study. A pilot test was also carried out before the main data collection to verify the face validity.

3.6.2. Reliability

Reliability is the degree to which an instrument consistently and stably measures, yielding the same results under similar circumstances (Pallant, 2011). Reliability in the present study was assessed by Cronbach's alpha coefficient which is used to assess the internal consistency of multi-item scales.

The major constructs of the study, namely ICT utilizations, logistics efficiency indicators, and ICT-related challenges, had their Cronbach's alpha values computed during the main data

analysis and after the pilot test. A Cronbach's alpha of 0.70 and above was considered acceptable to demonstrate good reliability. If any scale had a lower reliability value, adjustments were considered, such as revising or deleting problematic items. Through these procedures, the study was carried out to ensure that the data obtained from the questionnaire is reliable and consistent for quantitative analysis.

Furthermore, the study has the limitation of common method variance (CMV) because all variables were measured from the same respondents with the same questionnaire at the same time. Common method bias could overestimate relationships between variables when both independent and dependent measures are self-reported by the same source (MacKenzie, Lee, J. & Podsakoff, 2003). No statistical test (such as Harman's Single Factor Test) was performed, although procedural remedies were taken (such as ensuring anonymity and separating the items for ICT use from the items for efficiency in the questionnaire). This is known as a methodological constraint.

Table 3.1: Test of Reliability

Variables	**No. Items**	**No. Items Cronbach's alpha**
Logistics Information Systems (LIS)	4	0.734
Geographic Information Systems (GIS)	4	0.839
Early Warning Systems (EWS)	4	0.830
Mobile Data Collection Tools	4	0.810
Communication & Collaboration Platforms	4	0.832
Lead Time	3	0.869
Coordination	3	0.863
Accuracy	3	0.857
Visibility	3	0.895
Responsiveness	3	0.903
Cost Effectiveness	4	0.893
Last-Mile Delivery	3	0.924
Training & User Capacity	4	0.842
Infrastructure Constraints	4	0.804

System Integration Issues	4	0.798
Organizational Readiness	4	0.785

Source: Own Computation May, 2026

3.7. Ethical Considerations

Ethical considerations are critical to protect the rights and well-being of research respondents (Peters, 2010). Before collecting data, the respondents were informed about the aim of the research and their consent was obtained before they filled the questionnaire. Participation was voluntary and respondents had the right to refuse or withdraw from the study at any time without any adverse consequences. The questionnaire did not collect unnecessary personal identifying information in order to protect privacy. Anonymity was maintained by ensuring that individual responses could not be linked to individual participants. Data was used only for academic purpose and confidentiality was assured.

CHAPTER FOUR

4. DATA ANALYSIS AND RESULTS

4.1. Introduction

The analysis and interpretation of the data collected from Ethiopian Disaster Risk Management Commission (EDRMC) staff involved in humanitarian logistics and ICT operations are presented in this Chapter. The chapter proceeds by addressing each of the specific objectives of the study in turn. It begins with descriptive statistics of demographic variables, descriptive analysis of ICT utilizations, humanitarian logistics efficiency and ICT challenges at EDRMC. Later, some inferential statistical analysis such as Pearson correlation and multiple linear regression are presented to explore the relationship between ICT utilizations and humanitarian logistics efficiency. The data were analyzed through the Statistical Package for Social Sciences (SPSS).

4.2. Data Testing

4.2.1. Testing Non-Response Rate

The target population of this study comprised 136 employees of EDRMC who are directly engaged in humanitarian logistics and ICT-related operations. Based on (Yamane, 1967) formula, a sample size of 101 respondents was determined for this study. Accordingly, questionnaires were distributed to all 101 sampled respondents. However, out of the total distributed questionnaires, only 74 were returned fully completed and found valid for analysis. The remaining 27 questionnaires were either not returned or were incomplete and therefore excluded from the analysis.

Consequently, the response rate for this study is 73.3% and the non-response rate is 26.7%. According to (Mugenda & Mugenda, 2003), a response rate of 50% is adequate, 60% is good, and 70% and above is excellent for a research study. Therefore, the response rate of 73.3% obtained in this study is considered excellent and sufficient to draw meaningful conclusions.

4.2.2. Missing Data Assessment

Missing data usually refers to the omission of one or more values within the analysis variable(s) in the dataset. The development is often the result of a participant in the study choosing not to provide a response to a questionnaire, this kind of problem normally far beyond researcher's control. In general, a larger number of missing values within a dataset reflect the data analyst's

greater challenge. Missing data problem can occur when a participant failed to state or answer certain items in the questionnaire, for example, and he / she was unavailable on the data gathering day, or some questionnaires were offensive to the respondent. This kind of problem may create inaccurate predictions and affect the model fit because of this problem the researcher decides to focus on only 74 of responses.

4.3. Demographic Profile of the Respondent

Table 1: Descriptive Statistics of Demographic Variables

Demographic variables		**Frequency**	**%**
Gender	Male	57	77
	Female	17	23
Age	Below 25	8	10.8
	25-35	38	51.4
	More than 36	28	37.8
Highest level of education	Certificate	6	8.1
	Diploma	10	13.5
	BA/BSC	38	51.4
	MA/MSC	19	25.7
	PhD	1	1.4
Work experience (Years)	Less than 2	12	16.2
	2-5 years	24	32.4
	6-10 Years	30	40.5
	More than 10	8	10.8

Source: Own Computation May, 2026

According to the Table 4.1, out of 74 respondents, 57 (77%) were male and 17 (23%) were female. This shows that most EDRMC staff involved in humanitarian logistics and ICT operations are male. Regarding age, 8 respondents (10.8%) were below 25 years, 38 respondents (51.4%) were between 25–35 years, and 28 respondents (37.8%) were above 36 years. This means that most of the respondents are in the young and active working age group.

In terms of education, 6 respondents (8.1%) held a Certificate, 10 (13.5%) held a Diploma, 38 (51.4%) held a BA/BSC degree, 19 (25.7%) held an MA/MSC degree, and 1 (1.4%) held a PhD. This reveals that the majority of the respondents have first degree qualifications, which means that the workforce is well educated. Concerning work experience, 12 respondents (16.2%) had less than 2, 24 (32.4%) had 2–5, 30 (40.5%) had 6–10, and 8 (10.8%) had more than 10 years. The majority of respondents have 6–10 years of experience.

Table 4.2: Organizational and Operational Characteristics of Respondents

Organizational and Operational Characteristics		Frequencies	%
Department	ICT	7	9.5
	Logistics	17	23
	Operation	8	10.8
	Supply Chain	13	17.6
	Transport	7	9.5
	Warehouse	12	16.2
	Other	10	13.5
Level of Involvement in HL	High	32	43.2
	Moderate	36	48.6
	Low	6	8.1
Level of Involvement with ICT	High	41	55.4
	Moderate	30	40.5
	Low	3	4.1

Source: Own Computation May, 2026

The organizational and operational characteristics of the respondents are presented in Table 4.2. The results indicate that the respondents came from various departments of the organization such as Logistics, Supply Chain, Warehouse, Transport, ICT, Operations and other related departments. Of these, the logistics department had the greatest number of respondents (23%) followed by supply chain (17.6%). As far as involvement in humanitarian logistics operations is concerned, most respondents (48.6%) reported moderate level of involvement, and 43.2% reported high level of involvement. Few respondents (8.1%) indicated low involvement. This suggests that the majority of the respondents were involved in humanitarian logistics operations. Similarly, the results related to ICT system involvement show that more than half of the respondents (55.4%) had a high level of involvement with ICT systems, while 40.5% had moderate involvement. 4.1% reported low involvement. This shows that the respondents had enough exposure and experience in ICT-supported logistics operations, which makes the information obtained in this study reliable.

4.4. Information Communication Technology Utilization on Humanitarian Logistics Operation

The descriptive analysis of ICT utilizations practices at the Ethiopian Disaster Risk Management Commission (EDRMC) is presented in this section. Which aimed to identify the main ICT tools used in humanitarian logistics operations in the EDRMC. The findings are organized according to five ICT constructs, namely Logistics Information Systems (LIS), Geographic Information

Systems (GIS), Early Warning Systems (EWS), Mobile Data Collection Tools (MDC), and Communication and Collaboration Platforms (CCP). Mean scores are interpreted as: 1.00-1.80 Very Low 1.81-2.60 Low. 2.61-3.40 Moderate. 3.41-4.20 High. 4.21-5.00 Very High (Livingston, Edward H., 2004).

Table :4.3. Information Communication Technology Utilization on Humanitarian Logistics Operation (N=74)

No	Variables	Mean	Std. Deviation
1.	**Logistics Information Systems (LIS)**		
1.1	LIS are used to track inventory levels and relief supplies.	3.70	.754
1.2	Logistics data is regularly updated in digital systems.	3.65	.867
1.3	LIS supports coordination between warehouses and transport units.	3.65	.711
1.4	LIS provides timely information that supports logistics decision-making during emergency response operations.	3.86	.728
1.5	Grand Mean of ICT in Logistics Information Systems LIS	3.72	.57237
2.	**Geographic Information Systems (GIS)**	**Mean**	**Std. Deviation**
2.1	GIS tools are used to map disaster-affected areas for logistics planning.	3.59	.859
2.2	GIS supports route planning for the distribution of relief supplies.	3.65	.928
2.3	GIS helps identify hard-to-reach locations.	3.50	.864
2.4	GIS improves coordination of field logistics operations.	3.59	.920
2.5	Grand Mean of ICT in Geographic Information Systems GIS	3.5845	.73358
3.	**Early Warning Systems (EWS/EWI)**	**Mean**	**Std. Deviation**
3.1	EWS is used in logistics planning activities.	3.85	.822
3.2	EWS supports the pre-positioning of relief supplies before emergencies occur.	3.82	.817
3.3	Early warning information helps reduce delays in mobilizing logistics resources.	3.65	.867
3.4	Early warning information improves the preparedness of logistics operations for emergency response.	3.70	.872
3.5	Grand Mean of ICT in Early warning information EWI	3.7568	.68743

4.	Mobile Data Collection Tools	Mean	Std. Deviation
4.1	Field teams use mobile data collection tools to report needs and logistics-related information.	3.55	.830
4.2	Mobile tools improve the speed of information sharing between field teams and coordination units.	3.76	.962
4.3	Mobile tools improve the accuracy of logistics data collected from the field.	3.69	.775
4.4	Mobile tools support real-time updates from field operations.	3.66	.880
4.5	Grand Mean of ICT in mobile data collection	3.6655	.69029
5.	**Communication and Collaboration Platforms**	**Mean**	**Std. Deviation**
5.1	Digital platforms are used to coordinate logistics activities.	3.81	.822
5.2	ICT tools improve communication between headquarters and field teams.	3.72	.803
5.3	Digital platforms reduce information gaps between logistics units and departments.	3.78	.896
5.4	Collaboration platforms improve teamwork in logistics operations.	3.69	.843
5.5	Grand Mean of ICT in Communication and Collaboration Platforms	3.7500	.68621

Source: Own Computation May, 2026

Logistics Information System: The grand mean of 3.75 in table 4.3 for the Logistics Information System shows that the EDRMC extensively employs it in its humanitarian logistics operations. The high utilization of LIS is consistent with the notion that ICT infrastructure, when actively deployed across core logistics functions, can contribute to operational value within the organization. Overall, the results support the fact that LIS is very important for EDRMC's ability to plan and organize humanitarian logistics more accurately and promptly.

Geographic Information System: The recorded grand mean as shown in table 4.3 is 3.58 confirming high utilizations across EDRMC's humanitarian logistics operations. The utilization of GIS is consistent with the idea that spatial planning tools can support an organization's ability to adapt logistics operations in response to changing geographic and disaster conditions.

Early Warning System (EWS): The grand mean of 3.76 in table 4.3 indicated high utilizations in Ethiopian Disaster Risk Management Commission (EDRMC) humanitarian logistics operations.

The results suggest that organizations are interested in using anticipatory logistics to allow EDRMC to activate supply chains before crisis scenarios develop. The active use of EWS is consistent with the view that anticipatory information tools can support an organization's capacity to mobilize logistics resources ahead of escalating disaster conditions.

Mobile Data Collection: The grand mean of 3.67 lies within the high utilizations range which indicates the active reliance of field workers on mobile platforms for collecting and transmitting logistics information. The findings confirm that the collection of mobile data is an active and integrated part of EDRMC's field operations, and its wider adoption is expected to enhance data-driven decision making.

Communication and Collaboration Platforms: registered a grand mean of 3.7 which is within the high utilization range proving that communication and collaboration platforms are effective in bridging the internal communication barriers within the organization. It provides timely and usable information generated across systems to decision makers. These results validate the large-scale deployment of communication platforms and their significant and measurable contribution to the coordination efficiency of EDRMC.

4.4.1. Overall ICT Utilization on Humanitarian Logistics Operation Summary

Table: 4.4. Overall ICT Utilization Practices on Humanitarian Logistics Operation Summary (N=74)

Variables	Mean	Std. Deviation
Early Warning Systems (EWS)	3.76	.687
Communication & Collaboration Platforms	3.75	.686
Logistics Information Systems (LIS)	3.72	.572
Mobile Data Collection Tools	3.67	.690
Geographic Information Systems (GIS)	3.58	.734
Grand Mean of Information Communication Technology	3.69	.297

Source: Own Computation May, 2026

The overall grand mean of 3.69 in Table 4.4 confirms the consistent high level of utilizations of all the five ICT tools in the humanitarian logistics operations of EDRMC. EWS scored the highest grand mean of 3.76 among the five ICT constructs indicating the focus on preparedness of the organization whereas GIS scored the lowest (3.58) signifying the spatial planning

capabilities are still comparatively underutilized. The high scores across the board show that EDRMC is widely integrating ICT, with each tool playing a role in different aspects of efficiency. These findings suggest that EDRMC has developed organizational routines to allow the coordinated deployment of multiple ICT tools in changing disaster situations. Together, these results meet the first specific objective of the study and confirm that the EDRMC has a diversified and actively used ICT portfolio to support the efficiency of humanitarian logistics.

4.5. Humanitarian Logistics Efficiency Practices at EDRMC

This section presents the descriptive analysis of Humanitarian Logistics Efficiency Practices at the Ethiopian Disaster Risk Management Commission (EDRMC).

Table: 4.5. Humanitarian Logistics Efficiency Practices at EDRMC (N=74)

No	Variables	Mean	Std. Deviation
1.	**Lead Time**		
1.1	Relief items are delivered within the required time during emergency operations.	3.77	.732
1.2	Procurement and distribution processes are completed in a timely manner.	3.74	.812
1.3	Delays in humanitarian logistics operations are minimized.	3.49	.848
1.4	Grand Mean of Lead Time	3.6667	.71086
2.	**Coordination**	**Mean**	**Std. D**
2.1	Coordination among departments involved in humanitarian logistics operations is effective.	3.73	.799
2.2	Duplication of logistics activities across units is minimized.	3.59	.935
2.3	Information sharing among departments and field units is effective.	3.82	.850
2.4	Grand Mean of Coordination	3.7162	.76388
3.	**Information Accuracy**	**Mean**	**Std. D**
3.1	Logistics information used for operations is accurate and reliable.	3.88	.793
3.2	Errors in logistics reporting are minimal.	3.59	.810
3.3	Logistics data used for decision-making is of good quality.	3.54	.744
3.4	Grand Mean of Information Accuracy	3.6712	.69021
4.	**Visibility**	**Mean**	**Std. D**
4.1	Stock levels and shipments are easily monitored during operations.	3.72	.836

4.2	Relief items can be tracked throughout the distribution process.	3.78	.763
4.3	Inventory levels across locations are clearly visible.	3.59	.905
4.4	Grand Mean of Efficiency	3.6982	.76086
5.	**Responsiveness**	**Mean**	**Std. D**
5.1	The organization responds quickly during emergencies.	3.72	.852
5.2	Logistics plans are adjusted rapidly during changing situations.	3.65	.851
5.3	Humanitarian logistics operations are flexible during emergencies.	3.64	.915
5.4	Grand Mean of Responsiveness	3.6667	.79954
6.	**Last-Mile Delivery**	**Mean**	**Std. D**
6.1	Delivery challenges in remote areas are identified effectively.	3.47	.982
6.2	Final distribution activities are properly planned.	3.53	.910
6.3	Last-mile distribution activities are effectively monitored.	3.38	.917
6.4	Grand Mean of Last-Mile Delivery	3.4595	.85065
7.	**Cost-effectiveness**	**Mean**	**Std. D**
7.1	Logistics operational costs are efficiently managed.	3.55	.894
7.2	Wastage of relief items is minimized during operations.	3.70	.918
7.3	Transportation and fuel resources are efficiently utilized.	3.51	.880
7.4	Resources are allocated efficiently during logistics operations.	3.57	.845
7.5	Grand Mean of Cost-effectiveness	3.5845	.79734

Source: Own Computation May, 2026

Lead Time: LT had a grand mean of 3.67, which falls in the high efficiency range as shown in Table 4.5, these findings indicate that from the TAM point of view, ICT tools are seen as useful for delivery timeliness but have not yet been able to fully overcome systemic delays in the logistics chain at the previous stages. The results highlight the importance of more comprehensive ICTs in the entire procurement-to-delivery process to ensure uniform lead time reductions at EDRMC.

Coordination: Table 4.5 indicates that Coordination had the highest grand mean of 3.72, which indicates that the operational capacity of EDRMC is the strongest in the field of information exchange through ICTs. The results from the Resource Based View highlight the value of coordination that can be created through communication platforms and information systems when they are well integrated into the organizational processes. The results of these investments

have resulted in measurable coordination benefits at EDRMC, and continued system integration will likely continue to minimize duplication and improve operational alignment.

Information Accuracy: Table 4.5 shows that Information Accuracy had the greatest grand mean (3.67). This indicates that the logistical data at EDRMC is generally accurate and reliable. From the TAM perspective, workers appear to consider ICT tools beneficial for data entry at a daily level, but less confident on their outputs for higher level management choices. More rigorous data validation and standardization of reporting formats would further increase ICT's contribution to evidence-based humanitarian logistics management.

Visibility: The data reported in Table 4.5 shows that highly visible by recording grand mean of 3.70, which means that EDRMC has a solid ability to monitor and track relief supplies throughout its logistics chain. From a Dynamic Capability Theory perspective, visibility could be a critical capability that enables humanitarian logistics managers to perceive and respond to supply bottlenecks more rapidly. The findings indicate that ICT has a meaningful contribution to supply chain visibility, and that the more investment is made in integrated inventory systems, the more this dimension will be enhanced.

Responsiveness: The grand mean for Responsiveness was highest which recorded 3.67, indicating that EDRMC's overall ability to respond promptly to the changing operational conditions in emergencies. In the context of Dynamic Capability Theory, responsiveness is the ability of the organization to reconfigure its resources when operational demands shift quickly and unpredictably.

Last-Mile Delivery: As shown in Table 4.5, Last-Mile Delivery recorded the high rang somehow with grand mean of 3.46 confirming it as the most persistent operational challenge within EDRMC's humanitarian logistics system. Last-mile delivery therefore represents the most urgent area for targeted ICT investment and operational improvement at EDRMC.

Cost-effectiveness: The findings in Table 4.5 show Cost-Effectiveness recorded a grand mean of 3.58, within the highly cost-effective. These findings indicate meaningful scope for deeper ICT-driven resource optimization, particularly in transportation and logistics cost management at EDRMC.

4.6. Overall Humanitarian Logistics Efficiency Practices Summary

Table: 4.6. Overall Humanitarian Logistics Efficiency Summary (N=74)

Variables	Mean	Std. Deviation
Coordination	3.72	.764
Visibility	3.70	.761
Information Accuracy	3.67	.690
Lead Time	3.67	.711
Responsiveness	3.67	.800
Cost Effectiveness	3.58	.797
Last-Mile Delivery	3.46	.851
Grand Mean of Humanitarian Logistics Efficiency	3.64	.434

Source: Own Computation May, 2026

The overall grand mean of 3.64 in Table 4.6 confirms that EDRMC operates at a high level of humanitarian logistics efficiency. Coordination ranked highest (3.72) and Last-Mile Delivery ranked lowest (3.46), confirming that ICT investments have been most successful in strengthening information flows and coordination, while last-mile delivery and cost-effectiveness require further attention. Targeted improvement of last-mile delivery and cost management would meaningfully raise overall logistics efficiency at the commission.

4.7. Information Communication Technology Challenges (Barriers) at EDRMC

Table: 4.7. Information Communication Technology Challenges (Barriers) at EDRMC(N=74)

No	Variables	Mean	Std. Deviation
1.	**Limited Training and User Capacity**		
1.1	Staff have limited technical skills to effectively use ICT systems in humanitarian logistics operations.	3.18	.881
1.2	Employees receive insufficient training on the use of digital logistics systems.	3.32	.908
1.3	Limited user knowledge affects the effective utilization of ICT systems in logistics operations.	3.19	.839

1.4	Lack of staff confidence affects the use of ICT tools during emergency response operations.	3.16	.980
1.5	Grand Mean of Training and User Capacity	3.2128	.74448
2.	**Infrastructural Constraints**	**Mean**	**Std. Deviation**
2.1	Poor internet and network connectivity affect humanitarian logistics operations.	3.55	.938
2.2	The organization lacks adequate ICT infrastructure to support logistics activities.	3.38	.871
2.3	Frequent technical interruptions affect the use of ICT systems in logistics operations.	3.32	.862
2.4	ICT hardware and technical resources are insufficient for operational needs.	3.30	.903
2.5	Grand Mean of Infrastructure Constraints	3.3885	.70970
3.	**Poor System Integration and Interoperability**	**Mean**	**Std. Deviation**
3.1	Different ICT systems used within the organization are not effectively integrated.	3.23	.915
3.2	Information sharing across departments through ICT systems is inefficient.	3.26	.866
3.3	The Early Warning System (EWS) is not well integrated with logistics and warehouse management systems.	3.08	.840
3.4	Lack of interoperability between ICT systems affects humanitarian logistics operations.	3.15	.886
3.5	Grand Mean of Organizational Readiness	3.1791	.71256
4.	**Low Organizational ICT Readiness**	**Mean**	**Std. Deviation**
4.1	The organization is not adequately prepared to utilize ICT systems in humanitarian logistics operations.	2.82	.800
4.2	Management support for ICT implementation in logistics activities is limited.	2.85	.806
4.3	Organizational policies and procedures do not adequately support the effective use of ICT systems.	2.68	.967

4.4	The organization shows low readiness toward the adoption of digital technologies in humanitarian logistics operations.	2.88	.921
4.5	Grand Mean of Organizational Readiness	2.8074	.68315

Source: Own Computation May, 2026

Training and User Capacity: As table 4.7 indicates that the Training and User Capacity is a moderate severity of ICT barrier at EDRMC with a grand mean of 3.21. The TAM perspective is that inadequate training results in a lower perceived ease of use, which means that the system is not used by all operational units, or that it is not used consistently. It is therefore a strategic priority for logistics and field operations personnel at EDRMC to have structured and continuous digital skills development programs.

Infrastructure Constraints: The most significant ICT barrier at EDRMC is Infrastructure Constraints with high severity of a grand mean is 3.39 as presented in Table 4.7. The results indicate that investments in offline-capable systems and backup communication tools are necessary to ensure the success of the ICT adoption in terms of reliable operational outcomes.

System Integration Issue: Table 4.7 indicates that the problems of integrating systems is a big problem at EDRMC with an average score of 3.18. These gaps hinder the operational value of the ICT tools when they are used individually and limit the organization's ability to coordinate logistics decisions based on data across units. The integration of EWS, LIS and warehouse systems could be improved to better enable EDRMC to coordinate humanitarian logistics.

Organizational ICT Readiness: The results presented in Table 4.7 indicate that the lowest score of the entire issues is the Organizational Readiness with an average score of 2.81, meaning that Organizational Readiness is the least challenging issue in the use of ICT at EDRMC. While this is a relatively light barrier, weak policy frameworks can prevent digital logistics practices from being consolidated in the long term if not addressed.

4.7.1. Overall ICT Challenges Summary at EDRMC

Table:4.8 Overall ICT Challenges Summary at EDRMC (N=74)

Variables	Mean	Std. Deviation
Infrastructure Constraints	3.3885	.70970

Training and User Capacity	3.2128	.74448
System Integration Issues	3.1791	.71256
Organizational Readiness	2.8074	.68315

Source: Own Computation May, 2026

The results show that Infrastructure Constraints (3.39) are the most important followed by Training and User Capacity (3.21), System Integration Issues (3.18) and Organizational Readiness (2.81) indicating that physical and human capacity constraints are more acute than institutional and technical integration issues. The relatively low Organizational Readiness score indicates that there is institutional will for ICT adoption, but that this must be translated into investments in infrastructure, capacity, and integration.

4.8. The Role of ICT Utilization on Humanitarian Logistics Efficiency

4.8.1. Pearson Correlation Analysis

This section discusses the Pearson correlation analysis between ICT utilizations and humanitarian logistics efficiency at EDRMC Pearson correlation was used to examine the direction and strength of the relationship between independent and dependent variables. The strength of the correlation is interpreted as r = 0.10–0.29 weak, r = 0.30–0.49 moderate, r = 0.50 and above strong (Cleophas & Zwinderman, 2018).

Table: 4.9. Correlation Analysis Between ICT Utilization and Humanitarian Logistics Efficiency (N=74)

Variables	ICT Utilization	Mean CO	Mean VI	Mean IA	Mean LT	Mean RE	Mean CE	Mean LMD
ICT Utilization	1							
Mean Coordination (CO)	.461**	1						
Mean Visibility (VI)	.347**	. .055	1					
Mean Information Accuracy (IA)	.296*	.207	-.032	1				
Mean Lead Time (LT)	.478**	.241*	.419**	.180	1			

Mean Responsiveness (RE)	.391**	-.052	.120	.149	.380**	1		
Mean Cost Effectiveness (CE)	.389**	.197	-.070	.263*	.248*	.245*	1	
Mean Last-Mile Delivery (LMD)	.618**	.332**	.241*	.136	.292*	.403**	.317**	1

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

**Correlation is significant at the 0.05 level (2-tailed).*

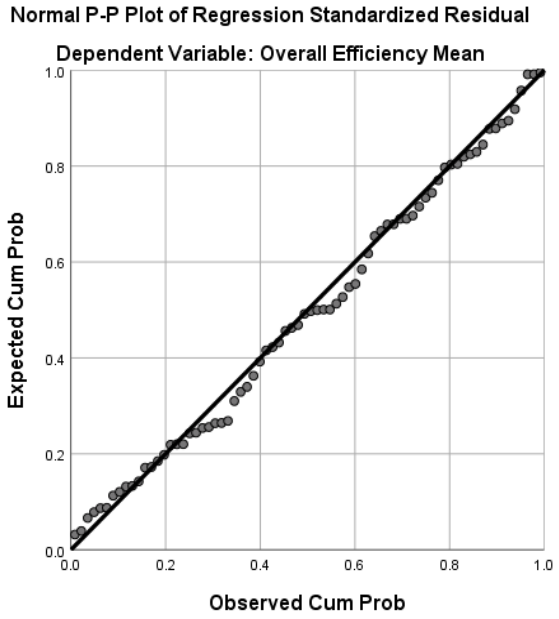
Source: Own Computation, 2026

4.9. Assumption Test

Multiple linear regression was conducted to examine the extent to which ICT utilization constructs predict humanitarian logistics efficiency at EDRMC. The five ICT sub-constructs LIS, GIS, EWS, MDC, and CCP were entered as independent variables, with overall Humanitarian Logistics Efficiency (EFF_Mean) as the dependent variable. The regression model is expressed as:

$$\textbf{\textit{HL Efficiency} } = \beta_0 + \beta_1(LIS) + \beta_2(GIS) + \beta_3(EWS) + \beta_4(MDC) + \beta_5(CCP) + \varepsilon$$

Figure 4: Test of the Linearity Assumption



4.9.1. Model Summary

Table: 4.10. Model Summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimates*
1	***.761[a]***	***.580***	***.549***	***.29165***

Source: Own Computation, 2026

The results presented in Table 4.10 show that the five constructs of ICT explain 58.0% of the variance in humanitarian logistics efficiency at EDRMC, with R = 0.761 and R Square = 0.580. This explanatory power is also confirmed by the Adjusted R Square of 0.549. The other 42% of variance is due to external factors like infrastructure variation, capacity of the staff and external factors beyond the scope of study. The results verify that the model is structurally valid and suitable for studying the individual and collective effects of each of the ICT constructs on humanitarian logistics efficiency.

4.9.2. ANOVA Results

*Table: 4.11. **ANOVA[a]** Table*

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	7.974	5	1.595	18.749	.000[b]
	Residual	5.784	68	.085		
	Total	13.759	73			

Source: Own Computation, 2026

The ANOVA results in Table 4.11 confirm that the regression model is statistically significant (F = 18.749, p = 0.000), validating that the five ICT constructs collectively and significantly predict humanitarian logistics efficiency at EDRMC. The high F-statistic confirms that the model explains substantially more variance than chance, establishing its predictive integrity and supporting the study's general objective. These results provide a strong statistical foundation for the coefficient-level analysis that follows.

4.9.3. Information Communication Technology Utilization on Humanitarian Logistics Efficiency

Table: 4.12. Information Communication Technology Utilization on Humanitarian Logistics Efficiency

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIF**

1	(Constant)	-.463	.439		-1.055	.295		
	Mean GIS	.232	.047	.392	4.960	.000	.989	1.011
	Mean of EWS	.213	.050	.338	4.274	.000	.990	1.010
	Mean MDC	.203	.051	.323	4.013	.000	.956	1.046
	Mean CCP	.240	.050	.380	4.770	.000	.974	1.026
	Mean LIS	.221	.060	.292	3.667	.000	.978	1.023
a. Dependent Variable: Overall Efficiency Mean								

Source: Own Computation, 2026

As presented in Table 4.12, all five ICT utilization constructs were found to have a statistically significant and positive influence on humanitarian logistics efficiency at EDRMC, with all significance values at p = 0.000. The findings are interpreted as follows.

The role of Information Communication Technology utilization in terms of Geographic Information Systems (GIS) adoption was found to have a significant and positive influence on the efficiency of humanitarian logistics operations by 39.2 percent (β = 0.392, t = 4.960, p = 0.000). This indicates that GIS contributes most strongly to humanitarian logistics efficiency among all five ICT tools, particularly through its role in spatial planning, route mapping, and field coordination.

The role of Information Communication Technology utilization in terms of Communication and Collaboration Platforms (CCP) adoption was found to have a significant and positive influence on the efficiency of humanitarian logistics operations by 38.0 percent (β = 0.380, t = 4.770, p = 0.000). This highlights the importance of digital communication platforms in facilitating coordination and information exchange amongst departments in EDRMC's logistical operations.

The results indicated that the role of Information Communication Technology utilization in the adoption of Early Warning Systems (EWS) had a substantial and favorable effect on the efficiency of humanitarian logistical operations by 33.8 percent (β = 0.338, t = 4.274, p = 0.000). This finding emphasizes the use of early warning information in early logistical planning and the mobilization of resources in a timely manner before events escalate.

The implementation of Mobile Data Collection Tools (MDC) of Information Communication Technology (ICT) was found to have a substantial and favorable influence on the efficiency of humanitarian logistics operations by 32.3 percent (β = 0.323, t = 4.013, p = 0.000). This suggests

that the use of mobile-based field reporting systems can greatly enhance data accuracy and operational responsiveness in humanitarian operations.

The use of Information Communication Technology in terms of LIS adoption was found to significantly and positively improve the efficiency of humanitarian logistics operations by 29.2 percent ($\beta = 0.292$, $t = 3.667$, $p = 0.000$). This indicates that logistics information systems assist to increasing efficiency by improving inventory control, data updates, and logistics decision support at EDRMC.

Regarding multicollinearity, all VIF values ranged from 1.010 to 1.046, much below the allowed limit of 5.0, which confirms that there is no multicollinearity concern among the five predictor variables. This confirms the independence and reliability of the contribution of each predictor to the regression model.

In summary, the regression results demonstrate that all five ICT utilization characteristics are statistically significant and positive predictors of humanitarian logistics efficiency at EDRMC. Among them, Geographic Information Systems and Communication and Collaboration Platforms were the two strongest predictors, together confirming that spatial planning capabilities and digital coordination tools yield the greatest efficiency returns in EDRMC's humanitarian logistics system.

The five ICT constructs together account for 58.0% of the variance in humanitarian logistics efficiency, but the remaining 42.0% is due to other factors not included in this model. These can be factors such as staff experience, leadership, donor funding, institutional changes and more. The results of the regression should therefore be interpreted as indicative of a significant association between ICT utilization and logistics efficiency, but not as an exhaustive explanation of logistics performance at EDRMC.

4.10. The Role of ICT in Supporting Logistics Decision-Making at EDRMC

Table: 4.13. The Role of ICT in Supporting Logistics Decision-Making at EDRMC (N=74)

Variables	Mean	Std. Deviation
LIS provides timely information that supports logistics decision-making (LIS4)	3.86	.728
Logistics data used for decision-making is of good quality (AC3)	3.54	.744
Grand Mean	3.70	

Source: Own Computation, May 2026

Table 4.26 shows that the utilization of Information Communication Technology in Logistics Information Systems (LIS) was determined to have a good impact to logistics decision making support at EDRMC with a mean score of 3.86. This result is in the high range and demonstrates that Logistics Information Systems give timely and relevant information that helps logistics personnel to take better operational decisions directly during emergency circumstances.

The use of Information Communication Technology in terms of data quality for decision making (AC3) has a mean score of 3.54 which is similarly in the upper range. This implies that the logistics data produced by the ICT system at EDRMC is generally of good quality to support decision-making needs. However, the comparatively lower score suggests that further improvement in data quality is still needed to fully support strategic and management-level resource allocation decisions within the organization.

The overall grand mean of 3.70 confirms that ICT tools at EDRMC provide timely and good quality information that supports evidence-based logistics decision-making during humanitarian operations.

4.10.1. Model Summary

Table 4.14: ICT Utilization on Supporting Logistics Decision-Making at EDRMC (N=74)

Model	***R***	***R Square***	***Adjusted R Square***	***Std. Error of the Estimates***
1	***. 649[a]***	***.421***	***.378***	***.39657***

Source: Own Computation, May 2026

The results of the Model Summary table show that the five ICT components explain 42.1% of the variance in logistical decision making at EDRMC with R = 0.649 and R Square = 0.421. The Adjusted R Square of 0.378 further supports this explanatory power. The remaining 57.9% of the

variance is due to external factors, such as corporate culture, staff experience, and contextual factors not covered in this study. The results validate the structural validity and applicability of the model to examine the individual and combined effects of each dimension of ICTs on the logistical decision-making support of EDRMC.

4.10.2. ANOVA Results

Table: 4.15. ANOVAa Table (N=74)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.765	5	1.553	9.875	.000[b]
	Residual	10.694	68	.157		
	Total	18.459	73			

Source: Own Computation, May 2026

The ANOVA results indicate that the five dimensions of ICT collectively and significantly predict logistical decision-making support at EDRMC, and that the regression model is statistically significant (F = 9.875, p = 0.000). The significant F statistic verifies that the model is predictive and the fourth particular objective of the study is confirmed. The subsequent coefficient-level analysis has a solid statistical basis thanks to these findings.

4.10.3. Information Communication Technology Utilization on Supporting Logistics Decision-Making at EDRMC

Table 4.16: ICT Utilization on Supporting Logistics Decision-Making at EDRMC (N=74)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.238	.596		2.075	.042
	Mean GIS	.105	.064	.154	1.658	.102
	Mean of EWS	-.177	.068	-.242	-2.612	.011
	Mean MDC	.079	.069	.108	1.148	.255
	Mean CCP	.143	.069	.196	2.091	.040
	Mean LIS	.518	.082	.590	6.320	.000

a. Dependent Variable: DM_Mean

Source: Own Computation, May 2026

As presented in the Coefficients table, not all five ICT utilization constructs were found to have a statistically significant influence on logistics decision-making support at EDRMC. The findings are interpreted as follows.

The role of Information Communication Technology utilization in terms of Logistics Information Systems (LIS) adoption was found to have a significant and positive influence on logistics decision-making support by 59.0 percent ($\beta = 0.590$, $t = 6.320$, $p = 0.000$). This means that LIS plays the most important role in logistics decision making among all five ICT tools, especially in delivering timely, structured and reliable logistics data directly to support logistics decisions during emergency response operations.

The adoption of Communication and Collaboration Platforms (CCP) was also discovered to have a significant and positive influence on logistics decision-making support with 19.6 percent ($\beta = 0.196$, $t = 2.091$, $p = 0.040$). This underscores the significance of digital communication platforms in supporting information sharing and joint decision-making across various departments in EDRMC's logistics processes.

The use of ICTs for EWS, however, was identified as having a negative and significant effect on logistics decision-making support ($\beta = -0.242$, $t = -2.612$, $p = 0.011$). This is an unexpected finding that indicates that in the field of decision-making in particular, EWS information may not be directly used to make logistics decisions at the operational level, which is likely due to the lack of integration between the EWS platforms and logistics information systems at EDRMC.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the summary, conclusions, and recommendations developed from the finding of the study. Based on the results/findings obtained from the study the following summary, conclusions and recommendations has been given.

5.1. SUMMARY

This study was conducted to examine the role of Information and Communication Technology (ICT) in enhancing humanitarian logistics efficiency decision-making within the Ethiopian Disaster Risk Management Commission (EDRMC). The study was conducted on employees of the EDRMC who are directly engaged in humanitarian logistics and ICT-supported operations at headquarters and selected operational locations.

- Concerning the use of ICT, all five ICT technologies investigated in this research were highly used in EDRMC's humanitarian logistics activities. Early Warning Systems (EWS) with grand mean of 3.76 was the most utilized, followed by Communication and Collaboration Platforms (CCP) with 3.75, Logistics Information Systems (LIS) with 3.72, Mobile Data Collection Tools (MDC) with 3.67 and Geographic Information Systems (GIS) with 3.58. The overall grand mean of ICT use was 3.69. This affirms that EDRMC actively and regularly utilizes all the five ICT instruments in its humanitarian logistics operations.
- The study indicated that EDRMC has a high efficiency in all seven dimensions examined with regard to the efficiency of humanitarian logistics. The grand mean for Coordination was 3.72, Visibility was 3.70, Information Accuracy was 3.67, Lead Time was 3.67 and Responsiveness was 3.67. Cost-effectiveness had the highest mean (3.58), while Last-Mile Delivery had the lowest mean (3.46). The overall grand mean for efficiency of humanitarian logistics was 3.64. This indicates that while ICT has contributed favorably to most of the efficiency factors, last mile delivery is the greatest persistent operational difficulty at EDRMC.
- Regarding the relationship between ICT utilization and humanitarian logistics efficiency, a strong positive and statistically significant correlation was found between the two variables ($r = 0.760$, $p < 0.01$). The multiple linear regression results further confirmed that the five

ICT constructs collectively explain 58.0% of the variance in humanitarian logistics efficiency ($R^2 = 0.580$, $F = 18.749$, $p = 0.000$). All five ICT tools were found to be significant positive predictors of efficiency. Geographic Information Systems emerged as the strongest predictor (Beta = 39.2%), followed by Communication and Collaboration Platforms (Beta = 38.0%), Early Warning Systems (Beta = 33.8%), Mobile Data Collection Tools (Beta = 32.3%), and Logistics Information Systems (Beta = 29.2%).

- In the case of ICT challenges, the study revealed moderate level of overall barriers to the effective use of ICT at EDRMC having an overall grand mean of 3.15. Infrastructure Constraints was the most important constraint at 3.39, with poor internet and network connectivity at 3.55. Training and User Capacity was the second most common with a mean of 3.21, and the System Integration Issues ranked third with a mean of 3.18. Organizational Readiness had the lowest mean of challenge, which is 2.81, suggesting that there is some level of readiness among institutions to implement ICTs, but that readiness has not been fully backed by specific policies and structures.
- In terms of ICT and logistics decision-making support, the regression analysis results indicated that the five constructs of ICT collectively accounted for 42.1% of the variance in the logistics decision-making at EDRMC ($R^2 = 0.421$, $F = 9.875$, $p = 0.000$). Logistics Information Systems and Communication and Collaboration Platforms were the most significant predictors (Beta = 59.0% and 19.6%, respectively). The early warning systems had a significant but negative effect (Beta = -24.2%), and GIS and MDC were not significant predictors of decision making. The overall descriptive grand mean of 3.70 also indicates that the information provided by the ICT tools at EDRMC is timely and of good quality, and helps to make logistics decisions based on evidence during humanitarian operations.

5.2. CONCLUSIONS

Based on the findings of this study, the following conclusions are drawn;

- EDRMC's humanitarian logistics operations are conducted at a high level with all five ICT tools: Logistics Information Systems, Geographic Information Systems, Early Warning Systems, Mobile Data Collection Tools and Communication and Collaboration Platforms. This indicates that ICT is widely used in the organization's core logistics

activities, such as planning, coordinating, reporting from the field and emergency preparedness.

- The Pearson correlation coefficient ($r = 0.760$, $p < 0.01$) and regression analysis ($R^2 = 0.580$, $F = 18.749$, $p = 0.000$) both showed that the utilization of ICTs has a strong, positive, and statistically significant effect on humanitarian logistics efficiency at EDRMC. This validates the link between investment and improvement in the use of ICTs and humanitarian logistics performance at EDRMC.
- Geographic Information Systems and Communication and Collaboration Platforms are the two strongest individual predictors of humanitarian logistics efficiency with Beta values of 39.2% and 38.0% respectively. This underscores the vital importance of spatial planning and digital coordination tools in delivering efficiencies in logistics in EDRMC's humanitarian activities.
- Among the seven efficiency dimensions, the most positively supported areas by ICT adoption in the area are Coordination and Visibility, while the weakest performance areas are Last-Mile Delivery and Cost-Effectiveness. Last mile delivery performance is lower as a result of underutilization of GIS, infrastructure limitations, and the geographic challenges of reaching remote populations in Ethiopia.
- The regression analysis for logistics decision-making support ($R^2 = 0.421$, $F = 9.875$, $p = 0.000$) showed that Logistics Information Systems was the most important predictor (Beta = 59.0%), while Communication and Collaboration Platforms was the second most important predictor (Beta = 19.6%). The results for EWS were significant, and negative (Beta = -24.2%), suggesting that EWS data is not yet fully utilized by logistics decision makers at EDRMC. The contribution of GIS and MDC was not significant, indicating that they are not used at the management level for decision support, but rather in the field during execution.

5.3. RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are provided to the EDRMC and relevant stakeholders.

- Strengthen ICT infrastructure across all operational levels: EDRMC should prioritize investments in reliable internet connectivity, backup communication systems, and

offline-capable digital platforms, particularly for sub-regional offices and field operations. Since Infrastructure Constraints ranked as the most significant barrier to ICT effectiveness, addressing connectivity gaps will have the greatest direct impact on improving the reliability and consistency of ICT utilization across the organization.

- Expand and institutionalize digital skills training: Structured and ongoing training programs on digital logistics systems should be developed and regularly delivered to all staff involved in humanitarian logistics, supply chain, warehouse, transport, and field operations. Training should be treated as a continuous organizational practice rather than a one-time event, with special attention given to building staff confidence in using ICT tools during emergency situations.
- Improve system integration and interoperability: EDRMC should invest in technically integrating its Early Warning Systems with Logistics Information Systems and warehouse management platforms to enable seamless data flow from hazard detection through to logistics mobilization. A unified digital logistics ecosystem would substantially strengthen coordinated humanitarian response at EDRMC.
- Expand the use of GIS in last-mile delivery planning: Geographic Information Systems (GIS) was the strongest predictor of humanitarian logistics efficiency, but the lowest in terms of current use, so EDRMC should expand the use of GIS in last-mile delivery planning, hard-to-reach area mapping, and route optimization for remote distribution activities. There are substantial efficiency gains to be reaped from targeted capacity development and wider use of GIS tools, especially for improving the performance of last-mile delivery.
- Improve ICT-based decision-making systems: EDRMC should focus on enhancing the quality and availability of logistics information produced by ICT systems to facilitate evidence-based decision making at the management level. Logistics Information Systems and Early Warning Systems need to be reinforced with data validation and standardization mechanisms. Increased operational decision-making speed and accuracy during emergency response would be achieved by connecting real-time field data from Mobile Data Collection Tools directly to coordination dashboards.
- Improve EWS integration with logistics decision making systems: EWS had a negative impact on decision making support, EDRMC should be implementing structured data

linkages between EWS and Logistics Information Systems, to ensure that the outputs of EWS are directly used for resource allocation and operational planning decisions. Standardizing the process of translating early warning information into logistics decisions would fill this gap in integration and enhance evidence-based decision making at EDRMC.

5.4. Suggestions for Future Research

This study focused on EDRMC headquarters and selected regional branches. Future research may consider extending the study to cover woreda-level operations and external humanitarian actors operating within Ethiopia to provide a more comprehensive picture of ICT's role in humanitarian logistics. Additionally, future studies could employ qualitative or mixed methods approaches to explore in greater depth the contextual factors that influence the relationship between ICT utilization and humanitarian logistics efficiency. Longitudinal studies tracking changes in ICT adoption and efficiency over time would also add significant value to the growing body of knowledge on ICT-enabled humanitarian logistics in developing country settings.

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Annex 1: Questionnaire

Addis Ababa University

School of Commerce

Department of Logistics and Supply Chain Management

Information sheet for participants of the questionnaire

Dear Sir/Madam,

This survey is designed to obtain practical data for the study entitled "***The Role of Information and Communication Technology (ICT) in Enhancing Humanitarian Logistics Efficiency and Decision-Making: The Case of the Ethiopian Disaster Risk Management Commission (EDRMC)''*** **for the partial fulfillment of master's degree in Logistics and Supply Chain Management**. You are requested to spare few minutes of your precious time to complete all the items. The study will involve employees of the Ethiopian Disaster Risk Management Commission (EDRMC) who are engaged in logistics, supply chain, and ICT-related activities. The fact that the answers for the questions will be treated as anonymous and the response will be confidential there is no known risk involved by being part of the study. This is completely a voluntary participation and you can withdraw anytime regardless of any reason you may have.

For further information you can contact me through cell number +251969388401 or wzemachu@gmail.com

Thank you very much!

Zemachu Worku

Email: wzemachu@gmail.com

Part I: Background Information

Please put "√" mark on the box below

1. Gender

Male ☐ Female ☐

2. Age Group

Below 25 ☐ between 25–35 ☐ More than 36 ☐

3. Educational Level

Certificate ☐ Diploma ☐ BA/BSC ☐ MA/MSC ☐ PhD ☐

4. Years of Work Experience (Years)

Less than 2 ☐ between 2–5 ☐ 6–10 years ☐ More than 10 ☐

5. Department/Unit

Logistics ☐ Supply Chain ☐ Warehouse ☐ Transport ☐

ICT ☐ Operations ☐ Other: _____

6. Level of Involvement in Humanitarian Logistics Operations

☐ Low ☐ Moderate ☐ High

7. Level of Involvement with ICT Systems

☐ Low ☐ Moderate ☐ High

Part II: ICT Utilization

Please put "√" mark on the box below that best represents your opinion about Use of digital systems for tracking, updating, and coordinating logistics data

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

No	Statement	Scale				
6.	**Logistics Information Systems (LIS/LMIS)**	**1**	**2**	**3**	**4**	**5**
1.1	Logistics Information Systems (LIS) are used to track inventory levels and relief supplies.					
1.2	Logistics data is regularly updated in digital systems.					
1.3	LIS supports coordination between warehouses and transport units.					
1.4	LIS provides timely information that supports logistics decision-making during emergency response operations.					
7.	**Geographic Information Systems (GIS)**	**1**	**2**	**3**	**4**	**5**
2.1	GIS tools are used to map disaster-affected areas for logistics planning.					
2.2	GIS supports route planning for the distribution of relief supplies.					
2.3	GIS helps identify hard-to-reach locations.					
2.4	GIS improves coordination of field logistics operations.					
8.	**Early Warning Systems (EWS)**					
3.1	Early warning information is used in logistics planning activities.					
3.2	EWS supports the pre-positioning of relief supplies before emergencies occur.					
3.3	EWS helps reduce delays in mobilizing logistics resources.					
3.4	EWS improves the preparedness of logistics operations for emergency response.					
9.	**Mobile Data Collection Tools**	**1**	**2**	**3**	**4**	**5**
4.1	Field teams use mobile data collection tools to report needs and logistics-related information.					
4.2	Mobile tools improve the speed of information sharing between field teams and coordination units.					

4.3	Mobile tools improve the accuracy of logistics data collected from the field.					
4.4	Mobile tools support real-time updates from field operations.					
10.	**Communication and Collaboration Platforms**	**1**	**2**	**3**	**4**	**5**
5.1	Digital platforms are used to coordinate logistics activities.					
5.2	ICT tools improve communication between headquarters and field teams.					
5.3	Digital platforms reduce information gaps between logistics units and departments.					
5.4	Collaboration platforms improve teamwork in logistics operations.					

Part III: Humanitarian Logistics Efficiency

Please put "√" mark on the box below that best represents your opinion whereas,

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

No	Statement	Scale				
8.	**Lead Time**	**1**	**2**	**3**	**4**	**5**
1.1	Relief items are delivered within the required time during emergency operations.					
1.2	Procurement and distribution processes are completed in a timely manner.					
1.3	Delays in humanitarian logistics operations are minimized.					
9.	**Coordination**	**1**	**2**	**3**	**4**	**5**
2.1	Coordination among departments involved in humanitarian logistics operations is effective.					
2.2	Duplication of logistics activities across units is minimized.					
2.3	Information sharing among departments and field units is effective.					
10.	**Information Accuracy**	**1**	**2**	**3**	**4**	**5**
3.1	Logistics information used for operations is accurate and reliable.					

3.2	Errors in logistics reporting are minimal.					
3.3	Logistics data used for decision-making is of good quality.					
11.	**Visibility**	**1**	**2**	**3**	**4**	**5**
4.1	Stock levels and shipments are easily monitored during operations.					
4.2	Relief items can be tracked throughout the distribution process.					
4.3	Inventory levels across locations are clearly visible.					
12.	**Responsiveness**	**1**	**2**	**3**	**4**	**5**
5.1	The organization responds quickly during emergencies.					
5.2	Logistics plans are adjusted rapidly during changing situations.					
5.3	Humanitarian logistics operations are flexible during emergencies.					
13.	**Last-Mile Delivery**	**1**	**2**	**3**	**4**	**5**
6.1	Delivery challenges in remote areas are identified effectively.					
6.2	Final distribution activities are properly planned.					
6.3	Last-mile distribution activities are effectively monitored.					
14.	**Cost-effectiveness**	**1**	**2**	**3**	**4**	**5**
7.1	Logistics operational costs are efficiently managed.					
7.2	Wastage of relief items is minimized during operations.					
7.3	Transportation and fuel resources are efficiently utilized.					
7.4	Resources are allocated efficiently during logistics operations.					

Part IV: Information Communication Technology (ICT) Challenges (Barriers)

Please put "√" mark on the box below that best represents your opinion whereas,

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

5.	**Limited Training and User Capacity**	**1**	**2**	**3**	**4**	**5**
1.1	Staff have limited technical skills to effectively use ICT systems in humanitarian logistics operations.					
1.2	Employees receive insufficient training on the use of digital logistics systems.					

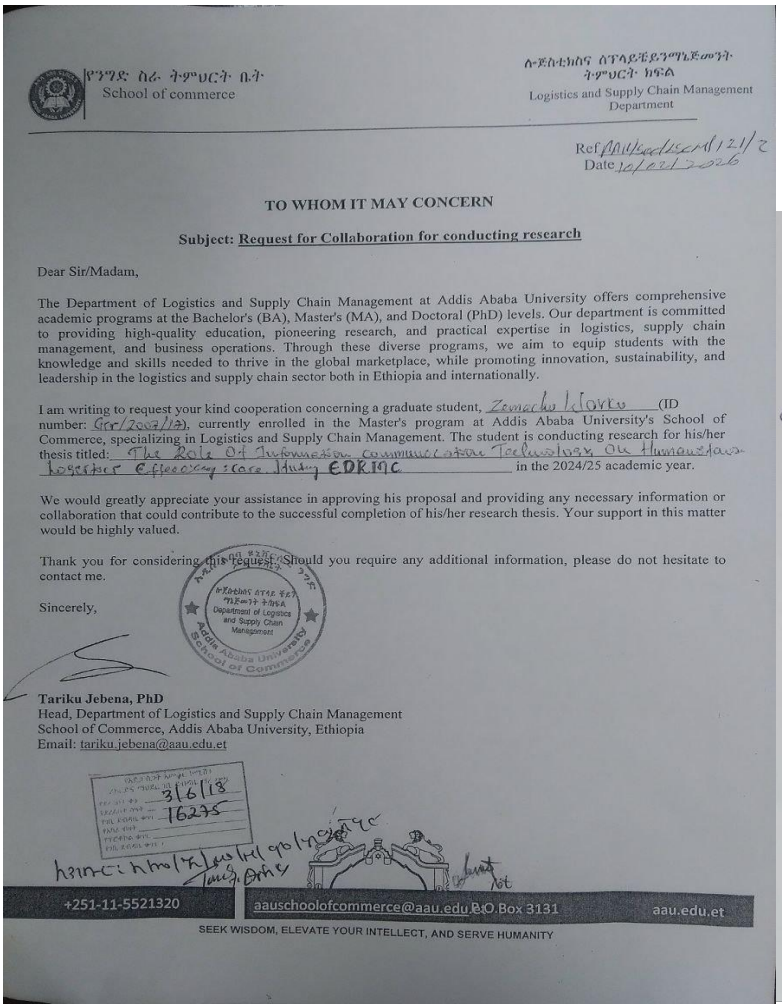
1.3	Limited user knowledge affects the effective utilization of ICT systems in logistics operations.					
1.4	Lack of staff confidence affects the use of ICT tools during emergency response operations.					
6.	**Infrastructural Constraints**					
1.1	Poor internet and network connectivity affect humanitarian logistics operations.					
1.2	The organization lacks adequate ICT infrastructure to support logistics activities.					
1.3	Frequent technical interruptions affect the use of ICT systems in logistics operations.					
1.4	ICT hardware and technical resources are insufficient for operational needs.					
7.	**Poor System Integration and Interoperability**					
3.1	Different ICT systems used within the organization are not effectively integrated.					
3.2	Information sharing across departments through ICT systems is inefficient.					
3.3	The Early Warning System (EWS) is not well integrated with logistics and warehouse management systems.					
3.4	Lack of interoperability between ICT systems affects humanitarian logistics operations.					
8.	**Low Organizational ICT Readiness**					
4.1	The organization is not adequately prepared to utilize ICT systems in humanitarian logistics operations.					
4.2	Management support for ICT implementation in logistics activities is limited.					
4.3	Organizational policies and procedures do not adequately support the effective use of ICT systems.					

4.4	The organization shows low readiness toward the adoption of digital technologies in humanitarian logistics operations.					

Part IIV: Any Additional comments to be considered

Please provide any additional comments related to ICT use and humanitarian logistics efficiency at Ethiopian Disaster Risk Management Commission (EDRMC):_____

Annex 2: Data Collection Permission Letter



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School of commerce

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Logistics and Supply Chain Management Department

Ref AAU/Sed/SCM/121/2
Date 10/02/2026

TO WHOM IT MAY CONCERN

Subject: Request for Collaboration for conducting research

Dear Sir/Madam,

The Department of Logistics and Supply Chain Management at Addis Ababa University offers comprehensive academic programs at the Bachelor's (BA), Master's (MA), and Doctoral (PhD) levels. Our department is committed to providing high-quality education, pioneering research, and practical expertise in logistics, supply chain management, and business operations. Through these diverse programs, we aim to equip students with the knowledge and skills needed to thrive in the global marketplace, while promoting innovation, sustainability, and leadership in the logistics and supply chain sector both in Ethiopia and internationally.

I am writing to request your kind cooperation concerning a graduate student, Zemecho Worku (ID number: Gsr/2007/17), currently enrolled in the Master's program at Addis Ababa University's School of Commerce, specializing in Logistics and Supply Chain Management. The student is conducting research for his/her thesis titled: The Role Of Information Communication Technology On Humanitarian Logistics Efficiency: Case Study EDRMC in the 2024/25 academic year.

We would greatly appreciate your assistance in approving his proposal and providing any necessary information or collaboration that could contribute to the successful completion of his/her research thesis. Your support in this matter would be highly valued.

Thank you for considering this request. Should you require any additional information, please do not hesitate to contact me.

Sincerely,

Department of Logistics and Supply Chain Management
Addis Ababa University
School of Commerce

Tariku Jebena, PhD
Head, Department of Logistics and Supply Chain Management
School of Commerce, Addis Ababa University, Ethiopia
Email: tariku.jebena@aau.edu.et

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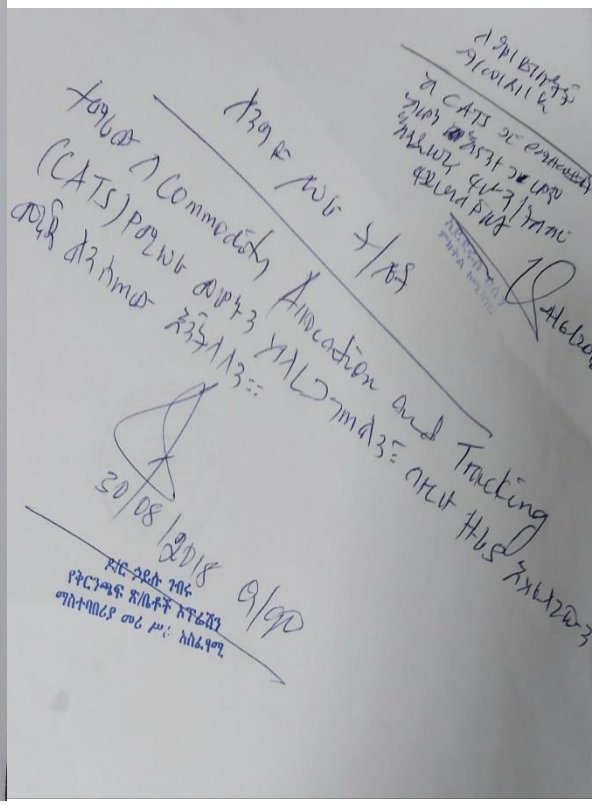

Commodity Allocation and Tracking (CATS)

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