The Role of Information Technology on the Performance of Humanitarian Supply Chain Management Practices: The case of United Nations High Commissioner for Refugees(UNHCR) Ethiopia

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Declaration

I hereby declare that this study entitled 'The Role of Information Technology on the Performance of Humanitarian Supply Chain Management Practices: The case of: United Nations High Commissioner for Refugees(UNHCR) Ethiopia' is my own work. All information in this research project has been gotten and displayed with scholastic rules and ethical conduct.

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Abbreviation and acronyms

HSCM: Humanitarian Supply Chain Management

HSCP: Humanitarian Supply Chain Performance

IT: Information Technology

UNHCR: United Nations High Commissioner for Refugees(UNHCR)

ERP: Enterprise Resource Planning

TOE: Technology-Organization- Environment

HOs: Humanitarian Organizations

Abstract

The primary objective of this study was to investigate the role of Information Technology (IT) in the supply chain management performance of humanitarian organizations, with a specific focus on the United Nations High Commissioner for Refugees (UNHCR) operations in Ethiopia. The study adopted causal research design, utilizing regression analysis as well as a descriptive research approach that included the analysis of means, frequency distributions, and simple percentage scores. to explain and analyze the collected data with the help of Statistical Program for Social Sciences (SPSS) tool. Target populations of the study were employees of UNHCR Ethiopia who are directly or indirectly involved in supply chain management activities. The researchers used a two-stage sampling method, where purposive sampling was used in the first stage to identify staff whose work is directly related to supply chain management and who possess relevant knowledge in this area. The study further used analytical approach of sample size determination with study's sample size of 111. The data was collected through an online survey distributed via email.The result of the research analysis presents a significant and positive relationship between supply chain management performance and IT usage. The study also showed that The two dimensions IT (ERP and Communication and collaboration tools) were generally confirmed to have a positive and significant effects on the dependent variable (supply chain performance) .The study recommends that UNHCR implement an Oracle Enterprise Resource Planning (ERP) system, as well as invest in advanced supply chain and collaboration tools to increase the supply chain performance.Future directives to additionally investigate the researchers recommend further investigations to explore additional determinants of IT-enabled supply chain management and performance in the humanitarian sector, as well as to identify different IT tools and technologies that can be leveraged to improve humanitarian supply chain management performance.

Key Words: Information Technology(IT), Supply Chain Management Performance, Supply Chain Management Practices, UHCR, Oracle ERP System, Supply Chain Visibility tools

CHAPTER ONE INTRODUCTION

1.1 Background of the study

At a global level, humanitarian organizations play a critical role in supporting vulnerable populations during crises. However, they face various challenges when it comes to delivering assistance and managing complex supply chains (Wassenhove, 2006). Across the African continent, humanitarian organizations like the United Nations High Commissioner for Refugees (UNHCR) play a crucial role in supporting displaced populations during emergencies. These organizations operate in multiple countries, facing the immense challenge of managing intricate supply chains to deliver essential aid and services in a timely and effective manner (UNHCR, 2022).

This challenge is particularly acute in countries like Ethiopia, which experiences frequent natural disasters and complex humanitarian crises. In such settings, managing supply chains efficiently is absolutely crucial to ensuring that life-saving assistance reaches those in desperate need (Alemu, 2018).One promising approach to addressing these formidable logistical obstacles is the strategic deployment of information technology (IT) solutions. Emerging research indicates that IT has significant potential to improve the efficiency and effectiveness of humanitarian supply chain operations (Altay *et al.*, 2023). Within the unique context of Ethiopia, a country with distinct humanitarian needs, organizations are already leveraging IT to enhance their supply chain practices (Lemma, 2022).

The UNHCR, as one of the key humanitarian actors on the African continent, faces the daunting task of managing complex supply chains to deliver essential aid and services to displaced populations. This is a critical challenge, as the UNHCR plays a vital role in supporting vulnerable communities during times of crisis (UNHCR, n.d.). Despite the promising developments in the use of IT solutions to address humanitarian supply chain challenges, a significant knowledge gap remains. There is a lack of research specifically examining the role of IT in the context of Ethiopian humanitarian organizations.

This study aims to address this gap by conducting an in-depth investigation into the impact and potential of IT solutions in improving humanitarian supply chain processes within the Ethiopian context. By focusing on this specific setting, the research seeks to provide valuable insights and tailored recommendations that can enhance the ability of humanitarian organizations operating in Ethiopia to deliver aid and services more effectively. The findings of this study have the potential to inform and guide the strategic deployment of IT tools and technologies, ultimately strengthening the resilience and responsiveness of humanitarian supply chains in Ethiopia and potentially serving as a model for other crisis-prone regions across the African continent.

1.2 Problem Statement

The staggering impact of natural hazards and disasters on a global scale underscores the critical importance of prompt and effective humanitarian response. In 2022 alone, 387 natural disasters were recorded worldwide, resulting in the tragic loss of 30,704 lives and affecting approximately 185 million individuals. The economic repercussions of these events amounted to around US$223.8 billion (Disasters in numbers, 2023). This evidence emphasizes the crucial role that humanitarian organizations play in reducing suffering and improving the lives of vulnerable populations.Despite recent economic progress, Ethiopia remains a largely impoverished nation heavily reliant on international aid for humanitarian assistance. The country is particularly vulnerable to the impacts of climate change, facing frequent and severe droughts, floods, and other natural disasters. These challenges, combined with population growth, deforestation, and land degradation, have significantly increased the risk of drought in Ethiopia.

A crucial aspect of humanitarian operations is the procurement of products and services, which accounts for approximately 65% of relief operation costs (Moshtari *et al.*, 2021). Ensuring the efficiency and effectiveness of these supply chain processes is paramount for humanitarian organizations. However, in Ethiopia, a country that frequently experiences complex humanitarian crises, many organizations struggle to fully leverage the potential of information technology (IT) to enhance their supply chain management.

In Ethiopia, the limited availability and utilization of information technology (IT) infrastructure impedes the ability of humanitarian organizations to collect real-time data and effectively share information across their supply chain networks (ACAPS, 2023). These technological limitations

undermine the ability of humanitarian organizations to respond swiftly and effectively to emergencies. There is a pressing need to explore how these organizations can harness the potential benefits of IT to bolster their capacity for saving lives.

Previous studies have highlighted the importance of IT in the context of humanitarian supply chain management. Capgemini Consulting (2018) emphasized the potential benefits of technological innovation in the field of humanitarian assistance, noting how it can help address the gap in humanitarian efforts. Moshtari *et al.* (2021) outlined the positive impact of IT on procurement management within humanitarian organizations, while Kumar Shrivastav and Bag (2023) discussed the role of IT-enabled humanitarian logistics. Additionally, Masudin *et al.* (2020) underscored the potential of IT in optimizing inventory warehousing and distribution processes.

The United Nations High Commissioner for Refugees (UNHCR), a key humanitarian actor in Africa, has implemented a strategy of global stock management aimed at enhancing the efficiency and reliability of aid delivery (Jahre *et al.,* 2016). However, challenges likely persist in ensuring timely deliveries and rapid response during emergencies. Potential limitations lie in two key areas: information technology (IT) and supply chain coordination.

Research has highlighted the need for decision-support tools within UNHCR's supply chain network design (Jahre *et al.,* 2016). This suggests that the trans-formative potential of digital technology remains largely untapped within the organization's operations. Bridging communication gaps, facilitating learning and work opportunities, and increasing access to essential services are some of the ways in which digital technology can enhance the UNHCR's humanitarian efforts (Digital transformation strategy 2022-2026, n.d.).

Given the critical importance of humanitarian response and the potential benefits of IT in this domain, there is a clear need for a comprehensive investigation into the role of information technology in improving the supply chain operations of humanitarian organizations in Ethiopia. Such a study would provide valuable insights and tailored recommendations to enhance the ability of these organizations to deliver aid and services more effectively, ultimately strengthening the responsiveness of humanitarian supply chains in Ethiopia and potentially serving as a model for other crisis-prone regions across the African continent.

1.3 Research Objectives

2.2.1 General Objective of the study

To investigate the role of information technology on the Performance of humanitarian supply chain management practices: In case of: United Nations High Commissioner for Refugees (UNHCR) Ethiopia.

2.2.1 Specific objectives of study

- To assess the humanitarian supply chain management practices of United Nations High Commissioner for Refugees (UNHCR) Ethiopia.(in-terms of procurement management, inventory management,ware house management, distribution management and transportation operations).
- To measure the humanitarian supply chain management performance of United Nations High Commissioner for Refugees (UNHCR) Ethiopia.(in-terms of reliability, responsiveness, flexibility, cost and asset management).
- To determine the role of information technology on the performance of humanitarian supply chain management of United Nations High Commissioner for Refugees (UNHCR) Ethiopia.

1.4 Research Questions.

- How humanitarian supply chain management is practiced at United Nations High Commissioner for Refugees (UNHCR) Ethiopia?
- What is humanitarian supply chain performance of United Nations High Commissioner for Refugees (UNHCR) Ethiopia?
- What is the role of IT on the humanitarian supply chain management performance of United Nations High Commissioner for Refugees (UNHCR) Ethiopia in-terms of reliability, responsiveness, flexibility, cost and asset management.

1.5 Significance of the Study

This research contributes to the academic knowledge and understanding of the role of Information Technology (IT) in supply chain management within humanitarian organizations. By exploring the specific impact of IT on procurement management, inventory management, warehousing and

distribution, and transportation operations, the study provides valuable insights to researchers, scholars, and students in the field of supply chain management, logistics, and humanitarian studies. It adds to the existing body of literature and serves as a foundation for further research and scholarly discussions.

The findings of this study hold relevance for policy-makers involved in shaping policies and regulations for humanitarian operations. By highlighting the positive impact of IT on supply chain processes, policy-makers can gain insights into the potential benefits of implementing IT solutions in the humanitarian sector. This knowledge can inform the development of guidelines and frameworks that promote the adoption and integration of IT systems and technologies within humanitarian organizations, ultimately leading to more efficient and effective aid delivery.Humanitarian organizations play a critical role in responding to crises and providing assistance to vulnerable populations. The study's findings offer practical implications for these organizations, helping them understand how IT can enhance their supply chain processes. By recognizing the positive impacts of IT on procurement management, inventory management, warehousing and distribution, and transportation operations, humanitarian organizations can make informed decisions regarding technology investments and system improvements. This can lead to improved operational efficiency, cost savings, better resource allocation, and ultimately, enhanced humanitarian outcomes.

Furthermore, the study provides insights that can guide humanitarian organizations in the selection, implementation, and utilization of IT solutions tailored to their specific needs and operational contexts. It offers practical recommendations for leveraging technology to overcome challenges, optimize processes, and deliver aid more effectively, thereby improving the overall impact and reach of humanitarian interventions.

1.6 Scope of the Study

The study focuses on Ethiopian humanitarian organizations, with a geographical scope limited to the Ethiopia. The research aims to investigate the role of Information Technology (IT) in specific supply chain processes, including procurement, inventory management, warehousing and distribution, and transportation operations. It’s important to note that the study is specifically centered on the humanitarian organization namely United Nations High Commissioner for Refugees (UNHCR) Ethiopia.

In terms of the time-frame, the study is delimited to a data collection period of one to two months. Within this time-frame, data will be gathered to analyze the impact of IT on the selected supply

chain processes in the context of Ethiopian humanitarian organizations.

While the study primarily examines the aforementioned supply chain processes, it acknowledges that there are additional processes involved in humanitarian operations. However, the conceptual scope of the study is focused on the specific areas of procurement, inventory management, warehousing and distribution, and transportation operations.This study focuses on the use of specific Information Technology (IT) solutions in the supply chain management of humanitarian organizations. Specifically, it examines the role and application of Enterprise Resource Planning (ERP) systems, Supply Chain Visibility tools, and Communication and Collaboration platforms within the humanitarian supply chain context.

By honing in on these processes, the research aims to provide valuable insights into how IT can improve the efficiency and effectiveness of supply chain management within Ethiopian humanitarian organizations.

1.7 Definition of Terms

Supply Chain Management: Supply Chain Management (SCM) oversees the entire production process, from acquiring raw materials to delivering the finished product directly to the customer.(Thomas and Kopczak, 2005).

Humanitarian Organizations: are entities that specialize in providing essential assistance and support to people affected by crises, such as natural disasters or conflict. (Kovács & Spens, 2007).

Emergency Response Programs (ERPs): are detailed strategies designed to safeguard communities and large populations from the devastating impacts of widespread crises affecting public health, safety, or well-being.(Fredrich et al., 2000).

Performance of Humanitarian Organizations' (HO): HO performance is the effective shared performance of a complex system of different humanitarian members, that engage in saving lives, alleviating suffering and maintaining human dignity both during and in the outcome of man-made crises and natural disasters, along with working to prevent and strengthen preparedness for the occurrence of such situations (Bölsche, 2013).

Supply Chain Operation Reference (SCOR) model: SCOR is an international cross industry, best practice benchmarking standard and framework established by the Supply Chain Council in 1997 (Georgise et al., 2012) and has now merged with APICS (formerly known as the American Production and Inventory Control Society) in 2014. SCOR is a comprehensive standard that is

aligned with modeling and mapping flows within a supply chain such as materials, infrastructure and financial (Long, 2014).

1.8 Organization of the Study

This research study is organized into five consecutive chapters. The first chapter establishes the background, problem statement, objectives, significance, scope, limitations and key definitions for the study.

The second chapter then presents a review of the relevant academic literature and prior research related to the topic.The third chapter outlines the specific research methodology employed in conducting this study.

Chapter four focuses on the analysis and findings derived from the data collected.Finally, the fifth and last chapter summarizes the overall study, draws conclusions, and provides recommendations based on the research.The full research document also includes a list of the reference materials consulted, as well as any questionnaires or other data collection instruments used

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1Introduction

The literature review section of this research proposal aims to explore the role of information technology in humanitarian supply chain processes, focusing specifically on the context of Ethiopian humanitarian organizations. By critically reviewing existing academic papers, reports, and case studies, this study seeks to identify the benefits, challenges, and best practices associated with the integration of IT in humanitarian supply chains in Ethiopia.

2.2Theoretical Framework of The Study

This study is based on Technology-Organization-Environment (TOE) Framework, Resource-Based View (RBV) and Diffusion of Innovations Theory.

2.2.1Technology-Organization-Environment (TOE) Framework:

The TOE framework explores the interaction between technological factors, organizational factors, and environmental factors in influencing the adoption and implementation of information technology in organizations.(Baker, 2011)In this research, the TOE framework could be used to examine how technological factors (e.g., IT infrastructure, IT capabilities), organizational factors (e.g., organizational structure, culture, and resources), and environmental factors (e.g., regulatory, political, and economic factors) impact the role and effectiveness of information technology in improving humanitarian supply chain processes.

2.2.2 Resource-Based View (RBV) Theory:

The RBV theory focuses on the firm's internal resources and capabilities as determinants of its competitive advantage. (Barney and 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 supply chain processes. The study could investigate the specific IT resources (e.g., IT infrastructure, information systems) and capabilities (e.g., IT management, IT integration) that enable organizations to effectively leverage information technology for improved humanitarian supply chain performance.

2.2.3Diffusion of Innovations Theory:

The Diffusion of Innovations theory explains how new ideas, technologies, or practices are adopted and spread within a social system. (Rogers, 2003) In this research, the theory could be used to analyze the adoption and diffusion of information technology in Ethiopian humanitarian

organizations' supply chain processes. It could explore the factors that influence the decision-making process of adopting IT solutions, the characteristics of IT innovations that make them more or less likely to be adopted, and the role of communication channels and social networks in spreading the use of IT within the organizations and across the humanitarian sector in Ethiopia.

After reviewing the above three studies, this study will be ground on the Technology-Organization-Environment (TOE) Framework, as it aligns with the research objective. The TOE frameworkallows for examining how organizational and environmental factors influence the implementation of IT solutions in supply chain practices, and how technological factors interact with organizational capabilities and the environment to impact supply chain performance. Analyzing this interplay will help determine the precise role of IT in enhancing UNHCR Ethiopia's humanitarian supply chain performance.

2.3 Theoretical Literature Review

2.3.1 Information Technology (IT)

Information Technology (IT) can be defined based on the contributions of various authors and articles, (Rainer *et al*., 2013) defined IT A computerized tool that individuals utilize to handle and facilitate the processing of information, serving the information and information-processing requirements of an organization.

According to McKeen and Smith (2014), IT refers to the use, development, and management of computer-based information systems. It involves the design, implementation, and maintenance of computer systems and networks, as well as the development of software applications to support organizational processes.

Laudon and Laudon (2013) explain IT as the various tools, technologies, and methods used to create, store, use, exchange, and secure information. It includes a wide range of technologies, such as computers, networks, databases, and software applications, that enable the processing and manipulation of data for organizational purposes.

Considering these definitions, Information Technology (IT) encompasses the hardware, software, and telecommunication components of an information system. It involves the use, development, and management of computer-based systems and technologies to create, store, process, and exchange information.

2.3.2 Humanitarian Supply Chain Practices

Humanitarian Supply chain Practices encompass a series of interconnected activities that enable the efficient flow of goods, services, and information from the point of origin to the point of consumption. Procurement management plays a crucial role in this process, involving the acquisition of raw materials, components, and services needed for production. As highlighted by (Monczka et al.,2019) effective procurement management involves supplier selection, negotiation, contract management, and supplier relationship development.

The management of the humanitarian supply chain has a significant impact on the humanitarian relief process.Humanitarian aid delivery is impacted by HSCM in terms of both timing and effectiveness. Beneficiaries benefit from improvements in the 11 supply chain. Better and faster responses to those in need are given by supply chains that are more prepared (Kovacs and Spen, 2007).

2.3.2.1 Procurement Management

The timely and sufficient distribution of relief supplies is essential for humanitarian groups to successfully save lives in crisis situations, according to research by Blecken and Hellingrath (2008). In order to provide recipients with the essential relief goods they have requested, the procurement function within the humanitarian supply chain is essential.In order to maximize the distribution, storage, and transit of these aid supplies, humanitarian groups use a variety of procurement decisions. It is estimated that around 65 percent of the total costs associated with disaster relief logistics are related to the procurement process. Relief supplies are propositioned in places close to disaster-prone areas to facilitate prompt delivery when needed. These procurement efforts can occur either during the disaster event or in the pre- disaster phase.

2.3.2.2 Inventory management

Inventory management is another critical aspect of the overall supply chain process, as it aims to strike a careful balance between meeting customer demand and minimizing holding costs. According to the research by Chopra and Meindl (2016), effective inventory management involves determining the optimal stock levels, implementing accurate forecasting techniques, and employing efficient inventory replenishment strategies.

Maintaining the right inventory levels is essential for ensuring the availability of critical supplies when and where they are needed most. Inventory management in the humanitarian context is

particularly complex, as organizations must contend with unpredictable demand patterns, sudden disaster events, and the need to preposition supplies in remote locations. Striking the right balance between holding too much inventory, which can lead to high storage and handling costs, and holding too little, which risks stockouts during crises, is a constant challenge.

2.3.2.3 Warehouse management

Focuses on the efficient storage and movement of goods within a facility. (Gwynne Richards, 2014) emphasizes the importance of effective warehouse layout design, inventory tracking systems, order picking strategies, and labor management to enhance operational efficiency and customer satisfaction.

A warehouse is a location where goods are kept until they are delivered to recipients. The main purpose of a warehouse is to store and protect humanitarian supplies. It is necessary to save supplies for future usage and unforeseen needs (Balcik and Beamon, 2008).

When humanitarian supplies are purchased before a tragedy strikes, they are stored in the warehouse. The amount of financial sources available, the likelihood of disasters occurring, and the high operating expenses associated with running distribution centers all have a significant impact on this. Not every humanitarian group takes this tack. Global or regional commodities may be pre-positioned in the warehouse. Airports and seaports are frequent locations for storage (Balcik et al., 2010)

2.3.2.4 The distribution processes

It Involves the movement of finished goods from warehouses to customers or retail outlets. As detailed in the book (Hayes, 2022), distribution management is about getting products from the starting point to where they'll be sold. This broad term covers many different tasks, including packaging, keeping track of stock, warehousing and the physical movement of those products.

Distribution is the movement of commodities from a warehouse to the impacted areas. Food, medications, shelters, and other relevant supplies for injured individuals can all be considered forms of relief. Since the post-disaster scenario is unknown, effective preparation is necessary (Afshar and Haighani, 2012).

2.3.2.5 Transportation operation

It is a critical component of supply chain processes, involving the physical movement of goods between different locations. (Novack *et al.*, 2019) highlights the significance of transportation modes selection, route optimization, carrier management, and freight cost analysis in achievingefficient and cost-effective transportation operations.

A part of logistics is transportation, which deals with getting relief supplies where they're required. The goods that need to be carried may originate domestically or internationally. These things must be delivered promptly and safely. The following needs to be taken into account for travel. These are substitute techniques, strategies, and paths. (WassenhoveVan, 2006).

Beamon and Balcik (2008) state that as humanitarian groups deal with difficulties in post-disaster transportation, transportation is a primary priority for their work. Large volumes of goods that need to be carried, scarce transportation resources, and broken infrastructure are the causes of these difficulties.

Effective procurement and products transportation are necessary for the establishment of successful disaster relief initiatives, as noted by (Kumar and Havey, 2013) in their study. They also offered methods for ensuring the correctness of the infrastructure.

2.3.3 Performance of Humanitarian Supply Chain Management Practices

Traditionally used performance metrics in commercial supply chains, like cost and lead time, may not be as relevant in a humanitarian context. Here, factors like reliability, responsiveness, and flexibility become paramount (Santarelli *et al.*, 2015). Several frameworks have been proposed to measure humanitarian supply chain performance: The Sphere Standards: These humanitarian principles outline core commitments for quality and accountability in response. They emphasize the importance of timeliness, effectiveness, and appropriateness of aid delivery. (Sphere Association, 2018).

The SCOR Model model provides a standardized framework for measuring and improving supply chain performance across various industries. While originally developed for commercial applications, the SCOR model can be adapted to the humanitarian sector with some modifications.The model outlines five core processes: Plan, Source, Make, Deliver, and Return, each with specific activities relevant to humanitarian supply chains. Using the SCOR Model offers several benefits, including standardized terminology for consistent communication and bench marking, process mapping to identify inefficiencies and improvement opportunities, and performance measurement through key

performance indicators aligned with humanitarian goals. (Thilakarathna, Dharmawardana and Rupasinghe, 2015). For this research purpose the SCOR model will be used to measure the performance According to (APICS , 2017) SCOR model defines the performance attributes Reliability, Responsiveness, Agility (Flexibility), Costs and Asset Management Efficiency(Assets) as bellow:

Reliability

Reliability refers to the ability of a process, system, or methodology to consistently perform its intended function or deliver its expected outputs. It pertains to the capacity to carry out tasks as anticipated and emphasizes the predictability and dependability of the process outcomes.

Measuring reliability often involves assessing specific quantifiable metrics such as timely delivery of results, accurate quantity or volume of outputs produced, and the desired level of quality or performance. Reliable processes demonstrate a low degree of variability and are able to produce consistent results, even when subjected to normal operating conditions or minor fluctuations.

Agility (Flexibility)

The capacity to react to external factors and adapt to changes in the marketplace in order to gain or sustain a competitive edge is referred to as agility. The SCOR model incorporates agility metrics such as Adaptability and Overall Value at Risk to assess this ability.

Costs

The expenses associated with operating the various processes in a supply chain, which encompass labor costs, material costs, management expenses, and transportation costs, are collectively known as the cost of operating the supply chain processes. A common metric used to measure these costs is the Cost of Goods Sold.

Asset Management Efficiency(Assets)

Efficient utilization of assets in a supply chain refers to the ability to effectively manage and maximize the use of resources. Asset management strategies, such as inventory reduction and deciding between in sourcing and outsourcing, are employed to achieve this goal. Metrics like inventory days of supply and capacity utilization are utilized to measure and evaluate asset

efficiency.

2.4Empirical literature review

2.4.1Humanitarian Supply Chain Management Process

Kunz and Gold (2015)This research review examines the concept of sustainable practices within humanitarian supply chains. It explores how optimizing networks, sourcing materials responsibly, and utilizing eco-friendly transportation methods can contribute to a more sustainable approach to delivering aid.

Costa, Campos and Bandeira, (2012)This research paper proposes a framework for effective coordination within HSCM processes. It analyzes a real-world case study to highlight the importance of information sharing, collaboration, and standardized procedures for optimizing aid delivery.

Sawyerr (2021)explores how HSCM processes can be strengthened to build long-term resilience in communities affected by disasters. It discusses practices for preparedness, risk mitigation, and collaboration across different stakeholders within the HSCM network.

Gupta *et al.*, (2021)Through a systematic review of relevant publications, the study identifies key themes, trends, and research gaps in humanitarian supply chain management. The findings highlight the growing interest in this field and emphasize the importance of collaboration, coordination, and information sharing in humanitarian supply chains. The research also identifies the need for further exploration of specific topics such as logistics network design, inventory management, and performance measurement in the context of humanitarian operations. Overall, the study provides valuable insights for researchers and practitioners to advance the understanding and practice of humanitarian supply chain management.

2.4.2 Humanitarian Supply Chain Performance

Santarelli et al. (2015) delve into the complexities surrounding the measurement of performance within humanitarian supply chain management (HSCM). The article proposes a multi-stakeholder approach that considers the needs and perspectives of not only the aid organizations directly involved in relief efforts, but also the beneficiaries receiving the humanitarian assistance as well as the local communities impacted by the crises. This comprehensive framework recognizes the importance of aligning performance metrics with the varying objectives and priorities of these diverse stakeholders, rather than relying solely on traditional supply chain efficiency measures. By incorporating the voices and requirements of all those affected, the proposed approach aims to

provide a more holistic and meaningful assessment of HSCM performance.

Dolapo Fakuade's (2023) article offers valuable insights gleaned from the challenges faced by humanitarian supply chain management during the COVID-19 pandemic. The study analyzes how the major disruptions to global supply chains, as well as the rapid and unpredictable changes in demand for certain goods and services, significantly impacted the performance of HSCM systems. The article highlights key learnings and recommendations for building a more agile, adaptable, and resilient HSCM framework capable of effectively responding to future crises and emergencies. By examining the performance-related lessons learned from the COVID-19 experience, the article provides critical guidance for strengthening the capabilities of humanitarian supply chains to withstand and recover from unexpected shocks and disruptions.

2.4.3 The role of IT on Humanitarian Supply chain Performance

Paciarotti *et al.*, (2021)This article provides a comprehensive overview of humanitarian logistics and supply chain management, offering insights into the role of IT in improving coordination, collaboration, and decision-making processes. It highlights the importance of IT systems, such as information sharing platforms and real-time tracking, in enhancing supply chain visibility and responsiveness.

Banomyong *et al*., (2017)This systematic literature review explores the role of technology, including IT, in enabling humanitarian logistics. It examines various technological advancements, such as mobile applications, geographic information systems, and cloud computing, and their impact on improving supply chain processes in humanitarian contexts. The review identifies key challenges and opportunities associated with IT adoption in humanitarian supply chains.

Kersten, Blecker and Ringle, (2017) examined the application of blockchain in logistics and supply chain, the potential of a decentralized logistics platform, IoT-coordinated logistics in product-service systems, a web-based transportation infrastructure, and the optimization potential of digitization in air cargo. Their research provided insights into innovation and technology management in these areas.

Marić, Galera-Zarco and Opazo-Basáez, (2021)This study reviewed 110 articles published between 2015 and 2020 to explore the role of digital technologies in humanitarian supply chains (HSC). The findings highlight the significance of digital technologies in HSC, including their objectives,

application domains, and deployment across different phases. The research offers insights into overcoming operational challenges in HSC through a technological portfolio.

Altay *et al*. (2023)Through a systematic review of relevant literature, the study identifies key themes and trends in innovation within the humanitarian context. The findings highlight the importance of innovation in enhancing the efficiency, effectiveness, and responsiveness of humanitarian supply chains. The research emphasizes the significance of technological advancements, collaboration and partnerships, and adaptive strategies in driving innovation within this sector. Additionally, the study underscores the need for further research and practical applications to leverage innovation and address the unique challenges faced by humanitarian organizations.

Gebisa (2023) investigates information sharing practices among Ethiopian relief organizations and their impact on supply chain performance. The authors analyze the use of IT platforms, such as cloud-based systems and collaborative platforms, in facilitating informationsharing and coordination. The findings emphasize the importance of effective information sharing for enhancing the overall efficiency and resilience of humanitarian supply chains.

This study will explore the use of Information Technology (IT) solutions to manage humanitarian supply chains. Specifically, it will discuss the role of Enterprise Resource Planning (ERP) systems, Supply Chain Visibility tools, and Communication and Collaboration platforms in this context.

2.4.3.1 Enterprise Resource Planning (ERP) Systems

Enterprise Resource Planning (ERP) Systems are comprehensive, packaged software solutions that aim to integrate and streamline the full range of an organization's core business processes and functions. The primary goal of ERP systems is to provide a holistic, single-source view of the entire organization by consolidating and unifying the information, data, and underlying IT architecture across the enterprise (Klaus, Rosemann and Gable, 2000).

2.4.3.2 Supply Chain Visibility Tools

Supply Chain Visibility Tools refer to integrated software systems that enable seamless communication, data sharing, and process optimization between a company and its entire network of suppliers. The primary objective of these Supply Chain Visibility Tools is to improve the overall visibility, efficiency, and responsiveness of the supply chain by facilitating the real-time exchange of information among all supply chain stakeholders (Ahmed Saqib, Ahmed Saqib and Ou, 2019).

By providing a centralized platform for data integration and collaboration, these visibility tools empower organizations to gain a more comprehensive, end-to-end understanding of their supply chain operations. This enhanced visibility allows them to make more informed, data-driven decisions, proactively identify and mitigate risks, and respond more quickly to disruptions or changes in demand and supply.

2.4.3.3 Communication and Collaboration platforms

Communication and Collaboration Platforms are software solutions that enable remote collaboration and communication among team members. These platforms go beyond traditional communication methods like audio/video conferencing, allowing for more dynamic and varied interactions. Effective collaboration platforms should promote real-time information sharing, facilitate natural dialogues, and enable persistent micro-interactions that foster an intimate understanding of colleagues over time. Additionally, these platforms can leverage virtual environments to transcend physical constraints and create opportunities for creativity and exploration. Overall, collaboration platforms aim to bridge the gaps presented by remote work and enhance the collaborative experience for distributed teams.(Cyprien, Michael nd Carie, 2008)

2.5 Conceptual Frame work

As mentioned in the previous section of this paper, the primary objective of this study was to investigate the role of Information Technology (IT) on the performance of humanitarian organizations. Accordingly, the research analyzed the relationship between the integration of IT into supply chain practices (the independent variable) and the overall performance of the humanitarian supply chain (the dependent variable).

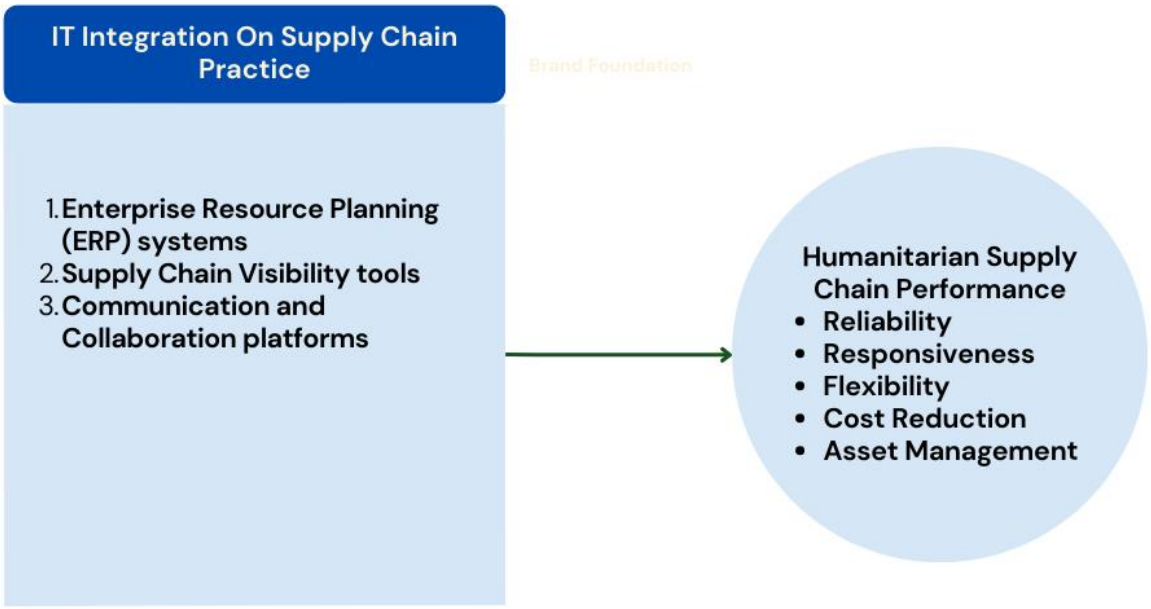

Figure 1:Conceptual Framework Adopted from (YOHANNES, 2021) slightly modified

CHAPTER THREE
METHEDOLOGY OF THE STUDY

This chapter provides an overview of the research design and methodologies employed in this study. It encompasses various aspects such as the selection of a specific research approach, the design of the study, the type and origin of the data, the techniques and tools used for data collection, the sampling methods utilized, and the techniques employed for data analysis.

3.1 Research Approach

This study employs a quantitative research approach to investigate the Role of Information Technology in Humanitarian Supply Chain Processes. The quantitative research technique is specifically utilized to obtain the perceptions and perspectives of the logistics and supply chain teams on the role and impact of information technology within the humanitarian supply chain processes.

The primary data collection method used in this quantitative component of the study is a structured questionnaire. The information is gathered from various departments within the UNHCR Ethiopia operations, including the logistics, procurement, and supply chain management teams, as well as the IT department and any other personnel providing related services to the program.

The targeted participants for the data collection are the employees of the United Nations High Commissioner for Refugees (UNHCR) Ethiopia who are actively engaged in logistics activities and supply chain management responsibilities. By including these key stakeholders, the study aims to capture the firsthand experiences, insights, and perceptions of the individuals directly involved in the day-to-day operations of the humanitarian supply chain.

The structured questionnaire is designed to elicit detailed responses from the participants, allowing for a comprehensive understanding of their views, opinions, and assessments regarding the Role of Information Technology in Humanitarian Supply Chain Processes. The questionnaire covers a range of relevant topics and variables, enabling the researchers to gather quantifiable data that can be analyzed using statistical techniques.

The quantitative data collection approach provides an opportunity to obtain measurable and numerical insights from the logistics and supply chain teams.

3.2 Research Design

This study employs a combination of descriptive and causal research designs to comprehensively investigate the research topic.The descriptive research design is utilized to understand the supply chain practices and performance of UNHCR Ethiopia. This approach allows the researchers to systematically examine and describe the supply chain performance and practices of Humanitarian Supply Chain Processes. The descriptive study aims to ascertain and document the characteristics of the variables of interest in the given situation.In addition to the descriptive approach, the study also employs a causal research design. This design is used to explore the cause-and-effect relationships between the dependent and independent variables. The researchers utilize regression that is multiple regression analysis as the causal analysis technique to examine the relationships between the variables.

The causal research design allows the researchers to understand the role of the different components of IT(Oracle ERP Systems, Supply Chain Visibility Tools and Communication and collaboration tools) on the supply chain performance.Through this approach, the study aims to uncover the underlying mechanisms and linkages between information technology and its impact on various aspect of the humanitarian supply chain performance.

3.3 Population and Sampling Techniques

3.3.1 Population

The population of the study is the employees who work in United Nations High Commissioner for Refugees(UNHCR) Ethiopia the organization . The target population for this study consisted of employees from the United Nations High Commissioner for Refugees (UNHCR) office in Ethiopia. The study focused on individuals working specifically in the areas of supply chain management, finance, project management, and the IT department. The office comprised 154 employees in the listed area, representing a portion of United Nations High Commissioner for Refugees(UNHCR) Ethiopia total workforce of 692 acrossall their Program Coordination Offices and various programs

3.3.2 Sampling frame

The sampling frame consists of list of employees of United Nations High Commissioner for Refugees(UNHCR) Ethiopia; found at national office, employees working on area program which

found under each field offices and head office and employee of field offices found at different locations by taking data from human resource department of the organization.

3.4 Sampling Techniques

For the purpose of this study purposive sampling is used to ensure participants with the deepest understanding of the research topic, the study has employed a targeted sampling approach known as purposive sampling. This method goes beyond random selection, focusing on employees with knowledge and experience directly related to the challenges and opportunities of information technology in their humanitarian supply chain.

3.5 Sample Size Determination

The target population for this study is 154 employees; they were directly engaged in supply chain related activities. A sample size of 111 employees was selected since the entire population ofinterest could not be selected. To arrive at the desired sample size this study used the formula given by (Yamane, 1967).

n = N / (1 + N * (e)^2)

Where:
n = the sample size
N = the population size
e = the margin of error (0.05 or 5%)

$n=154/1+154*0.05^{2)}$

=154/(1+154x0.0025)

=111.15.

n=111

Therefore, by using the above parameters the researcher has obtained the sample size as follows:

= 111 Respondents

3.6 Sources of data

To achieve the specified objective primary data sources is used. The primary data is collected from respondents who are related to the program or supply chain management and logistics activity through questionnaire designed by the researcher.

3.7 Data collection procedures

In order to investigate the SCM practice role on performance, in case of United Nations High Commissioner for Refugees(UNHCR) Ethiopia. The data is collected from United Nations High Commissioner for Refugees(UNHCR) Ethiopia (both head and field office) by distributing questionnaire.

3.8 Ethical Consideration

Research ethical considerations are a set of guiding principles ensuring the rights and well-being of participants(Peters, 2010).Each discipline should have its own ethical guidelines regarding the treatment of human research participants. Research ethics deal with how we treat those who participate in our studies and how we handle the data after we collect them. The researcher has keept privacy (leaving any personal questions), anonymity (protecting the identity of specific individuals from being known) and confidentiality or keeps the information confidential . In addition, the questionnaire is distributed to voluntary participants and have a clear introduction and instruction parts regarding the purpose of the research.

3.9 Validity And Reliability

3.9.1 Assessing Reliability

According to (Carmines and Zeller, 1979), Reliability analysis refers to the process of assessing the consistency and dependability of a research instrument or measurement tool. The internal consistency/reliability of this research has been assessed with Cronbach's Alpha and the reliability values for all constructs is greater than 0.7.

No.	Types of questionnaires	Cronbach's Alpha	No of Items
1	Supply Chain Management Practices	0.779	15
2	Supply Chain Management Performance	0.915	15
3	ERP System	0.858	5
4	Supply Chain Visibility tools	0.843	5
5	Collaboration and Communication tools	0.839	5
6	All Variables	0.871	45

Table 1Chap3:Reliability

3.9.2 Analysis of Validity

Validity analysis in supply chain management research encompasses a set of techniques and procedures used to assess the soundness and credibility of research findings. This assessment ensures that the findings accurately represent the phenomenon under study, have clear meaning within the domain, and can be meaningfully applied to other contexts or settings(Roque Júnior et al., 2023) This study have addressed content validity through the review of literature and adapting instruments used in previous research. It has referenced the relevance of the instrument or measurement strategy to the construct being measured.

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

This chapter focuses on understanding the The Role of Information Technology on UNHCR Ethiopia's Supply chain performance.The information comes from a survey given to a sample group. The researchers designed the survey specifically for this study. To get the most accurate data, people who answered the survey rated their level of agreement with various factors using a 5-point scale and were also given the opportunity to provide more details in their own words. A computer program (SPSS) was used to analyze the coded answers from the survey. The findings of the study, including details about the people who participated (demographics), and findings of the study are presented in tables throughout this chapter.

4.1 Response rate

Employees at UNHCR Ethiopia were given 111 questionnaires, and 105 of them were returned. As a result, the overall response rate utilized to analyze participant responses was 95.45%.

4.4 Profile of the Respondents

The researcher analyzed and summarized the relevant demographic data of the study participants, which is presented in the tables below. The tables include the frequencies and percentages of the different demographic characteristics.

The demographic data presented in the table provides a detailed snapshot of the study participants. The majority of the respondents are male (64.8%), while females make up 32.4% of the sample. The age distribution is skewed towards the 31-40 years age group, which accounts for 51.9% of the participants. The 41-50 years age group is the second largest at 35.2%, followed by the 20-30 years age group at 7.4%. Only a small percentage (2.8%) are above 50 years of age.

In terms of educational status, the majority of the respondents hold a bachelor's degree (47.2%), with a significant proportion (44.4%) having a master's degree or higher. Diploma or equivalent qualifications make up the smallest group at 5.6%.

The data also reveals the departmental breakdown of the participants, with Supply Chain Management being the largest group (29.6%), followed by Information Technology (22.2%), and Admin/Finance (10.2%). The remaining departments, including Program, Protection, Resettlement, and Other, make up smaller proportions of the sample.

Regarding the position held by the respondents, the largest group is Assistants (36.1%), followed by Senior Officers (18.5%), and Other positions (20.4%). The remaining categories, such as Director, Manager, Senior Manager, and Officer, make up smaller percentages of the sample.

Finally, the data shows that the majority of the participants have 6-10 years of experience (50.0%), while 29.6% have 1-5 years of experience, and 17.6% have above 10 years of experience.

Socio-demographic character	Category	Frequency	Percent
Sex	Female	35	32.4%
	Male	70	64.8%
Age	20-30 Years	8	7.4%
	31-40 Years	56	51.9%
	41-50 Years	38	35.2%
	Above 50 Years	3	2.8%
Educational status	Bachelor's degree	51	47.2%
	Diploma or equivalent	6	5.6%
	Masters and above	48	44.4%
	Bachelor's degree	51	47.2%
Department	Supply Chain Management	32	29.6%
	Information Technology	24	22.2%
	Admin/Finance	11	10.2%
	Program	13	12.0%
	Protection	9	8.3%
	Resettlement	5	4.6%
	Other	11	10.2%
Position	Director	1	0.9%
	Manger	5	4.6%

	Senior Manager	10	9.3%
	Senior Officer	20	18.5%
	Officer	8	7.4%
	Assistant	39	36.1%
	Other	22	20.4%
Years Of Experience	1-5 years	32	29.6%
	6-10 years	54	50.0%
	Above 10 years	19	17.6%

Table 2Chap4: Socio-demographic character

4.2. Supply Chain Management Practices of UNHCR Ethiopia

In this study, the researcher summarized the respondents' level of agreement with various measurements concerning the humanitarian supply chain management practices. A five-point Likert scale was used, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

Descriptive statistics were employed to collect, summarize, and simplify the data, with the goal of facilitating the derivation of key insights. Specifically, the supply chain management practices of UNHCR Ethiopia were described using descriptive statistics in the areas of procurement management, inventory management, warehouse management, distribution management, and transportation management. The items and responses were computed using the Statistical Package for the Social Sciences (SPSS) version 29.0.2.0.

To analyze the status of the supply chain management practices, the researcher used means and standard deviations. based on (Alexander, 2009).The interpretation of the mean values is as follows: Ratings falling within the range of 1.00 to 1.80 are considered Very low. Low ratings are in the narrower range of 1.81 to 2.60. Medium ratings are those considered to be from 2.61 up to 3.20. High ratings fall within the broader range of 3.21 to 4.20. At the top end of the scale, anything rated from 4.21 all the way up to 5.00 would be interpreted as Very high.

Procurement Management	Mean	Std. Deviation
UNHCR Ethiopia's Demand forecasting for relief supplies	4.02	1.03
UNHCR Ethiopia selection for qualified suppliers to meet the needs of refugees.	4.22	0.89
Timely and successful delivery.	3.95	0.98
Grand Mean of Procurement Management	4.06	
Inventory Management	**Mean**	**Std. Deviation**
Inventory levels of critical relief supplies being kept at appropriate levels to meet emergency needs.	4.14	0.90
Inventory planning processes	4.01	0.96
UNHCR inventory management systems to track and monitor stock levels	3.97	1.05
Grand Mean of Inventory Management	4.04	
Warehouse Management	**Mean**	**Std. Deviation**
Warehousing facilities in Ethiopia standard appropriateness to ensure the quality and safety of relief supplies.	3.94	0.96
Warehouse operations efficiency in storing relief supplies for distribution.	3.86	0.88
Effective warehouse layout to expedite order fulfillment.	4.27	3.94
Grand Mean of Warehouse Management	4.02	
Distribution Management	**Mean**	**Std. Deviation**
Distribution plans consideration of needs of different refugee populations and locations.	3.96	1.01
Delivery routes optimization to ensure cost-effective distribution of relief supplies.	3.92	0.94
UNHCR Ethiopia's effective tracking and monitoring of the distribution process to ensure supplies reach intended beneficiaries.	3.97	1.01
Grand Mean of Warehouse Management	3.95	
Transportation Operation	**Mean**	**Std. Deviation**
Efficient transportation methods to deliver relief supplies across Ethiopia.	4.02	1.03

Selection of transportation providers considers reliability, and capacity to meet humanitarian needs.	4.24	0.94
Data is collection and analysis to monitor the performance of transportation services.	4.03	1.01
Grand Mean of Warehouse Management		4.10
Grand Mean for Supply Chain Management Practice		4.04

Table 3Chap4: Supply Chain Management Practices of UNHCR

Procurement Management Practice: The UNHCR Ethiopia's supply chain management practices show strong Procurement Management The mean value for the demand forecasting of relief supplies is 4.02 with a standard deviation of 1.03. This indicates that the organization has effectively implemented systems to accurately forecast the demand for relief supplies to serve the refugee population.

Furthermore, the process of selecting qualified suppliers to meet the needs of refugees has a mean value of 4.22 and a standard deviation of 0.89. This suggests that the organization is able to fulfill the requirements of the refugee community in a timely manner.

The mean value for timely and successful delivery of relief supplies is 3.95 with a standard deviation of 0.98. This implies that the organization's supply chain efforts to reliable delivery of essential goods and services to the refugees.

The grand mean of 4.06 across these procurement management practices underscores that procurement management is very highly practiced in UNHCR Ethiopia.

Inventory Management Practice: According to this data The UNHCR Ethiopia's inventory management practices showcase a strong focus on maintaining appropriate levels of critical relief supplies to meet emergency needs. The mean value of 4.14 with a standard deviation of 0.90 indicates that the organization is adept at keeping inventory levels of essential relief items at suitable levels to respond to the immediate needs of the refugee population.

The inventory planning processes within the UNHCR Ethiopia also appear to be well-managed, with a mean value of 4.01 and a standard deviation of 0.96.Furthermore, the UNHCR Ethiopia has implemented effective inventory management systems to track and monitor stock levels, as evidenced by the mean value of 3.97 and a standard deviation of 1.05. This allows the organization to maintain oversight of its inventory, facilitating better decision-making and ensuring the timely availability of relief supplies.

The grand mean for the supply chain management practices of UNHCR Ethiopia was calculated to be 4.04. This indicates that supply chain management is being highly practiced and implemented within the organization. The high mean score suggests that UNHCR Ethiopia has made supply chain management a priority and has been successful in adopting and executing robust supply chain processes and strategies.The study's findings are further corroborated by the work of Yohannes (2021), who found that humanitarian supply chain management practices are being highly implemented and adopted by UN organizations.

Warehouse Management Practice: The UNHCR Ethiopia's warehouse management practices demonstrate a focus on quality, efficiency, and order fulfillment. The warehousing facilities are deemed appropriate for ensuring the quality and safety of relief supplies, with a mean of 3.94 and a standard deviation of 0.96. Warehouse operations are efficient in storing relief items for distribution, with a mean of 3.86 and a standard deviation of 0.88. Most notably, the warehouse layout is effective in expediting order fulfillment, with a mean of 4.27 and a standard deviation of 3.94. The grand mean of 4.02 across these warehouse management practices highlights the organization's commitment to maintaining high standards in its warehousing operation and that warehouse management is highly practiced.

Distribution Management Practice: The UNHCR Ethiopia's distribution management practices demonstrate a focus on meeting the diverse needs of refugee populations and ensuring cost-effective and trackable delivery of relief supplies. The distribution plans consider the needs of different refugee locations, with a mean of 3.96 and a standard deviation of 1.01. The delivery routes are optimized for cost-effective distribution, with a mean of 3.92 and a standard deviation of 0.94. Furthermore, the organization effectively tracks and monitors the distribution process to ensure supplies reach the intended beneficiaries, as indicated by a mean of 3.97 and a standard deviation of 1.01. The grand mean of 3.95 across these distribution management practices highlights the UNHCR Ethiopia's commitment to efficient and responsive relief distribution.

Transportation Operation Practice: The UNHCR Ethiopia's transportation operation practices

demonstrate a focus on efficiency, reliability, and data-driven performance monitoring. The organization utilizes efficient transportation methods to deliver relief supplies across Ethiopia, with a mean of 4.02 and a standard deviation of 1.03. The selection of transportation providers considers reliability and capacity to meet humanitarian needs, with a mean of 4.24 and a standard deviation of 0.94. Furthermore, the UNHCR collects and analyzes data to monitor the performance of its transportation services, with a mean of 4.03 and a standard deviation of 1.01. The grand mean of 4.10 across these transportation operation practices highlights the UNHCR Ethiopia's commitment to ensuring the timely and effective delivery of relief supplies and that Transportation management is very highly practiced.

The overall or grand mean for the supply chain management practices of UNHCR Ethiopia was calculated to be 4.04. This indicates that supply chain management is being highly practiced and implemented within the organization.

4.2.1 Discussion on Supply Chain Management Practices of UNHCR Ethiopia

The high mean score suggests that UNHCR Ethiopia has made supply chain management a priority and has been successful in adopting and executing robust supply chain processes and strategies.The study's findings are further corroborated by the work of Yohannes (2021), who found that humanitarian supply chain management practices are being highly implemented and adopted by UN organizations.Another study has found that humanitarian organizations have implemented effective strategies to manage their capacity, demand, and postponement practices. (Kaluki, n.d.).Another study also concluded that Humanitarian organizations use supply chain management techniques such as maintaining positive relationships with their suppliers. Because of the nature of their work, they must keep solid relationships with their suppliers because they can need essential supplies on short notice. It was also discovered that the humanitarian groups had well-functioning internal operations, which allowed them to improve supply chain management. (Hassan, 2012) In contrast, another study found that humanitarian organizations only moderately implemented supply chain management practices like supplier information systems, coordination, transportation management, and distribution. Additionally, the organizations' performance efforts were found to be at a low level.(Legesse and Shashi, 2023)

4.3.Supply Chain Management Performance

In this study, the researcher sought to summarize the respondents' level of agreement with various measurements concerning the humanitarian supply chain management performance. A five-point Likert scale was utilized, with 1 representing "Strongly Disagree", 2 for "Disagree", 3 for "Neutral", 4 for "Agree", and 5 for "Strongly Agree".

Descriptive statistics were employed as the primary analytical approach. This method encompasses data collection, summarize, and simplification, with the goal of facilitating the derivation of key insights from the data. Specifically, the supply chain management performance of UNHCR Ethiopia was described using descriptive statistics along the dimensions of reliability, responsiveness, flexibility, and asset management. The items and responses were computed using the Statistical Package for the Social Sciences (SPSS) version 29.0.2.0.

To analyze the status of the supply chain management practices, the researcher calculated the means and standard deviations. The interpretation of the mean values was based on the following scale developed by Alexander B. (2009).The interpretation of the mean values is as follows: Ratings falling within the range of 1.00 to 1.80 are considered Very low. Low ratings are in the narrower range of 1.81 to 2.60. Medium ratings are those considered to be from 2.61 up to 3.20. High ratings fall within the broader range of 3.21 to 4.20. At the top end of the scale, anything rated from 4.21 all the way up to 5.00 would be interpreted as Very high.

Reliability	**Mean**	**Std. Deviation**
Delivery of the right products.	4.06	0.96
Low rate of delivery delays.	3.92	1.10
Delivery of products in perfect condition in undamaged state	4.00	1.02
Grand Mean of Reliability	3.99	
Responsiveness	**Mean**	**Std. Deviation**
Inventory levels of critical relief supplies being kept at appropriate levels to meet emergency needs.	4.09	0.94
Inventory planning processes	4.12	0.88
UNHCR inventory management systems to track and monitor stock levels	3.96	0.96
Grand Mean of Responsiveness	4.06	

Flexibility	Mean	Std. Deviation
Capability to adjust quantity delivered within a short time	4.12	0.94
Easy modification of supply chain processes to accommodate shifts in delivery methods.	4.03	0.99
Easily recover to become fully functional after a disruption	4.06	1.02
Grand Mean of Flexibility	4.07	
Cost	**Mean**	**Std. Deviation**
minimized cost to source, manage suppliers, and for the overall bidding process.	4.12	0.92
minimized overall cost of delivering products and services.	4.05	0.95
having a cost-saving strategy in returning defective goods to suppliers.	4.12	0.77
Grand Mean of Cost	4.10	
Asset	**Mean**	**Std. Deviation**
Efficiently utilization of supply chain assets, such as inventory, transportation, and facilities.	4.06	0.88
Support of the organization's efforts to minimize working capital requirements.	4.09	0.88
support of the organization's efforts to minimize working capital requirements.	4.08	0.87
Grand Mean of Asset		4.07
Grand Mean for Supply Chain Management Performance		4.06

Table 4Chap4:Supply Chain Management Performance

Reliability:Delivery of the right products (Mean: 4.06, Std. Deviation: 0.96): This indicator suggests a high level of accuracy in delivering the intended supplies. The low standard deviation indicates most respondents agree with this assessment.Low rate of delivery delays (Mean: 3.92, Std. Deviation: 1.10): This data shows a generally positive view of on-time deliveries. Delivery of products in perfect condition (Mean: 4.00, Std. Deviation: 1.02): This indicator points towards a high likelihood of receiving undamaged supplies. The standard deviation is similar to the first reliability measure, suggesting a moderate level of agreement on this aspect.

Responsiveness:Inventory levels of critical relief supplies (Mean: 4.09, Std. Deviation: 0.94): This suggests a positive perception of the UNHCR's ability to maintain adequate stock levels for critical supplies during emergencies.

Inventory planning processes (Mean: 4.12, Std. Deviation: 0.88): This appears to be the strongest area within responsiveness, with a high mean score and a low standard deviation, indicating both a high effectiveness and broad agreement on the inventory planning processes.

UNHCR inventory management systems (Mean: 3.96, Std. Deviation: 0.96): This score suggests a "high" perception of the inventory management systems, but the slightly higher standard deviation compared to other responsiveness measures indicates there might be some room for improvement or a wider range of opinions on this aspect.

Flexibility (all indicators have means exceeding 4.00 and standard deviations around 1.0):Capability to adjust quantity delivered (Mean: 4.12): This suggests the UNHCR can effectively adapt delivery quantities based on changing needs.Easy modification of supply chain processes (Mean: 4.03): This indicates a perception of ease in adjusting procedures to accommodate different delivery methods.Recovery from disruptions (Mean: 4.06): The data shows a positive view of the supply chain's ability to bounce back from unexpected events or challenges.

Cost (all indicators have means exceeding 4.00 and standard deviations below 1.0):Minimized cost for sourcing and suppliers (Mean: 4.12): This suggests the UNHCR is perceived to be effective in obtaining supplies at a good cost.Minimized overall delivery cost (Mean: 4.05): The data indicates a positive view of the UNHCR's efficiency in managing overall delivery expenses.Cost-saving strategy for returning defective goods (Mean: 4.12): This suggests a well-regarded system for returning defective items while minimizing associated costs.

Asset Management (all indicators have means exceeding 4.00 and standard deviations below 1.0):Efficient utilization of supply chain assets (Mean: 4.06): This data shows a positive perception of how effectively the UNHCR uses resources like inventory, transportation, and facilities.Support for minimizing working capital (Mean: 4.09): The data suggests the supply chain practices contribute to reducing the amount of capital that needs to be readily available.

According to the data UNHCR's supply chain management performance demonstrates a strong focus on reliability, responsiveness, flexibility, cost-effectiveness, and asset management. Reliability, with a mean of 3.99, indicates the organization's ability to consistently deliver relief supplies as promised. Responsiveness, with a mean of 4.06, highlights the UNHCR's capacity to quickly and effectively react to changing humanitarian needs. The organization's supply chain also exhibits a high degree of flexibility, with a mean of 4.07 , allowing it to adapt to diverse operational requirements. Furthermore, the UNHCR's supply chain management prioritizes cost-effectiveness, with a mean of 4.10 and efficient asset utilization, with a mean of 4.07 and a standard. The overall strong performance across these key supply chain management dimensions underscores the UNHCR's commitment to delivering humanitarian aid effectively and efficiently with a grand mean of 4.06.

4.2.2 Discussion on Supply Chain Management Performance of UNHCR Ethiopia

The study's analysis of UNHCR Ethiopia's supply chain management performance across key dimensions, such as reliability, responsiveness, flexibility, and asset management, revealed an overall grand mean of 4.06. This strong performance across these critical supply chain areas underscores UNHCR's steadfast commitment to delivering humanitarian aid effectively and efficiently.This study's positive results are supported by similar research conducted by Yohannes (2021). Yohannes's research also found that UN organizations, like the UNHCR in this study, tend to have high-performing humanitarian supply chain practices.The aforementioned outcome is consistent with Selamawit Gebreyesus's (2020) research on the impact of humanitarian logistics techniques on emergency response chain performance. The results of the study demonstrated the significance of humanitarian logistics techniques for the effectiveness of the ERCS. Additionally, it aligns with the findings of a research conducted by Wolde Wodaje (2019), on Plan International Ethiopia on the performance, problems, and practices of humanitarian logistics management. Since HSCM is essential to the effectiveness of humanitarian aids.

4.4 The Role of IT A on UNHCR Supply Chain Management Performance

4.4.1 REGRESSION ANALYSIS

4.4.1.1 Assumptions of Regressions Analysis

Before conducting a multiple regression analysis, it is important to ensure that the data meets the necessary assumptions for the technique to produce valid results. This involves checking that the data satisfies five key assumptions required for multiple regression analysis:

- There should be no Multicollinearity between the independent variables.
- The error terms should have constant variance (homoscedasticity).
- The error terms should be normally distributed.
- The error terms should be independent of one another (no autocorrelation).

Multicollinearity Test

When conducting multiple regression analysis, it is important to assess the relationships among the predictor (independent) variables. If two or more of the predictor variables are highly correlated, meaning that one variable can be linearly predicted from the others, it can indicate the presence of multicollinearity.

The results of the multicollinearity test, as shown in Table below, revealed that all dimensions of the Variance Inflation Factor (VIF) are 10. This suggests that the multiple regression model is highly linearly related, implying the existence of multicollinearity.

The Variance Inflation Factor (VIF) is a measure used to quantify the degree of multicollinearity in a regression analysis. A VIF value of 10 or higher is generally considered to indicate a high degree of multicollinearity, which can negatively impact the reliability and interpretability of the regression model.

Overall, the multicollinearity test supports and validates the findings from the Pearson correlation analysis and the multiple regression analysis. It confirms that the predictor variables in the model are highly correlated, which is an important consideration when interpreting the results of the regression analysis.

	Collinearity Statistics	
	Tolerance	VIF
Cloud ERP System	0.398	2.511
Supply Chain Visibility Tools	0.327	3.056
Communication and Collaboration Platforms	0.335	2.986

Table 5Chap4:Collinearity Statistics

Normality test

A normal probability plot would ideally show a diagonal line, indicating no major deviations from normality.Skewness and kurtosis are statistics that measure the symmetry and shape of the data distribution.In this case figure bellow, the scores appear to be normally distributed because the skewness and kurtosis values likely fall within the acceptable range according to Gamst et al. (2008) The figures show that the data used for this research is homoscedastic confirming the randomly distribution of data and are annexed in appendix B as figure3 This distribution is close to a normal bell curve, which is a good sign. Because of this normality, we can assume that the errors in our analysis are also normally distributed with a constant variance.

Homoscedasticity:

For the analysis to be valid, the spread of scores for the independent variables shouldn't change significantly across all possible values of the dependent variable (Hair et al., 2010). In other words, the influence of the independent variables should be consistent regardless of the dependent variable's value.

One way to check this assumption (homoscedasticity) is by plotting a special scatterplot (ZRESID vs ZPRED). If the points on the plot show a pattern, like waves or funnels, it indicates a violation of homoscedasticity. Ideally, the points should be randomly scattered above and below zero on the Y-axis.

The scatterplots in this study as shown in the figure are annexed in appendix B as figure 4 don't show any patterns, suggesting homoscedasticity is likely met. This assumption is therefore considered reasonable for this analysis (Pallant, 2020).

Auto-correlation Assumption Test

The Durbin-Watson statistic is a statistical test used to detect auto correlation in the residuals of a linear regression analysis. Auto-correlation is a fancy way of saying that the errors from one observation are related to the errors from nearby observations. In other words, the errors are not independent of each other, which can violate assumptions made by linear regression models.

The Durbin-Watson statistic ranges in value from 0 to 4. A value close to 2 indicates that there is no auto correlation in the residuals. Values closer to 0 suggest positive auto-correlation, which means that the errors from one observation tend to be of the same sign (positive or negative) as the errors from nearby observations. Values closer to 4 indicate negative auto correlation, which means that the

errors from one observation tend to be of the opposite sign as the errors from nearby observations.(Bryman, 1988).

Auto-correlation Assumption Test	
Durbin - Watson	1.668

Table 6Chap4: Auto-correlation Assumption Test

4.4.1.2 Relation between IT and Supply Chain performance

The study investigated the impact of information technology (IT) on the performance of supply chain management at the United Nations High Commissioner for Refugees (UNHCR) in Ethiopia. The researchers employed regression analysis after verifying that the data met the necessary assumptions for this statistical technique. The analysis was conducted at a significance level of 0.05, which corresponds to a 95% confidence interval.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.652[a]	.426	.409	.48856	.426	24.958	3	101	<.001

a. Predictors: (Constant), COLABTOT, ERPTOT, SVTTOT

b. Dependent Variable: SupplyChainPerformance

Table 7:Model Summary for Role of IT on Supply Chain Management Performance

According to the summary table for the model, R Square was determined to be 0.426 (42.6%). The conclusion that IT (Oracle ERP System, Supply Chain Visibility Tools and Communication and collaboration tools) together explained 43.6.% of the variance in the dependent variable of Supply Chain Mangement performance at the significant level of p =.00 was also F-statistic (5, 93) = 24.958), so the hypothesis was accepted. In general, the study discovered a considerable link between IT and Supply Chain Performance. The table below

reports the adjustments made to the relative standardized beta weight () values of the four predictor variables on the dependent variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.376	.328		4.200	<.001		
	OracleERP	.353	.114	.378	3.108	.002	.384	2.603
	ColaborationTools	.289	.102	.325	2.847	.005	.435	2.299
	VisibilityTools	.005	.122	.006	.045	.964	.366	2.729

a. Dependent Variable: SupplyChainPerformance

Table 8Chap4:The Role of different IT tools on Supply Chain Performance.

As shown in Table 13 above, the results of multiple regressions showed that Oracle ERP system had a favorable and substantial impact on UNHCR Supply Chain Performance (β= 0.378, t = 3.108, Sig =0.002). According to this figure, Supply Chain Performance of UNHCR Ethiopia would rise by 37.8% if Usage of Oracle ERP tool improved by 1%. The results from the table also showed that, with values of (β= 0.325, t = 2.847, p = 0.05), show that significant relationship between the use of communication and collaboration tools and supply chain management performance at the UNHCR office in Ethiopia . Specifically, the beta coefficient (β) of 0.325 indicates that a one-unit increase in the utilization of communication and collaboration technologies was associated with a 32.5% -unit increase in supply chain management performance, holding all other factors constant. This relationship was found to be statistically significant at the 0.05 level, as evidenced by the t-statistic of 2.847 and the corresponding p-value of 0.05. In contrast, the study found that the use of supply chain visibility tools did not have a significant impact on the UNHCR's supply chain management performance .

The two dimensions IT were generally confirmed to have a positive and significant effects on the dependent variable (supply chain performance) by the findings of multiple regression analysis., except for Supply Chain Visibility tool.

4.8. Discussion on IT and Supply Chain performance

The research findings confirmed that the utilization of the Oracle ERP system, as well as effective communication and collaboration tools, have positively influenced the supply chain performance of UNHCR Ethiopia. In response to the study's research questions, the discussion can be summarized as follows:

The study highlights that implementing the Oracle ERP system and fostering effective communication and collaboration tools significantly contributed (with p-values of 0.02 and 0.05 respectively) to the strong performance of the UNHCR's supply chain in Ethiopia.Similar studies supported this finding The findings highlighted the key impacts of ERP systems on supply chain performance(Lukyanova, Haddud and Khare, 2022).Additional research has shown that the implementation of a uniquely designed Enterprise Resource Planning (ERP) system tailored for humanitarian organizations can provide a high-level framework of guidance. Under this structured approach, the specific operational requirements of humanitarian aid delivery can be further defined and effectively engineered to ultimately achieve success in supply chain management and logistics operations.(Falagara Sigala, Kettinger and Wakolbinger, 2020).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This research investigated the impact of Information Technology (IT) on the supply chain performance of UNHCR Ethiopia. A survey was administered to a representative sample group within the organization, and the data was analyzed to understand how IT systems influence various aspects of supply chain management. The participants included a mix of genders and age groups, with a significant portion holding at least a bachelor's degree. The majority worked in Supply Chain Management or Information Technology departments, reflecting the focus of the study.

The findings from the data analysis are largely supported by the broader existing research in this area. However, my work also provides some new perspectives and novel understandings that go beyond what has been covered in the current literature.

The main conclusions drawn from the data analysis are consistent with and corroborated by the wider body of relevant studies.At the same time, the analysis has surfaced certain new insights and angles that have not been extensively explored or documented previously.

So while this work builds upon and aligns with the established knowledge in this domain, it also contributes some fresh perspectives and expanded understandings.

5.2 The Impact of IT on Supply Chain Performance

The Regressions analysis revealed that the two dimensions IT were generally confirmed to have a positive and significant effects on the dependent variable (supply chain performance) by the findings of multiple regression analysis., except for Supply Chain Visibility tool.The data suggests that the organization's utilization of cloud-based Enterprise Resource Planning (ERP) systems and communication/collaboration platforms is associated with improvements in:

Reliability The consistent delivery of relief supplies as promised.
Responsiveness The ability to react quickly and effectively to changing humanitarian needs.
Flexibility The capacity to adapt to diverse operational requirements (moderate correlation).

Cost-Effectiveness The optimization of resources to deliver aid efficiently (moderate correlation).

Asset Management The efficient utilization of resources within the supply chain (strong correlation).

The result suggests that UNHCR Ethiopia's IT systems play a significant role in optimizing resource allocation and utilization within the supply chain. This efficient management of resources translates into cost-effectiveness, allowing the organization to deliver more aid with the same budget.

5.3 Strengths and Weaknesses of UNHCR Ethiopia's Supply Chain

The data analysis revealed several strengths in UNHCR Ethiopia's supply chain management practices. These strengths include:

Procurement Management: The organization demonstrates a strong ability to accurately forecast the demand for relief supplies, ensuring they have the necessary resources to meet the needs of the refugee population,The process for selecting qualified suppliers

Inventory Management:The study's findings indicate that UNHCR has developed and implemented sound inventory management practices as part of their supply chain management strategy. That focus on inventory optimization contributes to the organization's ability to deliver humanitarian assistance efficiently and effectively, even in the face of unexpected emergencies and fluctuating demand.

Appropriate Warehousing Facilities: The warehousing infrastructure appears to be suitable for maintaining the quality and safety of relief supplies.

Transportation Operation: The UNHCR Ethiopia's transportation operations play a crucial role in enabling the timely and effective delivery of humanitarian assistance to vulnerable populations across the country.

However, there is also some room for improvement:

Distribution Management: While the organization's distribution management practices are generally effective, there appears to be room for further improvement in this area compared to some of the other supply chain management practices.

5.4 Conclusion

The research findings demonstrate that UNHCR Ethiopia's utilization of IT systems has a positive impact on various aspects of its supply chain performance. The data suggests that IT contributes to

improvements in reliability,responsiveness, flexibility, cost-effectiveness, and asset management. While the organization has established strong practices in demand forecasting, supplier selection, and warehousing, there is potential to further optimize distributionefficiency. By strategically leveraging IT and addressing areas for improvement, UNHCR Ethiopia can ensure a more streamlined and effective supply chain, ultimately delivering critical humanitarian aid to refugees in a timely manner.

5.5 Recommendations

Based on the research findings, the following recommendations are proposed to further enhance UNHCR Ethiopia's supply chain management through IT integration and adjustments to practices:

Oracle ERP system The study suggests that UNHCR Ethiopia would benefit greatly from implementing an Oracle ERP system. ERP software provides integrated management of core supply chain processes, including procurement, inventory, transportation, and distribution management. By adopting a robust ERP platform, UNHCR Ethiopia can streamline its operations, improve it’s overall supply chain efficiency. An Oracle ERP system, in particular, is widely recognized for its powerful capabilities in managing complex supply chains.

Communication and Collaboration Tools:he research also recommends that UNHCR Ethiopia invest in advanced communication and collaboration tools to facilitate seamless information sharing and coordination among its staff, Implementing solutions like video conferencing and secure messaging apps can significantly improve cross-functional collaboration. This, in turn, will enhance UNHCR Ethiopia's ability to respond rapidly to emergencies and coordinate the supply chain activities.

By implementing these recommendations and continuing to leverage IT strategically, UNHCR Ethiopia can further strengthen its supply chain, ensuring the timely and efficient delivery of critical humanitarian aid to those in need. This not only improves the lives of refugees but also allows UNHCR Ethiopia to operate more effectively and efficiently,maximizing the impact

5.6 Future Research Direction

Due to the constraints of time and resources, the scope of this study was necessarily limited. The first limitation is that it only considered three variables of IT: ERP System, Supply Chain Visibility Tools, and Communication and Collaboration Tools. While these represent key aspects of IT integration, future research would benefit from examining a broader range of IT capabilities and their impact on

supply chain performance.

The second limitation is that this study employed a quantitative research approach. While this provides valuable insights into the statistical relationships between the variables, incorporating qualitative techniques, such as interviews or case studies, could offer deeper, contextual understanding of the mechanisms underlying these relationships. Combining both quantitative and qualitative methodologies in future research would provide a more comprehensive perspective on the topic.

Based on these limitations, several promising directions for future research are suggested:

Expanding the range of IT capabilities examined to gain a more holistic understanding of how different technologies contribute to supply chain performance.

Adopting a mixed-methods approach that combines quantitative and qualitative data collection and analysis to provide richer insights.

Investigating the role of organizational and environmental factors that may moderate the relationship between IT integration and supply chain performance.

Exploring the applicability of the findings in different industry contexts or geographic regions to enhance the generalization of the results.

By addressing these limitations and exploring these future research directions, scholars can deepen understanding of the complex interplay between IT integration and supply chain performance, ultimately informing more effective supply chain management strategies.

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Appendix-A Questionnaire

Addis Ababa University
School of Commerce

Questionnaire

Dear respondent

My name is Kalkidan Yitbarek, and I am currently pursuing my Master's Degree in Logistics and Supply Chain Management at Addis Ababa University, School of Commerce. I am conducting thesis on "The Role of Information Technology on the Performance of Humanitarian Supply Chain Management Practices: The case of United Nations High Commissioner for Refugees(UNHCR) Ethiopia" as a requirement in partial fulfillment of my Master's Degree.

This questionnaire is prepared solely for an academic purpose and gathers information relevant to your expertise in Supply Chain Management practices at United Nations High Commissioner for Refugees(UNHCR) Ethiopia. The Confidentiality of the respondents is assured, and your responses will be used exclusively for academic purpose only.

I kindly request you to spare a few minutes from your busy schedule to complete this questionnaire.

If you have any further questions or comments please don't hesitate to contact me with the below contact address.

Thank you for your time and consideration.

Sincerely,
Kalkidan Yitbarek
+251 938045425
yitbarekkalkidan@gmail.com

Section A: Background Information

1. Gender

Male ☐ Female ☐

2. Age

20-30 years ☐ 31-40 years ☐ 41-50 years ☐ Above 50 years ☐

3. What is your highest level of education?

Below Diploma ☐ Diploma or equivalent ☐ Bachelor's degree ☐ Masters and above ☐

4. How many years have you been working at at UNHCR?

1-5 years ☐ 6-10 years ☐ Above 10 years ☐

5. In Which department or functional area are you working?

Procurement ☐ Information Technology ☐ Logistics & Admin ☐ Human Resources ☐

Finance ☐ Other ☐

6. What is your position at UNHCR?

Director ☐ Senior Manager ☐ Manger ☐ Other ☐

Senior Officer ☐ Officer ☐ Assistant ☐

Section B: Supply Chain Management Practices at UNHCR

Instructions: Please rate the following statements regarding the Supply Chain Management Practices of UNHCR by marking the numbers in the column using the 1 to 5 rating scale (Likert Scale) Where

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

No	Statement	1	2	3	4	5
Supply Chain Management Practices of UNHCR						
Procurement Management						
1.	UNHCR Ethiopia's Demand forecasting for relief supplies is accurate and reflects the changing needs of refugee populations.	☐	☐	☐	☐	☐
2.	UNHCR Ethiopia utilizes a well-defined process for identifying and selecting qualified suppliers to meet the needs of refugees.	☐	☐	☐	☐	☐
3.	UNHCR closely monitors the progress of contracted activities and services to ensure timely delivery.	☐	☐	☐	☐	☐
Inventory Management						
4.	Inventory levels of critical relief supplies are maintained at appropriate levels to meet emergency needs.	☐	☐	☐	☐	☐
5.	Inventory planning processes consider transportation constraints to ensure continuous supply.	☐	☐	☐	☐	☐
6.	UNHCR Ethiopia utilizes efficient inventory management systems to track and monitor stock levels.	☐	☐	☐	☐	☐
Warehouse Management						
7.	Warehousing facilities in Ethiopia meet appropriate storage standards to ensure the quality and safety of relief supplies.	☐	☐	☐	☐	☐

8.	Warehouse operations are efficient in storing relief supplies for distribution.	☐	☐	☐	☐	☐
9.	UNHCR Ethiopia has implemented effective warehouse layout to expedite order fulfillment.	☐	☐	☐	☐	☐
Distribution Management						
10	Distribution plans consider the specific needs of different refugee populations and locations.	☐	☐	☐	☐	☐
11.	Delivery routes are optimized to ensure cost-effective distribution of relief supplies.	☐	☐	☐	☐	☐
12.	UNHCR Ethiopia effectively tracks and monitors the distribution process to ensure supplies reach intended beneficiaries.	☐	☐	☐	☐	☐
Transportation Operation						
13.	UNHCR utilizes efficient transportation methods to deliver relief supplies across Ethiopia.	☐	☐	☐	☐	☐
14.	The selection of transportation providers considers reliability, and capacity to meet humanitarian needs.	☐	☐	☐	☐	☐
15.	Data is collected and analyzed to monitor the performance of transportation services.	☐	☐	☐	☐	☐

Section C: Supply Chain Management Performance

Instructions:
Please show your level of disagreement or agreement regarding Supply Chain Management Performance by marking the numbers in the column using the 1 to 5 rating scale (Likert Scale)

Where:

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

		Agree				
No	**Statement**	**1**	**2**	**3**	**4**	**5**
Supply Chain Management Performance						
Reliability						
1.	UNHCR's supply chain consistently delivers the right products.	☐	☐	☐	☐	☐
2.	UNHCR's supply chain has a low rate of delivery delays.	☐	☐	☐	☐	☐
3.	UNHCR deliver all products in perfect condition in undamaged state that meet the specific needs of the refuge's	☐	☐	☐	☐	☐
Responsiveness						
4.	UNHCR's supply chain rapidly fulfill orders to meet changing humanitarian needs and emergency situations in a timely manner.	☐	☐	☐	☐	☐
5.	UNHCR is capable to rapidly identify, select, and negotiate with suppliers to address its supply chain needs.	☐	☐	☐	☐	☐
6.	UNHCR can quickly identify the need for product returns and efficiently coordinate and schedule the reverse logistics process.	☐	☐	☐	☐	☐
Flexibility						
7.	UNHCR's supply chain has the capability to adjust quantity delivered within a short time	☐	☐	☐	☐	☐
8.	UNHCR easily modifies its supply chain processes to accommodate shifts in delivery methods.	☐	☐	☐	☐	☐
9.	UNHCR easily recover to become fully functional after a disruption	☐	☐	☐	☐	☐
Cost						

10.	UNHCR's supply chain management practices have minimized the cost to source, manage suppliers, and for the overall bidding process.	☐	☐	☐	☐	☐
11.	UNHCR's supply chain management practices help minimize the overall cost of delivering products and services.	☐	☐	☐	☐	☐
12.	UNHCR's supply chain has a cost-saving strategy in returning defective goods to suppliers.	☐	☐	☐	☐	☐
Asset Management						
13.	UNHCR efficiently utilizes its supply chain assets, such as inventory, transportation, and facilities.	☐	☐	☐	☐	☐
14.	UNHCR's supply chain management supports the organization's efforts to minimize working capital requirements.	☐	☐	☐	☐	☐
15.	UNHCR's supply chain management supports the organization's efforts to minimize working capital requirements.	☐	☐	☐	☐	☐

Section D: IT Application on UNHCR Supply Chain Management Practices

Instructions: Please rate the following statements regarding IT Application on UNHCR Supply Chain Management Practices by marking the numbers in the column using the 1 to 5 rating scale (Likert Scale)

Where:

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

No	**Statement**	**1**	**2**	**3**	**4**	**5**
IT Application on UNHCR Supply Chain Management Practices						
Cloud ERP System						
1.	UNHCR Ethiopia has Cloud ERP systems to support the Procurement Management Practice	☐	☐	☐	☐	☐
2.	UNHCR Ethiopia has Cloud ERP system to support the Inventory Management Practice	☐	☐	☐	☐	☐

3.	UNHCR Ethiopia has Cloud ERP system to support the Warehouse Management Practice	☐	☐	☐	☐	☐
4.	UNHCR Ethiopia has Cloud ERP system to support the Distribution Management Practice	☐	☐	☐	☐	☐
5.	UNHCR Ethiopia has Cloud ERP system to support the Transportation Operation	☐	☐	☐	☐	☐
Supply Chain Visibility Tools						
6.	UNHCR Ethiopia utilizes Supply Chain Visibility tools to support the Procurement Management Practice	☐	☐	☐	☐	☐
7.	UNHCR Ethiopia utilizes Supply Chain Visibility tools to support the Inventory Management Practice	☐	☐	☐	☐	☐
8.	UNHCR Ethiopia utilizes Supply Chain Visibility tools to support the Warehouse Management Practice	☐	☐	☐	☐	☐
9.	UNHCR Ethiopia utilizes Supply Chain Visibility tools to support the Distribution Management Practice	☐	☐	☐	☐	☐
10.	UNHCR Ethiopia utilizes Supply Chain Visibility tools to support the Transportation Operation	☐	☐	☐	☐	☐
Communication and Collaboration Platforms						
11.	UNHCR Ethiopia utilizes various communication and collaboration platforms,(eg. video conferencing tools, instant messaging apps like Whatsapp for real-time communication, and project management platforms like Trello or Asana) to support the Procurement Management Practice	☐	☐	☐	☐	☐
12.	UNHCR Ethiopia utilizes various communication and collaboration platforms to support the Inventory Management Practice	☐	☐	☐	☐	☐

13.	UNHCR Ethiopia utilizes various communication and collaboration platforms to support the Warehouse Management Practice	☐	☐	☐	☐	☐
14.	UNHCR Ethiopia utilizes various communication and collaboration platforms to support the Distribution Management Practice	☐	☐	☐	☐	☐
15.	UNHCR Ethiopia utilizes various communication and collaboration platforms to support the Transportation Operation	☐	☐	☐	☐	☐

Any Additional comments to be considered:

What are the major IT solutions used to support Supply Chain Management of UNHCR?

Thank You Again!

Appendix-B Normality test

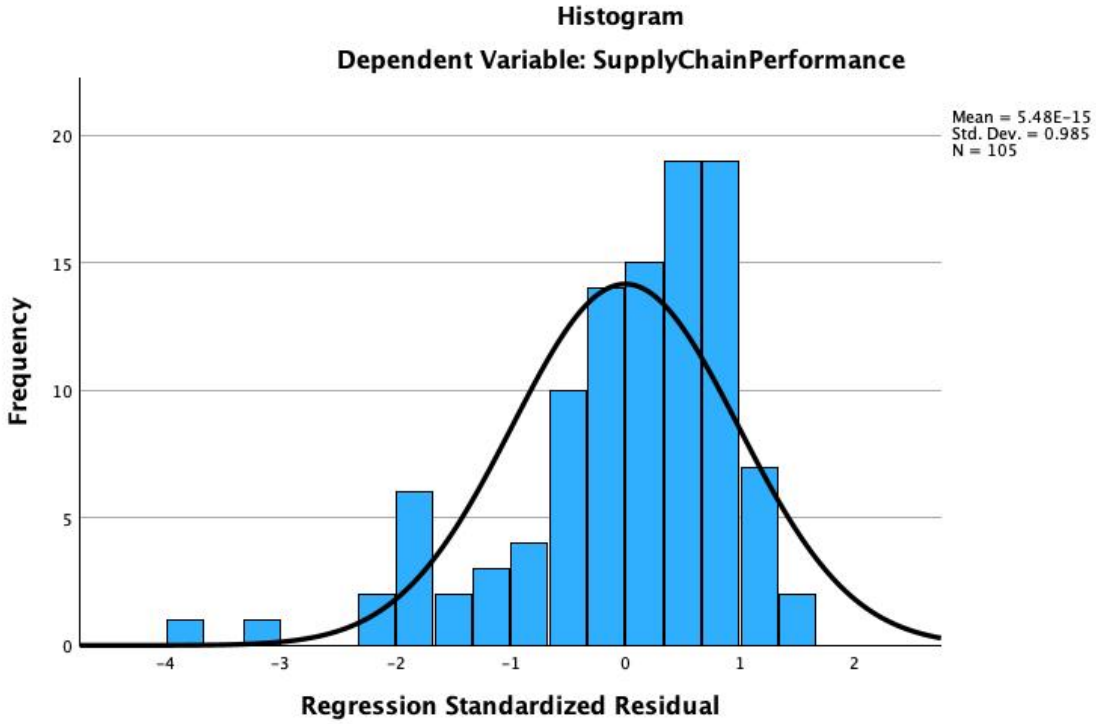

Figure 2Frequency Distribution Supply Chain Performance

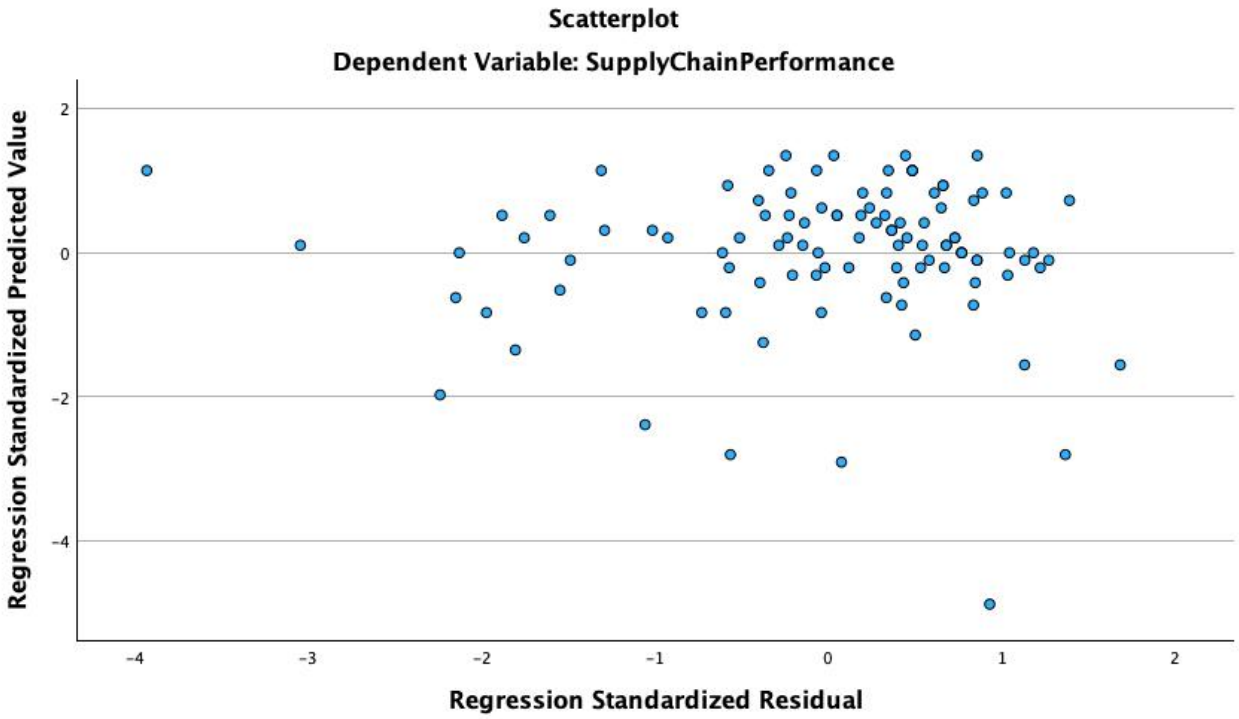

Figure 3Scatter Plot Showing Homoscedasticity