



The Role of E-Logistics Practices and its Challenge in Enhancing the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise

By

Tewodros Yoseph Engida

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Advisor: Shiferaw Mitiku (PhD)

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**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT
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**THE ROLE OF E-LOGISTICS PRACTICES AND ITS CHALLENGE IN ENHANCING
THE SUPPLY CHAIN PERFORMANCE OF ETHIOPIAN SHIPPING AND LOGISTICS
SERVICES ENTERPRISE**

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_____	_____	_____
Advisor	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

DECLARATION

I, the undersigned declare that this thesis entitled “**The Role of E-Logistics Practices and Its Challenge in Enhancing the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise**” is my original work. It has not been submitted for a degree in any other universities and all the materials used in this study have been duly acknowledged.

Signature: _____

Date: _____

Tewodros Yoseph Engida

GSE/6093/12

June, 2022

CERTIFICATION

This is to certify that Tewodros Yoseph Engida has carried out his thesis work on the topic entitled *“The Role of E-Logistics Practices and Its Challenge in Enhancing the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise”*. The work is original and is suitable for submission for the award of a Master’s Degree in Logistics and Supply Chain Management.

Advisor: Shiferaw Mitiku (Ph.D.)

Signature

Date

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Acronyms and Abbreviations

B2B: Business to Business

B2C: Business to Customer

CPFR: Collaborative Planning Forecasting and Replenishment

EC: E-commerce

EDI: Electronic Data Interchange

ERP: Enterprise Resource Planning

ESL: Ethiopian Shipping Lines

ESLSE: Ethiopian Shipping and Logistics Services Enterprise

ETS: Electronic Transfer System

GOE: Government of Ethiopia

GPS: Global Positioning System

ICT: Information and Communication Technology

IP: Internet Protocol

IT: Information Technology

JIT: Just-In-Time

LIS: Logistics Information Systems

LPI: Logistics Performance Index

RFID: Radio Frequency Identification

RFQ: Request for Quotes

SAP: System Application Program

SCM: Supply Chain Management

SCP: Supply Chain Performance

SHS: Ship Husbandry Service

TMS: Transport Management System

TOS: Terminal Operations System

VMI: Vendor Managed Inventory

WMS: Warehouse Management System

WWW: World Wide Web

XML: Extensible Markup Language

Abstract

E-logistics is a relatively recent phenomena that has arisen since the introduction of the computerized global market and the internet. Fusion of IT and logistics management is credited with the development of E-logistics. The aim of the research is to assess the role of e-logistics and identify its challenge in enhancing supply chain performance of Ethiopian Shipping and Logistics Services Enterprise. Descriptive and explanatory research design as well as qualitative and quantitative approaches were used. Primary data source such as questionnaire were used to collect data. Descriptive statistics (such as mean and standard deviation) and inferential statistics (such as regression coefficient analysis) were used to analyze the data with the help of SPSS software. A total of 159 questionnaires were distributed to employees under the five ESLSE target departments: inventory management, transportation management, warehouse management, procurement and property management, and information technology, with 146 being returned, resulting in a response rate of 91.8 percent. The findings indicates that the practice of e-logistics in the ESLSE is moderate. The study concludes that, if technological, infrastructural, economic, legal, managerial and manpower challenges are minimized, the ESLSE could have reaped the fruits of enhanced supply chain performance. In order to enhance the supply chain performance of the Ethiopian Shipping and Logistics Services Enterprise, the researcher recommends that the enterprise should go extra mile to keep up with the state of the art e-logistics technologies like ERP II, Inventory Management System, WMS, CRM and other E-logistics platforms.

Key words: E-logistic, Electronic Data Interchange (EDI), Logistics Information Systems (LIS), Supply Chain Performance.

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CHAPTER ONE

INTRODUCTION

The first chapter discusses background of the study in relation to objectives of the study, followed by a statement of the problem and the gaps that need to be filled. The general and specific objectives are also presented in this chapter, which leads to research questions. Following the study's scope and limitations, the study's organization and definition of key terms are discussed.

1.1. Background of the study

Logistics is the efficient and effective administration of all types of products, services, and information flow between the point of production and the point of consumption within the supply chain in order to meet the needs of customers (Tekin, 2017).

E-logistics refers to the transfer of goods and services using Internet communication technologies such as Electronic Data Interchange (EDI), Enterprise Resource Planning (ERP), System Application Program (SAP), Global Positioning System (GPS), e-mail, and the World Wide Web (WWW) (Gunasekaran and Ngai, 2003).

In the 1990s, the Internet, an open-system of computer network, made worldwide communications possible at a significantly cheaper cost of operation. The phenomenal rise of the Internet is transforming the way businesses operate. The advancements in the Internet provide a wide range of chances for businesses to develop new ways to connect their customers in order to deal more efficiently and effectively with rising competition (Bayles, 2001). That is why, as the global economy has increasingly computerized, the logistics industry has grown dramatically. Following that, traditional logistics services were changed into e-logistics, or electronic commerce logistics (Lee & Seo, 2017). The e-logistic is now being used all around the world. It entails the movement of goods across the industry. As a result, it has a significant impact on enterprises all over the world (Lee & Seo, 2017a), notably in developed countries like the United Kingdom (UK), Germany, and the Netherlands. These countries saw rapid growth from 1999 to 2005.

When we come to Africa, the continent is increasingly playing a role as a key commodity producer and a large consumer market for items from other regions of the world as the world steadily evolves

into a global economy. In order to offer trade benefits to Africa, international entrepreneurs doing business in and with Africa would need to engage with African national and regional governments to integrate freight logistics and supply chain strategies with new technology (Adewole, A., 2019).

The open, non-equilibrium nature of complex systems contributes greater uncertainty, unpredictability, and turbulence to the logistics sector, making effective deployment of e-logistics systems troublesome and difficult (Wang and Pettit, 2016).

E-logistics faces a number of challenges. Lack of technical knowledge in the development and maintenance of E-logistics, as well as insufficient telecommunications bandwidth and constantly changing software for developing such systems, has been a major challenge for many businesses (Ramanathan, Ramanathan, and Hsiao, 2012).

Georgise, Heramo, and Bekele (2020) identified reduced technology distribution in an economy, the usage of the English language for online commerce, power outages and lack of a consistent power source as a major challenge for conducting E-logistics smoothly in developing nations like Ethiopia.

According to Byrd and Davidson (2003), knowledge and information technology have a substantial impact on firm supply performance, and a firm's supply chain performance can be improved by implementing and adopting information technology.

The fact that e-logistics is a relatively new phenomena that emerged following the internet revolution serves as the study's driving force. Today, practically all aspects of business operations are automated. As a result, the researcher is driven to investigate how e-logistics might improve the supply chain performance of the ESLSE, the sole government-owned company providing shipping and logistics services in the nation.

1.2. Problem Statement

The World Bank (WB) measures the performances of international trade logistics of countries using its standards known as the Logistics Performance Index (LPI) survey every two years. According to the latest World Bank, Country Score Card (2016) Ethiopia ranks 126th out of 160 countries in Logistics Performance Index (LPI) in the six key indicators: the efficiency of customs

and border management clearance, the quality of trade and transport infrastructure, the ease of arranging competitively priced shipments, the competence and quality of logistics services – trucking, forwarding, and customs brokerage, the ability to track and trace consignments and the frequency with which shipments reach consignees within scheduled or expected delivery times (National Logistics Strategy of Ethiopia, 2018).

One way to transform the logistics sector to the higher level is the use of technology driven logistics services so as to ensure comparative advantage and global competition. Georgise, Heramo, and Bekele (2020) stated that traditional ways of service, lengthier lead times, and low customer service levels have a significant economic impact on the organization. As a result, these existing issues can be addressed through the use of E-logistics, which can help to improve operational integration and customer service levels. Kadłubek (2015) suggested that the current management conditions on local and worldwide supply and distribution markets force businesses to rely on the support of sophisticated logistics processes more frequently through the use of information technology.

Diagnosis reports in Ethiopia showed several gaps and shortcomings related to transport supply and management problem, road condition, status of logistics centers, port facilities, stuffing materials, port handling equipment and the use of modern information technology and related infrastructures (FDRE Logistics Strategy, 2018).

Taye (2020) and Bizuayen (2019) argued that several studies have focused on logistics management practices and logistics management performances but none of them have focused on the logistics management performance and challenges of the adoption of logistics management system practices especially on the government enterprise sectors. The former attempted to address the impact of an information system on logistics management performance focusing on examining measures that will be taken to the role of an information system on logistics management performance. Whereas, Bizuayen (2019) focused on logistics management information system activities that have an impact on overall logistics management performance of the company emphasizing on identifying steps that may be adopted to improve logistics management information system practices.

Mekonnen (2018), Abebe (2019) and Frew (2020) argued that many studies have focused on the impact of Information Technology and its roles in organizations in general. Abebe (2019) and Frew (2020) studied the effect of ICT tools on operational performance of logistics management. However, Mekonnen's (2018) research have gained insight into the role of Information Technology in logistics and supply chain management.

Girma (2019) also identified a research gap on the role of Information and Communication Technology adoption on supply chain performance and examined the role of ICT adoption on supply chain performance.

Even though a number of studies have been done on how ICT affects how well firms in Ethiopia perform in their supply chains, they still continue to do their operations the old-fashioned way. But in order to gain a competitive edge and increase customer satisfaction, logistics needs to be supported by cutting-edge technologies in order to improve an organization's supply chain performance. In light of this, the research aimed to determine what part e-logistics might play in improving the ESLSE's supply chain performance. Therefore the fundamental aim of the research is to assess the role of e-logistics and its challenge in enhancing supply chain performance of the ESLSE.

1.3. Research Question

Since E-logistics is a new trend and under studied area, this study tries to answer the following questions.

1. To what extent ESLCE is practicing E-logistics in terms of procurement management, transport management, inventory management, warehouse management and customer relationship management?
2. What are the challenges of E-logistics Practices in ESLSE?
3. How E-logistics practices affects the supply chain performance in ESLSE?

1.4. Research Objective

1.4.1. General Objective

The general objective of this study is to assess the role of E-logistics in enhancing the supply chain performance of Ethiopian Shipping and Logistics Services Enterprise.

1.4.2. Specific Objectives

1. To assess the E-logistics Practices of the ESLSE (in terms of procurement management, transport management, distribution management, warehouse management and customer relationship management).
2. To identify the challenges of E-logistics practices in ESLSE.
3. To examine how e-logistics practices affects the supply chain performance in ESLSE.

1.5. Scope of the Study

The research is limited to present E-logistics practices and challenges in enhancing the supply chain performance of ESLSE. The study's scope included the inventory department, warehouse department, transport department, procurement and property administration department and ESLSE's ICT department in Addis Ababa's main office. To give fundamental descriptive information on the dataset and to explain the link between the independent and dependent variables, the study used a descriptive and explanatory research design. Data was collected using a quantitative survey questionnaire with a Likert scale. Respondents from the ESLSE headquarters' Logistics and IT departments are intentionally chosen based on relevancy. The study is limited to e-logistics practice with regard to procurement management, transport management, warehouse management, inventory management and customer relationship management, its challenges and the role it played in enhancing supply chain performance in ESLSE. The research is conducted in the academic year 2021/2022.

1.6. Significance of the Study

E-logistics has been a very important part of the supply chain process even though it is at early stage in Ethiopia. Regardless of the need for E-logistics practice, there has been a few empirical

study carried out either to assess, identify or to determine the challenges or factors affecting the application of IT and internet based technologies to improve supply chain performance within ESLSE. Effective application of E-logistics has a positive impact on supply chain performance and in order to boost competitive advantage and customer satisfaction. The findings of the research shall benefit the shipping and logistics sector including logistics service providers. The research also initiates policy makers to look up to E-logistics and its benefits to boost supply chain performance and consider it when making policy. Finally, this research could serve as an empirical evidence for those students who wished to work their research in E-logistics.

1.7. Definition of terms/ Operational Terms

“**E-logistics** can be defined as the transfer of goods and services using internet communication technologies such as Electronic Data Interchange (EDI), Enterprise Resource Planning (ERP), SAP (System Application Program), Global Positioning System (GPS), e-mail and World Wide Web (WWW)” (Gunasekaran and Ngai, 2003a)

Gunasekaran and Ngai (2003b) described e-logistics as an Internet-enabled logistics value chain designed to offer competitive logistics services including public warehouse management, transportation management, distribution management, freight consolidation.

Electronic Data Interchange: It is a standard way to electronically transfer data between software applications in logistics companies and their business partners. It speeds up important logistics processes in supply chain (Kohli, 2021).

Logistics Information System (LIS) – is implementation of solutions for a system of records and reports which may be paper based or electronic. This is a specialized area in logistics that can handle location, work management, and data management in organizations. It mainly includes coordination of demand, supply, movement, and control of material or finished goods (Kohli, 2021).

Supply Chain Performance – Supply Chain Performance refers to the extended supply chain’s activities in meeting end-customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner. Supply Chain Performance crosses company boundaries since it includes basic

materials, components, subassemblies and finished products, and distribution through various channels to the end customer (Hausman, 2004).

1.8. Organizations of the study

The first chapter discusses the broad background of e-logistics practice and challenges in improving supply chain performance, as well as the problem statement that exist within ESLSE and the challenges that affect e-logistics practices. The second chapter looks at literatures that are important to e-logistics concepts and theories, followed by an empirical literature assessment to assess e-logistics practices inside logistics organizations, analyze the literature gap, and develop a conceptual framework that is relevant to the topic at hand. The study's methodology is discussed in Chapter three. Chapter four presents the data analysis, with the findings leading to answers to the study questions. Chapter five presents the summary, conclusion, and recommendations for possible future study directions and further discussion.

CHAPTER TWO

RELATED LITERATURE REVIEW

The theoretical reviews are based on the E-logistics process, E-logistics systems, and supply chain performance. To establish the conceptual framework for data collection instrument, the researcher examines literature relevant to E-logistics concepts and empirical studies written by various scholars in the field of E-logistics to understand the role and challenges of E-logistics practices and the knowledge gap that exists. This comprises E-logistics definitions and concepts, E-logistics processes, E-logistics systems, as well as a conceptual framework.

2.1. Theoretical Literature Review

2.1.1. E-logistics Definitions and Concepts

“Logistics is the process of planning, executing and controlling the efficient & effective flow and storage of goods, services as well as the related information from point of origin to point of consumption to serve the purpose of conforming the customer requirement” – Council of Logistics Management.

Logistics is the efficient and effective administration of all types of products, services, and information flow between the point of production and the point of consumption within the supply chain in order to meet the needs of customers. The logistics management process encompasses all logistics-related tasks such as planning, implementation, transportation, warehousing, and control (Tekin, 2017).

E-logistics is defined to be the mechanism of automating logistics processes and providing an integrated, end-to-end fulfillment and supply chain management services to the players of logistics processes. Those logistics processes that are automated by e-logistics provide supply chain visibility and can be part of existing e-Commerce or Workflow systems in an enterprise. E-logistics is one subset of a larger external logistics market.

E-logistics is defined as a technique for automating logistics processes and providing comprehensive, end-to-end fulfillment and supply chain management services to logistics process participants. E-logistics-assisted logistics processes give supply chain visibility and can be

integrated into an organization's existing e-Commerce or Workflow systems. (Liang-Jie *et-al*, 2001) E-logistics refers to the transfer of goods and services using Internet communication technologies such as electronic data interchange (EDI), Enterprise Resource Planning (ERP), System Application Program (SAP), Global Positioning System (GPS), e-mail, and the World Wide Web (WWW). (Gunasekaran and Ngai, 2003c)

Wang and Pettit (2016a) looked at the evolution of e-logistics systems over the last 50 years based on several characteristics (typical e-logistics system, emergent IT trends, integration focus, business application, and supporting computer technology), whereas, Merali, Papadopoulos and Nadkarni (2012) presented four-step changes in ICTs since the 1960s that had a significant impact on e-logistics development that is, Connectivity (between people, apps, and devices); capacity for dispersed data storage and processing; reach and range of data transmission; and rate (speed and volume) of data transmission.

In the 1990s, the Internet, an open-system computer network, made worldwide communications possible at a significantly cheaper cost of operation. The cyber space of the World Wide Web (WWW) has provided businesses with the possibility to engage in electronic commerce (e-commerce) with customers or other businesses with whom they may subsequently develop a relationship in the SCM (Bayles, 2001a). The phenomenal rise of the Internet is transforming the way businesses operate. The advancements in the Internet provide a wide range of chances for businesses to develop new ways to connect their customers in order to deal more efficiently and effectively with rising competition. As a result, studies measuring the impact of the Internet on economic growth and business performance are increasingly focusing on e-logistics practices (Bayles, 2001b).

Information and communication technology (ICT)-enabled innovations are giving businesses new ways to manage supply chain interactions (Sambamurthy *et al*, 2013). ICT is being used by companies like Cisco, General Electric, Wal-Mart, and Dell to coordinate activities throughout their supply chains, including upstream procurement, internal production, and downstream sales and customer support, as well as overall information sharing (Lee, 2012).

Through the supply chain, logistics plays a critical role in getting products from manufacturers to consumers (Lee & Seo, 2017b). That is why, as the global economy has increasingly computerized,

the logistics industry has grown dramatically. Following that, traditional logistics services were changed into e-logistics, or electronic commerce logistics.

The e-logistic is now being used all around the world. It entails the movement of goods across the industry. As a result, it has a significant impact on enterprises all over the world (Lee and Seo, 2017), notably in developed countries like the United Kingdom (UK), Germany, and the Netherlands. These countries saw rapid growth from 1999 to 2005. The growth rate in the United Kingdom (UK) was around 720 percent, 1060 percent in Germany, and 1403 percent in the Netherlands (Weltevreden, 2007).

The need of rapidly growing information and communication technologies (ICTs) for eventual success and, in some circumstances, even survival of any logistical operation or project has long been recognized in today's highly competitive commercial markets. Many corporate innovations, such as just-in-time (JIT), time compression, collaborative planning forecasting and replenishment (CPFR), vendor-managed inventory (VMI), and cross docking, would not have been successful without the use of ICT. Modern global manufacturing and distribution would not be possible without the use of information technology (IT) applications to connect design, sourcing, marketing, manufacturing, and, eventually, sales. To achieve a competitive advantage in the market, businesses must have a thorough understanding of logistics operations. In today's global environment, competitiveness may be acquired by conducting sensible activities and employing modern logistics tools (Wieczorek, 2017).

As far as Africa is concerned the continent is increasingly playing a role as a key commodity producer and a large consumer market for items from other regions of the world as the world steadily evolves into a global economy. As a result, understanding logistics and supply chain management (SCM) methods in Africa has become critical for businesses. Understanding the current condition of logistics in Africa and identifying the problems and opportunities inherent in the system has become a strategic competitive priority for organizations who operate in Africa or have business relations there. Finally, it is critical to understand how to overcome obstacles and maximize opportunities. (Muogboh and Ojadi , 2018)

Adewole (2019a) "attributes the slow pace of logistics infrastructure development in Africa to: inadequate inland roads and railways; the high cost of operations; the lack of adoption of new

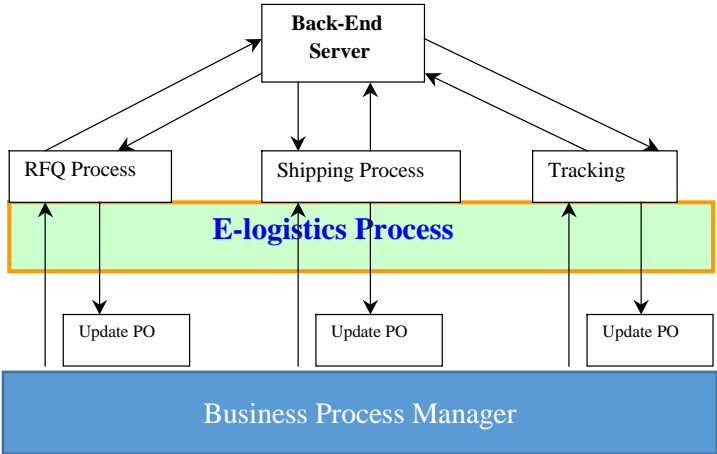
technology; bureaucratic and inefficient port management; the absence of a defined strategy for freight transport; inadequate investment; ineffective regional collaborations; and a lack of political will.”

In order to offer trade benefits to Africa, international entrepreneurs doing business in and with Africa would need to engage with African national and regional governments to integrate freight logistics and supply chain strategies with new technology. The burden of trade and the cost of investing in new logistics capabilities will be shared by developing partnership engagements between commercial investors and African governments, resulting in more market success (Adewole, A., 2019b).

2.1.2. E-logistics Process

E-logistics is defined as a technique for automating supply chain activities and providing comprehensive, end-to-end fulfillment and supply chain management services to the participants in the supply chain. Those supplying activities that are machine-driven by E logistics provide chain visibility and may be a part of an enterprise’s existing e-Commerce or work flow systems. Request for Quotes (RFQ), Shipping, and Tracking are all common e-logistics processes. The RFQ net Services will receive an invitation from any B2B application. After that, the RFQ net Services dynamically tie the requester’s information, such as shipping destination and weight, to the input XML guide and submit the request to the variation layer. The variation layer sends the request to the appropriate server and receives a response from it (Liang-Jie *et al*, 2001).

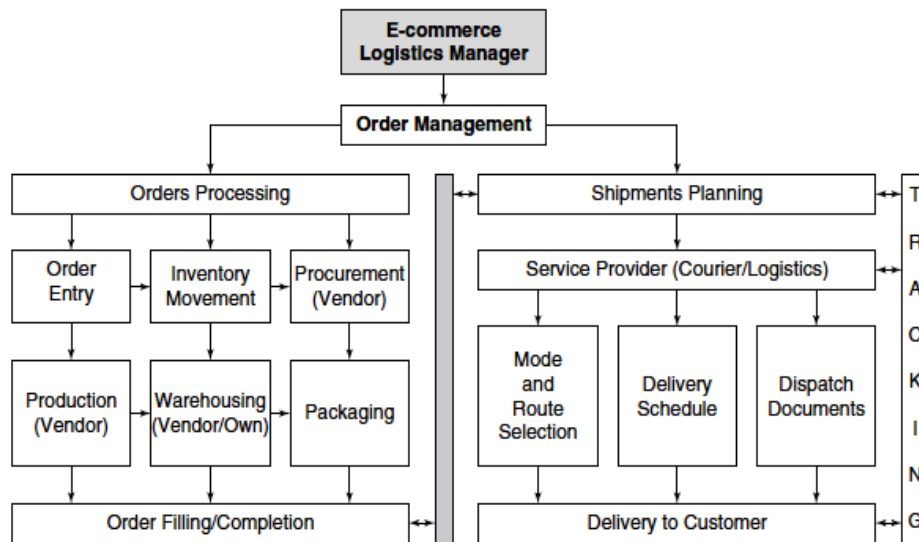
Figure 2.1. E-logistics Process



Source: Liang-Jie *et al*, 2001a

The RFQ process is used by the business process manager to obtain basic services, such as quotes in an e-logistics process. The purchase order (PO) is updated whenever a response is received. The business process manager also starts the shipping process, which updates the PO once it's finished. Once the goods have been sent, the consumer is issued a tracking number, which is then shipments. Figure 1 depicts the e-logistics and business process manager interaction diagram. (Liang-Jie *et al*, 2001b)

Figure 2.2. E-Commerce Logistics Software Application



Source: Sople (2012)

2.1.3. E-logistics system

E-logistics systems are applied by enterprises so as to enable them to control and manage their primary components. Enterprises integrate handling of data, software and hardware to successfully manage their activities.

The Transport Management System, which is based only on Internet Protocol (IP) technology, is used to run e-logistic systems. A multi-based activity is offered by an E-logistics system. It occurs because it facilitates real-time view of the entire enterprise network, including transportation and other activities required to complete the enterprise's tasks. Planning, transportation operations, forecasting, and management are all examples of business activity (Murphy and Wood, 2004).

It's important to note that the e-logistics system can manage and handle all of the operations that the company needs to complete its tasks. In contrast to other systems that exist and support sections of the enterprise's activities, this occurs with the e-logistics system.

It's worth mentioning that the e-logistic system is made up of three components: processes, information systems, and value. These points will be examined in order to create a comprehensive icon for the components that deal with e-logistic systems (Pappa, 2008).

From customer service to new product design, an e-logistics system may assist businesses in all aspects of their operations. It enables new web-based business processes for contacting and interacting with customers, such as online advertising and marketing, online ordering, and online customer service, among others. It can also reduce costs in areas like order management and interfacing with a wide range of suppliers and trading partners, as well as other areas where considerable overheads are generally added to the cost of goods and services (Hazen, Hanna and Hall, 2014). It is vital to ensure two-way communication between suppliers and customers on all areas while developing an e-logistics system (Hernandez *et al*, cited in Chung, Yeh, and Chen, 2015).

2.1.4. Supply Chain Performance

According to Byrd and Davidson (2003a), knowledge and information technology have a substantial impact on firm supply performance, and a firm's supply chain performance can be improved by implementing and adopting information technology.

Inventory cost is a major concern in all businesses, particularly in the manufacturing sector, and firms are constantly developing new methods and strategies to minimize inventory costs. Walmart became the world's most valuable company by inventing an inventory management strategy called as cross doc, which lowers storage costs and allows businesses to provide things at the lowest feasible price. The seamless movement of information and material across the supply chain is a strategic decision, and any supply chain's financial performance cannot be judged without accounting for total logistics costs (Hadrawi, 2019).

Traditionally, Supply Chain Management (SCM) was the coordination and the planning of all company processes, from product design to its delivery to the final customer. According to

Balfaqih *et al.* (2016), SCM illustrates the discipline of enhancing the delivery of goods, services and information from raw materials supplier to the last customer. In the last decades, this concept has evolved taking into account sustainable development, new technologies (i.e. additive manufacturing) and information systems implementation. SCM aims at value creation for companies, customers and stakeholders who interact along it (Gashti *et al.*, 2012). It enhances efficiency, and decreases total operating costs (Balfaqih *et al.*, 2016a). Besides, SCM has to deal with the interrelated set of activities controlled by different firms (Prasad, 2012).

Nowadays, measuring Supply Chain Performance (SCP) becomes essential as it shows strengths and weaknesses of each SC process by analyzing values of the Key Performance Indicators (KPI). In this vein, Pretorius *et al.* (2013) declare that when an organization can measure its SCP, there are multiple advantages such as increasing the opportunity for effective SCM, monitoring the values of each attribute to achieve the organizations' strategic aims, etc. Similarly, Balfaqih *et al.* (2016b) claim that it is imperative that SCP should be continually analyzed to improve its yield, which increases competitiveness and flexibility. Likewise, Charkha and Jaju (2015) have affirmed that effectiveness of any SCM can be evaluated by analyzing the performance at the three decisions making levels for different cyclic processes such as procurement, production and distribution. In this regard, performance indicators support SCM goals and provide effective information, which is helpful for continuous improvement.

2.2. Empirical Literature Review

2.2.1. E-logistics Practice

Wong, Chow, and Sculli did research on the development of an e-logistics system for a Hong Kong maritime transportation firm (Wong *et al.*, 2010). This system makes use of web-based technologies to provide data support for physical operations and to make data exchange amongst delivery service businesses easier. This study examines an e-logistics system for shipping commodities by sea. All users, including sender, delivery route, overseas agents, and forwarding operators, are accommodated by the system. The findings show that an e-logistics system may simplify and facilitate the distribution of items and the flow of information. This study aids in the creation of an efficient and open environment in which all parties involved in this industry can communicate and share information with business partners such as the sender, sailing route, and

co-loader.

Due to the consideration of logistics service operators for shifting their traditional logistics system to e-logistics in order to meet dynamic changes in the commercial environment, Angheluta and Costea (2010) conducted a research that aims to provide a better knowledge of how a business uses e-logistics in its supply chain and how to gain competitive advantage during an economic downturn, as well as how to offset losses if they cannot be avoided. It may be inferred that an e-logistics system can be described as a networking process that provides value, with aspects such as reliability, maintenance, software and facility, transportation and handling, and other factors influencing the system. The factors of availability, economics, organization, and supporting tools, as well as assessment, on the other hand, have little impact.

E-logistics practices include:

a) E-Inventory Management Practice

Many corporate concepts, such as just-in-time (JIT), time compression, collaborative planning forecasting and replenishment (CPFR), vendor-managed inventory (VMI), and cross docking, would not have been effective without the use of ICT. Modern global manufacturing and distribution would not be possible without the use of information technology (IT) applications to connect design, sourcing, marketing, manufacturing, and, eventually, sales (Wang and Pettit, 2016b).

The application of IT can help with inventory management. IT can help a company share information with its suppliers in a more efficient and effective way. Due to enhanced forecasting and visibility, real-time information exchange can result in cheaper inventory costs. As a result, the amount of safety stock required to minimize uncertainties can be minimized (Harnowo, 2015).

b) E-Warehouse Management Practice

Big quantities of daily orders, a large variety of product lines, shorter order lead times, and rising pressure to do the process right the first time are all factors that warehouse operations must now consider.

Tim Hotze, formerly of Panalpina and now of Amazon Supply Chain Execution, explains innovative warehouse management technologies for improving e-logistics practices. Because storing goods in a warehouse adds expenses to a product, warehouses must also contribute value

by consolidating products both temporally and spatially, as well as reducing the overall number of supply chain links. He demonstrates how e-logistics must not only handle the actual flow of items, but also integrate different applications and increase data gathering and data validation, all while minimizing or completely eliminating any negative influence on business processes (Wang and Pettit, 2016).

c) E-Transport Management practice

Cardiff University's Irina Harris, Yingli Wang, and Haiyang Wang discuss how a well-integrated ICT driven multimodal transportation network is essential for businesses to succeed (Wang and Pettit, 2016c).

With the expansion in transport and cargo volume in seaports, the volume and speed of information exchange among stakeholders increased. There are several ways for stakeholders to communicate, including electronic exchange systems, shipping online portals, and e-commerce. Electronic Transportation Management Systems (e-TMS) address the problem of non-uniform format standards and message exchange methods, which can be addressed through the use of Mediation Service Software and Electronic Transaction Platforms. The distinction between efficient and inefficient traffic management systems becomes clearer with this adoption (Jović et al 2019).

d) E-Procurement Management Practice

According to Presutti (2003), forward-looking top executives are eager to harness the potential of technology to boost their companies' competitiveness. Simultaneously, they are becoming more conscious of the importance of effective supply management, as 50 percent or more of a company's sales revenue is spent on supporting activities at the input end of the supply chain.

E-procurement has risen to prominence as the most significant advance in supply management in recent years as a result of the convergence of these two forces. The impact of Internet technology on what has traditionally been referred to as the purchasing process has been widespread, ranging from how suppliers and internal members of the firm's buying team participate in the specification development process to the systematic collection of data required to fully and objectively evaluate supplier performance.

The ramifications of the introduction of e-procurement are evident since industrial marketers connect with the purchasing firm's supply chain on the input end of the chain. Supply managers will increasingly look for suppliers who can help them create value for their companies through efficient e-procurement (Presutti (2003).

e) E-Customer Management Practice

Allan Woodburn of the University of Westminster highlights the fundamental principles of ICT in the rail industry, as well as the essential needs of customers and the extent to which ICT applications are utilized to increase performance and improve customer service. We live in a world where physical and virtual supply chains are increasingly merging, and businesses must be able to meet customer demands at any time and from any location (Wang and Pettit, 2016d).

2.2.1.1. E-logistics practices in Ethiopia

One of the important success factors in reaching the Ethiopian government's objective of becoming Africa's manufacturing hub by 2025 is efficient logistics (Nitsche, 2021).

The Ethiopian logistics system is characterized by a poor logistics management system and a lack of coordination of goods transportation, a low level of development of logistics infrastructure, and insufficient fleets of freight vehicles in terms of number and age, as well as damage and quality deterioration of goods during handling, transport, and storage. This, combined with the lack of a sea port, resulted in a weak relationship between producers (farmers) and consumers (market), as well as non-competitiveness of Ethiopian goods on the world market, jeopardizing the people's livelihood and the country's economy. In cities and at city inlets/outlets, there is a very high rate of traffic accidents (first in the world) and congestion, to which freight vehicles contribute considerably. To address these socio-economic issues, an efficient and effective logistics system must be implemented (Fikadu, 2013).

The use of ICT in logistics is non-existent. One area bar code is used is at cash register of supermarkets but it is not connected with inventory or warehousing management system. MOT's plan is to introduce tracing and tracking using GPS, and software, databases and other logistics ICT applications (Fikadu, 2013a).

Security and privacy, perception of risk in e-services, legal and legislative concerns, lack of adequate skilled workforce, sociocultural issues, transportation and delivery system are all universal challenges throughout the world, and the majority of them are applicable to African countries. Ethiopia faces all of the aforementioned issues, as well as the infant stage of telecommunications infrastructure and an e-payment system, which are substantial bottlenecks (Sundaram *et al*, 2018).

Among the several advantages that e-commerce provides are increased economy-wide efficiency, direct export access, and easier inventory management and integration. Ethiopia will also benefit from the aforementioned chances, which will broaden people's knowledge and expose them to fresh ideas and perspectives (Sundaram *et al*, 2018a).

In Ethiopia, electronic commerce is still in its infancy and is hardly practiced. Ethiopia's government is working on a draft national law to regulate e-commerce. Debit cards and automated teller machines (ATM) are widely used in Ethiopian banks, while credit cards have yet to be introduced. The majority of Ethiopians lack credit cards, and internet access is slow, expensive, and unreliable. However, Ethiopia's internet connectivity has lately improved thanks to Seacom's underground/sea fiber optic cable through Djibouti. International banking networks are connected to ATMs. International ATM cardholders can withdraw money from any ATM machine operated by Ethiopia's 18 commercial banks.

Ethiopian banks have begun to use mobile, internet, and card banking services to conduct primary internet transactions. These technologies were developed in response to the introduction of centralized, online real-time, electronic banking systems, which resulted in a rise in customer numbers. The mechanism for delivering digital financial services still has a long way to go. Currently, international companies are providing technical services for the GOE's different financial inclusion projects. Ethiopia has currently developed and tabled a proclamation in Parliament to allow, regulate, and monitor e-commerce operations in Ethiopia (ITA, 2021).

2.2.1.2. E-logistics Practices in ESLCE

ESLSE is using advanced ICT between head quarter and on board ships (Fikadu, 2013a). In terms of supporting its services and activities and utilizing information communication technology, ESLSE has relied on a variety of systems that it acquired and overhauled from former

independently operating companies (Ethiopian Shipping Lines S.C, Maritime and Transit Services Enterprise and Dry Port Enterprise), as well as developing new systems using its own internal capacity and resources. These systems can be divided into three categories: The first one includes the two systems that the shipping industry has been utilizing, both of which were procured from outside the country and were off the shelf. The second involves major systems constructed using internal resources to assist freight forwarding, port, and terminal operations. The third encompasses minor systems such as websites and internal information portals that aid in the transmission of messages to corporate customers and employees (ESLSE).

The sea liner software is one of the most important systems utilized by the Ethiopia shipping and logistics service company (ESLSE). The system consists of various modules, some of which have yet to be implemented. The sea liner software system comprises three modules: Terminal Operations System (TOS), Ship Husbandry Service (SHS), and Vendor. The terminal operation activities for each port are defined in advance based on the voyage record kept in other modules. The terminal operations were tailored to a given voyage and port, and the system included both terminal and ship husbandry costs. Using booking information, the system can extract the loading and discharging details of a voyage. The system populated the appropriate terminal activity with arrival and departure information. The ship husbandry service is mostly concerned with the vessel's expenses. As a result, the system may create expenses based on the SHS tariffs specified for the port, as well as voyage loading and discharging details based on booking information. The SHS cost can be linked to the TOS cost in the system. The vendor sea liner system is used to settle commissions for shipping agents, and it is particularly significant for both shipping agents and ESLSE since it eliminates paperwork, delays in payments, and ensures that appropriate payments are made (Habtesilase, 2018).

Since October, 2019, the Ethiopian Shipping and Logistics Services Enterprise (ESLSE) has been adopting Enterprise Resource Planning (ERP) software. Since the start of the implementation, many functions of the enterprise that use these tools have benefited a lot. A number of accomplishments have been recorded since the enterprise linked its existing systems with the new ERP and began utilizing the consolidated tools of effective and efficient software. The systems assist in the transfer of enterprise data and information from the head office to the seaport destination, as well as day-to-day operational and related tasks such as administrative, financial,

human resource, procurement, and property management. Furthermore, they are systems that assist in the delivery of communications to customers (ESLSE).

2.2.2. Challenges of E-logistics

Economic structures and information networks based on the internet are the new business reality, as businesses and individuals enjoy the convenience of acquiring goods and services from other countries. Most developing nations, on the other hand, are far from experiencing this reality due to a variety of issues that operate as roadblocks to the growth of e-commerce (kamel, 2006).

Regardless, several barriers exist in underdeveloped countries that stifle the growth of their e-commerce industries. With its favorable impact on trade, investment, business transactions, and market penetration, e-commerce has the potential to bring many opportunities unmatched by other technology breakthroughs (Wresch and Fraser 2011). However, many scholars who have attempted to find ways for these benefits to be realized in underdeveloped countries have come to a disappointing result. According to Molla and Heeks (2007), “The majority of businesses do not appear to have achieved E-commerce benefits in terms of expanding their access to markets, improving their reach or links to consumers or suppliers, or in connection to cost reductions or other efficiency gains”.

External Challenges

a. Technological Challenge

The open, non-equilibrium nature of complex systems contributes greater uncertainty, unpredictability, and turbulence to the logistics sector, making effective deployment of e-logistics systems troublesome and difficult. Fragmented development of distinct software applications and standards, interoperability challenges across different systems, and deployment time and cost are all common issues. As a result, the capacity to orchestrate and manage a portfolio of e-logistics systems is viewed as a critical dynamic competency for users and providers of logistics services, and it is essential for optimal information flows within and across supply chains (Wang and Pettit, 2016e).

Reduced technology distribution in an economy can also stifle E-logistics expertise (Georgise, Heramo and Bekele, 2020).

b. Infrastructural Challenge

Another stumbling hurdle to ecommerce expansion is internet connectivity in terms of cost, quality, and speed of service given, as well as a lack of effective branding and trust difficulties (Alyoubi, 2015).

Insufficient telecommunications bandwidth and constantly changing software for developing e-logistics system, has been a major challenge for many businesses, forcing them to abandon the many benefits of ICT in general (Ramanathan, Ramanathan, and Hsiao, 2012a).

Power outages, lack of a consistent power source is a major problem for conducting E-logistics smoothly in developing nations like Ethiopia (Georgise, Heramo and Bekele, 2020a).

c. Economic Challenge

The inability of banking systems to adapt to new technology has a negative impact on the development of E-logistics (Fitzgerald et al. 2014)

d. Legal Challenge

A common obstacle developing countries face is the absence of a sound legal and regulatory environment for e-commerce, which acts as a deterrent for both buyers and sellers to conduct business over the Internet (UNCTAD, 2004 cited in Alyoubi, 2015).

Wang and Pettit (2016f) also highlighted legal challenges as one of the bottlenecks for the successful implementation of e-logistics.

Ethiopia, as one of the fastest-growing countries, has seen significant progress in terms of internet availability and electronic commerce growth in recent years. In light of recent developments in the digital world, Ethiopia's Parliament recently passed the Electronic Signature Proclamation No. 1072/2018, which took effect on February 6, 2018. Despite being late to the game, the Federal Democratic Republic of Ethiopia's promise to establish electronic signature legislation is a positive step toward creating an enabling environment for electronic commerce. However, because Ethiopia's electronic commerce industry and regulation are still in their infancy, there are worries about the appropriateness and compatibility of this newly established electronic signature law (Haileyesus, 2021).

When participants to a transaction utilize electronic records instead of paper and communicate through an electronic channel, they face unique legal and security problems. Data communications, for example, could be intercepted and modified, document authenticity could be questioned, and personal data could be gathered illegally (Barofski, 2000). Existing legal traditions, in addition to the lack of new legislation to match new technology developments, create a barrier to performing electronic transactions (Yilma and Abraha, 2015).

Electronic transaction legal issues have been the focus of substantial legislative initiatives at the international, regional, and national levels. For example, the United Nations Commission on International Trade Law (UNCITRAL) published Model Law on Electronic Commerce in 1996 and Model Law on Electronic Signatures in 2001, both of which have served as the foundation for laws implemented in a number of nations. In 2005, the United Nations ratified the UN E-Contracting Convention on the Use of Electronic Communications in International Contracts. The African Union (AU) enacted the African Union Convention on Cyber Security and Personal Data Protection, which covers three primary areas, including electronic transactions, in the African context. All of these international and regional laws are designed to remove barriers and improve legal protection (Yilma and Abraha, 2015).

Internal Challenges

a. Managerial Challenge

Although the challenges differ by country and location, the most generally mentioned impediments that countries confront include a serious lack of managerial skills required to create and implement a business e-commerce strategy (Alyoubi, 2015).

In terms of forming strategic alliances based on core capabilities while constructing a logistical value chain, e-logistics presents a number of managerial challenges. In E-logistics, logistics managers' behavior and roles will differ from those in traditional logistics systems that rely on centralized resources (Georgise, Heramo and Bekele, 2020b).

According to Winters, McDonough, and Willis (2014), Today's supply chain managers will be expected to understand and manage potentially complicated global supply chain networks. Supplier management, manufacturing facilities, and freight movements across many nations and

time zones are all areas of expertise. This necessitates the ability to comprehend and manage various forms of individual contracts, as well as knowledge of cross-border working practices and compliance.

Logistics companies are hiring 'Continuous or Process Improvement Managers' to assess current workflows and technology as part of their ongoing efforts to increase operational efficiency. They must be able to monitor, analyze, and improve essential processes, therefore Six Sigma skills are in high demand (Winters, McDonough, and Willis, 2014).

b. Manpower Challenge

Winters, McDonough, and Willis (2014a), argues that new technology has an impact on worker abilities. To begin with, employers need trained personnel who can recognize the benefits of new technologies as well as operational personnel who can realize the potential benefits of new technologies. Any cost-benefit analysis of an employer's decision to invest in capital and technology must include the human capital component of the workforce responsible for achieving the investment's advantages. To guarantee a smooth adoption across the organization, the implementation process must be clearly communicated, managed, and structured, including staff training and buy-in. New systems that necessitate advanced IT, strategic planning, and analytical skills necessitate the development of appropriate training programs and skill sets.

Lack of technical knowledge of employees is a challenge in the development and maintenance of E-logistics (Ramanathan, Ramanathan, and Hsiao, 2012b).

Employers face a challenge in ensuring that their staff have the necessary skills in the proper amounts as a result of the technology used across the logistic sector. Many positions, such as management, drivers, port operatives, warehouse operatives, transport office, IT experts, and trainers, are becoming increasingly multi-skilled (Winters, McDonough and Willis, 2014b). According to Winters, McDonough and Willis (2014c), Companies in the logistics industry, like those in other industries, are increasingly adopting new technological solutions to improve their competitiveness and efficiency. Staff with specialist knowledge and more specialized skills are needed to sustain the competitive advantage afforded by new technologies. Firms facing such skills issues may have trouble maximizing the return on investment in new technology if their most valuable resource, their employees, is not properly trained and qualified to deal with industry

changes.

2.2.3. The Role of E-logistics on Supply Chain Performance

Pappa (2008a) argued that many companies are recognizing the importance of e-logistics in their growth and success. They're also recognizing how these tasks differ from typical logistics in terms of complexities and challenges. The additional constraints of delivering items ordered online and meeting consumer expectations after the sale compound the challenges that developing countries confront in implementing e-commerce logistics. Many of the same technologies and improved business practices that will facilitate e-logistics are expected to allow many participants to collaborate more closely than ever before. Nitsche (2021) also claimed one of the most significant issues in supply chain was the lack of coordination among the various parties involved, and digital platforms can help to integrate those stakeholders into multi-stakeholder platforms. Hernández *et al* (2012) added that the benefits of a successful e-logistic system deployment include the ability to automate traditional logistics activities as well as visibility and real-time synchronization across a network of collaborators

E-logistics is the most cutting-edge technology in the logistics field, combining the entire business world into a small online e-world. By sharing data, delivering knowledge, and exact statistics with supply chain customers, this revolutionary set of communication with superior computing and shared skills transforms new logistics into a customer-oriented technology. E-logistics helps in the management of emerging supply chain challenges. Multi-channel operations, cross-border tasks, warehouse plan and inventory, planning, estimation, and performance management are the primary components of e-logistics (Kanagavalli and Azeez, 2019).

Sheng and Lan (2011) stated electronic business affects commodity trading activities, so it affects logistics deeply. It is important to the development of logistics. Logistics support electronic businesses strongly. The rapid and healthy development of logistics and electronic business are benefit to each other. Nowadays, the competitive position of enterprises depends not only on prices, but also on factors such as quality, customer service, and execution time, which can be improved by implementing modern solutions into the logistics processes (Wieczorek, 2017a).

In the 21st century, modern businesses have realized that implementing e-business systems and building strong e-commerce (EC) capabilities is crucial to staying competitive. The development

of EC capabilities is not only a creative way of doing business, but it is also a critical solution for organizations' long-term competitiveness (Chung, Yeh and Chen, 2015).

a. The Role of E-logistics Practice on Responsiveness

Supply chain responsiveness has also been defined as the supply chain's ability to efficiently and effectively respond to the dynamics that affect an organization's clients by reacting quickly to changing market requirements (Gunasekaran *et al*, 2008).

b. The Role of E-logistics Practice on Cost

The amount of money spent on an event or activity is referred to as the cost. One of the most important factors to consider when evaluating performance is the cost. This dimension keeps track of the inputs used as well as the efficacy of cost control. Financial resources are needed to carry out numerous tasks within the scope of SCM, hence this is a critical performance parameter (Prasad, 2012a).

E-logistics is an Internet-enabled value chain that includes commercial warehouse operations, export logistics, inventory systems, distribution management, and shipping systems, among other things. Low functional cost, mapping request fluctuations, and primary savings are the main benefits of outsourcing logistics services. Several variables that occur as challenges in business logistics, such as erroneous information, unreliable resources, sluggish and inadequate operations, and high product risk rates, highlight the importance of precise information interchange between various partners throughout the logistics value chain (Ding and Zhao, 2021).

c. The Role of E-logistics Practice on Asset Management

Inventory is an important area where every company has to concentrate on and differentiate themselves with their competitors. With the growing demand for various varieties of products available all over the world people's expectations are changing for every product. If a company wants to survive in the long run it should pay special attention to the area of supply chain and Inventory. Research is demanded to reduce the product cost and improve the quality with reduced failure rates (Singh and Verma, 2018).

d. The Role of E-logistics Practice on Reliability

The capacity of a system or component to fulfill its needed functions under specified conditions for a certain amount of time is referred to as reliability. It is the ability of a single event or activity to carry out a given task. It stresses the circumstances in which the activity or process takes place (Prasad, 2012).

Supply chain reliability refers to the degree to which a supply chain yields consistent performance. Increasing reliability, reducing inventory and preparing for demand are top priorities for supply chain professionals. Reliability is essential in implementing an operative supply chain management strategy since it enhances productivity and cuts costs. It also warrants inventory to be delivered to customers on time. On-time, consistent performance is frequently attributed to shipper/carrier collaboration.

Reliability is one of the most important characteristics of the functioning of supply chains since it has a significant impact on the completeness and quality of delivered parties, on the execution time of logistics cycle and on logistics costs in supply chains. Since the processes of interaction between the companies, that are participants of the supply chain, become more complicated, this leads to the need of improvement of methods used to assess the reliability of supply chains and to search for active ways to improve reliability. Strong shipper/carrier relationships are also crucial in maintaining or improving transportation performance. In transportation, carrier connectivity is essential to the protection of the supply chain (Lukinskiy, Lukinskiy and Churilov 2014).

e. The Role of E-logistics Practice on Flexibility

The ability to adjust to both internal and external business changes is referred to as flexibility. It is a specific activity's ability to adapt to changing functional requirements or respond to changes. It is the ability to obtain materials from a variety of sources, produce a variety of goods, and meet a variety of customer requirements (Prasad, 2012b).

Flexibility is perhaps the most important factor for supply chains because of the ever-changing and unpredictable nature of today's consumers. Flexible logistics involves having a cloud-based digital supply chain that centralizes and shares information from manufacturing, administration, and logistics systems, among others. It becomes a control panel that joins systems, processes and

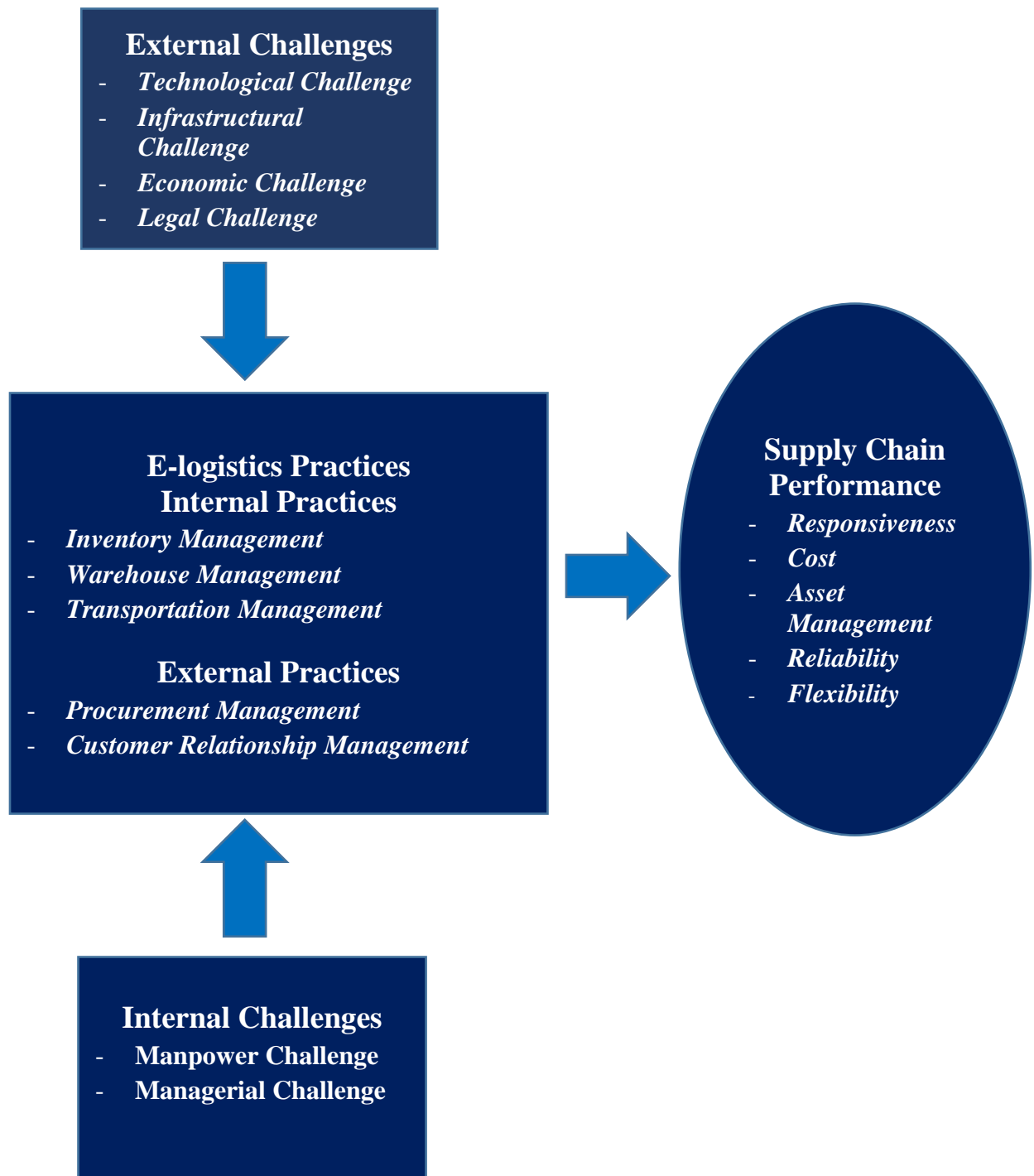
information in real time.

Due to the increasing uncertainty and diversity in supply chains (SCs), companies are aiming to develop their SC flexibility, which we define as the capability of a company, both internally and externally in conjunction with its key suppliers and customers, to respond to uncertainties and customer expectations without excessive costs, time and performance losses. SC flexibility has three dimensions – internal, supplier and customer flexibility (Huo, Gu and Wang, 2018).

2.3. Conceptual Framework

Electronic information management refers to the automation of information exchanges, in which data is transmitted between parties using electronic channels such as the Internet, the World Wide Web, EDI, ERP and SAP. These communication technologies are necessary for transmitting timely and accurate information in order to make decisions that will improve the logistics operations' performance. Information technology, such as enterprise resource planning (ERP), will make it easier for supply chain participants to share data. This will aid in improving communication throughout the supply chain, resulting in increased confidence and improved material flow. Transportation and warehousing entails storing and consolidating goods in order to make the required goods available at the appropriate time. In areas like updating inventory records, consolidation, loading and unloading, automated warehousing processes will reduce human involvement. A transportation network can assist reduce transportation expenses while also increasing flexibility (Gunasekaran, Ngai and Cheng, 2007).

Figure 2.3. A Conceptual Framework for E-logistics Practice and Challenges



Source: Researcher (2022)

2.4. Identified Literature Gap

Matay (2019) claims that past research has failed to demonstrate how the usage of ICT has impacted logistics practices and performance in a clear manner. His research focused on the effects of ICT on Supply Chain Management practices and performance in public institutions, in an attempt to close the gap. Taye (2020) on his study “the role of an information system on the logistics management performance” attempted to address the impact of an information system on logistics management performance. Girma (2019) identified a research gap on the role of Information and Communication Technology adoption on supply chain performance and examined the role of ICT adoption on supply chain performance. Abebe (2019) argued that there are not enough studies carried out to assess the effect of ICT tools on operational performance of logistics management in organizational level in Ethiopia.

Frew (2020) explains that many studies have been conducted on the role of IT in logistics operations in general. However, there is limited evidence of the direct influence of IT on logistics operations organizations in the literature. Many studies have focused on the impact of information technology on organizations in general. This research delved deeper into the role of information technology in logistics operational Performance. Bizuayen (2019) focused on logistics management information system activities that have an impact on overall logistics management performance of the company namely; inventory management, Warehouse management, transportation management, customer service management and information flow management.

Several studies have focused on logistics management practices and issues, but none have concentrated on Logistics Management Information System practices and challenges, particularly in the government enterprise sectors, according to Bizuayen (2019). The goal of the study evaluating logistics management information system practices was to identify steps that may be adopted to improve logistics management information system practices.

According to Mekonnen (2018), there has been limited research on the direct involvement of IT in service delivery, logistics, and supply chain management operations. Many studies have focused on the impact of Information Technology and its roles in organizations in general. His research will gain insight into the function of Information Technology in logistics and supply chain management.

Very few researches attempted to empirically study the role of E-logistics and its challenges and the effect they had on Supply Chain Performance in Ethiopia. Thus, this study will contribute by exploring and empirically testing to examine the role and challenges of E-logistics practice in enhancing the supply chain performance of ESLSE, in Ethiopia.

CHAPTER THREE

METHODS OF THE STUDY

This chapter addresses the study's methodology, which incorporates the study area as well as the research approach and design used to conduct it. The study's target population and sampling technique are then discussed. The data collection procedure, an ethical consideration of the study, data analysis and organization, as well as data validity and reliability tests, are all briefly will be discussed in this chapter.

3.1. Description of the study area

Ethiopian Shipping and Logistics Services Enterprise (ESL) is the result of the merger of the former three public enterprises, Ethiopian Shipping Lines S.C, Maritime and Transit Services Enterprise, and Dry Port Enterprise, which had been operating separately in a similar and interdependent maritime sub-sector until recently.

This newly merged enterprise was established after the Council of Ministers issued Regulation No. 255/2011, and it is vested with the enormous task of providing more effective and efficient sea-transport and logistics services to the country's importers, exporters, and investors by reducing transit time, cost, and handoffs. In addition, a trucking company known as Comet Transport SC was recently transferred to ESL as a result of a government directive issued in the mid of 2014.

ESL has a large fleet of vessels, heavy-duty trucks, sea and dry port facilities, chicaneries, and other equipment that allows it to provide efficient marine and land transport as well as sea and dry port services.

ESL's headquarters are in Addis Ababa, Ethiopia, with main branches in Djibouti, Modjo, and Kality (formerly Comet), as well as branches in Mekelle, DireDawa, Kombolcha, Semera, and Gelan. It also has a Maritime Training Institute in Bishoftu (formerly Debrezeit) Town, which is called Babogaya (ESLSE).

The study mainly focuses on E-logistics practice and its challenge in enhancing the supply chain performance of Ethiopian Shipping and Logistics Services Enterprise's headquarter of at Addis Ababa since the ICT and logistics departments are operating here.

3.2 Research design

Exploratory studies, descriptive studies, and explanatory studies are the three types of studies defined according to their objective (Saunders, Lewis and Thornhill, 2009). The researcher used descriptive and explanatory study designs among these. Descriptive research design was used to present descriptive statistics that provide basic information such as the mean of data set whereas explanatory research designs was used to explain and study the link between independent variables.

3.3 Research approach

The study was conducted using two approaches, these are quantitative and qualitative research approach (a mixed research). Mixed methods research is a prominent methodology in the social, behavioral, and health sciences in which researchers collect, evaluate, and integrate both quantitative and qualitative data in a single study or in a sustained long-term program of inquiry to answer their research questions (Creswell, 2013).

3.4. Population and Sample Design

The target population of the research are employees directly related to the ICT, logistics and SCM, as they have vivid picture on e-logistics practices and challenges.

According to the ESLSE human resource department (2022), there are 773 employees in Addis Ababa's head office in total, with a target population, 92 in the Inventory Management, 96 in Transportation Management, 32 in Warehouse Management, 29 in Procurement and Property Management and 16 in the IT department, totaling 265. Stratified sampling techniques was used. Staff at various levels, such as managers, department heads, officers and other employees, were among the target respondents. After the population was segmented into the appropriate strata, a simple random sampling was taken from each layer to represent all of the strata.

Sample Size determination

$$n = N / [1 + N (e^2)]$$

Where,

n = is the sample size,

N = is the population size, and

e = is the level of precision.

$$n = 265 / [1 + 265(0.05^2)]$$

$$n = 159$$

Source: Yamane (1967)

Table 3.1. Sample Size Determination

Name of Strata	Population Size	Proportional Sample Size	Sample Size for each Stratum
Inventory Management	92	$92/265=0.347170$	$0.347170*159=55$
Transportation Management	96	$96/265=0.362264$	$0.391045*159=58$
Warehouse Management	32	$32/265=0.120755$	$0.125373*159=19$
Procurement and Property Management	29	$29/265=0.109434$	$0.113432*159=17$
IT	16	$16/265=0.060377$	$0.060377*16=10$
Total	265		159

Source: Own Survey 2022

Questionnaire was administered for employees of ESLSE at the Head Office from various departments. Accordingly, 55 employees from Inventory Management, 58 employees from Transportation Management, 19 employees from Warehouse Management, 17 employees from Procurement and Property Management and 10 employees from IT department, with a total of 159 employees were selected to respond for questionnaire.

3.5. Data source and type

The research mainly used primary data i.e., questionnaire, that is administered for employees at the head office. The research also utilized secondary data that included publications and records that are available at ESLCE.

3.6. Data collection Procedure

Data was collected through questionnaires. The questionnaires were distributed to the respective logistics and ICT professionals. Secondary data was gathered from a variety of secondary sources, including logistics and supply chain journals and publications published in international journals.

3.7. Method of data analysis and presentation

For this study, both qualitative and quantitative measurements were implemented. Data was evaluated with descriptive statistics, which included frequency, percentage, and mean. The correlation and regression tests were conducted using inferential analysis techniques. To discover the link between the variables under investigation, correlations and regression analysis were used. Descriptive data were presented using the mean, standard deviation, frequencies, and percentages. Tables and figures are used to present the findings.

3.8. Validity and Reliability test

The terms reliability and validity are used to assess the quality of research. They describe the accuracy with which a method, approach, or test measures something. Validity is concerned with a measure's precision, while reliability is concerned with its consistency (Middleton, 2019). To ensure that the research instrument is valid, the researcher sought the advice of professionals in the field, particularly the researcher's advisor. This made it easier to revise and modify the study instrument as needed, improving its validity.

To show the instrument's reliability, the researcher distributed some questionnaires as a pilot test and subsequently made revisions based on the results. The Cronbach's – Alpha test coefficient was used to verify the questionnaire's reliability, and a score of 0.70 and above was taken as an acceptable level of reliability (Sekaran, 2003).

Table 3.2. Cronbach's Alpha Table for all items

Variables	Cronbach's Alpha	N of Items
Inventory Management Practice	.781	6
Warehouse Management Practice	.779	5
Transport Management Practice	.771	5
Procurement Management Practice	.776	6
Customer Relationship Management Practice	.788	5
Technological Challenge	.804	5
Infrastructural Challenge	.808	5
Economic Challenge	.788	5
Legal Challenge	.785	4
Managerial Challenge	.796	5
Manpower Challenge	.812	5
Responsiveness	.789	7
Cost	.782	7
Asset Management	.797	5
Reliability	.772	6
Flexibility	.792	10
N of sample population		146

Source: SPSS data output (2022)

3.9. Ethical Considerations

Letter of permission to conduct the research at ESLSE was issued by Addis Ababa University, School of Commerce. Anonymity and confidentiality of responders was assured during data collection. The research's goal and benefits was clearly conveyed to the informants.

CHAPTER FOUR

RESULT, DISCUSSION AND INTERPRETATION

To present sample characteristics, frequency distributions were used to indicate variations of respondents based on gender, experience, qualification, sector or department, designation and exposure to ICT training. The sample characteristics were presented basing on the responses from ESLSE head office in Addis Ababa. The results are presented in Tables.

4.1. Response Rate

The researcher should aim for a response rate of more than 80%, according to Saunders et al. (2009). The researcher produced 159 copies of questionnaires and submitted them to five ESLSE target departments i.e. Inventory Management, Transport Management, Warehouse Management, Procurement and Property Management and IT departments, with 146 of them being returned, resulting in a response rate of 91.8%, which was appropriate for analysis, conclusion, and suggestion. 13 questionnaires are not responded due to a number of reasons.

Table 4.1. Response Rate of Respondents

Response Rate	Frequency	Percent
Questionnaires Responded	146	91.82
Questionnaires Not Responded	13	8.18
Total	159	100

Source: Own Survey, 2022

4.2 Demographic profile of the respondent

Table 4.2. Demographic profile of the respondent

Demographics of the Respondent		Frequency	Percent
Gender	Female	36	24.7
	Male	110	75.3
Educational Qualification	First Degree	71	48.6
	Second Degree and above	75	51.4
Years of experience	Below 5 Years	17	11.6
	5-10 Years	81	55.5
	11-15 Years	43	29.5
	Over 15 Years	5	3.4
Department/Sector	Inventory Management	50	34.2
	Transportation Management	52	35.6
	Warehouse Management	21	14.4
	Procurement and Property Management	16	11.0
	IT	7	4.8
Designation	Executive	0	0
	Manager/head of department	5	3.4
	Officer	141	96.6
ICT course	Yes	136	93.2
	No	10	6.8

Source: own survey (2022)

According to the output from the data there were 110 male and 36 female respondents. This shows that the majority of the respondents, 75.3% of them are male while female respondents constitute 24.7%.

The output shows that among the target respondents of ESLSE 48.6% of them are first degree holders while the majority of them have acquired their master's degree or above which constitutes 51.4% of the total target sample.

With Regard to years of experience in ESLSE 11.6% of the respondents served the enterprise below 5 Years; 55.5% of them served for 5-10 Years; 29.5% of them serve the enterprise for 11-15 Years and 3.4% of the respondents have experience over 15 Years.

When we come to the departments or sectors they are serving, 34.2% of the respondents are from

Inventory Management; 35.6% of the respondents are from Transportation Management, 14.4 % of the respondents are working in Warehouse Management, 11.0% are from Procurement and Property Management and 4.8% of the respondents are from IT.

As far as their designation is concerned, 3.4% of the respondents are Managers or head of departments and the majority 96.6% of them are Officers.

Based on the output from table 4.2, 93.2% of the respondents attended IT courses or are computer literate while 6.8% of them did not attend any IT courses or training.

4.3. Descriptive Analysis of E-logistics Practices of ESLSE

4.3.1. Descriptive Statistics of Respondents on E-logistics Practice

The responses were based on a five-point Likert scale, with 5 indicating Strongly Agree, 4 indicating Agree, 3 indicating Neutral, 2 indicating Disagree, and 1 indicating Strongly Disagree. The respondents were asked to indicate whether they agreed or disagreed with the statements regarding e-logistics practices of ESLSE.

According to Alexander (2009), the range of mean interpretation is 1-1.8 – very weak, 1.81-2.60 – weak, 2.61-3.20 – moderate, 3.21-4.2 – highly, and 4.2-5 – very highly.

Table 4.3. Descriptive statistical analysis of Inventory Management Practice

Inventory Management Practice	Mean	Std. Deviation
Material Requirements Planning (MRP), a planning and control system is used at ESLSE for inventory scheduling.	3.18	0.847
ESLSE uses e-logistics platforms in forecasting inventory.	2.98	0.979
ESLSE uses e-logistics platforms in inventory adjustment.	3.12	1.007
ESLSE uses e-logistics platforms in inventory replenishment.	3.15	0.782
ESLSE uses e-logistics platforms in inventory management reporting.	3.38	0.807
E-logistics practice is used in ESLSE to plan and manage inventory counts.	3.29	0.830
Grand Mean of Inventory Management Practice	3.18	

Source: Own survey, 2022

According to table 4.3, the utilization of e-logistics for the inventory management practice of ESLSE in terms of Material Requirements Planning (MRP), inventory adjustment, inventory replenishment, inventory management reporting, plan and manage inventory counts and forecasting inventory accounts a grand mean of 3.18. This indicates that the ESLSE moderately practices on e-logistics for its inventory management.

Despite the fact that inventory management practice has great contribution in enhancing supply chain performance, the ESLSE utilization of E-logistics platforms is average and need to be improved in the future.

Table 4.4. Descriptive statistical analysis of Warehouse Management Practice

Warehouse Management Practice	Mean	Std. Deviation
ESLSE applies e-logistics platforms in warehouse distribution center management.	3.00	0.902
ESLSE applies e-logistics platforms in tracking and allocating inventory within the warehouse.	3.19	0.905
E-logistics practice is used in ESLSE to plan and schedule product moves.	3.15	0.927
E-logistics practice is used in ESLSE to manage outbound order release and load/ route planning.	3.33	1.051
Warehouse Management System (WMS) is used in ESLSE to optimize resource usage and material flows.	3.63	0.814
Grand Mean of Warehouse Management Practice	3.26	

Source: Own Survey, 2022

According to table 4.4, the practice of e-logistics for warehouse management in terms of tracking and allocating inventory within the warehouse, plan and schedule product moves, manage outbound order release and load/ route planning, Warehouse Management System (WMS) and warehouse distribution center management accounts a grand mean value of 3.26. This indicates that the ESLSE highly practice on e-logistics for its warehouse management.

Table 4.5. Descriptive statistical analysis of Transport Management Practice

Transport Management Practice	Mean	Std. Deviation
Transportation planning and management in ESLSE is executed electronically.	2.84	0.966
ESLSE uses GPS and other tracking technologies for multimodal transports.	3.58	0.981
E-logistics practices are applied at ESLSE in fleet management.	3.21	0.857
E-logistics technologies are applied at ESLSE in transport scheduling.	3.47	0.790
Transportation Management System (TMS) is used in ESLSE to plan and execute the movement of goods.	3.45	0.822
Grand Mean of Transport Management Practice	3.13	

Source: Own Survey, 2022

Table 4.5 depicts that the utilization of e-logistics for transport management practice of ESLSE in terms of usage of GPS and other tracking technologies, fleet management, transport scheduling, transportation Management System (TMS), transportation planning and management accounts a grand mean value of 3.13. This indicates that the ESLSE moderately practices on e-logistics for its transport management.

Table 4.6. Descriptive statistical analysis of Procurement Management Practice

Procurement Management Practice	Mean	Std. Deviation
ESLSE uses e-logistics platforms in need identification	3.05	0.995
ESLSE uses e-logistics platforms in supplier selection	2.94	0.934
ESLSE uses e-logistics platforms in contract management	2.90	1.019
ESLSE uses e-logistics platforms in contract award	2.92	1.175
ESLSE uses e-logistics platforms in making payment to supplier	3.06	1.176
ESLSE uses e-logistics platforms in Supplier Relationship Management	2.96	1.101
Grand Mean of Procurement Management Practice	2.97	

Source: Own Survey, 2022

Table 4.6 shows that the utilization of e-logistics for the procurement management practices of ESLSE in terms of need identification, making payment to supplier, supplier selection, contract management, contract award and supplier relationship management accounts a grand mean value of 2.97. This indicates that the ESLSE weakly practices on e-logistics for its procurement

management.

Table 4.7. Descriptive Statistical Analysis of Customer Relationship Management Practice

Customer Relationship Management Practice	Mean	Std. Deviation
ESLSE practices e-logistics to manage customer information.	3.16	1.024
ESLSE practices e-logistics in managing and coordinating customer interactions.	3.08	0.983
E-logistics platform in ESLSE is used to manage customer requirements, purchase orders, sales and distribution.	3.07	1.015
ESLSE's Customers can order and track their shipments online.	3.18	1.093
ESLSC uses Customer Relation Management (CRM) technology to forecast future customer needs to adjust its operation accordingly.	2.90	1.022
Grand Mean of Customer Relationship Management Practice	3.08	

Source: Own Survey, 2022

Table 4.7 depicts that the utilization of e-logistics for the customer relationship management practices of the ESLSE in terms of managing customer information, managing and coordinating customer interactions, managing customer requirements, purchase orders, sales and distribution, order and track shipments online and usage of Customer Relation Management (CRM) technology to forecast future customer needs accounts a grand mean value of 3.08. This indicates that the ESLSE moderately practices on e-logistics for its customer relationship management.

Table 4.8. Summary of Descriptive Statistical Analysis of Respondents on E-logistics Practices

E-logistics Practice	Mean
Inventory management practice	3.18
Warehouse management practice	3.26
Transport management practice	3.13
Procurement management practice	2.97
Customer relationship management practice	3.08
Overall Grand Mean of E-logistics Practice	3.12

Source: own survey, 2022

Table 4.8 shows the utilization of e-logistics practice of the ESLSE is accounts an overall grand mean value of 3.12. This indicates that the ESLSE moderately practices e-logistics in its supply chain management operation.

Among all e-logistics practices, warehouse management practice management in terms of tracking and allocating inventory within the warehouse, plan and schedule product moves, manage outbound order release and load/ route planning, Warehouse Management System (WMS) and warehouse distribution center management is relatively highly practiced in the ESLSE with a grand mean value of 3.26.

In the contrary, the utilization of e-logistics for the procurement management practices of ESLSE in terms of need identification, making payment to supplier, supplier selection, contract management, contract award and supplier relationship management accounts a grand mean value of 2.97. This indicates that the ESLSE weakly practices on e-logistics for its procurement management.

4.3.2. Descriptive Statistics of Respondents on challenges of E-logistics Practice

Table 4.9. Descriptive Statistical Analysis of Technological Challenge

Technological Challenge	Mean	Std. Deviation
High technological costs hinder e-logistics practices in ESLSE.	3.64	0.982
Lack of security of information is a challenge for the proper application of e-logistics practice.	3.12	1.069
ESLSE is being challenged by the advancement of Suppliers' technological capacity.	3.01	0.996
Unease with which users adapt to the emerging technologies is a challenge for ESLSE not to properly utilize e-logistics.	3.07	0.987
Unavailability of ICT infrastructure to support the E-logistics technology is a challenge for ESLSE not to properly utilize E-logistics	3.09	1.089
Grand Mean of Technological Challenge	3.19	

Source: Own Survey, 2022

Table 4.9 shows technological challenge that affects the e-logistics practices of the ESLSE in terms of high technological costs, lack of security of information, the advancement of Suppliers'

technological capacity, unease with which users adapt to the emerging technologies and unavailability of ICT infrastructure accounts a grand mean value of 3.19. This indicates that technological challenge is moderately influential on the e-logistics practices of the ESLSE.

Table 4.10. Descriptive Statistical Analysis of Infrastructural Challenge

Infrastructural Challenge	Mean	Std. Deviation
Poor telecommunication infrastructure limited the proper application of e-logistics practice in ESLSE.	3.42	0.885
ESLSE has inadequate software and hardware which enhances the e-logistics process.	3.47	0.955
There are no enough ICT equipment which facilitates the e-logistics process in ESLSE.	3.38	0.991
Inadequate warehousing is a challenge for the practice of e-logistics in ESLSE.	3.42	0.915
All branches of ESLSE are not integrated through e-logistics platforms.	3.63	0.895
Grand Mean of Infrastructural Challenge	3.46	

Source: Own Survey, 2022

Table 4.10. shows infrastructural challenge that affects the e-logistics practices of the ESLSE in terms of poor telecommunication infrastructure, inadequate software and hardware, not enough ICT equipment, inadequate warehousing and lack of integration of all branches through e-logistics platforms accounts a grand mean value of 3.46. This indicates that infrastructural challenge is influential on the e-logistics practices of the ESLSE.

Table 4.11. Descriptive Statistical Analysis of Economic Challenge

Economic Challenge	Mean	Std. Deviation
High cost of computing and networking technologies is a challenge to e-logistics practice in ESLSE.	3.60	0.875
Limited access to financial resources / Poor banking system in Ethiopia is a challenge to e-logistics practice in ESLSE.	3.28	0.845
Limited market readiness is a challenge to e-logistics practice in ESLSE.	3.34	0.817
Lack of economic resources is a challenge to e-logistics practice in ESLSE.	3.14	0.917
Rising inflation in the country is a challenge to e-logistics practice in ESLSE.	3.25	0.885
Grand Mean of Economic Challenge	3.32	

Source: Own Survey, 2022

According to table 4.11 economic challenge that affects the e-logistics practice of the ESLSE in terms of high cost of computing and networking technologies, limited access to financial resources / Poor banking system in Ethiopia, limited market readiness, lack of economic resources, and rising inflation in the country accounts a grand mean value of 3.32. This indicates that economic challenge is influential on the e-logistics practices of the ESLSE.

Table 4.12. Descriptive Statistical Analysis of Legal Challenge

Legal Challenge	Mean	Std. Deviation
Absence of legal background towards electronic document is a challenge to e-logistics practice in ESLSE.	3.75	0.630
E-logistics practice in ESLSE is affected by global trade regulations.	3.41	0.785
Absence of a sound legal and regulatory environment for electronic transaction in the country is a challenge to e-logistics practice in ESLSE.	3.75	0.573
E-logistics practice in ESLSE is affected by the legal system of the country.	3.60	0.719
Grand Mean of Legal Challenge	3.63	

Source: Own Survey, 2022

Table 4.12 shows the legal challenges that affects the e-logistics practices of the ESLSE in terms of absence of legal background towards electronic document, global trade regulations, absence of a sound legal and regulatory environment for electronic transaction, and the legal system of the country accounts a grand mean value of 3.63. This indicates that legal challenge is influential on the e-logistics practices of the ESLSE.

Table 4.13. Descriptive Statistical Analysis of Managerial Challenge

Managerial Challenge	Mean	Std. Deviation
Lack of management commitment hinders effective e-logistics practice in ESLSE.	3.73	0.826
Management style do not promote change implementation in ESLSE.	3.55	0.855
Lack of management support slow down e-logistics practice in ESLSE.	3.77	0.786
Management do not reward employees who excel in E-logistics in ESLSE.	3.95	0.837
Lack of innovation and drive of the management becomes an obstacle not to properly implement E-logistics technology.	3.82	0.702
Grand Mean of Managerial Challenge	3.76	

Source: Own Survey, 2022

Table 4.13 shows managerial challenge that affects the e-logistics practices of the ESLSE in terms of lack of management commitment, management style with regard to change implementation, lack of management support, management do not reward employees who excel in E-logistics and lack of innovation and drive of the management accounts a grand mean value of 3.76. This indicates that managerial challenge is influential on the e-logistics practices of the ESLSE.

Table 4.14. Descriptive Statistical Analysis of Manpower Challenge

Manpower Challenge	Mean	Std. Deviation
Lack of Personnel to implement e-logistics is a challenge in ESLSE.	3.14	0.892
Employees have inadequate knowledge in e-logistics.	3.55	0.940
E-logistics is considered as a threat to the jobs of employees.	3.34	0.874
The enterprise do not sponsor employees to embark on ICT training.	3.49	0.963
Resistance to change among employees is a challenge for the proper implementation of e-logistics practice in ESLSE.	3.28	0.938
Grand Mean of Manpower Challenge	3.36	

Source: Own Survey, 2022

Table 4.14 shows man power challenge that affects the e-logistics practices of the ESLSE in terms of lack of Personnel to implement e-logistics, inadequate knowledge of employees, a threat to the jobs of employees, lack of ICT training and resistance to change accounts a grand mean of 3.36. This indicates that manpower challenge is influential on the e-logistics practice of the ESLSE.

Table 4.15. Summary of Descriptive Statistics of Respondents on challenges of E-logistics Practice

Challenges of E-logistics Practice	Mean
Technological challenge	3.19
Infrastructural Challenge	3.46
Economic challenge	3.32
Legal Challenge	3.63
Managerial challenge	3.76
Manpower Challenge	3.36
Overall Grand Mean of Challenges of E-logistics Practice	3.45

Source: Own Survey, 2022

According to table 4.15 challenges of e-logistics practice accounts an overall grand mean of 3.45. This indicates that challenges of e-logistics are influential on the e-logistics practice of the ESLSE. The ESLSE e-logistics practices are dragged down by infrastructural challenge, economic challenge, legal challenge, managerial challenge and manpower challenge. Therefore, the ESLSE need to overcome those challenges so as to effectively utilize e-logistics practices and reap the fruits of supply chain performance.

The results are consistent with that of Elizabeth, Lemma and Mariye (2010), who found that the main obstacles to the growth of e-trade and e-commerce in Ethiopia are the country's subpar telecom infrastructure, the restrictive regulatory environment, a lack of qualified human resources, and a lack of key technologies.

The results of a study conducted in Kenya by Mutisya (2016) highlighted a number of elements that have a role at various levels and have an impact on how e-logistics systems, in particular, are used. Many of the organizations surveyed were forced to run systems manually due to a lack of understanding of how to create and operate such systems as well as financial limitations caused by the expense of developing, deploying, and maintaining such systems.

4.3.3. Descriptive Statistics of Respondents on the Role of E-logistics on the Supply Chain Performance the ESLSE.

Table 4.16. Descriptive Statistical Analysis of Responsiveness

Responsiveness	Mean	Std. Deviation
E-logistics practice facilitates ESLSE’s short Order-to-Deliver cycle time to satisfy its customers.	3.42	0.908
E-logistics practice helped ESLSE meet short lead times in terms of procurement management and customer relationship management.	3.46	0.864
E-logistics practices helped in an increase in speed of supply chain operations in terms of inventory management.	3.55	0.724
E-logistics practices helped in an increase in speed of supply chain operations in terms of warehouse management.	3.66	0.719
E-logistics practices helped in an increase in speed of supply chain operations in terms of procurement management.	3.58	0.672
E-logistics practices helped in an increase in speed of supply chain operations in terms of transportation management.	3.48	0.687
E-logistics practices helped in an increase in speed of supply chain operations in terms of customer relationship management.	3.48	0.781
Grand Mean of Responsiveness	3.52	

Source: Own Survey, 2022

Table 4.16 shows the role of e-logistics practice on the supply chain performance of responsiveness in terms of short Order-to-Deliver cycle time, short lead times in terms of procurement management and customer relationship management, speed of supply chain operations in terms of inventory management, speed of supply chain operations in terms of warehouse management, speed of supply chain operations in terms of procurement management, speed of supply chain operations in terms of transportation management, speed of supply chain operations in terms of customer relationship management accounts a grand mean of 3.52. This indicates that e-logistics practices highly enhances the supply chain performance of responsiveness.

The finding is similar to the research by Somuyiwa, Adebayo, and Akanbi (2011) that reveals the processes by which IS integration can increase supply chain agility and consequently operational performance in terms of responsiveness. Cheng and Yue (2006); Aydin (2014) advocated that e-logistics can improve the overall responsiveness of supply chains and create a new source of

advantage to ensure competitiveness in enterprises in China. A research by Carrasco-Gallego and Moreno-Romero (2010) on ICTs contribution to global logistics sustainability reveals that the digital transformation and the application of intelligent and cooperative systems, which have been studied and identified in relation to the supply chain, will make the supply chain smarter, more transparent, and more efficient at every point.

Table 4.17. Descriptive Statistical Analysis of Cost

Cost	Mean	Std. Deviation
E-logistics practice enables ESLSE to deliver cost effective service to customers in the right amounts, at the right time with the right quality.	3.49	0.873
E-logistics practice reduce warehouse Costs through inventory visibility, storage optimization and cross docking.	3.49	0.832
E-logistics practice help ESLSE make smarter decisions on routing, carrier selection, load optimization and shipment consolidation so as to eliminate costly human error and manual inefficiencies.	3.35	0.852
E-logistics provide ESLSE reduced Cost in document Preparation and information integration.	3.52	0.824
E-logistics practice helped ESLSE to reduce its operational cost in procurement management.	3.49	0.857
E-logistics practice results in decreased shipping and trucking costs.	3.63	0.814
Grand Mean of Cost	3.48	

Source: Own Survey, 2022

Table 4.17 shows the role of e-logistics on the supply chain performance of cost in terms of delivering cost effective service to customers, reduced warehouse Costs, smarter decisions on routing, carrier selection, load optimization and shipment consolidation, reduced Cost in document preparation and information integration, reduced operational cost in procurement management and decreased shipping and trucking costs accounts a grand mean value of 3.48. This indicates that e-logistics practice highly enhances the supply chain performance of cost of the ESLSE.

A research by Tarn, Yen and Beaumont (2002) reveals that, one of the e-logistics platforms, ERP system, can speed up information sharing within SCM to promote closer cooperation among supply chain partners and to save transaction costs. A research conducted by Pokharel (2005) in Singapore also argued that ICT can facilitate both front-end and back-end supply chain processing.

If all parties in a supply chain have access to information, logistics services may be more precise, efficient, and less costly.

Table 4.18. Descriptive Statistical Asset Management

Asset Management	Mean	Std. Deviation
E-logistics practice helps ESLSE to manage assets from any location.	3.47	0.780
Asset management in transportation helps ESLSE keep its fleet operating optimally.	3.48	0.726
Web assisted inventory control enables ESLSE to implement real time tracking of its warehouses from any location.	3.38	0.815
E-logistics practice offers an integrated dashboard where employees of ESLSE can access, track, and analyze asset information.	3.19	0.889
E-logistics practice enabled ESLSE's assets are regularly inspected, maintained and repaired.	3.43	0.821
Grand Mean of Asset Management	3.39	

Source: Own Survey, 2022

Table 4.18 shows the role of e-logistics practice on the supply chain performance of asset management in terms of managing assets from any location, optimal fleet operation, real time tracking of warehouses, integrated dashboard to and regular inspection and maintenance accounts a grand mean value of 3.39. This indicates that e-logistics practice highly enhances the supply chain performance of asset management of the ESLSE.

The results are consistent with a research carried out in Slovenia by Groznik et al. (2004), which showed that e-logistics enables improved asset management. The research conducted by Boyson, Corsi and Verbraeck (2003) also proved that supply chain managers can make use of portal infrastructure to harness various real-time data sources and provide a unified format and middleware platform for various asset management data sources, such as legacy, enterprise, and internet data, and use real-time messaging to guarantee valuable asset management service levels. Wang and Sarkis (2021) also revealed that the concept of total preventive maintenance can be supported by digitalization technologies, which can also improve life-cycle asset management.

Table 4.19. Descriptive Statistical Reliability

Reliability	Mean	Std. Deviation
E-logistics practice creates integrity of transactions between ESLSE and the suppliers.	3.62	0.896
E-logistics practice enabled ESLSE to provide reliable transportation system with a consistent range of predictable travel times.	3.55	0.872
Fulfillment of an order is guaranteed because of e-logistics practice.	3.29	0.807
E-logistics practice creates stability of delivery, schedule and conditions.	3.55	0.725
Documents are executed properly because of e-logistics platforms.	3.46	0.735
E-logistics practice facilitated that goods are delivered in the right quality and quantity from suppliers, allowing the business to satisfy customer demands.	3.49	0.781
Grand Mean of Reliability	3.49	

Source: Own Survey, 2022

Table 4.19 shows the role of e-logistics practice on the supply chain performance of reliability in terms of integrity of transactions between ESLSE and the suppliers, reliable transportation system fulfillment of an order, stability of delivery, schedule and conditions, documents execution and delivery from suppliers accounts a grand mean value of 3.49. This indicates that e-logistics practice highly enhances the supply chain performance of reliability of the ESLSE.

The finding is consistent with the research of Milovanovic (2015) that stated when a firm transitions to an electronic flow of systems that are superior at cooperation and close communication gaps with suppliers, it improves reliability, agility, and effectiveness.

Table 4.20. Descriptive Statistical Flexibility

Flexibility	Mean	Std. Deviation
E-logistics practice provides a wide variety of taste and preference of services to customers.	3.51	0.677
In case of emergency needs, speeding up the delivery of products is possible because of e-logistics practice.	3.68	0.751
E-logistics practice helped to satisfy one delivery order of a customer from more than one warehouses or by transshipments.	3.61	0.773
Customers may change the quantity, type and the due date of delivery in a quite short period because of e-logistics practice.	3.25	0.739
The costs implication of changing the quantity, type and the due date of delivery is very low due to e-logistics practice.	3.12	0.778
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of inventory management.	3.45	0.734
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of warehouse management.	3.40	0.617
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of procurement management.	3.55	0.685
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of transportation management.	3.49	0.824
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of customer relationship management.	3.68	0.662
Grand Mean of Flexibility	3.47	

Source: Own Survey, 2022

Table 4.20 shows the role of e-logistics practice on the supply chain performance of flexibility in terms of wide variety of taste and preference of services, speeding up the delivery of products, delivery order of a customer from multiple warehouses or by transshipments, customer's change the quantity, type and the due date of delivery, flexibility of supply chain operations in terms of inventory management, flexibility of supply chain operations in terms of warehouse management, flexibility of supply chain operations in terms of procurement management, flexibility of supply chain operations in terms of transportation management, flexibility of supply chain operations in terms of customer relationship management accounts a grand mean value of 3.47. This indicates that e-logistics practice highly enhances the supply chain performance of flexibility of the ESLSE.

The finding is consistent with the result of Sheikh and Rana (2011) which stated that IT increases operational competitiveness, flexibility and productivity of supply chain. Successful IT systems,

according to Lai, Wang and Zhao (2008), have a significant potential to increase the efficiency, effectiveness, and flexibility of logistics organizations. Tang and Qin (2018) also agreed that the use IT driven logistics process increased the supply chain performance of flexibility to a great extent.

Table 4.21. Summary of Descriptive Statistics of Respondents on the Role of E-logistics on the Supply Chain Performance the ESLSE.

Supply Chain Performance	Mean
Responsiveness	3.52
Cost	3.48
Asset Management	3.39
Reliability	3.49
Flexibility	3.47
Overall Grand Mean of Supply Chain Performance	3.47

Source: Own Survey, 2022

Table 4.21 shows the role of e-logistics practices on the supply chain performance accounts an overall grand mean value of 3.47. This indicates that e-logistics practices highly enhances the supply chain performance of the ESLSE.

The research that was conducted by Aydin (2014a) in turkey focused on development of e-logistics, shows that due to the nature of the global economy, industries are forced to come up with novel approaches in order to compete in the marketplaces. Additionally, new technological advancements offer numerous options for businesses to raise the quality of their services. As a result, this beneficial interdependence contributes to the successful integration of information technology into logistical processes. A number of good outcomes, including efficient time use in logistics companies, cost savings, efficient management techniques, and others, have been brought about by the accelerated, simplified, and increased dependability of information sharing.

4.4. Correlation Analysis

The measure of the linear relationship between two or more variables is correlation. According to Kothari (2004), the value of 'r' for a coefficient of correlation is between 0 and 1. Positive r values

imply a positive relationship between the two variables, whereas negative r values suggest a negative relationship. There is no correlation between the two variables if the 'r' value is zero.

The association between independent variables i.e. e-logistics practice and challenges of e-logistics practice and dependent variable supply chain performance was identified using Pearson Correlation Coefficient.

According to Marczyk, DeMatteo, and Festinger (2010) a range of correlations interpretation of .01 to .30 are considered weak, correlations of 0.30 to 0.70 are considered moderate, correlations of 0.70 to 0.90 are considered strong, and correlations of 0.90 to 1.00 are considered very strong. In addition to this guideline, other factors i.e. sample size, need to be taken into account when interpreting correlations.

Table 4.22 Correlation Analysis

Correlation	1	2	3	4	5	6	7	8	9	10	11	12
Inventory Management Practice (1)	1											
Warehouse Management Practice (2)	.458**	1										
Transport Management Practice (3)	.620**	.562**	1									
Procurement Management Practice (4)	.356**	.666**	.513**	1								
Customer Relationship Management Practice (5)	.589**	.673**	.600**	.617**	1							
Technological Challenge (6)	0.147	0.140	-0.118	0.080	0.008	1						
Infrastructural Challenge (7)	0.005	-.319**	0.092	-.218**	-.226**	.202*	1					
Economic Challenge (8)	0.133	0.040	.417**	.431**	0.068	0.120	.182*	1				
Legal Challenge (9)	.309**	.193*	.257**	.348**	.216**	.325**	.567**	.450**	1			
Managerial Challenge (10)	.387**	.278**	.254**	.253**	.262**	-0.004	.233**	0.130	.529**	1		
Manpower Challenge (11)	.181*	-0.122	-.220**	-0.021	-.179*	.481**	.522**	.245**	.501**	.323**	1	
Supply Chain Performance (12)	0.129	.301**	.499**	.255**	0.113	0.085	0.069	.237**	-0.025	-0.121	-.225**	1

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

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

Source: SPSS Output: Own Survey

The output from table 4.22 shows the correlation between warehouse management practice and supply chain performance have a correlation coefficient value of ($r=0.458^{**}$) and $p<0.001$, which indicates that warehouse management practice and supply chain performance have a moderate, significant and positive relationship.

The correlation between transport management practice and supply chain performance have a correlation coefficient value of ($r=0.620^{**}$) and $p<0.001$, which indicates that transport management practice and supply chain performance have a moderate, significant and positive relationship.

The correlation between procurement management practice and supply chain performance have a correlation coefficient value of ($r=0.356^{**}$) and $p<0.001$, which indicates that procurement management practice and supply chain performance have a moderate, significant and positive relationship.

The correlation between customer relationship management practice and supply chain performance have a correlation coefficient value of ($r=0.589^{**}$) and $p<0.001$, which indicates that customer relationship management practice and supply chain performance have a moderate, significant and positive relationship.

The correlation between infrastructural challenge and warehouse management practice have a correlation coefficient value of ($r= -0.319^{**}$) and $p<0.001$, which indicates that infrastructural challenge and warehouse management practice have a moderate, significant and negative relationship.

The correlation between infrastructural challenge and procurement management practice have a correlation coefficient value of ($r= -0.218^{**}$) and $p<0.001$, which indicates that infrastructural challenge and procurement management practice have a moderate, significant and negative relationship.

The correlation between infrastructural challenge and customer relationship management practice have a correlation coefficient value of ($r= -0.226^{**}$) and $p<0.001$, which indicates that infrastructural challenge and customer relationship management practice have a moderate, significant and negative relationship.

The correlation between economic challenge and transport management practice have a correlation coefficient value of ($r=0.417^{**}$) and $p<0.001$, which indicates that economic challenge and transport management practice have a moderate, significant and positive relationship.

The correlation between economic challenge and procurement management practice have a correlation coefficient value of ($r=0.431^{**}$) and $p<0.001$, which indicates that infrastructural challenge and procurement management practice have a moderate, significant and positive relationship.

The correlation between legal challenge and inventory management practice and procurement management practice have a correlation coefficient value of ($r=0.309^{**}$ and 0.348^{**} respectively) and $p<0.001$, which indicates that legal challenge and inventory management practice and procurement management practice have a moderate, significant and positive relationship.

The correlation between legal challenge and warehouse management practice, transport management practice, and customer relationship management practice have a correlation coefficient value of ($r=0.193^{**}$, 0.257^{**} and 0.216^{**} respectively) and $p<0.001$, which indicates that legal challenge and warehouse management practice, transport management practice, and customer relationship management practice have a weak, significant and positive relationship.

The correlation between managerial challenge and inventory management practice, warehouse management practice, transport management practice, procurement management practice and customer relationship management practice have a correlation coefficient value of ($r=0.387^{**}$, 0.278^{**} , 0.254^{**} , 0.253^{**} and 0.262^{**} respectively) and $p<0.001$, which indicates that managerial challenge and all of the five logistics management practices have a moderate, significant and positive relationship.

The correlation between manpower challenge and inventory management practice have a correlation coefficient value of ($r=0.181^{**}$) and $p<0.001$, which indicates that manpower challenge and inventory management practice have a weak, significant and positive relationship.

The correlation between manpower challenge and transport management practice and customer relationship management practice have a correlation coefficient value of ($r=-0.220^{**}$ and $-.179^{**}$ respectively) and $p<0.001$, which indicates that manpower challenge and transport management practice and customer relationship management practice have a weak, significant and negative relationship.

The output from table 4.19 also shows the correlation between warehouse management practice, transport management practice, procurement management practice, customer relationship management practice and supply chain performance have a correlation coefficient value of ($r=0.458^{**}$) and $p<0.001$, ($r=0.620^{**}$) and $p<0.001$, ($r=0.356^{**}$) and $p<0.001$, ($r=0.589^{**}$) and

$p < 0.001$, ($r = 0.589^{**}$) and $p < 0.001$ respectively, which indicates that warehouse management practice, transport management practice, procurement management practice, customer relationship management practice and supply chain performance of the ESLSE have a moderate, significant and positive relationship.

4.5. Model Test

1. Multicollinearity Test

When the independent variables in a regression model are highly correlated, this is known as multicollinearity. It makes the model difficult to comprehend and causes an overfitting problem. Researchers frequently test assumptions before deciding which variables to include in a regression model.

Table 4.23. Multicollinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Inventory Management Practice	.530	1.886
	Warehouse Management Practice	.354	2.824
	Procurement Management Practice	.320	3.125
	Customer Relationship Management Practice	.351	2.849
	Technological Challenge	.631	1.585
	Infrastructural Challenge	.419	2.386
	Economic Challenge	.580	1.723
	Legal Challenge	.309	3.238
	Managerial Challenge	.559	1.789
	Manpower Challenge	.455	2.200

Source: SPSS Output: Own Survey 2022

According to Hair et al (1998), the variance inflating factor is one of several approaches for producing collinearity diagnostics (VIF). The VIF shows if one predictor has a strong linear association with another. As a result, some authors employ the VIF as a multicollinearity indicator. The more VIF is increased, the more difficult or collinear the variable becomes. As a general rule, any variable with a VIF value more than 10.0 indicates a multicollinearity issue.

Table 4.24. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.693 ^a	.480	.438	.37715	2.064

a. Predictors: (Constant), Manpower Challenge, Procurement Management Practice, Inventory Management Practice, Managerial Challenge, Economic Challenge, Technological Challenge, Infrastructural Challenge, Warehouse Management Practice, Customer Relationship Management Practice, Legal Challenge, Transport Management Practice

b. Dependent Variable: Supply Chain Performance

Source: SPSS Output

Table 4.24 describes a multiple linear regression analysis to determine the relationship between independent variables (Inventory Management Practice, Warehouse Management Practice, Transport Management Practice, Procurement Management Practice, Customer Relationship Management Practice, Technological Challenge, Infrastructural Challenge, Economic Challenge, Legal Challenge, Managerial Challenge and Manpower Challenge) and the dependent variable (Supply Chain Performance).

The adjusted R square tells us that 43.8% of the variance of the dependent variable is explained by the independent variable.

The Durbin-Watson statistic will always have a value ranging between 0 and 4. A score of 2.0 implies that the sample contains no autocorrelation. Positive autocorrelation is defined as a value between 0 and less than 2, whereas negative autocorrelation is defined as a value between 2 and 4. The Durbin-Watson statistic should be between 1.5 and 2.5 if there is no autocorrelation (Kenton, 2021).

Table 4.24 shows that the Durbin-Watson statistic is 2.064, which is between 1.5 and 2.5 and therefore the data is no autocorrelation or there is no issue of multicollinearity.

Table 4.25. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.313	.304		7.613	.000
	E-Inventory Management Practice	.029	.094	.040	.308	.759
	E-Warehouse Management Practice	.233	.097	.343	2.392	.018
	E-Transport Management Practice	.283	.167	.353	1.695	.092
	E-Procurement Management Practice	.112	.062	.197	1.790	.076
	E-Customer Relationship Management Practice	-.197	.061	-.344	-3.225	.002
	Technological Challenge	.143	.051	.230	2.810	.006
	Infrastructural Challenge	.314	.113	.439	2.779	.006
	Economic Challenge	.126	.102	.159	1.237	.218
	Legal Challenge	-.352	.125	-.361	-2.823	.005
	Managerial Challenge	-.081	.065	-.104	-1.245	.215
	Manpower Challenge	-.219	.088	-.335	-2.485	.014

a. Dependent Variable: Supply Chain Performance

Source: SPSS Output

The Beta (β) sign consists of both a positive (+) and a negative (-) sign. It depicts the influence of independent variables on dependent variables (Field, 2009).

According to Brooks (2008), an independent variable with a level of significance (sig) of less than 5% can make a significant contribution to the dependent variable's predicted value, whereas a variable with a level of significance (sig) more than 5% cannot make a significant contribution.

The regression model was as follows:

$$Y=2.31+0.343 (\text{Warehouse Management Practice})-0.344 (\text{Customer Relationship Management Practice}) + 0.230 (\text{Technological Challenge}) + 0.439 (\text{Infrastructural Challenge}) -0.361 (\text{Legal Challenge}) - 0.335 (\text{Manpower Challenge})$$

The findings of the study from table 4.25 shows warehouse management practices had a statistically significant positive effect on supply chain performance with beta coefficients of (β = .343, P = 0.018), contributing the most to the supply chain performance of the ESLSE. This indicates that so as to enhance the supply chain performance of the ESLSE, there is a need to

increase warehouse management practices of the enterprise.

On the contrary, the study shows customer relationship management practice had a statistically significant negative effect on supply chain performance with beta coefficients of ($\beta = -0.344$, $P = 0.002$). This shows that one unit decrease in the customer relationship management practice results in a decrease in supply chain performance by a factor of -0.344. This indicates that ESLSE should work hard on electronic customer relationship management practice to enhance its supply chain performance.

Technological challenge had a statistically significant positive effect on supply chain performance with beta coefficients of ($\beta = .230$, $P = 0.006$). This indicates that so as to enhance the supply chain performance of the ESLSE, there is a need to minimize technological challenge of e-logistics practices of the enterprise.

Infrastructural challenge had a statistically significant positive effect on the supply chain performance with beta coefficients of ($\beta = .439$, $P = 0.006$). This indicates that so as to enhance the supply chain performance of the ESLSE, there is a need to decrease infrastructural challenge of e-logistics practices of the enterprise.

Legal Challenge had a statistically significant negative effect on the supply chain performance with beta coefficients of ($\beta = -.361$, $P = 0.005$). This indicates that so as to enhance the supply chain performance of the ESLSE, there is a need to decrease legal challenge of e-logistics practices of the enterprise.

Manpower challenge had a statistically significant negative effect on supply chain performance with beta coefficients of ($\beta = -.335$, $P = 0.014$). This indicates that so as to enhance the supply chain performance of the ESLSE, there is a need to decrease manpower challenge of e-logistics practices of the enterprise.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this chapter are based on the results of the questionnaire replies. It is divided into three sections, the first of which offers the study's conclusion. The second section contains recommendations, while the third section focuses on potential future research possibilities.

5.1. Summary of major findings

Based on the questionnaire obtained from respondents and quantitative data the following are the research findings:

Objective one: Assess the e-logistics practice of the ESLSE

The utilization of e-logistics practice of the ESLSE is accounts an overall grand mean value of 3.12. This indicates that the ESLSE moderately practices e-logistics in its supply management operation.

Among all e-logistics practices, warehouse management practice management in terms of tracking and allocating inventory within the warehouse, plan and schedule product moves, manage outbound order release and load/ route planning, Warehouse Management System (WMS) and warehouse distribution center management is relatively highly practiced in the ESLSE with a grand mean value of 3.26.

In the contrary, the utilization of e-logistics for the procurement management practices of ESLSE in terms of need identification, making payment to supplier, supplier selection, contract management, contract award and supplier relationship management accounts a grand mean value of 2.97. This indicates that the ESLSE weakly practices on e-logistics for its procurement management.

The Pearson correlation coefficient proved that warehouse management practices of the ESLSE had a statistically significant positive effect on supply chain performance with beta coefficients of ($\beta = .343$, $P = 0.018$), contributing the most to the supply chain performance of the ESLSE.

Objective two: identify the challenges of e-logistics practices in the ESLSE.

The challenges of e-logistics practice accounts an overall grand mean of 3.45. This indicates that challenges of e-logistics are influential on the e-logistics practice of the ESLSE. The ESLSE e-logistics practices are dragged down by infrastructural challenge, economic challenge, legal challenge, managerial challenge and manpower challenge.

Among all other challenges managerial challenge that affects the e-logistics practices of the ESLSE in terms of lack of management commitment, management style with regard to change implementation, lack of management support, management do not reward employees who excel in E-logistics and lack of innovation and drive of the management accounts a grand mean value of 3.76. This indicates that managerial challenge is relatively highly influential on the e-logistics practices of the ESLSE.

On the contrary, technological challenge that affects the e-logistics practices of the ESLSE in terms of high technological costs, lack of security of information, the advancement of Suppliers' technological capacity, unease with which users adapt to the emerging technologies and unavailability of ICT infrastructure accounts a grand mean value of 3.19. This indicates that technological challenge is moderately influential on the e-logistics practices of the ESLSE. This challenge is the least factor that affects e-logistics practices of the ESLSE.

Objective three: examine how e-logistics practices affects the supply chain performance of ESLSE

The role of e-logistics practices on the supply chain performance accounts an overall grand mean value of 3.47. This indicates that e-logistics practices highly enhances the supply chain performance of the ESLSE.

Compared to other supply chain performance parameters, the role of e-logistics practice on the supply chain performance of responsiveness in terms of short Order-to-Deliver cycle time, short lead times in terms of procurement management and customer relationship management, speed of supply chain operations in terms of inventory management, speed of supply chain operations in terms of warehouse management, speed of supply chain operations in terms of procurement management, speed of supply chain operations in terms of transportation management, speed of supply chain operations in terms of customer relationship management accounts a grand mean of

3.52. This indicates that e-logistics practices highly enhances the supply chain performance of responsiveness.

On the other hand, the role of e-logistics practice on the supply chain performance of asset management in terms of managing assets from any location, optimal fleet operation, real time tracking of warehouses, integrated dashboard to and regular inspection and maintenance accounts a grand mean value of 3.39. This indicates that e-logistics practice is the least highly practice to enhance the supply chain performance of asset management of the ESLSE.

The regression analysis output also shows that warehouse management practices had a statistically significant positive effect on supply chain performance with beta coefficients of ($\beta = .343$, $P = 0.018$), contributing the most to the supply chain performance of the ESLSE.

5.2. Conclusion

The aim of the research was to assess the role of e-logistics and identify its challenge in enhancing supply chain performance of Ethiopian Shipping and Logistics Services Enterprise.

The finding from the study concludes that e-logistics practices of the ESLSE is average. Electronic warehouse management practice is the most highly practiced in the ESLSE compared to other e-logistics practices. E-procurement practice is the least e-logistics practice in the ESLSE.

The e-logistics practices of the ESLSE are highly influenced by technological, infrastructural, economic, legal, managerial and manpower challenges. Managerial challenge is the most influential challenge whereas, technological challenge is the least influential challenge to the e-logistics practices of the enterprise.

E-logistics played important role in enhancing the supply chain performance of the ESLSE. Though the practice of e-logistics is average the supply chain performance of the ESLSE is high especially with regard to responsiveness. The supply chain performance of asset management is relatively weak compared to other supply chain performance parameters.

5.3. Recommendation

ESLSE should keep up with the state of the art e-logistics technologies like ERP II, Inventory Management System, WMS, CRM and other E-logistics platforms in order to enhance its supply chain performance.

The ESLSE e-logistics practices are dragged down by infrastructural challenge, economic challenge, legal challenge, managerial challenge and manpower challenge. Therefore, the ESLSE need to overcome those challenges so as to effectively utilize e-logistics practices and reap the fruits of supply chain performance.

5.4 Suggestions for Future Research

This study looks for empirical proof of e-logistics practices and their effect on supply chain performance. It is the intention of this study that the outcomes and conclusions will encourage additional research in this crucial field and be helpful to practitioners. Moreover, taking the benefits of e-logistics into consideration, it is imperative to make further investigation and studies on the topic in all manufacturing and service industries of the country.

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Annex

Questionnaire

Dear Participant,

I am a student at Addis Ababa University, School of Commerce, Department of Logistics and Supply Chain Management. This questionnaire is designed for the completion of my Post graduation in Master's Degree in Logistics and Supply Chain Management on the topic '*The Role of E-logistic Practice and Its Challenge in Enhancing the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise*'. The main purpose of this questionnaire is to collect necessary data for the study which will be purely for academic purpose and your response will be kept confidential. To make the research outcomes complete, reliable, and fruitful, please complete the questionnaire by considering each question thoughtfully and honestly. Where answer options are available, please tick (√) in the appropriate box.

If you have any questions, please feel free to contact me via Tel. 0911-30-08-10 or Email: yosephtheodros@gmail.com

Thank you in advance for your cooperation!

Part – I: Demographic Profile of the Respondent:

1.1. Gender/Sex:

Female

Male

1.2. Educational Qualification:

Secondary School Completion Certificate

College Diploma

First Degree

Second Degree and above

1.3. Years of experience in your organization:

Below 5 Years

5-10 Years

11-15 Years

Over 15 Years

1.3. In which process, department or section are you working at ESLSE?

Inventory

Transport

Warehouse

Procurement

IT

1.6. What is your designation?

Executive

Manager/head of department

Officer

1.5. Have You attended any ICT course

Yes

No

Part II: E-logistics Practice of ESLSE

Please rate the following points where;

1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neutral (N)

4 = Agree (A) 5 = Strongly Agree (SA) , where E-logistics practices from ESLSE

perspective can be considered in terms of adoption of Enterprise Resource Planning (ERP),

Electronic Data Interchange (EDI), Global Positioning System (GPS), System Application

Program (SAP), Radio Frequency Identification (RFID), Ship Husbandry Service (SHS), Terminal

Operations System (TOS), Warehouse Management System (WMS) and Transport Management

System (TMS).

A. Inventory Management Practice	SD	D	N	A	SA
	1	2	3	4	5
Material Requirements Planning (MRP), a planning and control system is used at ESLSE for inventory scheduling.					
ESLSE uses e-logistics platforms in forecasting inventory.					
ESLSE uses e-logistics platforms in inventory adjustment.					
ESLSE uses e-logistics platforms in inventory replenishment.					
ESLSE uses e-logistics platforms in inventory management reporting.					
E-logistics practice is used in ESLSE to plan and manage inventory counts.					
B. Warehouse Management Practice	SD	D	N	A	SA
	1	2	3	4	5
ESLSE applies e-logistics platforms in warehouse distribution center management.					
ESLSE applies e-logistics platforms in tracking and allocating inventory within the warehouse.					
E-logistics practice is used in ESLSE to plan and schedule product moves.					
E-logistics practice is used in ESLSE to manage outbound order release and load/ route planning.					
Warehouse Management System (WMS) is used in ESLSE to optimize resource usage and material flows.					

C. Transportation Management Practice	SD	D	N	A	SA
	1	2	3	4	5
Transportation planning and management in ESLSE is executed electronically.					
ESLSE uses GPS and other tracking technologies for multimodal transports.					
E-logistics practices are applied at ESLSE in fleet management.					
E-logistics technologies are applied at ESLSE in transport scheduling.					
Transportation Management System (TMS) is used in ESLSE to plan and execute the movement of goods.					

D. Procurement Management Practice	SD	D	N	A	SA
	1	2	3	4	5
ESLSE uses e-logistics platforms in need identification					
ESLSE uses e-logistics platforms in supplier selection					
ESLSE uses e-logistics platforms in contract management					
ESLSE uses e-logistics platforms in contract award					
ESLSE uses e-logistics platforms in making payment to supplier					
ESLSE uses e-logistics platforms in Supplier Relationship Management					
E. Customer Relationship Management Practice	SD	D	N	A	SA
	1	2	3	4	5
ESLSE practices e-logistics to manage customer information.					
ESLSE practices e-logistics in managing and coordinating customer interactions.					
E-logistics platform in ESLSE is used to manage customer requirements, purchase orders, sales and distribution.					
ESLSE's Customers can order and track their shipments online.					
ESLSC uses Customer Relation Management (CRM) technology to forecast future customer needs to adjust its operation accordingly.					

Part III. Challenges affecting E-logistics practices of ESLSE

Please rate the following points where;

1 = Strongly Disagree (SD),

2 = Disagree (D),

3 = Neutral (N)

4 = Agree (A)

5 = Strongly Agree (SA)

A. Technological Challenge	SD	D	N	A	SA
	1	2	3	4	5
High technological costs hinder e-logistics practices in ESLSE.					
Lack of security of information is a challenge for the proper application of e-logistics practice.					
ESLSE is being challenged by the advancement of Suppliers' technological capacity.					
Unease with which users adapt to the emerging technologies is a challenge for ESLSE not to properly utilize e-logistics.					
Unavailability of ICT infrastructure to support the E-logistics technology is a challenge for ESLSE not to properly utilize E-logistics					
B. Infrastructural Challenge	SD	D	N	A	SA
	1	2	3	4	5
Poor telecommunication infrastructure limited the proper application of e-logistics practice in ESLSE.					
ESLSE has inadequate software and hardware which enhances the e-logistics process.					
There are no enough ICT equipments which facilitates the e-logistics process in ESLSE.					
Inadequate warehousing is a challenge for the practice of e-logistics in ESLSE.					
All branches of ESLSE are not integrated through e-logistics platforms.					
C. Economic Challenge	SD	D	N	A	SA
	1	2	3	4	5
High cost of computing and networking technologies is a challenge to e-logistics practice in ESLSE.					
Limited access to financial resources / Poor banking system in Ethiopia is a challenge to e-logistics practice in ESLSE.					
Limited market readiness is a challenge to e-logistics practice in ESLSE.					
Lack of economic resources is a challenge to e-logistics practice in ESLSE.					
Rising inflation in the country is a challenge to e-logistics practice in ESLSE.					

D. Legal Challenge	SD	D	N	A	SA
	1	2	3	4	5
Absence of legal background towards electronic document is a challenge to e-logistics practice in ESLSE.					
E-logistics practice in ESLSE is affected by global trade regulations.					
Absence of a sound legal and regulatory environment for electronic transaction in the country is a challenge to e-logistics practice in ESLSE.					
E-logistics practice in ESLSE is affected by the legal system of the country.					
E. Managerial Challenge	SD	D	N	A	SA
	1	2	3	4	5
Managerial policies in ESLSE did not favor implementation of e-logistics practices					
Lack of management commitment hinders effective e-logistics practice in ESLSE.					
Management style do not promote change implementation in ESLSE.					
Lack of management support slow down e-logistics practice in ESLSE.					
Management do not reward employees who excel in E-logistics in ESLSE.					
Lack of innovation and drive of the management becomes an obstacle not to properly implement E-logistics technology.					
F. Manpower Challenge	SD	D	N	A	SA
	1	2	3	4	5
Lack of Personnel to implement e-logistics is a challenge in ESLSE.					
Employees have inadequate knowledge in e-logistics.					
E-logistics is considered as a threat to the jobs of employees.					
The enterprise do not sponsor employees to embark on ICT training.					
Resistance to change among employees is a challenge for the proper implementation of e-logistics practice in ESLSE.					

Part IV: The role of e-logistics practice on supply performance of ESLSE

Please rate the following points where;

1 = Strongly Disagree (SD),

2 = Disagree (D),

3 = Neutral (N)

4 = Agree (A)

5 = Strongly Agree (SA)

A. Responsiveness	SD	D	N	A	SA
	1	2	3	4	5
E-logistics practice facilitates ESLSE's short Order-to-Deliver cycle time to satisfy its customers.					
E-logistics practice helped ESLSE meet short lead times in terms of procurement management and customer relationship management.					
Electronic Transfer System (ETS) is applied to facilitate transaction with suppliers and customers.					
E-logistics practices helped in an increase in speed of supply chain operations in terms of inventory management.					
E-logistics practices helped in an increase in speed of supply chain operations in terms of warehouse management.					
E-logistics practices helped in an increase in speed of supply chain operations in terms of procurement management.					
E-logistics practices helped in an increase in speed of supply chain operations in terms of transportation management.					
E-logistics practices helped in an increase in speed of supply chain operations in terms of customer relationship management.					
B. Cost	SD	D	N	A	SA
	1	2	3	4	5
E-logistics practice enables ESLSE to deliver cost effective service to customers in the right amounts, at the right time with the right quality.					
E-logistics practice reduce warehouse Costs through inventory visibility, storage optimization and cross docking.					
E-logistics practice help ESLSE make smarter decisions on routing, carrier selection, load optimization and shipment consolidation so as to eliminate costly human error and manual inefficiencies.					
E-logistics provide ESLSE reduced Cost in document Preparation and information integration.					
E-logistics enabled ESLSE to enjoy a reduction in inventory carrying cost.					
E-logistics practice helped ESLSE to reduce its operational cost in procurement management.					
E-logistics practice results in decreased shipping and trucking costs.					

C. Asset Management	SD	D	N	A	SA
	1	2	3	4	5
E-logistics practice helps ESLSE to manage assets from any location.					
Asset management transportation helps ESLSE keep its fleet operating optimally.					
Web assisted inventory control enables ESLSE to implement real time tracking of its warehouses from any location.					
E-logistics practice offers an integrated dashboard where employees of ESLSE can access, track, and analyze asset information.					
E-logistics practice enabled ESLSE's assets are regularly inspected, maintained and repaired.					
D. Reliability	SD	D	N	A	SA
	1	2	3	4	5
E-logistics practice creates integrity of transactions between ESLSE and the suppliers.					
E-logistics practice enabled ESLSE to provide reliable transportation system with a consistent range of predictable travel times.					
Fulfillment of an order is guaranteed because of e-logistics practice.					
E-logistics practice creates stability of delivery, schedule and conditions.					
Documents are executed properly because of e-logistics platforms.					
E-logistics practice facilitated that goods are delivered in the right quality and quantity from suppliers, allowing the business to satisfy customer demands.					
E. Flexibility	SD	D	N	A	SA
	1	2	3	4	5
E-logistics practice provides a wide variety of taste and preference of services to customers.					
In case of emergency needs, speeding up the delivery of products is possible because of e-logistics practice.					
E-logistics practice helped to satisfy one delivery order of a customer from more than one warehouses or by transshipments.					
Customers may change the quantity, type and the due date of delivery in a quite short period because of e-logistics practice.					
The costs implication of changing the quantity, type and the due date of delivery is very low due to e-logistics practice.					
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of inventory management.					
E-logistics practices helped in an increase in flexibility of supply chain					

operations in terms of warehouse management.					
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of procurement management.					
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of transportation management.					
E-logistics practices helped in an increase in flexibility of supply chain operations in terms of customer relationship management.					

4. What other information would you like to share about the role of E-logistics in enhancing supply chain performance in ESLSE?

5. What do you think should be done in E-logistics practice to enhance supply chain performance in ESLSE?

Thank You!