



**THE ROLE AND CHALLENGES OF E-LOGISTICS ON THE  
SUPPLY CHAIN PERFORMANCE OF THE ETHIOPIAN  
SHIPPING AND LOGISTICS SERVICE ENTERPRISE**

**By**

**Tsegaye Hailemichael**

**(GSE/3728/14)**

**Advisor: Shiferaw Mitiku (PhD)**

**June 10/2024**

**Addis Ababa, Ethiopia**

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, SCHOOL OF COMMERCE  
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ADDS ABABA UNIVERISTY  
SCHOOL OF COMMERCE  
LOGISTIC AND SUPPLY CHAIN MANAGEMENT

THE ROLE AND CHALLENGES OF E-LOGISTICS PRACTICES ON THE  
SUPPLY CHAIN PERFORMANCE OF ETHIOPIAN SHIPPING AND  
LOGISTICS SERVICES ENTERPRISE

Approved by Board of Examiners

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

## **Declaration**

This is to declare that the thesis prepared by Tsegaye Hailemichael entitled: The role and challenges of E-logistics on the supply chain performance of Ethiopian shipping and logistics service enterprise and submitted in partial fulfilment of the requirements for the degree of Masters of Arts Degree In Logistics and supply chain management, complies with the regulations of the Addis Ababa University and meets the accepted standard with respect to originality and quality.

Tsegaye Hailemichael  
Student Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## **CERTIFICATION**

This is to certify that Tsegaye Hailemichael Teklu has carried out his thesis work on the topic entitled “The Role and challenges of E-Logistics on 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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# Table of Contents

ACKNOWLEDGEMENT .....	i
List of Tables .....	v
List of Figures .....	vi
Acronyms and Abbreviations .....	vii
Abstract .....	viii
CHAPTER ONE .....	1
1. INTRODUCTION .....	1
1.1. Back ground of the study .....	1
1.2 Statement of the problem .....	4
1.3. Research Objectives .....	5
1.3.1. General Objectives .....	5
1.3.2. Specific Objective .....	6
1.4. Research Questions .....	6
1.5. Significance of the Study .....	6
1.6. Scope of the Study .....	6
1.7. Organization of the study .....	7
1.8. Limitation of the study .....	7
1.9 Definition of terms / operational terms .....	7
CHAPTER TWO .....	10
REVIEW OF RELATED LITERATURE .....	10
2.1. Theoretical literature review .....	10
2.1.1. E-Logistics Management Practices .....	10
2.1.1.1 Inventory management .....	11
2.1.1.2 Warehouse management .....	12
2.1.1.3 Transport management .....	12
2.1.1.4 Procurement management .....	13
2.1.1.5 Customer relationship management .....	13
2.1.2 Supply Chain Performance .....	14
2.2. Empirical Literature Review .....	15
2.2.1 E-logistics Practices in ESLSE .....	15
2.2.2 Performance measurement model .....	16

2.3. Challenges of e-logistics management practices.....	17
2.3.1 Technological challenge .....	17
2.3.2 Infrastructural challenge .....	18
2.3.3 Managerial challenge .....	18
2.3.4 Manpower challenge .....	19
2.3.5 Legal challenge .....	20
2.3.6 Economic challenge .....	20
2.4. Supply chain performance indicators.....	20
2.4.1 Reliability.....	22
2.4.2 Responsiveness .....	22
2.4.3 Flexibility .....	22
2.4.4 Cost .....	22
2.4.5 Asset management .....	23
2.5 The role of E-logistics on supply chain performance .....	23
2.6 Conceptual Framework.....	24
CHAPTER THREE .....	26
METHODS OF THE STUDY .....	26
3.1. Description of the study area .....	26
3.2. Research Design.....	26
3.3. Research Approach .....	27
3.4. Population and sample design.....	27
3.5. Data source and type .....	29
3.6. Data Collection Procedure .....	29
3.7. Method of data analysis and presentation .....	29
3.8. Validity and Reliability Test.....	29
3.9. Ethical Considerations .....	30
CHAPTER FOUR.....	32
RESULT, DISCUSSTION AND INTERPRETATION .....	32
4.2. Descriptive Analysis .....	35
4.2.1 Inventory Management Practices.....	37
4.2.2 Warehouse Management practices.....	37
4.2.3 Transportation management practice .....	38
4.2.4 Procurement management practice .....	38

4.2.5 Customer relationship management practice .....	38
4.3 Challenges of e-logistics practices .....	40
4.3.1 Technological challenge .....	40
4.3.2 Infrastructural challenge .....	40
4.3.3 Managerial challenge .....	41
4.3.4 Man power challenge .....	41
4.3.5 Legal challenge .....	42
4.3.6 Economic challenge .....	42
4.5 Inferential Statistics for factors affecting SC Performance of ESLSE.....	43
4.5.1 Regression Analysis.....	43
4.5.1.1 Model Summary.....	43
4.5.1.2 Beta coefficient determination.....	45
4.5.1.3 ANOVA Results .....	47
CHAPTER FIVE .....	49
SUMMARY, CONCLUSION, AND RECOMMENDATION .....	49
5.1 Summary of the Major findings.....	49
5.2. CONCLUSION.....	50
5.3 RECOMMENDATION .....	51
5.4 Suggestions for Future Research.....	52
REFERENCES .....	53
Annex.....	63
Questionnaire .....	63

## **List of Tables**

Table 3.1 Sample Size Determination .....	28
Table 3.2 Cronbach's Alpha test table .....	30
Table 3.3 Cronbach's Alpha test table for each items.....	30
Table 4.1 Demographic profile of the respondent .....	33
Table 4.2 Have you attend any ICT Course.....	34
Table 4.3 Descriptive Statistics of Respondents on e-logistics Management Practice.....	36
Table 4.4 Descriptive statistical analysis of e-logistics challenges .....	39
Table 4.5 Supply chain performance indicators .....	42
Table 4.6 Model summary .....	44
Table 4.7 Beta coefficient determination .....	45
Table 4.8 Anova result.....	47

## List of Figures

Figure 1. Supply chain performance indicators .....	22
Figure 2 Conceptual frame work for e-logistics .....	25

## Acronyms and Abbreviations

<b>AI</b>	Artificial Intelligence
<b>B2B</b>	Business to Business
<b>B2C</b>	Business to Customer
<b>CPFR</b>	Collaborative Planning Forecasting and Replenishment
<b>EDI</b>	Electronic Data Interchange
<b>ERP</b>	Enterprise Resource Planning
<b>ESL</b>	Ethiopian Shipping Lines
<b>ESLSE</b>	Ethiopian Shipping and Logistics Services Enterprise
<b>ETS</b>	Electronic Transfer System
<b>GPS</b>	Global Positioning System
<b>ICT</b>	Information and Communication Technology
<b>IP</b>	Internet Protocol
<b>IT</b>	Information Technology
<b>LIS</b>	Logistics Information Systems
<b>LPI</b>	Logistics Performance Index
<b>RFQ</b>	Request for Quotes
<b>SAP</b>	System Application Program
<b>SCM</b>	Supply Chain Management
<b>SCP</b>	Supply Chain Performance
<b>SMEs</b>	Small and Medium Enterprises
<b>TMS</b>	Transport Management System
<b>TOS</b>	Terminal Operations System
<b>UN</b>	United Nations
<b>UNCTAD</b>	United Nation's Trade and Development
<b>VMI</b>	Vendor Managed Inventory
<b>WMS</b>	Warehouse Management System
<b>WWW</b>	World Wide Web

## Abstract

*The abstract of the study highlights the increasing pressure on companies to enhance supply chain performance through the utilization of Information Technology (IT) tools such as Electronic Data Interchange (EDI), the internet, World Wide Web (WWW), and E-Commerce, emphasizing their significant contributions to improving communication within the logistics chain. It underscores the impact of e-logistics on various operational aspects like maritime ports, air ports, rail services, maritime shipping lines, container leasing, and terminals, showcasing the broad scope of influence within the logistics sector. The study's objective is to evaluate the role and challenges of e-logistics on the supply chain performance of Ethiopian Shipping and Logistics Services Enterprise (ESLSE), incorporating both primary and secondary data through quantitative methods such as structured questionnaires distributed to employees of ESLSE. Descriptive statistics & inferential statistics were used to analyze the data with the help of IBM SPSS 26 software. A total of 102 questionnaires were distributed to employees under the five ESLSE target departments with 99 being returned, resulting in a response rate of 97 percent. The linear combination of independent variables account, 82.4% of the variance in Supply chain performance, while extraneous variables, only shows 17.6 percent. According to Durbin-Watson Statistics the value for this data is 1.741, therefore the data is no autocorrelation or there is no issue of multicollinearity. The linear combination of the independent variables highly predicted the dependent variable SCP. Recommendations is provided for ESLSE to address the identified challenges and barriers of e-logistics, aiming to optimize supply chain performance and overall operational efficiency.*

Key Words: - E-logistics, IT, Supply chain performance

# 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**

E-Commerce became a catalyst for private sector development, high trading opportunities and development gains. However, poor logistics contribute a barrier to e-commerce growth of cross-border e-commerce of physical goods in many developing countries like Ethiopia. E-logistics process encompasses ordering, paying and shipping of goods, service and information. A transaction will be considered as e-commerce if the ordering takes place digitally, whereas the payment and the delivery of goods or services may be conducted on or off line. E-logistics can expand markets and improve efficiency as it facilitates on line investment, thanks to digital platforms, indeed e-logistics enables closer customer relations among different actors (Kotler and Armstrong.2012).

E-commerce logistics platforms use ICT based technology to support the material acquisition, warehousing / consolidation and transportation. E-commerce logistics systems seek improved communication transparency in the supply chain, improved customer satisfaction distribution and logistics optimization, cost reduction, improvement in efficiency and on time delivery. This development creates new opportunities such as more alternatives for sourcing freight capacity, more options for improved organization and tracking of shipments and more transparency in terms of freight rates (Wicks, 2009).

To gain market share and take advantage of higher production and sourcing efficiencies, many companies are entering the global arena at today's competitive environments. E-logistics has brought new challenges as well as opportunities to logistics management. Company's profitability depends on the cost of logistics and transportation. A global market, outsourcing and

operations place tremendous pressure on the logistics function to deliver the goods as quickly as possible at lowest cost (Gunasakaran & Ngai, 2004a).

The role of logistics function is ensuring the smooth flow of materials, products and information throughout a company's supply chain is a key determinant on business performance (sum et al, 2001). Now a day, logistics has become more prominent and is recognized as a critical factor in competitive advantage due to the nature of a physically distributed operations environment and global markets.

Communications plays an important role in integrating the activities along the supply chain. Information technologies system, electronic data interchange (EDI), the internet, world wide web (WWW) and e-commerce have contributed greatly to improving communication with partners in the logistics chain (Chowdhury, A. 2003). E-logistics is used to illustrate the implications of information technology, in particular the internet, WWW & EDI, on the performance of the logistics value chain. This case study bases on the frame work proposed to enable companies like ESLSE fully develop an e-logistics system to improve competitiveness in the global market.

However, poor logistics contribute a barrier to e-commerce growth of cross border e-commerce of physical goods, in many developing countries like Ethiopia. E-logistics process encompasses ordering, paying and shipping of goods, service and information. A transaction will be considered as e-commerce, if the ordering takes place digitally, whereas the payment and the delivery of goods or services may be conducted on or off line. E-logistics can expand markets and improve efficiency as it facilitates on line investment thanks to digital platforms. Indeed e-logistics enables closer customer relations among different actors (Tilahun & Mekonnen, 2016).

The main challenges in ESLSE related to logistical and transport infrastructure, access to quality services under competitive conditions, efficiency of customs and border clearance procedures. i.e. infrastructure investment gaps, bottlenecks in ports and roads, lack of parcel delivery services, lack of a national addressing system impedes end customer delivery, customer related inefficiencies, problems regarding international returns and tax refunds(Wicks, 2009,World Bank, 2019).

Ethiopian shipping and logistics services enterprise was incorporated by proclamation number 255/2004 of the council of ministers merging the former Ethiopian shipping lines share company, maritime and transit services enterprise dry port Enterprise and comet transport that have been operating independently. This merger and radical transformation is not only aimed at bringing the companies under one corporate management, but also aims providing competitive services ,making sustainable change and continuous improvement in transportation and logistics sector.

E-logistics management poses several challenges, and it also offers various opportunities. Leveraging technology and automation, for instance, it can enhance logistics processes, cut costs, and optimize the efficiency of the delivery process (Moons et al., 2019). Furthermore, effective e-logistics management can serve as a market differentiation strategy, providing customers with a unique and satisfying shopping experience. On-time delivery with tracking options and Fast delivery are crucial elements for ensuring customer satisfaction (Daugherty et al., 2019; Gajewska et al., 2019).

The objective of this research is to conduct a comprehensive literature review on e-logistics management and it seeks to provide a comprehensive outlook on the role and challenges that ESLSE encounter in this rapidly-evolving environment, and analyze the various strategies and solutions that can be adopted to overcome these challenges. The research provides insights and recommendations to help ESLSE enhance their logistics processes and stand out in a competitive market. By presenting valuable insights and practical recommendations, this research aims to equip ESLSE with the knowledge and tools they need to improve their logistics processes and thrive in an intensely competitive market.

The objectives for which the Enterprise is established are: To render coastal and international marine and internal water transport services; To render freight forwarding agency, multimodal transport, shipping agency and air agency services; To provide the services of stevedoring, shore-handling, dry port, warehousing other logistics services for import export goods; To study the country's import and export trade demand and thereby develop technological capacity in order to render efficient maritime and transit transport services (ESLSE, 2021).

## **1.2 Statement of the problem**

The use of innovative tools and technologies in the analysis, processing, and transmission of information can help simplify, accelerate and reduce the cost of traditional business processes. However, related information management problems still exist. Its essence is to proactively provide complete and reliable information at the correct location and at a minimum cost so that consumers or company management can make sufficiently relevant decisions. With the development of the Internet and the widespread use of electronic expression of information in information logistics, e-logistics occurred (Skitsko, 2015).

Logistics companies need to constantly make effort to maintain unchanged market position in gaining and retaining competitiveness in relation to other companies which are present in the market. This can be done through establishing business partnerships which are based on trust and adaptation to modern IT technologies. Companies need to properly understand logistics operations to be able to gain a competitive position in the market. Competitiveness in the modern global world can be gained through using modern logistics tools and conduction of rational activities (Wieczorek 2017).

There are 44 landlocked countries in the world and a new program has been devised to support their transit transport services. At present time, the UN is implementing a 10 years program namely, Vienna Program of Action (VPOA) for Landlocked Developing Countries in 2014–2024. The responsible body organized to see the implementation of the VPOA has published an assessment report on landlocked countries transit transport systems. According to this report, progress has been observed on Ethiopia’s transit transport system in terms of the development of road, logistics facilities and other related infrastructures, and establishing bilateral agreements with coastal neighbours on port utilization. While the government made subsequent efforts, the evaluation report shows that there is still a wide gap when compared with the expected results (FDRE Logistics Strategy, 2018).

The LPI is an interactive bench marking tool created to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance (World Bank, 2019).The capacity of developing countries, like Ethiopia efficiently move goods and connect manufactures and consumers with international markets is

improving. But much more is needed to close the existing ‘performance gap’ “between high and low performers. Supply chains are only as good as their weakest link, and sustainable improvements require complex changes in a range of policy dimensions in areas including infrastructure, trade facilitation and logistics services.

The economic growth of Ethiopia in recent years has brought about a rapid increase in volume and type of the country’s import–export trade. The country’s logistics systems, however, are still at the early stage and characterized by high freight transit time, longer cargo dwell time as well as ship’s turnaround time in ports. The acute capacity limitation has hindered the accommodation of the increased trade cargo flows. The Ethiopian Government has recognized the trade logistics service as a major impediment, and has considered the improvement of this enabling service as a core perspective of the country’s economic development. It is important to acknowledge that logistics cost is a major national expenditure and it should be properly managed to eliminate avoidable costs (FDRE Logistics Strategy, 2018).

Ethiopia’s LPI index score is less than the average point; also it is less compared to sub-Saharan Africa and low income countries. The main barriers for successfully e-commerce implementation in ESLSE are : Inability fully replace paper based/manual systems ,the physical and electronic transaction infrastructure are insufficient ,less availability of experts on e-logistics ,legal and regulatory framework is still inadequate ,the level of awareness about e-commerce is not high enough ,lack of uniformity in policies, laws, standards and trade practices in different jurisdictions and numbers of e-commerce ventures currently in operating are small in number. ESLSE, in addition to its effort to improve its capacity on infrastructure development dry port expansion, increasing availability of experts and others has enhance its capacity on e-logistics development. This research tried to focus on the role and challenges of e-logistics on the supply chain performance of ESLSE (World Bank, 2020, Addis .G, 2017, Tewodros, 2022).

### **1.3. Research Objectives**

#### **1.3.1. General Objectives**

The main purpose of the study is to determine the role of e-logistics on ESLSE’s supply chain performance and identify its challenges.

### **1.3.2. Specific Objective**

- To assess the e-logistic management practices of ESLSE.
- To identify the major challenges of e-logistics management practices of ESLSE.
- To determine the role of E-logistic on the supply chain performance of ESLSE.

### **1.4. Research Questions**

- How e-logistics management is being practiced at the ESLSE?
- What are the major challenges of e-logistics management practices of ESLSE?
- How E-logistics affects the supply chain performance of ESLSE?

### **1.5. Significance of the Study**

This research enables ESLSE to develop effective policies, strategies and tactics. By aligning corporate goals with research goals, research management leading to the development of new and usable technology. Practically helps ESLSE to generate superior processes and services that give companies a competitive edge. The findings of the case studies suggest that the institutionalization of ICT – related initiatives is favoured when the initiative integrated with the core productive actions of the organization. Finally it enables the management of the enterprise to take corrective or reinforcement measures.

### **1.6. Scope of the Study**

The research is limited to present the role and challenges of e-logistics on the supply Chain performance of ESLSE. The study scope includes department linked with e-logistics specially ICT, inventory, procurement, warehouse and transport and logistics department in Addis Ababa's main office. The study used descriptive research design. Data collected using a quantitative survey i.e. structured questionnaire with a likert scale. The respondents chosen from different departments intentionally and also based on relevancy. The research conducted in the academic year of 2023/24.

## **1.7. Organization of the study**

This report is organized under five chapters. The first chapter represents introduction of the study whereby background of the study, problem statement, objectives of the study, research questions, significance of the study, definitions of terms, scope of the study, and limitations of the study are included. The second chapter is devoted to reviewing related literature followed by the third chapter that discusses the methodology used to undertake the study. In chapter four, data analysis & discussion of the results and chapter five, summary, conclusion and recommendations are presented consecutively. Finally, references presented and copies of questionnaires are annexed.

## **1.8. Limitation of the study**

Although the study focuses on the role and challenges of e-logistics on the supply Chain performance of ESLSE, other mediating and moderating factors might be ignored. These might put their adverse influences on the wholeness or generalizability of the output of the findings. Another limitations goes to respondents might have limitation in understanding the overall operation or service delivery of the enterprise. Depending on the scope of the research, prior researches are limited so this research will help for the development new researches in the area of e-logistics, but the limitation doesn't undermine the quality and integrity of the research.

## **1.9 Definition of terms / operational terms**

**Electronic logistics (e-logistics)** - is the process of planning and executing the efficient transportation and storage of physical goods that have been ordered and paid for through digital means from the point of origin to the point of consumption to meet customer requirements in a timely, cost-effective manner. This facilitates the connection between customers and sellers over the Internet rather than dealing with the distribution or actual transportation of goods (Diana, Pirra, & Woodcock, 2020).

In both academia and practice, the terms electronic logistics, e-logistics, internet-enabled logistics or e-business (e-commerce) logistics have been loosely used. Some consider e-logistics as a supportive delivery process for fulfilling online e-commerce orders (Joseph, Laura and Srinivas, 2004). Others believe that e-logistics implies the use of information and

communication technology to support the provision and execution of a broad range of logistics activities (Daly and Cui, 2003; Gunasekaran, Ngai and Cheng, 2007). While the former narrowly defines the e-logistics utility in an online business to customer (B2C) or business to business (B2B) setting, the latter offers a broader concept focusing on utilizing ICT to manage information and information flows in supply chains or supply networks.

**Information and communication technologies (ICTs)** are the driving force behind electronic commerce logistics (e-commerce logistics). This type of logistics has the potential to improve trade efficiency globally and integrate emerging nations into a global economy (UNCTD, 2009). Because of this, (Chowdhury, 2003) noticed that e-commerce logistics had significantly increased in developed nations during the last twenty years, while (Adeniran et al., 2022) observed that this had also been witnessed in developing nations over the last ten years.

**Electronic logistics management-**In the recent decade, due to the rapid development in IT, the E-logistics management has evolved and gained greater significance in doing business (Ristovska et al., 2017). Now, e-logistic success is one of the main areas worldwide to gain competitive advantage and grow more rapidly. Because logistics is strategically vital in most of the industries because, it is key to achieve competitive advantage (Kenyon & Meixell, 2007) and get success in a competitive environment.

However, firms must respond to changing needs of different customers because logistics flexibility is one of the essential parts of response (Zhang et al., 2005). Information communication technology (ICT) brings a better communication system for staff to communicate with customers, which increases the service quality. Service quality determines the level of customer satisfaction (Thai, 2013). Therefore, customer satisfaction is one of the indicators of good e-logistic performance.

**Challenges of Electronic logistics-** E-logistics is no longer a new phenomenon in most of the developing countries, but the penetration and growth is very low (Shed Khan & Bawden, 2005). That is the reason e-logistic services of developing countries are facing many challenges and all these challenges effecting negatively on the performance of e-logistic. Because electronic **logistics** a much more volatile and logistic industry facing several problems (Shamsi & Syed,

2015). While the cost of transport as well as logistics services is decreasing worldwide due to global competition.

**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, sub-assemblies and finished products, and distribution through various channels to the end customer. It also crosses traditional functional organization lines such as procurement, manufacturing, distribution, marketing & sales, and research & development (Warren H., 2002).

In recent years, with widespread use of the internet technology gained the close attention in logistic industry (Xiaomin & Yi, 2017). Because information communication technology is vital to solve the problems of e-payment and improving staff service quality which automatically improves e-logistic performance. Additionally, according to the results of Hua & Jing (2015), service quality has significant positive relationship with e-logistic customer satisfaction.

Therefore, there is a relationship between staff service quality, information communication technology and e-logistic performance. Hence, information communication technology (ICT) provides better system to increase staff service quality which in turn increases the e-logistic performance. Thus, service quality and information communication technology (ICT) has significant relationship with each other. E-logistic performance measured based on reliability, response rate, flexibility of the organizational structure and cost effectiveness of the company etc. . . . Service quality measured with the help of communication skills of staff, attitude and timely delivery (Hua & jing (2015).

## Chapter Two

### Review of Related Literature

*The theoretical reviews are based on e-logistics definition and concepts, emergence of e-commerce and supply chain management. To synthesize the conceptual framework for data collection method, the researcher examines literature relevant to e-commerce logistics and empirical studies written by many scholars in the field of e-commerce logistics and to evaluate the impact and challenge of e-logistics practices on the worldwide market dynamics. The literature review comprise of e-logistics Management Practices, Supply Chain Performance metrics, and also challenges of e-logistics.*

#### **2.1. Theoretical literature review**

##### **2.1.1. E-Logistics Management Practices**

A new business paradigm is required to move towards connected, seamless, intelligent, efficient, and sustainable digital logistics, commencing with the business activities regarding the supplying of raw materials, components, and parts and ending with the transporting of those supplies and finished goods, which in turn deliver the goods to the customers who are demanding fulfilment (PWC, 2016b). This is expected to lead to a radical shift in the way that business thinking and implementation in logistics are implemented.

Logistics activities are changing significantly as a result of the introduction of technologies such as artificial intelligence (AI), robots, and drones for managing the domestic and international movement of goods. The performance of the logistics business, both now and in the future, is greatly influenced by some technologies and applications, including unmanned ground vehicles, unmanned aerial vehicles, autonomous mobile robots, and self-driving automobiles. Additionally, autonomous vehicles have a greater potential to reduce accidents and improve road safety (Trubia, Giuffrè, Canale, & Severino, 2017).

A new business paradigm is expected to lead to a radical shift in the way that business thinking and implementation in logistics are implemented. Although the importance of managing the digital supply chain and information flows is obvious, many organizations are lagging behind,

unable to take full advantage of fast-paced technological developments (PWC, 2016b). Value generation could be obtained through improving existing operational efficiency and/or offering innovative products and services. The company builds its dynamic e-logistics capability to integrate, build and reconfigure external and internal competences to respond quickly to the changing environment (Arthur, W. 2011).

When organizations able to provide more flexible services to customer demand it enables the organization to enhance the performance and responsiveness of their logistics operation. In making sure a greater logistics operation, development in the management of inventory, warehouse, transport ,procurement and customer relationship management practices are crucial , these factors enable the organizations to achieve a greater balance of the cost, quality and the delivery time as well (Bartholdi,J 2005).

### **2.1.1.1 Inventory management**

Organizations that has better inventory management system face few cost that includes ordering, holding and penalty costs and it usually involve the high necessity of working capital that involve organizations to invest in single investment on assets that provide variety of retailers and wholesalers (Bartholdi,J, 2005). However, making these investments; organizations able to provide extra solutions to customer and balance the return to make revenue and thus effecting in the logistics performance.

Inventory management also enable the organizations to gain competitive advantage that influence the performance of logistics operation and on the other hand when organizations targeted to reduce the inventory cost it will involve the time of shipment and accuracy of forecast that are related to warehouse and transportation management (Thompkins, J,2003). Inventory management should consider factors such as seasonality, demand forecasting, and product life cycle, among others. Moreover, inventory management is closely related to the company's storage capacity and the efficiency of the shipping and delivery processes, as product availability and location in inventory are crucial factors in determining the customer's waiting time (Staudt et al., 2015)

### **2.1.1.2 Warehouse management**

Warehouse management are crucial in affecting logistics performance and can be managed by proper balance between the transportation cost and development and maintenance of warehouse and among tools that been used includes that optimizing layout of a warehouse to improve the efficiency of material movement in a warehouse (Thompkins, J, 2003). Warehouse management activities can influence the logistics performance of an organizations when excellent design supported by wise decision in determining an appropriate size, location and facilities that has to provide to cater the customer needs in making sure the organization increased its competitiveness in regards to the logistics performance (Bartholdi,J ,2005).

Mittal et al. (2018) state that inadequate storage capacity can lead to a shortage of space to store products, resulting in excess inventory being stored in unsuitable areas or an increase in costs associated with renting external warehouses. The lack of storage space can disrupt inventory organization, making it challenging to access products and increasing the time required to locate and retrieve items for shipment (Karim et al., 2018). . Warehousing services are now more in demand than ever before, which will allow most logistics and warehousing operators to stay afloat throughout the crisis.

### **2.1.1.3 Transport management**

Transportation management are related to time utility and place utility where time utility is referring to the flow of the products been delivered from sender to receiver where the flexibility of delivery and timeliness of delivery where place utility are referring to location of products delivered specifically from the origin of the product towards the destination (Routroy and R. Kodali, 2005). For Effective transportation management many organizations have opted to engage with third party logistics provider and forwarding agency that provides solutions many organizations in supporting its logistics needs (Bartholdi,J ,2005).

Third party logistics services enable organizations to benefit from hassle of interactions with carrier, gain advantage by professional services and organizations able to focus on its core priority (Thompkins, J, 2003). Transportation management systems allow companies to better manage their deliveries by monitoring orders in real-time, tracking vehicle status, and identifying

possible delays or issues in the route (Hrušovský et al., 2021). This allows companies to make necessary adjustments and corrections to the route and delivery schedules, ensuring that orders are delivered to their destination within the expected timeframe (De Souza et al., 2017).

#### **2.1.1.4 Procurement management**

The global market influenced to many supply chain organizations to select the most suitable supply chain network for total cost reduction (Ghasimi, Ramli, and Saibani, 2014) Cost leadership provides the competitive advantage in the market for the organizations and organizations focus on cost reduction for value chain benefits (Thompson and Strickland, 1996).

There is an increasing need in innovation policy as the demand side of innovation has been ignored. Public procurement processes are complex processes and complicated by the need for multi objectives services. Sometime, it has different purposes and value for many stakeholders involved (Edler and Georghiou, 2007). The defective goods and goods storages reduce the overall organization's profit. The using of JIT logistics is not only minimizing the production costs, holding transportation, defective products but also determine the product quality (Ghasimi, Ramli, and Saibani, 2014).

#### **2.1.1.5 Customer relationship management**

SCM needs to respond quickly to customer changes. However, different customer groups have diverse needs. It is difficult for SCM to make timely changes in the rapid changes in consumer tastes and continue to provide customers with the highest quality products or services at the lower or lowest cost ( Trkman, P., & McCormack, K. (2009). The most significant disadvantage of CRM needs high cost. Costs include software's to upgrade CRM services, IT resources needed and staff training and skills improvement ( Ernst, H., Hoyer, W. D., Krafft, M., & Krieger, K. 2010). To improve or maintain the customer satisfaction rate, company must train the service staff to accurately query the customer's order and give timely feedback to the customer.

## 2.1.2 Supply Chain Performance

E-logistics involves harnessing the internet and digital technologies to oversee the transportation and distribution of goods as business adopt digital tools to bring efficiency into their logistics and supply chain management efforts, e-logistics' has evolved to encompass technology driven solutions for inventory management, warehousing, storage, pickup and delivery services, as well as the optimization of customer experiences and expectations. The integration of real-time data into e-logistics transforms supplies chain management (Swaninathan and Tayar, 2003). In modern Supply Chain Management thinking, Quality is taken as a given. The diagnosis and improvement of Quality involves factors which are quite separate from factors used to improve Supply Chain Management (Chaffey, D. 2012).

Supply chain relationships achieve benefits for the participants (Christopher, 2005); however, it is also apparent that full SCM implementation is not being achieved (Kempainen and Vepsalainen, 2003). This in turn partners are still taking a short-term view, often in the face of increasing market-place uncertainty and complexity and are limiting the extent to which they extend their collaborative focus (Fawcett and Magnan, 2002).

For effective SCM, Financial, equipment, technological and market-based resources are necessary, but the people that accomplish the work of the firm are critical for the effective functioning and exploitation of each of these resource categories (Richey et al., 2006). It is coherent from the fact that over 90 percent of logistics activities occur outside direct supervision (Bowersox et al., 2000), highlighting the importance of influential people (i.e., HRs) to logistics and supply chain excellence.

Daugherty et al. (2000) said, "Many companies have pushed hard on technological and infrastructure improvements and investments. To take supply chain performance to the next level, companies will have to focus into this human element more intensively. The next wave of improvements and investment should center on the people who manage and operate the supply chain."

Companies can improve their competitiveness as by reducing supply chain cycle times. Tracking performance measures is crucial for successful implementation of information integration in the case logistic companies (Soni, & Kodali, 2011).Internet will enable much

richer, faster and easier collaboration across different partners in the supply chain; it will enhance the role of the customer in product development and drastically increase the potential for customer interaction; and it will simplify the task of implementing various supply chain improvements. With the Internet, the information sharing across the supply chain occurs much more seamlessly and efficiently.

It is important to add essential characteristics of performance measurement system given by Morgan (2004) that performance measures must be connected with the strategy of an organization, be part of integrated control system, have internal validity and enable proactive management; and second, the performance measurement system must be dynamic, intra-connectable, focused and usable. In the recent decade, the management of e-logistics activities has become one of the valuable ways to gain competitive advantage and to enhance organizational supply chain performance (Li et al., 2006).

The design and development of a supply chain performance measurement (SCPM) system implies various difficulties because it denotes a tool that generally leads to a company organizational change. As said by Agami et al. (2012), in their review of the main methods used to measuring SC performance, according to leading researchers in this field (Keebler, 2001; Gunasekaran et al, 2004; Tangen, 2004; Ramaa et al, 2009; Akyuz and Erkan, 2010; Kurien and Qureshi, 2011), an effective SCPM should be characterized by its reliability, responsiveness, flexibility and cost effectiveness.

## **2.2. Empirical Literature Review**

### **2.2.1 E-logistics Practices in ESLSE**

The dispatch and delivery of products also represent a critical activity for e-logistics management, in terms of meeting deadlines and reducing logistics costs. This is especially due to the fact that customers currently have increasingly high expectations regarding delivery speed (Silva et al., 2022). ESLSE is using advanced ICT technologies between head quarter and on board ships (Fikadu, 2013a). In terms of supporting its services and activities and utilizing ICT, ESLSE adopt a variety of systems that is acquired from former independently operating companies like Ethiopian shipping lines S.C., maritime and transit services enterprises, Dry port

enterprise and comet transport share company, as well as developing new systems using its own internal capacity and resources.

The ESLSE Services has three dimensions (i) major services include sea transport services for import and export and share handling services (ii) services like multimodal, unimodal and customs and port clearing and the (iii) services provided by port and terminal sector. As indicated by Tewodros Y. (2022) challenges of e-logistics are influential on the e-logistics practice of the ESLSE. The ESLSE e-logistics practices are dragged down by infrastructural challenges, economic challenge, legal challenge, managerial and manpower challenge. Therefore, the ESLSE need to overcome those challenges so as the effectively utilize e-logistics practice and reap the fruits of SC performance.

### **2.2.2 Performance measurement model**

The literature review showed the most reliable model for the measurement of logistics performance i.e. Supply Chain Operations Reference (SCOR) model. The Supply Chain Operations Reference model (SCOR) is definitely the most used model within the SC performance assessment; it was proposed by the Supply Chain Council (SCC) to manage and evaluate the performance of the supply chain. SCOR has been widely used by many companies all over the world and it has become the standard model for the management of the processes that characterize the supply chain (Hwang et al., 2008).

Through improving communication between the various members of the chain, SCOR model enables companies to analyze the performance of their supply chain in a systematic way, at the same time, enhancing the network and the performance of each region and then of the supply chain as a whole (Hwang et al., 2008). The model has a hierarchical structure characterized by three levels, for each of processes (shared into the areas: reliability, responsiveness, flexibility, cost and resources) are defined with a level of detail which increases from level 1 to level 3.

The processes associated with each level are:

1. Source, ordering and receiving raw materials and products;
2. Make, manufacturing, producing, repairing, modifying or recycling materials and products;

3. Deliver, receiving, programming, taking, packing and delivering products that are ordered by customers;

4. Return, managing the logistics of returning products and goods not suitable for sale and packaging.

### **2.3. Challenges of e-logistics management practices**

Businesses are exploring technological opportunities to sustain and have a competitive advantage over their competitors (perera, perera, & wijesinghe, 2013). The strategic goals are surrounded based on calculated standards whereby the effectiveness of creation, and administration, decrease stocks and overheads, increase the utilization of limits, minimize conveyance time span, increasing lucidity, generating and augment adaptability, making low ecological burden, applying reverberation amicable advancements, achieving high transportation abilities, and improving customer delight and viability. While planning the delight of these strategic targets the fulfilment of a solitary goal must not be seen as a confined issue, yet all calculated destinations ought to be for all intents and purposes considered simultaneously on a weighted premise.

#### **2.3.1 Technological challenge**

A better trustworthy system with regards to the privacy and security is required for e-logistic (Changchit et al., 2009; Chen & Barnes, 2007) which is only possible with the help of information communication technology (ICT). Inclusion of information communication technology (ICT) in e-logistics enhances the efficiency of e-logistic services and decreases the error rate by increasing the effectiveness of overall process, which impact positively on e-logistic performance. Because electronic logistic depends heavily on information technology.

Additionally, in most of the developing countries the growth of information communication technology (ICT) is low (Shed Khan & Bawden, 2005). Approximately, 95% of e-logistic customers in developing countries show concern about security and trust regarding payment (Kim et al., 2010). Moreover, staff service quality includes problems related to communication, distribution of information, delivery services etc.

The logistics market is undergoing a revolution due to the implementation of new technologies such as drones and robots for deliveries (Tang & Veelenturf, 2019). These technologies have the potential to transform the logistics industry by introducing new levels of speed, accuracy, and cost-effectiveness. Drones, for instance, are ideal for delivering small and lightweight packages over short distances, while robots can navigate busy streets and narrow alleys to deliver goods quickly and efficiently (Jaller et al., 2020).

Investing in technology and automation of activities and processes is another important strategy for e-logistics management practices. By leveraging automation, these activities can be performed with greater precision, speed, and consistency compared to manual execution (Javaid et al., 2021). By automating activities such as product picking, packaging, and dispatching, businesses can achieve greater efficiency gains and reduce the likelihood of errors occurring.

### **2.3.2 Infrastructural challenge**

Infrastructural challenges refer to the structure and equipment necessary to facilitate and expedite matters such as communication, ICT infrastructure. Logistics-based organizations require integrated information systems (Lainez & Kopanos, 2008).

The integration of infrastructure and supply chain activities is necessary. This is rightly so because according to Jacoby and Hodge (2008) investing in infrastructure has a positive impact on the supply chain and saves businesses 1-2% of operating costs and more than 15% of annual transportation costs. Organisational output depends on the degree to which infrastructure and transport are engaged in supply chain activities. This reasoning is in line with many studies, particularly (Nandi, M. et al, 2020) who show that transportation infrastructures in supply chain management is more multifaceted, is not only for the organisation's competitiveness but also service quality .

### **2.3.3 Managerial challenge**

It is clear that over 90 percent of logistics activities occur outside direct supervision (Bowersox et al., 2000), highlighting the importance of managers to logistics and supply chain excellence. Daugherty et al. (2000) said, "To take supply chain performance to the next level, companies will have to tap into this human element more intensively. Many companies have pushed hard on

technological and infrastructure improvements and investments. The next wave of improvements and investment should center on the people who manage and operate the supply chain.”

Logistics management requires an effective coordination of different stakeholders and systems. It also requires strong commitment and follows up. Various actors and stakeholders pursue their own respective approaches and analysis towards the challenges facing the logistics sector (FDRE Logistics Strategy, 2018).

### **2.3.4 Manpower challenge**

Financial, equipment, technological, and market-based resources are necessary for effective SCM, but the people that accomplish the work of the firm are critical for the effective functioning and exploitation of each of these resource categories (Richey et al., 2006)

Developed countries have already raised the alarm about the future shortage of talented and professional logistics managers due to the aging population and slower growth rate (Feisel et al., 2011; Goffnett et al., 2012; Hohenstein et al. 2014). The situation in developing countries, which is higher in population growth and unemployment, is similar. The human resource difficulties in the logistics industry are compounded by factors such as limited resources, competition for those resources, and a lack of understanding of the supply chain sector.

In Ethiopia Institutions responsible for issuing qualification certificates to professionals and companies engaged in the logistics sector include Ministry of Revenues to custom clearing agents, Maritime Affairs Authority to freight forwarders and ship agents and Ministry of Trade and Industry to traders. However, the certifications provided by these institutes are neither reliable nor integrated. And the trainings are inefficient and ineffective; the opportunity for training is very narrow. This has resulted in a shortage of professionals, and created knowledge and skill gaps. This in turn has a negative effect on the performance of the logistics sector (FDRE Logistics Strategy, 2018).

### **2.3.5 Legal challenge**

The development of e-logistics, mainly based on logistics and transport infrastructure, harmonization of regulations and law, i.e., creating an economic environment and facilitating the undisturbed flow of goods, people, and capital (Kilibarda et al., 2019).

A number policies and strategies implement to sustain the country's rapid economic growth and bring about significant improvements in the logistics sector (FDRE Logistics Strategy, 2018).

### **2.3.6 Economic challenge**

Kilibarda et al. (2019) suggested that economic development, economic growth, spatial integration, and market integration depend on the logistics system. It clearly affects how well various industries and national economies function economically. Unlike in the past, today's requirement for the building and growth of logistics on a global, regional, and local level is growing more and more critical. Along the same line, Viswanadham and Gaonkar (2001) advised that having good logistics infrastructure and culture is becoming a prerequisite for attracting global manufacturing and service companies into the country.

Generally costs for transport, port handling, transaction and storage services as well as container demurrages and maintaining inventories are on the high side. It results in bearing unnecessary and avoidable logistics costs. Studies show that the logistics costs of countries vary but they are estimated to be in the range of 14-35% of the GDP of each respective country (World Bank, 2019). It is important to acknowledge that logistics cost is a major national expenditure and it should be properly managed to eliminate avoidable costs.

## **2.4. Supply chain performance indicators**

Supply Chain Performance refers to the optimized supply chain's activities in meeting end-customer requirements, including on-time delivery, product availability 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, sub-assemblies and finished products, and distribution through various channels to the end customer. It also crosses traditional functional organization lines such as procurement,

manufacturing, distribution, marketing & sales, and research & development. To win in the new environment, supply chains need continuous improvement. To achieve this we need performance measures, or “metrics”, which support global Supply Chain Performance improvements rather than narrow company-specific or function specific (silo) metrics which inhibit chain-wide improvements (Charan,et al2008).

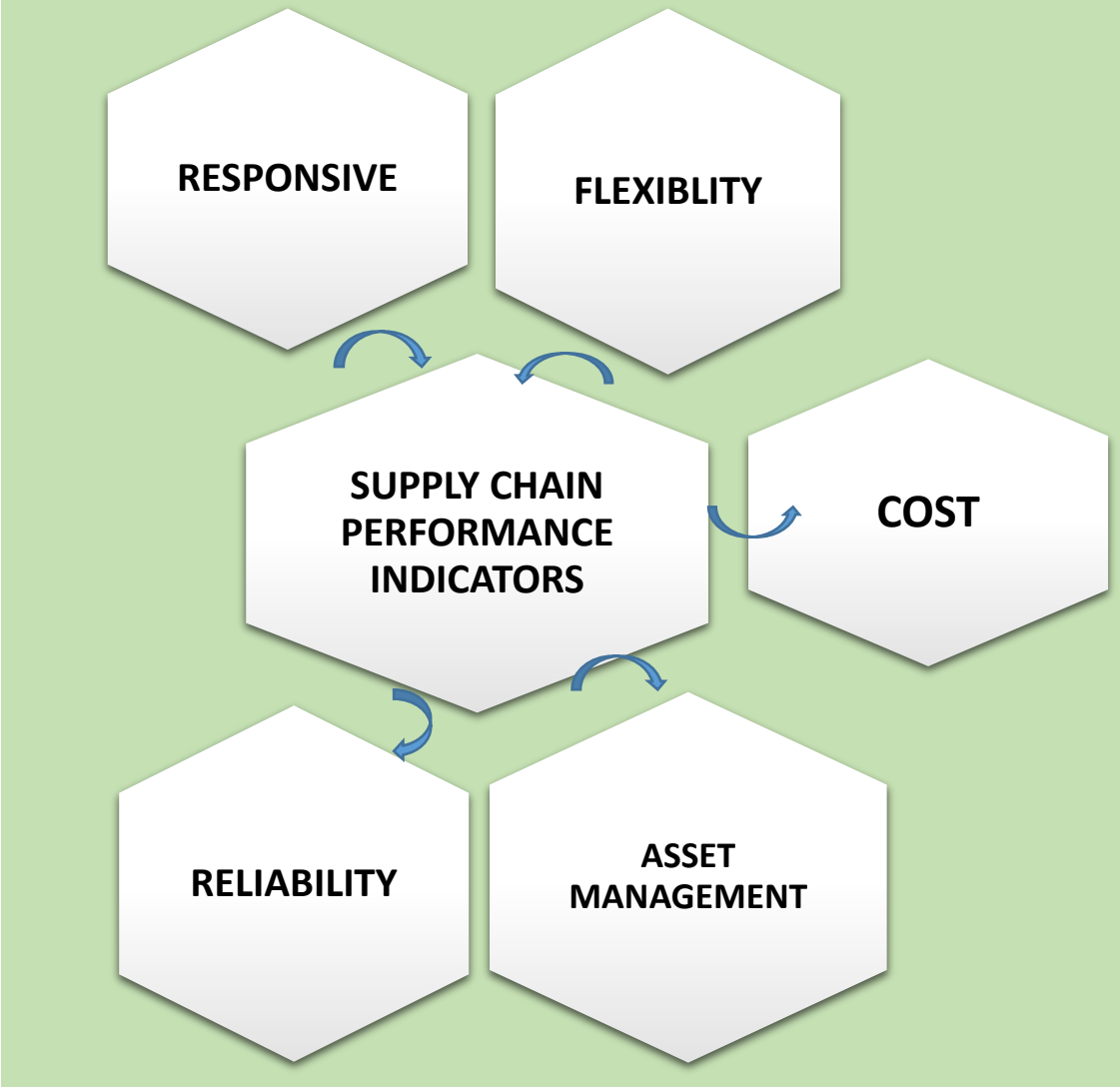


Figure 1, Supply chain performance indicators

### **2.4.1 Reliability**

E-Logistics management plays an important role in companies' competitiveness. By using efficient logistics management strategies, companies guarantee the prompt delivery of products, which is crucial for customers who value convenience and speed (Harrison et al., 2019). Companies Improved quality of service: Through effective logistics management, it is possible to ensure that products are delivered on time, in perfect condition, and with safety (Ding et al., 2021). E-Logistics management enables companies to provide high-quality services and delivering products within the agreed timeframe, companies can increase customer loyalty and attract new consumers (Murfield et al., 2017)

### **2.4.2 Responsiveness**

E-logistics management offers numerous opportunities that businesses can leverage. One of the key opportunities is improving customer service. With streamlined logistics processes, companies can meet delivery timelines, offer order tracking services, and ensure the high quality of products delivered to customers (Mehmood, 2021). This contributes to customer loyalty and the building of a good reputation, strengthening the brand in the market (Farooq et al., 2019).

### **2.4.3 Flexibility**

Another opportunity offered by e-logistics management is the expansion of companies' area of operation. With the possibility of nationwide delivery, companies can expand their geographic reach, reaching a larger audience and increasing sales opportunities (Pigatto et al., 2017). One benefit of nationwide delivery is that it can help companies diversify their markets and reduce dependence on a specific region. This can be particularly important during times of economic or political crisis, where one region may be more affected than others (Hübner et al., 2016).

### **2.4.4 Cost**

Efficient e- logistics management enables companies to guarantee the prompt delivery of products, which is crucial for customers who value cost (Harrison et al., 2019). Cost reduction achieved through by optimizing warehousing, distribution, and transportation processes, companies can reduce the time and money spent on each stage of the logistics chain (Moons et al., 2019). As consumers gain confidence that they will have a good online shopping experience, they search the Internet for higher quality products at lower prices. To maintain the financial

well-being, companies strive to lower logistics costs. As a result, ecommerce companies continuously strive to deliver products on time and at reduced costs to meet customer demands and stay ahead of their competitors (Oláh et al., 2019)

### **2.4.5 Asset management**

E-logistics management enable companies the possibility of integrating their activity with other company processes, such as marketing and sales. According to Nunhes et al. (2017), by using integrated technologies and systems, it is possible to improve process efficiency and increase team productivity, contributing to the growth of companies. Better internal communication, avoids rework, management of customer and prospect data is more precise, customer service is enhanced, costs are reduced, and productivity increases due to the automation of manual and repetitive tasks (De Vass et al., 2018). E- Logistics management is a crucial aspect of businesses. With the increasing competition in the market, it is vital for companies to invest in logistics management to stand out from the competition.

Ellram *et. al.* (2013),through his popular resource-based view (RBV), mentioned that strategic resources possess valuable, rare, imperfectly imitable, and non-substitutable and are capable of providing a sustainable competitive advantage to an organization.

## **2.5 The role of E-logistics on supply chain performance**

The effects of digital transformation on e-commerce logistics in this digital era cannot be overemphasized. Businesses have shown great anxiety over technical acceleration, even though it calls for much more than just technology. A few of the elements that make up the process of digital transformation include improving employee capabilities, altering organizational structures and management approaches, empowering leaders, taking cultural differences and values into account, addressing business strategy and process-related issues, considering customer journeys and experiences, and leveraging technology to drive and facilitate the organization's business models( Gunasekaran et al, 2004).

New technology adoption results in modifications to the organization's overall strategy, system, culture, and mindset and eventually propels the development of the whole business model, it cannot be considered a transformative process on its own (Gezgin, Huang, Samal, & Silva,

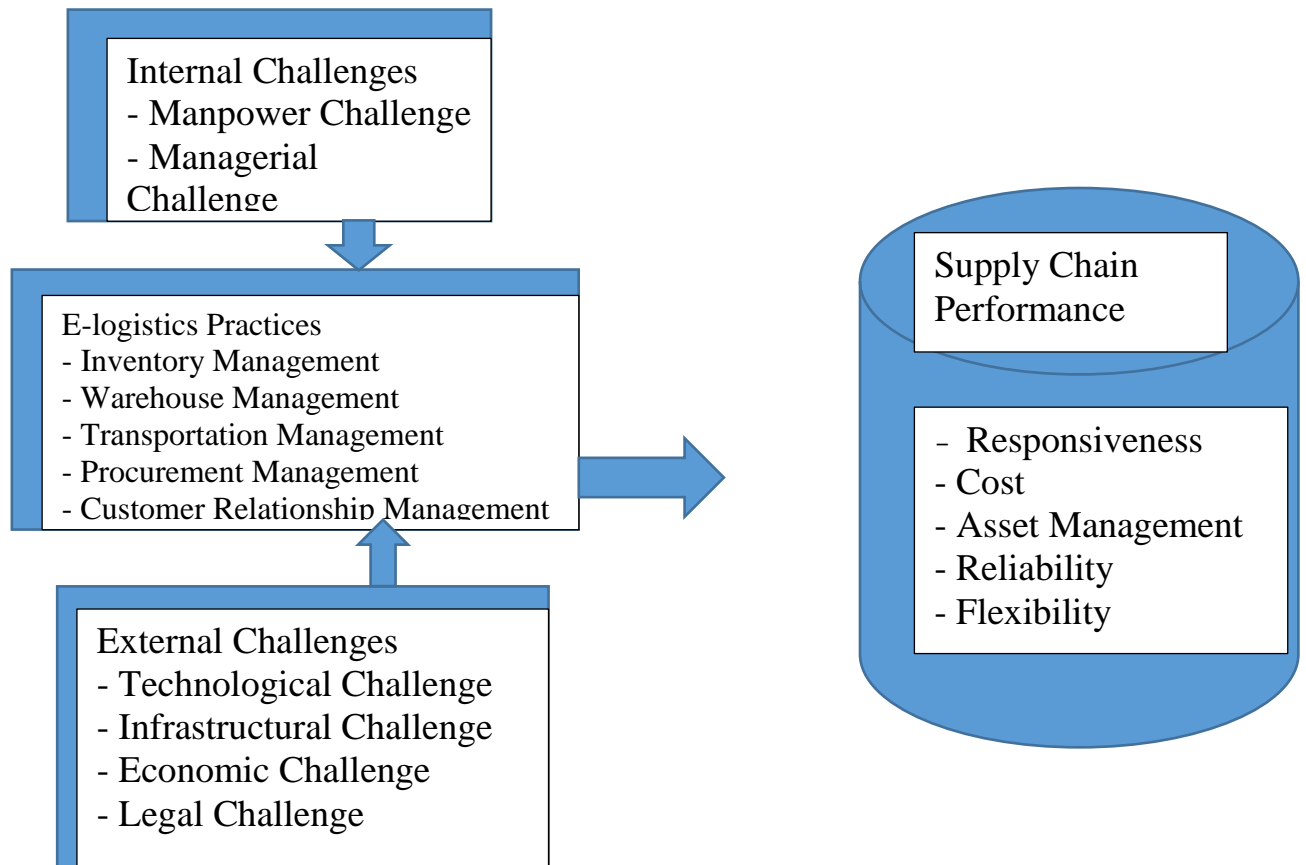
2023). To be competitive, organizations need to adapt to evolving technologies by refining and improving their present procedures.

E-logistics create a value proposition and make companies remain competitive (Mentzer et al., 2001). In other words, companies have started to leverage their logistics capabilities as a source of competitive advantage (Lynch et al., 2000; Zhao et al., 2001). Here, logistics leverage means achieving excellence and satisfaction through inventory availability, timely delivery, and less product failure. It originates from a company's logistics infrastructure (e.g., processes, strategic partnerships, systems, personnel) (Darkow et al., 2015). Mentzer and Williams (2001) substantiate that e-logistics can create a value-added service that customers consider critical and difficult to copy by the competition, particularly in the short run.

## **2.6 Conceptual Framework**

Adoption of technology has been studied in various industries and geographic location for many years. The research was conducted on supply chain performance of ESLSE due to the practice of e-logistics. The technologies considered in the research are those technologies with the potential to improve data analytics by digitizing some or all possible aspects of the e-logistics supply chain and providing safe, reliable data collection, data movement, data storage, data sharing and data analysis are needed in all aspects of SC management. The technology adoption frameworks feasibility will be assessed and both pros and cons were detailed. The development of the conceptual framework for the research will logically explained based on the analysis of numerous technology adoption models, framework and studies (Hilton, 2017). The main purpose of this study is to assess the role and challenges of e-logistics on the supply chain performance of ESLSE

**Figure 2** Conceptual Framework of e-logistics



## **Chapter Three**

### **Methods of the study**

#### **3.1. Description of the study area**

Ethiopian shipping and logistics services Enterprise (ESLSE) is the result of the merging of the former three public enterprises that have until recently been operating separately in a rather similar and interdependent maritime sub-sector; namely, Ethiopian shipping lines S.C, Maritime and Transit services enterprise and dry port enterprise. ESLSE is a multimodal transport operator with a business model called comprehensive transit transport in Ethiopia.

Ethiopia launched a national logistic policy and strategy which endorsed by the council of ministers. The enterprise vividly enunciates which ports are relevant for the development of the country in the years ahead, considering the political and economic situation of the country and the neighbouring countries. ESLSE is currently operating with 11 ships, and currently import 6mln metric tons on a yearly basis. To enhance the number and capacity of maritime professionals ESLSE got two training institutes, the Babogaya and the Bahirdar maritime academy (ESLSE, 2021).

#### **3.2. Research Design**

The researcher uses descriptive researcher design. The researcher aimed at gathering information plausible to examines the what, where, and when of a phenomenon, and explanation of the objectives under the study. Descriptive research is a research design guided by research questions and research hypotheses. This research design often requires a statistical sampling technique such as random sampling, and supported by structured questionnaire. In descriptive research, the main aim includes providing explanations to problems by collecting either qualitative or quantitative data. Analysis of data collected is through statistical means to establish a relationship among variables (Saunders, Lewis and Thorn phill, 2009).

The regression test was conducted using inferential analysis technique. Regression analysis, in fact, aims to identify the relationship between a dependent variable and one or more independent variables (Hwang et al., 2008; García-Alcaraz et al., 2015). If the model of the relationship is

deemed satisfactory, given values for the independent variables, the estimated regression equation can be also used to predict the value of the dependent variable.

### **3.3. Research Approach**

The study was conducted using quantitative research design, this design offers a number of benefits to approaching complex research issues, quantitative research is mostly employed to validate theories or assumptions with the goal of generalizing facts to the larger population and quantitative data collection methods include surveys, experiments, and statistical analysis to gather and analyze numerical data. Quantitative research data collection approaches comprise of fundamental methods for generating numerical data that can be analyzed using statistical or mathematical tools. The most common quantitative data collection approach is the usage of structured surveys with close-ended questions to collect quantifiable data from a large sample of participants (Fetters, 2016).

### **3.4. Population and sample design**

The population targeted for the research includes employees work on ICT department, property administration and general service department (which includes Inventory, Warehouse and transport departments) and Procurement departments. Sampling design is the method used to choose the right sample. The researcher used stratified sampling techniques. Quantitative research methods i.e. structured questionnaires used to elicit information from 102 participants who worked in ESLSE. Sixteen (16) pertinent criteria are identified, of which five relate to e-logistic management practices, six relate to challenges affecting e-logistics, and the remaining five relate to the role of e-logistics.

The target populations of the research are employees currently work at ESLSE from IT, property administration and general service department (inventory department, warehouse management department, transport and logistics department) and procurement department. Based on ESLSE human resource department currently there are 335 male and 304 females at the head office work permanently, with a target population 76 in property administration and general service department, 24 in procurement and 37 in IT department, i.e. a total target population of 137.

Stratified random sampling used in dividing the entire population into homogeneous groups, i.e. executives, managers, coordinators and officers are the target respondents .These sample sizes are a subset of the population used to represent the entire population. A sample selected from a population by using a simple random sampling to represent all the strata.

The sample size for a known population is determined by the relation,

$$n = N / (1 + Ne^2) \quad (\text{Yemane, 1967}).$$

Where,

n =is the sample size

N = is the population size, and

e =the error term. For 95% accuracy the error factor e is 0.05.

$$n = 137 / [1 + 137(0.05^2)]$$

$$n = 102$$

Name	N=Population	Proportional Sample Size	Sample Size
IT department	37	37/137=0.27	0.27*102~ 28
Inventory department	38	38/137=0.277	0.277*102~ 28
Warehouse management department	24	24/137=0.175	0.175*102~ 18
Transport and logistics department	14	14/137=0.102	0.102*102~ 10
Procurement department	24	24/137=0.175	0.175*102~ 18
Total	137		102

**Table 3.1 Sample Size Determination, Source; Own survey 2024**

Based on the given table 3.1 the questionnaire administered for employees currently work at ESLSE, i.e. 28 workers from IT department, 28 workers from inventory department, 18 workers from warehouse management department,10 workers from transport and logistics department and 18 workers from procurement department ,which makes a total of 102 respondents.

### **3.5. Data source and type**

The researcher mainly used primary data (Questionnaire) that is given for employees at the head office and secondary data. The secondary data mainly obtained from human resource management of ESLSE in order to obtain detailed first-hand data. The Primary data obtained through own survey for a specific purpose of addressing the problem at hand. On the other hand, secondary data (Publications, journal and records) contains relevant data that has been collected for a different purpose, but from which valuable data selected for the purpose of the research.

### **3.6. Data Collection Procedure**

There are two sources of data collection techniques, primary data was collected through questionnaires distributed to employees, managers and coordinators. Secondary data collection achieved through by collecting information from a diverse source of documents, electronically stored information etc...found in ESLSE.

### **3.7. Method of data analysis and presentation**

Data are analyzed to categorize, manipulate, summarize and to give order to describe in meaningful terms (Murray, 2012). Descriptive research design method used to analyze the quantitative data gained through structured questionnaire. To analyze the data obtained from respondents from questionnaire, the researcher go through all the gathered data carefully. The researcher give codes to each questionnaire and finally the answers organized, presented and analyzed by using statistical tool IBM SPSS version 26 which enables readers to have a clear, organized and statistically stated idea about the topic.

### **3.8. Validity and Reliability Test**

Reliability and validity are both about how well a method measures something. Reliability refers to the consistency of a measure and validity refers to the accuracy of a measure (Middleton, 2019). To achieve the validity and reliability the researcher seeks the advice of professionals in the field and make pilot test. In this research, Cronbach's alpha used to assess the internal consistency of variables in the research instrument. The degree to which data gathering techniques or analysis procedures produce consistent results is referred to as reliability (Saunders, M, Lewis, P. and Thornhill, A., 2007). Cronbach's alpha ( $\alpha$ ) is a coefficient of

reliability used to measure the internal consistency of the scale; it is represented numerically between values 0 and 1, inclusive.

Cronbach's Alpha test is one of the data reliabilities evaluating tests. Cronbach's Alpha will determine the reliability test to see how reliable the results are, and if the sample size was expanded, comparable generalized results should be obtained (Feild,A., 2006). The Alpha value runs from 0 to 1, inclusive, with 0.70 or greater being a good measure of alpha (Neuman W.L., 2007). A "high" alpha value, on the other hand, does not suggest that the measure is one-dimensional. Technically speaking, Cronbach's alpha is a coefficient of reliability (or consistency).

<b>Reliability Statistics</b>	
Cronbach's Alpha	No of Items
.900	60

**Table 3.2 Cronbach's Alpha test table**

Source; SPSS data output 2024

According to the output, this research shows how reliable or consistent the results are due to high value or a good measure of alpha. Cronbach's Alpha value greater or equal to 0.9 indicates high reliability and strong internal consistency among the items in the questionnaire.

Variable	Cronbach's Alpha	No of Items
E-logistics management practices	0.865	18
Challenges of E-logistics	0.675	17
Supply chain performance indicators	0.968	25
Total No of Items	0.900	60

Source; SPSS data output 2024

**Table 3.3 Cronbach's Alpha test table for management practice, challenge & SCP**

### **3.9. Ethical Considerations**

The researcher responsible for participants of the research informed about part of the research, to get their permission to record and share data and keeping their personal information safe. To avoid the conflict of interest on managers and workers, the purpose of the study will be clearly

stated, and the confidentiality will be strictly maintained in the questionnaire. Furthermore, the questionnaire distribute only to volunteers and those who are willing to respond after clarifying the purpose.

## CHAPTER FOUR

### RESULT, DISCUSSTION AND INTERPRETATION

This chapter contains the researchers' findings, which are based on a review of the data collected from the participants and a discussion of the findings based on the response. As stated in the previous chapter, the primary goal of this research is to look into the role & challenges of e-logistics on the supply chain performance in the case of Ethiopian Shipping and Logistics Services Enterprise. The data collected from the ESLSE workers via questionnaire was processed, presented, and interpreted in this section in order to achieve the study's objectives.

Once the questionnaires were collected, before data analysis, the questionnaire was reviewed that it filled appropriately. Any incomplete or missing responses were rejected from the subsequent analysis. The steps which stated in the data analysis section such as coding, eliminating coding and data entry error, known as "clearing the data", (Rubin & Babbie 2010) was performed in this research.

A response rate is the ratio of the number of respondents in a study to the number of participants who were asked to participate. Several formulas have been developed to calculate response rates, which are based on different definitions of what it means to have fully participated and how to count eligible units. The researcher should aim for a response rate of rate of more than 80%, according to Saunders et al. (2009). The researcher produced 102 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 99 of them being returned, resulting in a response rate of 97%, which was good enough for analysis, conclusion, and suggestion. 3 questionnaires are not returned due to annual leave of the workers.

Demographic profile of the respondent

Demographic profile	Item	Frequency	Percent
Gender	Female	36	36.4
	Male	63	63.6
<b>Educational qualifications</b>	College diploma	27	27.3
	First degree	48	48.5
	Second degree & above	24	24.2
<b>Years of experience</b>	Below 5 years	18	18.2
	5-10 years	56	56.6
	11-15 years	21	21.2
	Over 15 years	4	4.0
<b>Department or section</b>	Inventory	28	28.3
	Transport	10	10.1
	Warehouse	20	20.2
	Procurement	16	16.2
	IT	25	25.3
<b>Designation</b>	Executive	1	1.0
	Manager / head of department	13	13.1
	Officer	80	80.8
	Coordinator	5	5.1

**Table 4.1 General demographic profile of the respondent**

According to the output from table 4.1 there were 36 female and 63 male respondents. This shows that the majority of the respondents, 63.6% of them are male while female respondents constitute 36.4%.

As a result of the descriptive analysis, about 48.5% of the total respondents had a BA/ BSc ,and 24.2% have acquired their master’s degree or above educational background, while the remaining 27.3% had a college diploma or less. This implies that majority of the respondents were well educated and it can be taken as a positive indication regarding credibility of the responses from the respondents.

With Regard to years of experience in ESLSE 18.2% of the respondents served the enterprise below 5 Years; 56.6% of them served for 5-10 Years; 21.2% of them serve the enterprise for 11-15 Years and 4% of the respondents have experience over 15 Years. This implies that majority of the respondents served the enterprise more than 5 Years and it can be taken as a positive indication regarding credibility of the responses from the respondents.

In terms of the respondents' assigned positions in their organizations, 80.8% are Officers, followed by 33% as Manager/head of department. Coordinators and Executives accounted for 5.1% and 1% of responses, respectively. It is evidenced that more employees are officers in service providing organizations like ESLSE. And this finding has an implication that the sample representativeness of the staff population in the company.

Have you attend any ICT Course	Frequency	Percent
Yes	94	94.9
No	5	5.1
Total	99	100.0

**Table 4.2 Have you attend any ICT Course**  
**Source: Own Survey**

Based on the output from table 4.1.6, 94.9% of the respondents attended IT courses or are computer literate while 5.1% of them did not attend any IT courses or training. IT professionals are the driving force behind various technological systems and infrastructures.

## 4.2. Descriptive Analysis

All variables listed on the primary data were categorized in order to assess 'The role and challenges of e-logistics on the supply chain performance of Ethiopian shipping and logistics service enterprise'. The dimensions are broadly discussed in the literature review and were examined in terms of e-logistics practice, Challenges affecting e-logistics practice and Supply chain performance. For the development of a multidimensional Supply chain performance measurement a total of 60 criteria are identified, of which 18 relate to e-logistic management practices, 17 relate to challenges affecting e-logistics, and the remaining 25 relate to the role of e-logistics. Meanwhile, the mean value and the standard deviation of the variables are stated as shown in table 4.3.

To determine the minimum and the maximum length of the 5-point Likert type scale, the range is calculated by  $(5 - 1 = 4)$  then divided by five as it is the greatest value of the scale ( $4 \div 5 = 0.80$ ). Afterwards, number one which is the least value in the scale was added in order to identify the maximum of this cell. The length of the cells is determined as follows: According to Best (1987), the scale is set in such a way that respondents strongly disagreed if the mean scored value is in the range of 1.00 – 1.80; disagreed within 1.81 – 2.60; neither agreed nor disagreed within 2.61 - 3.40; agreed if it is in the range of 3.41 – 4.20; while strongly agreed when it falls within 4.21 – 5.00. In addition, standard deviation shows the variability of an observed response. Below, the results are discussed one by one (Alexander 2009).

The model has 60 items to measure e-logistics practice, Challenges affecting e-logistics practice and Supply chain performance. Hence, the respondents were asked to tick on questionnaire based on their experience, knowledge and level of satisfaction by using five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree". Lower mean value indicates responses disagreement while higher values for strong agreement. The standard deviation (below 1.0) indicates relatively low variability of respondent's response while more than 1.0 shows high variability of response on same subject.

**Descriptive statistics of e-logistics practices (99)**

No	<b>A .Inventory Management practice variables</b>	Mean	Std. deviation
1	Inventory counting is done electronically	2.81	.829
2	Planning and Forecasting of Inventory counting is done electronically	3.06	1.185
3	Synchronizing warehouse stock with sales is done using e-logistics solutions	2.90	.814
4	Electronic approval of stock orders is in practice	3.64	.692
5	Batch tracking is managed electronically	3.46	.644
6	Inventory storage oversight function is executed using e-logistics solutions	3.43	.625
	<b>Grand mean of Inventory Management</b>	<b>3.22</b>	
	<b>B .Warehouse Management practice variables</b>		
7	ESLSE uses effectively ERP in ware housing	4.01	.802
8	ESLSE uses e-logistics to boost ware house management system	3.54	.719
9	ESLSE employ effective e-logistics for smooth ware house operations	3.44	.642
	<b>Grand mean Warehouse Management</b>	<b>3.663</b>	
	<b>C .Transport Management practice variables</b>		
10	E-logistics solution at ESLSE ensure shipments meet the company standard	3.48	.691
11	ESLSE use e-logistics platforms in panning & scheduling of transportation's	3.61	.767
12	ESLSE adopt strategies to reduce distribution costs with the help of e-logistic solutions	3.70	.863
	<b>Grand mean Transport Management</b>	<b>3.597</b>	
	<b>D. Procurement management practice variables</b>		
13	ESLSE use e-logistics platforms in need identification, supplier selection, contract management & in contract award	3.82	.578
14	ESLSE use e-logistics platforms in making payment to supplier,	3.48	.873
15	ESLSE use e-logistics platforms in supplier relationship management & to maximize customer satisfaction	3.58	.809
	<b>Grand mean Procurement Management</b>	<b>3.62</b>	
	<b>E. Customer relationship management practice</b>		
16	ESLSE practices e-logistics to manage customer information	3.43	.960
17	ESLSE practice e-CRM solutions in managing & coordinating customer interactions	3.33	.948
18	ESLSE use customer service software to manage customer inquiries	3.19	1.037
	<b>Grand mean of Customer relationship Management</b>	<b>3.317</b>	

**Table 4.3 Descriptive statistics of e-logistics practices Source: Own Survey**

### **4.2.1 Inventory Management Practices**

According to table 4.3, the mean scores Inventory counting is done electronically, planning and forecasting of inventory counting is done electronically and Synchronizing warehouse stock with sales is done using e-logistics solutions are 2.81, 3.01 and 2.90 respectively, which means that employees were neither agreed nor disagreed and their perceived value were relatively neutral. This implies that from inventory Management Practices these variables; Inventory counting is done electronically, planning and forecasting of inventory counting is done electronically and Synchronizing warehouse stock with sales is done using e-logistics solutions are at early stage in ESLSE head office.

The results consistent with the research done by Sarkar & Kumar (2015), inventory management strategies ensure that products are always available and ready to be shipped to customers. These strategies may include implementing real-time inventory management systems, which allow companies to monitor inventory levels in real-time and proactively place restocking orders.

Yet, the mean scores of the variables Electronic approval of stock orders is in practice, batch tracking is managed electronically and Inventory storage oversight function is executed using e-logistics were all between the margins 3.41 to 4.20, respondents chosen a good attitude or agreed on the service dimensions. Based on the response of employees, the variable planning and forecasting of inventory counting is done electronically indicates more than 1.0 standard deviation, this shows high variability of response on the same variable. While other variables of inventory Management Practices show below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable.

### **4.2.2 Warehouse Management practices**

Employees were also asked to judge their opinions towards the overall Warehouse Management Practice of the enterprise. Accordingly, the average score for their level of satisfaction of the variable have a mean value of 3.663, which means that the workers of the enterprise were have a good attitude on the performance of the enterprise. This implies that the variables; ESLSE uses effectively ERP in ware housing, ESLSE uses e-logistics to boost ware house management system and ESLSE employ effective e-logistics for smooth ware house operations develop a

good attitude on the service dimensions of Warehouse Management Practice of the enterprise. The results consistent with the research done by Tejesh & Neeraja( 2018)It is important to have an inventory tracking system that allows the company to know exactly where each product is located in the warehouse

### **4.2.3 Transportation management practice**

According to table 4.3 the average score of ESLSE workers for the variable Transportation management practice was fall between 3.41-4.20 which means that the workers of the enterprise were have a good attitude on the performance Transportation management practice of the enterprise. And the variables of Transportation management practices show below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable. Good inventory management requires effective ordering and physical count systems. The results consistent with the research done by Hrušovský et al., 2021) Transportation management systems allow companies to better manage their deliveries by monitoring orders in real-time, tracking vehicle status, and identifying possible delays or issues in the route .

### **4.2.4 Procurement management practice**

According to table 4.5 the average score of ESLSE workers for the variable Procurement management practice has a grand mean value of 3.62 which means that the workers of the enterprise were have a good attitude on the performance Transportation management practice of the enterprise. And the variables of Procurement management practice show below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable.

### **4.2.5 Customer relationship management practice**

Employees were also asked to judge their opinions towards the overall Customer relationship management practice of the enterprise. Accordingly, the average score for their level of satisfaction of the variable has a grand mean value of 3.317, which means that the workers of the enterprise were have a neutral attitude on the performance of the enterprise. This implies that the variables; ESLSE practices e-logistics to manage customer information, ESLSE practice e-CRM solutions in managing & coordinating customer interactions. ESLSE use customer service software to manage customer inquiries develops a neutral attitude on the service dimensions of

customer relationship management practice of the enterprise. The results consistent with the research done by Farooq et al., (2019) it said e-logistics management offers numerous opportunities like improving customer service. This contributes to customer loyalty, building of a good reputation and strengthening the brand in the market.

#### **Descriptive statistics of e-logistics challenges**

No	Technological challenge variables	Mean	Std. deviation
1	Increased security threats & risks are a challenge for e-logistics practice	3.38	1.007
2	ESLSE experiencing gaps in using cutting- edge technologies for e-logistics practices	3.09	0.834
3	ESLSE experiencing gaps on regularly monitor technological changes & adapt successfully	3.05	0.761
	<b>Grand mean of Technological challenge</b>	<b>3.17</b>	0.867
	<b>Infrastructural challenge variables</b>		
4	Lack of electric power and internet infrastructure are a challenge for e-logistics practice	3.32	1.105
5	Infrastructure gaps in terms of roads, electricity hinder the e-logistics practice	3.70	1.281
6	Lack of stable power grid & access to fiber optic networks are a challenge for e-logistics practice	3.76	0.970
	<b>Grand mean of Infrastructural challenge</b>	<b>3.593</b>	1.118
	<b>Managerial challenge variables</b>		
7	There is lack of management commitment to provide the necessary resource and support for e-logistics practice	3.45	1.206
8	There is lack of collaboration & partnerships with stakeholders to adapt changing circumstances	2.88	0.940
9	There is lack of management commitment to adopt holistic approach to proactively address supply chain disruptions with the help of e-logistic solutions	3.08	1.140
	<b>Grand mean of Managerial challenge</b>	<b>3.13</b>	1.095
	<b>Man power challenge variables</b>		
10	There is lack of trained manpower to effectively implement e-logistics practice	2.81	1.226
11	There is high turnover on key personnel on e-logistics	2.18	0.861
12	ESLSE face difficulties to continuously train & empower front-line staff to make informed decisions	2.70	0.952
	<b>Grand mean of Man power challenge</b>	<b>2.56</b>	1.013
	<b>Legal challenge variables</b>		
13	There is legal and regulatory gap to build trust and accountability to implement e-logistics practice	3.39	1.114
14	ESLSE experiencing gap to navigate complex customs procedures & ensures compliance with import/export regulations	3.40	1.019
15	Lack of legal framework for e-commerce affects e-logistic practice	3.68	1.268
	<b>Grand mean of Legal challenge</b>	<b>3.49</b>	1.134
	<b>Economic challenge variables</b>		
16	The high cost of adapting new technology/ e-logistics practice is a challenge	3.21	0.860
17	The cost of employing robotics and AI driven solution is very high compared to its outcome	3.35	0.825
	<b>Grand mean of Economic challenge</b>	<b>3.28</b>	0.843

**Table 4.4 Descriptive statistics of e-logistics challenges**  
**Source: Own Survey**

## **4.3 Challenges of e-logistics practices**

### **4.3.1 Technological challenge**

According to table 4.4, the mean scores Increased security threats & risks are a challenge for e-logistics practice, ESLSE experiencing gaps in using cutting- edge technologies for e-logistics practices and ESLSE experiencing gaps on regularly monitor technological changes & adapt successfully are 3.38, 3.09 and 3.05 respectively showing the results are marginally fall in the range between 2.81 - 3.40, which means that employees were neither agreed nor disagreed and their perceived value were relatively neutral. Based on the response of targeted employees, the variable increased security threats & risks are a challenge for e-logistics practice indicates above 1.0 standard deviation, this shows high variability of response on the same variable. The results consistent with the research done by Tang & Veelenturf ( 2019) who found that the logistics market is undergoing a revolution due to the implementation of new technologies such as drones and robots for deliveries.

### **4.3.2 Infrastructural challenge**

The mean scores of the variables; Infrastructure gaps in terms of roads, electricity hinder the e-logistics practice, Lack of stable power grid & access to fiber optic networks are a challenge for e-logistics practice were all between in the range of 3.41 to 4.20, respondents chosen a good attitude or agreed on these infrastructure variables. Based on the response of employees, the variable Lack of electric power and internet infrastructure are a challenge for e-logistics practice & Infrastructure gaps in terms of roads, electricity hinder the e-logistics practice indicates more than 1.0 standard deviation, this shows high variability of response on these variables.

While the other variable Lack of stable power grid shows below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable. The results consistent with the research done by Custodio & Machado( 2020) who found that the utilizing automation technologies like picking systems and automated forklifts to increase efficiency and reduce the time required to handle and move products .

### **4.3.3 Managerial challenge**

According to table 4.4 the mean scores of the Managerial challenge variables that affect the e-logistics practice of the ESLSE in terms of lack of collaboration & partnerships with stakeholders and lack of management commitment to adopt holistic approach to proactively address supply chain disruptions accounts mean value of 2.88 and 3.08 respectively. This indicates that Managerial challenge is moderately influential on the e-logistics practices of the ESLSE.

Based on the response of employees, the variable lack of management commitment to provide the necessary resource and support for e-logistics practice & lack of management commitment to adopt holistic approach to proactively address supply chain disruptions shows 1.206 and 1.140 standard deviation respectively, this shows high variability of response on these variables. While the other variable lack of collaboration & partnerships with stakeholders to adapt changing circumstances shows below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable.

The results are consistent with a research "Developing an E-Logistics System:" it says Strategic planning, taking into account both external and internal factors that influence the logistics performance of an organization, requires the involvement of top management (Gunasekaran and Ngai, 2003). Strategic planning for logistics should support the long-term objectives and goals of logistics in terms of flexibility, cost effectiveness and responsiveness to changing market requirements.

### **4.3.4 Man power challenge**

According to table 4.4, the mean score value of the variable; lack of trained manpower to effectively implement e-logistics practice showing the result that marginally fall in the range between 2.81 - 3.40, which means that employees were neither agreed nor disagreed and their perceived value were relatively neutral. But employees of ESLSE disagree that there is high turnover on key personnel on e-logistics and ESLSE face difficulties to continuously train & empower front-line staff to make informed decisions. Jurcevic et al. (2009) asserted that there are strong interdependencies between Human Resource & LSCM.

### 4.3.5 Legal challenge

Employees were also asked to judge their opinions towards the variable; Lack of legal framework for e-commerce affects e-logistic practice. Accordingly, the average score for their level of satisfaction of the variable was a mean value of 3.49; which means that the workers of the enterprise agreed Lack of legal framework for e-commerce a challenge for the enterprise.

### 4.3.6 Economic challenge

According to table 4.4, economic challenges that affects the e-logistics practice of the ESLSE in terms of adapting new technology and the cost of employing robotics and AI driven solution is very high compared to its outcome accounts mean value of 3.21 and 3.35 respectively. This indicates that economic challenge is moderately influential on the e-logistics practices of the ESLSE.

The research that was conducted by Gunasekaran and Ngai, 2004, in Shanghai and Taipei focused on “development of E-logistics” .Management of costs plays a predominant role in logistics management. ecL uses real-time logistics information systems to control their logistics operations and their costs. They also have a large warehouse in Shanghai to take advantage of being closer to the market/customers and reduce the overall cost of distributing the products.

## 4.4 Supply chain performance

No	Supply chain performance indicators	Grand mean	Std. deviation	Number of items
1	Reliability	3.824	0.819	5
2	Responsiveness	3.836	0.732	5
3	Flexibility	4.0	0.675	5
4	Cost	3.878	0.729	5
5	Asset Management	3.698	0.885	5
	Grand mean of SCPI	3.8472		

**Table 4.5 Supply chain performance indicators**

**Source: Own Survey**

According to table 4.13, the grand mean scores of Supply chain performance indicators; Reliability, Responsiveness, Flexibility, Cost effectiveness and Asset Management respectively showing a grand mean value 3.85, which means that employees were agreed that Supply Chain

Performance of ESLSE meet end-customer requirements, including product availability, on-time delivery, etc. in a responsive manner. Based on the response of employees, the variables Reliability, Responsiveness, Flexibility, Cost effectiveness and Asset Management shows below 1.0 standard deviation this indicates relatively low variability on respondent's response across the variable.

The results are consistent with a research "Developing an E-Logistics System:" (Sum et al., 2001). For E-Logistics, information is needed on product characteristics, customer requirements, and partners' services and performance in terms of cost, quality, flexibility and responsiveness; offering logistics services at competitive prices. The results consistent with the research done by De Vass et al. (2018), found that using efficient e-logistics management strategies, companies can ensure timely delivery of products, reduce costs, improve service quality, and increase customer satisfaction

## **4.5 Inferential Statistics for factors affecting SC Performance of ESLSE**

### **4.5.1 Regression Analysis**

Regression analysis, in fact, aims to identify the relationship between a dependent variable and one or more independent variables (Hwang et al., 2008; García-Alcaraz et al., 2015). If the model of the relationship is deemed satisfactory, given values for the independent variables (e-logistics management practices & challenges of e-logistics practices), the estimated regression equation can be also used to predict the value of the dependent variable (Supply chain performance).

#### **4.5.1.1 Model Summary**

The correlation between observed and predicted values is represented by the R value. It indicates the value of the multiple correlation coefficients between the predictors and the outcome, with a range of 0 to 1, where the closer the value gets to 1, the higher the correlation is, 1 indicating an equation that precisely predicts the observed value (Pedhazur, 1982). On the contrary, a value closer to zero indicates lower correlation where zero shows absence of linearity. The linear combination of the eleven independent variables (e-logistics management practices & challenges of e-logistics practices) highly predicted the dependent variable (supply chain performance), based on the model summary ( $R=.908^a$ ) in table 4.6.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.908 <sup>a</sup>	.824	.802	6.466	1.741

a. Predictors: (Constant), A,B,C,D,E,E,F,G,H,I,J,K ( denotes 11 variables of e-logistics management practices & challenges of e-logistics practices)

b. Dependent Variable: SCP( Supply chain performance)

**Table 4.6 Model Summary Source: Own Survey Result of IBM SPSS data output, 2024**

R Square ( $R^2$ ) value indicates the proportion of variance in the dependent variable that can be explained by a linear combination of the independent variables. In other words,  $R^2$  is a measure of how much the respondents justified the outcome variability.  $R^2$  values range from 0 to 1 according to (Pedhazur, 1982). The linear combination of independent variables or predictors, such as e-logistics management practices & challenges of e-logistics practices, explains 82.4% of the variance in Supply chain performance, while extraneous variables, which were not included in this regression model, explain the remaining 17.6 percent.

Adjusted R Square ( $R^2$ ): The adjusted  $R^2$  gives an indication of how well the model generalizes. That is, the value of  $R^2$  is adjusted to better represent the population under study (Pedhazur, 1982). The final model's change is minor (the difference between  $R^2$  and Adjusted  $R^2$  is  $(0.824-0.802=0.022)$ , which is equivalent to 2.2%. This value suggests that the model would account for about 2.2% less variance in the outcome if it were derived from the population rather than the target sample.

Durbin-Watson Statistics is commonly used statistics to test whether successive values of random noise are related to each other. Its' estimated by and expected value of this statistics for a normally distributed random variable ranges between 0&2 (Kenton, 2021). Yet, the desired result is when the value is closer to 2, and the value for this data is 1.741, which is near to 2 that the assumption is nearly likely met. Table 4.6 shows that the Durbin-Watson statistic is 1.741, which is between 1.5 and 2.5 and therefore the data is no autocorrelation or there is no issue of multicollinearity.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	30.114	8.686		3.467	.001	12.849	47.378		
A	1.546	.387	.360	3.990	.000	.776	2.316	.249	4.018
B	4.617	.698	.515	6.617	.000	3.230	6.004	.334	2.993
C	-2.270	.472	-.311	-4.808	.000	-3.208	-1.331	.483	2.071
D	3.521	.502	.480	7.017	.000	2.524	4.519	.432	2.316
E	-1.242	.504	-.230	-2.462	.016	-2.245	-.239	.232	4.308
F	.674	.570	.086	1.181	.241	-.460	1.807	.380	2.635
G	.369	.343	.065	1.075	.285	-.313	1.050	.546	1.832
H	-2.138	.477	-.376	-4.480	.000	-3.087	-1.190	.287	3.487
I	-.876	.600	-.156	-1.459	.148	-2.069	.317	.178	5.629
J	-1.661	.514	-.256	-3.235	.002	-2.682	-.641	.323	3.095
K	2.721	.677	.238	4.022	.000	1.376	4.066	.577	1.733

**Table 4.7 Beta coefficient determination**

**Source: Own Survey Result of IBM SPSS data output, 2024**

#### **4.5.1.2 Beta coefficient determination**

The Beta Weights are the unstandardized beta coefficients that tell us about the relationships between the dependent (SCP) and independent variables (e-logistics management practices & challenges of e-logistics practices). The association between the predictor and the outcome is positive if the value is positive. A negative coefficient indicates that there is a negative association (Field, 2006). A  $\beta$  weight coefficient, according to Pedhazur (1997), tells us how much change in the dependent variable (i.e. supply chain performance)

A one-unit change in the predictor variables (i.e., e-logistics management practices & challenges of e-logistics practices) holding all other predictor variables constant (Field, 2006). That is, provided the other ten predictor variables remain constant, as inventory management practices increases by one unit, logistics performance of the enterprise increases by 0.360. The dependent variable (supply chain performance) and the 11 independent variables (e-logistics management practices & challenges of e-logistics practices variables) had the following linear multiple regression formula:

$$(Y = \beta_0 + \beta_1X_1 + \beta_2X_2+\dots +\epsilon)$$

Becomes:

Where; Y is SCP.

$X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}$  and  $x_{11}$  are inventory management practice, warehouse management practice, transportation management practice, procurement management practice, customer relationship management practice, technological challenge infrastructural challenge, managerial challenge, man power challenge, legal challenge, and economic challenge respectively.

$\beta_0$  = constant term (the axis y-intercept)

$\beta_1, \beta_2, \beta_3, \beta_4 \dots \beta_{10}$  and  $\beta_{11}$  are beta weights for the corresponding independent variables.

$e$  =is the error term (level of significance which is 0.05 in our case at 95% confidence level) Based on table-4.7 and taking the unstandardized beta value into consideration, the regression equation of this particular study to the nearest three decimal places can be expressed as follows:

$$(Y=30.114+0.362X_1+0.515X_2+-0.311x_3+0.480x_4+-0.230x_5+0.086x_6+0.065x_7+-0.376x_8+-0.156x_9+-0.256x_{10}+0.238+\epsilon).$$

For every unit increase in the value of warehouse management practice of the company setting all other predictor variable to be constant, the value of dependent variable SC performance will increase by 0.515 units or 51.5%, which is the highest. For every unit increase in the Predictor value of procurement management practice in ESLSE, setting all other predictor variable to be constant, the value of dependent variable SC performance will increase by 0.480 units or 48%.

For every unit increase in the value of technological challenge in the service provision of ESLSE, setting all other predictor variables constant, the value of dependent variable SC performance will increase by 0.086 units or 8.6%. This implies that to increase the supply chain performance of ESLSE, there is a need to decrease technological challenge of e-logistics practices of the enterprise.

For every unit increase in the value of infrastructural challenge, setting all other predictor variable constant, the value of SC performance will decrease by 0.065 units or 6.5%. This implies that to increase the supply chain performance of ESLSE, there is a need to decrease infrastructural challenge of e-logistics practices of the enterprise.

For every unit increase in the value of managerial challenge, in the response of ESLSE employees, setting all other independent variable constant, the value of managerial challenge statistically significant negative effect on the supply chain performance with beta coefficients of ( $\beta = -.376$ ,  $P = 0.005$ ). This implies that to increase the supply chain performance of ESLSE, there is a need to decrease managerial challenge of e-logistics practices of the enterprise.

For every unit increase in the value of legal challenge, setting all other independent variable constant, the value legal challenge statistically significant negative effect on the supply chain performance with beta coefficients of ( $\beta = -.256$ ,  $P = 0.002$ ). This implies that to increase the supply chain performance of ESLSE, there is a need to decrease legal challenge of e-logistics practices of the enterprise.

This infers that warehouse management practice contribute most to the SC performance followed by procurement management practice, inventory management practice and so on respectively. At 5% level of significance and 95% level of confidence, Infrastructure challenge had 0.285 level of significance which is the highest while six of them had 0.000: level of significance; hence all are the most significant factors affecting the SC performance of ESLSE.

#### 4.5.1.3 ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	17044.702	11	1549.518	37.062	.000 <sup>b</sup>
Residual	3637.319	87	41.808		
Total	20682.020	98			

a. Dependent Variable: SCP= Supply chain performance

b. Predictors: (Constant),A,B,C,D,E,F,G,H,I,J,K ( i.e. e-logistics management practices & challenges of e-logistics practices)

**Table 4.8 Anova result;** Source: Own Survey Result of IBM SPSS data output, 2024

Table 4.8 shows the fitness of the model in estimating the effects of the independent variables on the SC performance at ESLSE, two way ANOVA was carried out where the statistics (F) =37.62, p-value=0.000 was realized: implying that the model was significantly used in predicting the effects of independent variables on SC performance of ESLSE.

## CHAPTER FIVE

### SUMMARY, CONCLUSION, AND RECOMMENDATION

*This chapter comprises four sections. The first section describes the summary of the major findings of the study, the second section deals with the conclusions; the third section reveals the recommendations for the findings of the study and recommendations for further research. The study was conducted to assess The Role and challenges of E-Logistics on the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise.*

#### **5.1 Summary of the Major findings**

In this study, the researcher aimed to assess The Role and challenges of E-Logistics on the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise head office located at the capital city of Addis. The study also illustrated the relationship that exists between the effect of e-logistics management practices on organizational performance in the case of Ethiopian Shipping and Logistics Services Enterprise and challenges affecting e-logistics dimensions and also the effect of e-logistics management practices on the Supply Chain Performance of Ethiopian Shipping and Logistics Services Enterprise.

##### Summary on demographic profile of the respondent

Out of the total sampled respondents more than 48% had a BA/ BSc, 24.2 MSc/MA while the remaining had college diploma. 80.8% designate as officer, followed by 14.1% at a manager level. Coordinators and senior executives accounted for 5.1% and 1% of respectively. Based on gender, male accounts 63.6% and the remaining are females.

In order to achieve the following objectives, data were collected from the employees of the ESLSE.

#### **1. To assess the e-logistic management practices of ESLSE**

The e-logistics practice comprise of inventory,warehouse ,transportation, procurement and customer relationship management practices .From e-logistics practices, warehouse management practice management in terms ESLSE uses effectively ERP in ware housing , ESLSE uses e-logistics to boost ware house management system and ESLSE employ effective e-logistics for

smooth ware house operations had a better value with a grand mean value of 3.66. This indicates that the ESLSE moderately practices warehouse management in its supply chain management activities. on the other hand inventory management practices specially the variable inventory counting done electronically accounts a mean value of 2.81, this implies that the ESLSE weakly practices on e-logistics for its inventory management.

## **2. To identify the major challenges of e-logistics management practices of ESLSE**

Challenges affecting e-logistics management practices accounts an overall grand mean of 3.2 this value marginally fall in the range 2.81-3.40, this implies that the variables moderately influence e-logistics practice of ESLSE.

The variables in infrastructural challenge accounts a grand mean value of 3.593, this indicates that infrastructural challenge of e-logistics are influential on the e-logistics practice of the ESLSE. On the other hand manpower had less influence on e-logistics practice of the ESLSE.

## **3. To determine the role of E-logistic on the supply chain performance of ESLSE**

The grand mean scores of Supply chain performance indicators; Reliability, Responsiveness, Flexibility, Cost effectiveness and Asset Management showing the results marginally fall in the range of 3.41 – 4.20, This indicates that e-logistics practices highly enhances the supply chain performance of ESLSE.

## **5.2. CONCLUSION**

The study concludes by summarizing the major findings related to the role and challenges of e-logistics on the supply chain performance of Ethiopian Shipping and Logistics Services Enterprise (ESLSE). The current research discloses that reliability, responsiveness, flexibility, cost and resources are the indicators of e-logistic performance, particularly in ESLSE. Due to the high growth of e-logistic practices, information communication technology (ICT) has major role for better performance. E-logistic Staff quality can be improved by the help of information communication technology (ICT). As, information communication technology (ICT) provides a better system to communicate with stakeholders and it provides a good system for staff of

e-logistic to provide information's in a systematic way. ICT has a significant positive relationship with e-logistics management.

Moreover, minimizing e-logistics challenges enhance the performance of e-logistics practices. Which in turn satisfy the customers and increases the performance of e-logistic companies like ESLSE. Logistics sector based on knowledge, to identify gaps through research and come up with solutions for the problems in the sector, providing continuous training, appointing focal offices and personnel for institutions having key roles for logistics system in the country are critical measures to be taken to improve the overall performance of the enterprise.

The conclusions drawn underscore the importance of leveraging information technologies like Electronic Data Interchange (EDI), the internet, and e-commerce to improve communication within the logistics chain and enhance competitiveness. The e-logistics practices of the ESLSE are highly influenced by technological, infrastructural, economic, legal, managerial and manpower challenges. Infrastructural challenge is the most influential challenge in contrary, manpower challenge is the least influential challenge to the e-logistics practices of the enterprise.

The finding from the study concludes that an e-logistics practice of the ESLSE is moderately practiced. Electronic warehouse management practice is the most highly practiced in the ESLSE especially use of ERP compared to other e-logistics practices. Inventory management practice is the least e-logistics practice in the ESLSE. Lack of managerial commitment, economical challenge, technological challenge, manpower challenge and legal challenge lowers ESLSE competency in achieving an integrated SCM.

### **5.3 RECOMMENDATION**

Implementation of e -logistics to achieve agility in a supply chain requires a strong team that can include key knowledgeable managers, from all functional areas i.e. IT ,inventory management transportation and logistics department, warehouse management and procurement and property administration. A well-documented implementation plan is required for e -logistics in developing an effective supply chain. Moreover, the top management support and involvement are essential for the successful implementation of e -logistics in Supply chain performance.

There is several tools and methods available (information technology (IT) systems used in the industry, including customer relationship management (CRM), warehouse management (WMS), and transportation management (TMS) systems) for effectively managing the implementation of e-logistics to be responsive, reliable, flexible, cost effective supply chain

Top management should encourage the empowered implementation team that trained in e-logistics to cut across the functional barriers or challenges and provide with necessary technical and financial support to achieve a productive supply chain.

Suitable performance measures and metrics should be developed to monitor the implementation of e-logistics over a time period. There is a need for developing standards and legal frameworks for the application of e-logistics, in order to minimize its impact on the e-logistics practices of ESLSE.

#### **5.4 Suggestions for Future Research**

The paper outlines future directions for research, with a focus on three key areas: summarizing major findings, drawing conclusions, and providing recommendations for ESLSE's supply chain performance enhancement. It suggests delving deeper into the implications of e-logistics on supply chain management to facilitate continuous improvement and innovation in the logistics industry.

Recommendations for further research include exploring additional mediating and moderating factors that could influence supply chain performance beyond e-logistics, aiming to enhance the generalizability and completeness of the findings.

There is a call for future studies to consider a broader range of variables that may impact ESLSE's operations and supply chain performance, indicating a need for more comprehensive data collection strategies to address potential biases or gaps.

Overall, the paper sets the stage for future research endeavors to build upon the current study's findings and recommendations, paving the way for a more holistic understanding of e-logistics' role in optimizing supply chain performance within ESLSE and the broader logistics industry

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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 and challenges of e-logistics on the supply chain performance of Ethiopian shipping and logistics service 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 option are available, please tick in the appropriate box.

Thank you in advance for your cooperation!

Your Sincerely,

**Tsegaye Hailemichael**

tel. 0911070621

Email tsegayehailemichael6@gmail.com.

#### Part I: Demographic profile of the respondent

1. Gender:

1. Female  2. Male

2 Educational qualifications

1, Secondary school completion certificate  2, college diploma   
3, First degree  4, second degree and above

3. Years of experience in your organization

1, below 5 years  2, 5-10 years  3, 11-15 years  4, over 15 years

4. In Which process department or section are you working at ESLSE?

1, Inventory  2, Transport  3, warehouse  4, procurement  5, IT

5. What is your designation?

1, Executive

2, Manager/head of department

3, Officer

4, Coordinator

6. Have you attend any ICT Course

1, yes

2, No

**Part II: PRACTICE OF E-LOGISTICS**

Please rate the e-logistics practice of ESLSE using a 5 point Likert scale where; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree

<b>E-LOGISTICS PRACTICE</b>		<b>Scale</b>				
No	<b>A. Inventory management practice</b>	1	2	3	4	5
7	Inventory counting is done electronically					
8	Planning and Forecasting of Inventory counting is done electronically					
9	Synchronizing warehouse stock with sales is done using e-logistics solutions					
10	Electronic approval of stock orders is in practice					
11	Batch tracking is managed electronically					
12	Inventory storage oversight function is executed using e-logistics solutions					
	<b>B .Warehouse Management practice</b>	1	2	3	4	5
13	ESLSE uses effectively ERP in ware housing					
14	ESLSE uses e-logistics to boost ware house management system					
15	ESLSE employ effective e-logistics for smooth ware house operations					
	<b>C. Transportation management practice</b>	1	2	3	4	5
16	E-logistics solution at ESLSE ensure shipments meet the company standard					
17	ESLSE use e-logistics platforms in panning & scheduling of transportation's					
18	ESLSE adopt strategies to reduce distribution costs with the help of e-logistic solutions					
	<b>D. Procurement management practice</b>	1	2	3	4	5
19	ESLSE use e-logistics platforms in need identification, supplier selection, contract management & in contract award					
20	ESLSE use e-logistics platforms in making payment to supplier,					
21	ESLSE use e-logistics platforms in supplier relationship management & to maximize customer satisfaction					
	<b>E. Customer relationship management practice</b>	1	2	3	4	5
22	ESLSE practices e-logistics to manage customer information					
23	ESLSE practice e-CRM solutions in managing & coordinating customer interactions					
24	ESLSE use customer service software to manage customer inquiries					
	<b>Challenges affecting e-logistics practice in ESLSE</b>	<b>Scale</b>				
A	<b>Technological challenge</b>	1	2	3	4	5
25	Increased security threats & risks are a challenge for e-logistics practice					

26	ESLSE experiencing gaps in using cutting- edge technologies for e-logistics practices					
27	ESLSE experiencing gaps on regularly monitor technological changes & adapt successfully					
<b>B</b>	<b>Infrastructural challenge</b>	1	2	3	4	5
28	Lack of electric power and internet infrastructure are a challenge for e-logistics practice					
29	Infrastructure gaps in terms of roads, electricity hinder the e-logistics practice					
30	Lack of stable power grid & access to fiber optic networks are a challenge for e-logistics practice					
<b>C</b>	<b>Managerial challenge</b>	1	2	3	4	5
31	There is lack of management commitment to provide the necessary resource and support for e-logistics practice					
32	There is lack of collaboration & partnerships with stakeholders to adapt changing circumstances					
33	There is lack of management commitment to adopt holistic approach to proactively address supply chain disruptions with the help of e-logistic solutions					
<b>D</b>	<b>Man power challenge</b>	1	2	3	4	5
34	There is lack of trained manpower to effectively implement e-logistics practice					
35	There is high turnover on key personnel on e-logistics					
36	ESLSE face difficulties to continuously train & empower front-line staff to make informed decisions					
<b>E</b>	<b>Legal challenge</b>	1	2	3	4	5
37	There is legal and regulatory gap to build trust and accountability to implement e-logistics practice					
38	ESLSE experiencing gap to navigate complex customs procedures & ensures compliance with import/export regulations					
39	Lack of legal framework for e-commerce affects e-logistic practice					
<b>F</b>	<b>Economic challenge</b>	1	2	3	4	5
40	The high cost of adapting new technology/ e-logistics practice is a challenge					
41	The cost of employing robotics and AI driven solution is very high compared to its outcome					
<b>PART IV : Supply chain performance</b>		<b>Scale</b>				
<b>A</b>	<b>Reliability</b>	1	2	3	4	5
42	The planning practices of ESLSE is reliable					
43	The sourcing practices of ESLSE is reliable					
44	The making practices of ESLSE is reliable					
45	The Delivery practices of ESLSE is reliable					
46	The return practices of ESLSE is reliable					
<b>B</b>	<b>responsiveness</b>	1	2	3	4	5
47	The planning practices of ESLSE is responsive					
48	The sourcing practices of ESLSE is responsive					

49	The making practices of ESLSE is responsive					
50	The Delivery practices of ESLSE is responsive					
51	The return practices of ESLSE is responsive					
<b>C</b>	<b>flexibility</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
52	The planning practices of ESLSE is flexible					
53	The sourcing practices of ESLSE is flexible					
54	The making practices of ESLSE is flexible					
55	The Delivery practices of ESLSE is flexible					
56	The return practices of ESLSE is flexible					
<b>D</b>	<b>Cost</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
57	The planning practices of ESLSE is cost effective					
58	The sourcing practices of ESLSE is cost effective					
59	The making practices of ESLSE is cost effective					
60	The Delivery practices of ESLSE is cost effective					
61	The return practices of ESLSE is cost effective					
<b>E</b>	<b>Asset Management</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
62	The planning practices of ESLSE is effective on Asset Management					
63	The sourcing practices of ESLSE is effective on Asset Management					
64	The making practices of ESLSE is effective on Asset Management					
65	The Delivery practices of ESLSE is effective on Asset Management					
66	The return practices of ESLSE is effective on Asset Management					

**THANK YOU**