Addis Ababa University

School of Commerce

Department of Logistics and Supply Chain Management

Assessment on Operational Performance of Multimodal Transport Service the Case of Ethiopian Shipping and Logistics Service Enterprise (ESLSE)

A Thesis Submitted to the Graduate School of Addis Ababa University, School of Commerce in Partial Fulfillment of the requirements for the Masters of Logistics and Supply Chain Management Program

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DECLARATION

I Selam Tadesse do here by declare that this thesis on the topic entitled **"Assessment on Operational Performance of Multimodal Transport Service the Case of Ethiopian Shipping and Logistics Service Enterprise"** is the result of my original work and that is has not been submitted partially, or in fully by any other person for an award of degree in any other university/institution, except where due acknowledgements have been made in the text.

Submitted by:

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ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

This is to Certify that the thesis prepared by ***Selam Tadesse Bezabh***, entitled: *"***Assessment on Operational Performance of Multimodal Transport Service the Case of Ethiopian Shipping and Logistics Service Enterprise*",*** submitted to Addis Ababa University School of commerce in partial fulfillment of Degree of MA in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ECMT - European Conference of Ministers of Transport

EDI - Electronic Data Interchange

ESLSE - Ethiopian Shipping and Logistics Service Enterprise

EU - European Union

ICC -International Chamber of Commerce

ICT - Information and Communication Technology

LPI - Logistics Performance Index

OECD - Organization for Economic Cooperation and Development

UNCTAD - United Nations Conference on Trade and Development

WB - World Bank

DSGI - Descartes systems Group Inc

EUTRP - European Union Transportation Research

ICC - International Chamber of Commerce

MTS - Multimodal Transport Service

TEU - Twenty foot Equivalent Unit

UNCTAD - United Nations Conference and Development

ASEAN - Associations of Southeast Asian Nations

Abstract

Multimodal transport has become an essential part of international trade nowadays. Most countries get benefit of multimodal transport that can minimize logistics costs and transit time because cargoes can be moved from one country to another with single administration document and one multimodal operator. However, problems like poor existing and lack of basic infrastructures, congestion of dry ports, inefficient and ineffective freight vehicles, long and inefficient custom clearance process, high shipment price and lack of competence in service can highly affect the standards of delivery time. This study was made with the main objective of assessing the operational performance of multimodal transport service in Ethiopian Shipping and Logistics Services Enterprise. In order to achieve this objective, the study has used descriptive and explanatory research design by employing mixed research approach in order to present the data. This study used primary and secondary sources of data in order to collect data from respondent and other sources. Close ended questionnaire was used to collect primary data. Out of the 230 questionnaires distributed 207 were returned back. This study used both descriptive and explanatory research design to carry out the research analysis. The Data collected through questionnaires were analyzed by using STATA software ver.12 under mean, standard deviation, frequencies, percentages, correlation and regression analysis. From descriptive analysis all the parameters (Customs, Infrastructure, Competence or logistics Service Quality, Timeliness, and Competition or Cost and Tracking and Tracing) are summarized under mean score of disagree that the customers are not satisfied by the performance of ESLSE. From the inferential analysis the correlation matrix result shows performance of Multimodal Transport service operation (dependent variable) has direct and positive relation with Customs, Infrastructure, Competence/ logistics Service Quality/, Timeliness, and Competition/Cost/ Tracking and Tracing dimensions (independent variables) with strong positive correlation between MTS performance and customs, moderate positive correlation in between MTS performance with infrastructure, service quality & cost and week positive correlation with timeliness and tracking/tracing. The findings from regression analysis showed all the selected performance indicator dimensions together significantly affect MTS performance that can be concluded all are determinant factors, the contribution of custom, infrastructure, service quality, timeliness, cost and tracking/tracing in explaining the performance of MTS is 72% while the remaining 28% is influenced by another variable/s that was not observed and the coefficients of β (beta) showed that Infrastructure has largest significant influence on the performance of Multimodal transport service operation followed by Customs, Cost and logistics Service Quality. Therefore, the study has recommended that the company should work with collaboration to different stockholders and give due emphasis to those driving factors in order to appropriately address performance issues step by step.

Keywords: Multimodal Transport Service Operation, Ethiopian shipping and logistics services enterprise, Performance

CHAPTER ONE
1. INTRODUCTION

This part contains the background of the study, statement of the problem, research questions, objective of the study, significance of the study, delimitation/scope of the study**,** definition of terms and organization of the paper.

1.1. Background of the Study

The products we consume everyday travel long distance to reach us nowadays and even with globalization business companies source raw material and parts from different parts of the world. The council of logistics management, defined logistics as the process of planning, implementing & controlling the efficient, effective flow and storage of raw materials, in process inventory, finished goods, services and related information from point of origin to point of consumption including in bound, out bound, internal & external movements for the purpose of confirming customers requirement (Council of Logistics Management Definition of Logistics, 1991). As this movements become international suitable and modem transportation practices such as Multimodal Transport System has significant impact on the overall logistics performance. Multimodal Transport is defined as involvement of cargo movement through the usage of combination of modes from shipper to consignee under a single rate, with through billing and through liability in providing door-to-door services (UNCTAD, 1981).

The concept of logistics in early times was implemented at military institutions in the way to ensure the delivery of military supplies to war zones. Bhat (2011) clarifies military logistics as the design and integration of all aspects of support for the operational capability of the military forces and equipment to confirm readiness, reliability and efficiency. Most ancient books written in areas of logistics witness the reality in this manner. The country has understood multiple benefits of multimodal transport system from global experience and many countries have implemented this system to minimize transit time and cost which was resulted in economic growth.

From the assessment made on Logistics Practice in Ethiopia by Fekadu, (2013) it is concluded that Ethiopian logistics system is characterized as poor logistics management system that is characterized by inefficient custom clearance process, poor infrastructure development, poor handling of equipment

and facilities in dry ports, inadequate port, terminal and warehouse spaces, shortage of truck, shortage of skilled manpower in logistic sector, cargo is not delivered as schedule or expected, lack of competitiveness in multimodal transport, tracking and tracing service not supported by automated or computerized system. These challenges were found to be sources of increased transit time, cost increment and unreliability.

Based on six main dimensions Customs, Infrastructure, International shipments or competitiveness on cost, Logistics service quality or competence, Tracking and tracing and Timeliness World Bank measure logistics performance of countries every two year starting from 2007 to indicate the areas that need focus to improve logistics practice and areas in need of policies and actions for the improvement on infrastructural development service quality, international trade and the overall growth and of a country. In 2016 Germany was best performing country with an LPI score of 4.23 from 160 countries, Syrian Arab Republic was the worst with 1.60 score and Ethiopia stood 126th with the LPI score of 2.38. The Aggregated LPI combines the four most recent LPI editions scores of the six components across the years 2012, 2014, 2016 and 2018 LPI surveys and generates a big picture that better indicate the countries logistics performance and from this Ethiopia has putted 131st rank with a score of 2.40. (World Bank, LPI, 2018).

As Ethiopia is a land locked country most of the items are transported through Djibouti corridor and distributed to different parts of the country. Arega, (2015) described that, there is dalliance of loading and unloading due to unorganized planning of machineries, manpower and poor communication with customers regarding to truck arrival at their warehouses, this will have great impact on operational performance of transportation management.

Ethiopian Shipping and Logistic Service Enterprise (ESLSE) is a vessel owner, charterer, liner operator and multi modal services provider organization that have a mission to build and upgrade organizational capacity, in order to render world class and competitive shipping & logistics services; thus contribute towards the rapid economic growth of the country. It also put its vision to reach by providing competitive shipping & logistics services, to become preferred and renowned African logistics company by 2025. Multimodal transport service was applied in Ethiopia on 2011 as a new transport system because it is very costly to continue being dependent only on unimodal transport system.

As per the 2019-2020 Budget Year Report the Ethiopian Shipping and Logistics Service Enterprise has transported and handled 11 million tons of cargo, out of the total, some 7 million tons was transported by ships. The enterprise that serves 330 ports leases ships with slot charter agreement from other carriers and use its own vessels. The number of containers processed through the multi modal system was more than 187,466 TEUs per year in the 2020 from 12,337 TEU in 2013. From previous records the company transport around 60 % of Ethiopia's import cargo every year and from this share the company always plans 95% to be under Multimodal transport system and the actual performance of the year 2019/2020 was 96%. (Reporter 2020)

ESLSE is improving the flow of cargo between Djibouti port and inland dry port destinations including customer's bonded warehouse in Ethiopia through the Multimodal Transport System. Problems related to logistics system lead to high transport costs; long transit times and has negative impact on the enhancement of the country's international trade, competitiveness, and economic development. Hence, evaluating ESLSE multimodal transport system operation performance is more important because the Ethiopian Shipping and Logistics Service Enterprise is the sole vessel owned Multi Modal Operator (MTO) in the Country and logistics is the main input to all economic sectors of agriculture, industry and commerce.

1.2. Statement of the problem

The findings of studies provide strong evidence of the positive role that logistics plays in increasing trade. The logistics achievements in the low and middle-income countries are at lower levels than the high-income countries. Several aspects of logistics specifics to countries and regions of the developing world still pose substantial difficulties in easing up the flow of goods in a cost effective and timely manner. Focus should be given to investments in logistics infrastructure and better logistics governance with co-ordination as well as integration of trade related institutions that is likely to help modernize the logistics services in countries with low levels of logistics performance. (Azmat GANI 2017)

The main objective of arranging integrated transport system is efficient and effective goods flow from one point to another. These are key arrangements to development as no country can develop without trade and transportation which is the central gravity of effective and efficient trade. Intermodal transport service gives collected responsibility for transport activities under one operator. Then it is the responsibility of operator to manage and coordinate the total activities from shippers' door to buyers'

door. The rise of international intermodal transport service is the result of its benefit over the separate mode arrangements that many studies have showed intermodal transportation system saves both money and time. (Tadesse, Girma 2015)

According to Fekadu (2013), Ethiopian logistics system is characterized by poor logistics management and lack of coordination to transport goods, low level of development in logistics infrastructures and inadequate fleets of freight vehicles in number and ages, occurrence of damage and quality deterioration of goods on the time of handling, transport and storage. According to Tadesse and Girma (2015) on the evaluation of multimodal summarized: majority of the customers were not satisfied with delivery and documentation performance, cost and convenience service performances. In contrary, employees evaluated the performance organization positively. The comparison made with "uni-modal" approach and that of the "multimodal" system which was supposed to improve the service performance did not even satisfied customers as much as the "uni-modal" approach on majority of the performance indicators of their study.

Considering the global trade is raising continuously the desire to speed up the pace of integration within the global trading system depends not only on maintaining an open global economic system but also improving the quantity and efficiency of the logistics services. Poor logistics services such as limited co-ordination among countries on border procedures; inefficiency of customs clearance process at the ports; fragmented and poor quality of transportation related infrastructure; costly and infrequent shipping (with long and indirect shipping routes); delays in tracking and tracing consignments; delays in terminal handling and clearance of goods; absence of cool storage facilities at ports; and the inability to certify product quality; amongst others; can cause significant hindrance to international trade.

Transport infrastructure development is the main task to be performed by every government. Countries which have already developed their infrastructural facilities have managed to provide modern transportation and communication services at minimum cost and service time with visible differences in the international business ground. In contrast developing countries have not been able to support their international trade as needed due to their poor transport infrastructural facilities (Rodrigue et.al, 2006).

The Government of Ethiopia introduced multimodal transport system with the intention of providing seamless logistics services with reduced transaction cost. To assess the performance of multimodal

transport service the performance measure were categorized in to six dimensions only for the purpose of this study. These are Custom. Infrastructure, Tracking and Tracing, International shipment, Logistics service quality and Timelines

Since the multimodal transportation service has an impact to the Ethiopian import dominated business sector, its operational performance has to be measured continuously to find out whether is implemented properly. Different researchers conduct research in relation to multimodal transport regarding the practice, challenge and performance and it is necessary to assess and examine the performance through time to identify the outcome and limitations in order to able suggest solutions that have to be taken for better performance in the case of ESLSE.

1.3. Research Questions

The study emphasized on addressing the following research questions:

- How suitable is the customs clearance process to deliver efficient MTS?
- How adequate is the transport infrastructure to render MTS?
- How adequate is the service provided by MTS in the case of ESLSE?
- How easily is the cargo where about could be located?
- How timely do multimodal transport cargos reach customers?
- How competitive is the enterprises service cost?

1.4. Objective of the Study

1.4.1. General Objective

The general objective of the study is to assess the operational performance of multimodal transport service of the Ethiopian Shipping and Logistics Service Enterprise.

1.4.2. Specific Objectives

This research has the following specific objectives.

- ✓ Assess ESLSE multi modal transport service performance with respect to efficiency and effectiveness.
- ✓ Assess level of the operational performance of multimodal transport service.
- ✓ Assess the reliability of the multimodal transportation in ESLSE,
- ✓ Assess the service coverage of MTS.
- ✓ Analyze the factors that affect the operational performance of multimodal transport service providing practices.

1.5. Significance of the study

The study is highly useful to understand the current performance level of multimodal transport system in ESLSE with the major performance indicator. It also enables the enterprise to be aware of the service delivery performance of Multimodal transport System and its quality as perceived by customers and lead to further improvement on the service provided currently . It can also be used as an indicator or to generate future related research areas. In addition to that it might provide an input for policy makers to take into consideration in enacting future laws and regulations. Moreover, the study provides important inputs to formulate effective Multimodal Transport System. It also contributes theoretically to the future studies on Multimodal Transport System for Ethiopian logistics sector and the findings and recommendations of the study help as a springboard for further research.

1.6. Scope of the Study

As we all know multimodal transport is vast and parcel part of logistics activity. The activity is mainly performed on import and export activity and this study focused only on the import side of multimodal transport system.

The study is limited in constructing and taking population size only consider on ESLSE head office found in the capital city of Ethiopia, Addis Ababa customers and management who are directly involved in Multimodal transport system. The multimodal operation practice requires all customers to pass through the head office to get the service needed. Due to this homogeneity ESLSE head office is the geographical area of the study.

1.7. Definition of Terms

Uni-modal Transport: The transportation rendered by only one mode of transport, where each carrier issues its own transport document (Bill of Lading, Air waybill, consignment note, etc.).

Multimodal Transport: The carrier organizing the transport takes all the responsibility for the entire door-to-door transport and issues a multimodal transport document. Multimodal transport is therefore a concept that places the responsibility for transport activities on one operator, who manages and coordinates the total activity from the shipper's door to the consignee's premises, ensuring the continuous movement of the goods along the best route, by the most efficient and, cost-effective ways, to satisfy the shippers requirement of delivery. This means simplified documentation, by increasingly electronic means such as electronic data interchange (EDI).

Multimodal Transport Operator: is a multimodal transport company that delivers an integrated international freight transport services through different modes of transport.

Logistics: is an integrated flow of goods and services and information in the supply chain process. Harrison and Hoke (2008)

Tracking: is a system of recording movements' at intervals of shipments from origin to destination. DSGI (2018).

Twenty Equivalent Units (TEU): A measure of shipping container capacity using a standard 20-foot international ocean shipping container as a measuring unit. DSGI (2018).

Bill of Loading: A receipt signed on behalf of the carrier and issued to the shipper acknowledging that goods, as described in it, have been shipped in a particular vessel UNCTAD (1971).

Shipper: "Someone who sends goods for shipment, by packaging labeling, and arranging for transit, or who coordinate the transport of goods" (DSGI, (2018).

1.8. Organization of the Study

The study was organized by five chapters. Chapter one includes background of the study, statement of the problem, research questions, objectives of the study, significance of the study, scope of the study, , definition of terms and organization of the study. On the second chapter related literatures was summarized. Chapter three discussed the research methodology to be used for the study. Results and Discussion were presented on the fourth chapter. On the final chapter five presented conclusion and recommendation,

CHAPTER TWO
2. REVIEW OF RELATED LITERATURES

The literature review part of this study has theoretical literature review and empirical literature review parts. The theoretical part presents the summary of theories forwarded by different scholars pertaining to the subject under study at different times. Whereas the empirical part contains summary of similar or related research findings obtained from other earlier researches.

2.1. Theoretical Literature

The aim of developing performance indicators for the logistics sector is to evaluate the efficiency and sustainability of logistics systems, monitor the achievement of logistics policies and explore possible improvements. Different players in the logistics chain have different objectives, and achievement of each of these objectives needs to be evaluated. Performance indicators can be used to assess impacts of logistics by considering the major players in the logistics system, i.e. consumers, shippers, logistic service providers and governments. Although a complete evaluation of logistics systems may be difficult, a relative evaluation is possible and useful by comparing the performances of logistics services using performance indicators (OECD, 2002). According to Yang (2011), transportation today is all about logistics in international trade. The primary task of logistics is transportation which deals with moving the products from one place to another. The international transportation of finished goods from shipper site to customer destination is essential as that applies to domestic production and transportation to domestic market.

2.1.1. Definition and concept of Multimodal Transport

Multimodal Transport is the use of different means of transport, combining in order to facilitate the movement of cargo to make it faster and more efficient. The modes of transportation are more than one kind that are necessary to take the goods from the origin to their final destination, by the use of trucks, trains, ships, airplanes or some other mean of transport for the delivery.

The basic feature of multimodal transport is that at least two modes of transport are used. The definition jointly given by the United Nations Economic Commission for Europe (ECE), the European Conference of Ministers of Transport (ECMT) and the European Commission (EC) is “Multimodal transport: carriage of goods by two and more means of transport.” Sometimes, multimodal transport is connected to the international transport of containers and the need for transport facilitation. It derives its name from the United Nations Convention on International

Multimodal Transport of Goods of 1980. The definition of the term “international multimodal transport” is provided in article 1 of the Convention, which reads as: “International multimodal transport” means the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country. It has evolved, however, to have various meanings closely related to multimodal transport, and these various definitions will be reviewed in turn. The most common is that the goods are carried from door to door in the same intermodal transport unit (ITU), usually a container, but it can be also swap bodies or piggyback trailers. This is called intermodal transport by ECE, ECMT and the EC, as well as the International Container and Intermodal Transport Bureau (ICB) and the International Chamber of Commerce (ICC). (United Nations, 2001),

The definition jointly given by ECE, ECMT and the EC in Terminology on Combined Transport is: INTERMODAL TRANSPORT: The movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes. By extension, the term intermodal has been used to describe a system of transport where by two or more modes of transport are used to transport the same loading unit or truck in an integrated manner, without loading or unloading, in a door to door transport chain. Intermodal transport is also defined as the use of at least two different modes of transport in an integrated manner in a door-to-door transport chain. A related term is combined transport. “Combined transport” is defined as intermodal transport where the major part of the European journey is through rail, inland waterways or sea and initial or final legs carried out by road are as short as possible. This term is used by ECE, ECMT and the EC to cover environment-friendly intermodal transport, involving as little road transport as possible, and supported by financial incentives. (Organizations for Economic Cooperation and Development, 2001,)

The definition by the European Union (EU) combined transport means the transport of goods between Member States where the lorry, trailer, semi-trailer, with or without tractor unit, swap body or container of 20 feet or more uses the road on the initial or final leg of the journey and, on the other leg, rail or inland waterway or maritime services where this section exceeds 100 km as the crow flies and make the initial or final road transport leg of the journey; - between the point where the goods are loaded and the nearest suitable rail loading station for the initial leg, and between the nearest suitable

rail unloading station and the point where the goods are unloaded for the final leg, or; - within a radius not exceeding 150 km as the crow flies from the inland waterway port or seaport of loading or unloading. (European Union, 1992,)

Both intermodal and multimodal transportation suggest using two or more shipping modes and sometimes found used interchangeable but. However, there is a list of differences between intermodal and multimodal transport. When shipping by intermodal, a different carrier is responsible for each part of the transportation. Consequently, we have several separate shipping bills and reports from each link in the chain. When using multimodal, all of the shipments are signed under a single bill of lading. Both transportation methods have benefits and drawbacks, and here we will dive deep into multimodal.

Basic Concept of Multimodal Transport "A transport system operated by one carrier with more than one mode of transport under the control or ownership of One Operator." UNESCAP 2020

International Multimodal Transport defines as the carriage of goods by at least two different modes of transport on the basis of a multimodal transport agreement from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery located in another country (MT Convention 1980)

Basic Concepts of Unimodal Transport ASEAN (2014) defined unimodal Transport is a transport system, which the goods are transported by only single mode of transport is so called unimodal transport, such as by road, rails, sea, inland waterway, air, space and pipeline. In sea transport, if the goods are shipped by one carrier who issues its own transport document, bill of lading from one port to another is a normal case, however, If there is more than one carriers, the carriage from one port via another port (transshipment at intermediate port) to final destination port, the first carrier who has taken in charge may issue a through bill of lading covering the entire transport with full responsibility and liability for the entire port-to-port transport ASEAN (2014).

2.1.2. Practice of Multimodal Transport

As world shipping council liner shipping companies deployed around 400 services providing on regular schedule usually weekly to connect countries of the world. Irrespective of the amount and type

of cargo they have on board. Ships involved in this trade include general cargo carriers, specialized cargo carriers (e.g. refrigerated goods carriers or car carriers), and/or partially or fully dedicated container carriers. Liner shipping is distinct from bulk shipping services, which carry non-containerized raw materials in bulk form such as crude and refined oil, grain, coal, cement or liquefied gas and are provided only on demand by shippers on non-scheduled routes. (Website of the World Shipping Council, www.worldshipping.org.)

The use of multi modal transport system has increased dramatically since the introduction of container in 1965 by the maritime industry. Containerization raised more as a means of 'door-to-door' transport, spurred on by the development of the Piggy Back System where trailers themselves were carried aboard specialized 'Flat cars' (ESCAP, 1983). For many developed economies, containerization revolutionized the transport technology and cargo handling system (Hayuth, 1987; Eno Transportation Foundation, 1999; Muller, 1999) at the same time in newly industrialized countries including ASEAN members have begun to develop such systems (ASEAN Working Group, 1998). Multimodal transport, which eases the origin-to-destination freight transportation system through a single operator's responsibility using more than one mode of transport, is a natural extension of containerization (Hayuth, 1987; D'Este, 1996; Muller, 1999). However, the inland transport system components of international freight transport hinder international trade in many undeveloped countries, (UNCTAD), 1994b). Transport companies involved in international trade have been developing for several years and creating new technologies to allow more efficient distribution along multiple modes of transport.

Ethiopia as a land-locked country the import and export is mainly destined to Djibouti and then transported to inland. The cargo handling and miscellaneous costs which are incurred at the port of Djibouti becomes a huge challenge to Ethiopian business economy to be competitive in local as well as in international market (Carter, J. R., & Ferrin, B. G. (1995). This problem was well noticed by Ethiopian government policy makers and led to the introduction of "Multimodal Transport of Goods" under proclamation number 548/2007 on 4th September 2007.

Multimodal transport document is a document issued or signed by a carrier indicating carriage by more than one means of transportation. For example, a multimodal transport document for a door-to-port shipment with main carriage by vessel might indicate pickup at the place where the shipment originates (often the seller´s premises with pre-carriage by truck and main carriage from the

named port of loading to the named port of discharge by a named vessel. Depending on how the contact carriage was drafted, the document could be issued either on a received for shipment basis at any time after the goods entered the control of the main carrier or on an on-board basis after the goods were loaded in the named vessel. As some ship lines accept liability only while the cargo is on their vessel, it is important to carefully read the contract of carriage.

Commercial Practices:- For merchants there exist an international conventions to govern contracts for the international transaction of goods, it is obvious that disputes and misunderstandings do often arisen between buyers and sellers, mainly because of different interpretations about the terms used in the contracts. In order to avoid such circumstances which hinder the smooth flow of international trade, the ICC has intrude standardized trade terms known as INCOTERMS (International rules for the interpretation of trade terms). In Practice, The ICC Rules were accepted as the appropriate standard for the Model Combined Transport Bills of Lading designed by such industry associations as the Baltic and International Maritime Council (BIMCO) and the International Federation of Freight Forwarders (FIATA) (INCOTERMS). These terms contract delivery conditions among the buyer and the seller, and the main purpose is to divide the costs and risks of transport movement and related operations between the two parties ASEAN (2014).

Customs Practice To implement multimodal transport, customs are required to facilitate the container flows, through minimization of import or export documents and to permit the movement of cargo to and from ports under bond or in a sealed container. Customs procedures can be eased through the adherence to various customs conventions UNCTAD (2017). Efficient freight movement ensures that stores stocked appropriately, manufacturers get raw materials that they need, and local business receives packages, office supplies, and other goods. Williams and Carroll (2015).

Transit times vary substantially based on freight mode and carriage systems, the analysis considered average time spent for various activities in the import and export operation. Transit time takes the time from cargo discharged at sea port to delivery including customs clearance period at sea port, time taken to receive D/O and port clearance, assigning trucks and gate pass & truck waybill EMAA (2016). Import lead time includes the time required for securing foreign currency, preparation and connectivity from seller’s point of origin to the port of loading, to fulfill import procedure at port of loading, sea passage time, and clearance at sea ports, inland transit time and time taken to clear cargo

at destination EMAA (2016).

Safety and Security of Multimodal Transport System Transit safety is an important to a more accessible and efficient transportation system. Safety and security are of primary concern for any transport system EUTRP (2016).

Efficient international logistics is also heavily dependent on internationally harmonized documentary procedures enabling speedy electronic transmission of freight bills, payment orders, insurance contracts and other transaction documentation. M. Cukrov et al (2016) said that information exchange and documentation efficiency within a port is crucial for multimodal based level standard performance. Accordingly, the author suggested infrastructural performance indicators such as availability of suitable ICT systems for remote real time information exchange (electronic document transfer between all multimodal service stakeholders), communication of cargo documentation well in advance of ship arrival in port, online booking system and cargo trucking information system at each and every terminal or intermodal crossings. Cost components used to measure the performance of multimodal transport are transaction LC value, sea freight cost, inland transport cost, port handling and storage costs, insurance, container demurrage, and commissions and other related expenses EMAA (2016). From this we can understand, there is difference in cost model to measure the performance of cost of multimodal transport system.

2.1.3. The benefits of multimodal transport

The advantages of Multimodal Transport lie on the most efficient combination of multiple means of transport, optimizing deadlines, cutting back on inventory costs and keeping the costs of the merchandise under control. The combination of these also results in high environmental sustainability, since Multimodal Transport reduces the environmental footprint of transportation. For more complex shipments, or a more thorough exploration of the quality/price ratio of each part of the transportation, multimodal transport is a good, often the only, option to consider, especially to countries that do not border on the sea.

Multimodal transport can benefit many businesses that do ship large quantities of freight on a regular time base. Multimodal transportation is preferable because it requires less time and effort. While using Multimodal transport shipments are usually managed by an external party under a single bill.

Besides it does save money and time, there are many reasons that multimodal transportation can be taken as a choice when planning shipments. Multimodal transport system helps to improve the relationship between international trading partners in order to achieve trade efficiency.

Multimodal transportation plays a significant role in modern international trade operations by enabling the multimodal transport operators to give efficient and effective integrated transportation services with minimum transport costs. The consignees will find raw materials in manufacturing place without facing any shortage and avoid decuple of production by ensuring early delivery at the same time In this case, shippers will be satisfied in supplying their goods with the lowest possible transportation cost. This system adds one more modes of transport to render multimodal transport services through a single multimodal operator or multimodal service provider by avoiding the involvement of more transport operators and helps shipper to enter a single transportation contractual agreement with the multimodal transport operator and receive a door to door cargo delivery service than port to port. Multimodal transport is able to generate practical benefits by saving goods transit time, transportation costs, the environment from pollution by incorporating less polluting modes of transport in to the transport chain. He also emphasizes that it can help to increase productiveness and effectiveness of freight transport industry as a whole. Breda (2009)

Below listed are among the benefits of Multimodal transport

Time savings/ Faster Transit

The entire process in multimodal transportation is handled by one shipping provider that gives the opportunity to communicate and get a report from only one company. This ensures less worrying about the shipment, and faster transit times, which eventually result in higher productivity.

Cost-efficiency

Multimodal transport can help to save a significant amount of money spent on transportation because it entertain a much easier logistics coordination as compared to Intermodal transport that involves not only different contracts and carriers but also multiple shipment insurances. Economies of scale in transport negotiations, better use of available infrastructure and more efficient means of transport, focused on cost reduction of indirect costs in the organization like human resources) are also among the benefits on cost wise.

Less worrying

When a single carrier handles the freight from door to door, it ensures easier communication and efficient tracking. It delegates a larger piece of responsibility and liability to the company coordinating the logistics. The ability of the shipper/consignee to hold one carrier liable for the movement of the freight and centralization of responsibility in one transport operator for meeting the promised delivery requirements

Easier Communication

When companies through multimodal transportation, they handle all shipping updates, delays and interactions through one provider and contract. One contact for tracking a shipment gives shipper/consignee ease of mind and simplifies the process of communicating between different contacts and carriers. Essentially, when there is only one entity responsible for the entire transportation, it's much easier to just focus on the business and not spend time bouncing from one call to another.

It is clear that using Multimodal helps to grasp international experience, in transportation as well as in the field of bureaucracy and commerce. It also help to achieve economies of scale in transport negotiations, better use of available infrastructure and more efficient means of transport, focused on cost reduction in the organization including reduction of indirect costs such as human resources.

2.1.4. Service Coverage and Reliability

In today's world, different types of commodities are sourced from places that we haven't even heard of and international trade participants can liaise with each other in a real time communication. The dynamic nature of business creates the need to get cargo transportation services from various countries and the multimodal transport operator is the one who is expected to fulfill such kind of needs by having a wide area of service coverage (Berry, L. L.(1991).

Having wide area of service coverage could not be enough by itself. Rather, business firms need adequate frequency of sailing schedule from the demanded ports till the place of destination. If the multimodal operator has vast network of service coverage and adequate sailing frequency, business entities (consignees) can be able to manage their inventory just in time and it will enhance the level of service quality for themselves as well as their end buyers (Cronin & Taylor, 1992).

According to Zeithaml et al. (1990), service reliability is the service "core" to most customers and companies should use every opportunity to build a "do-it right- first" attitude. Specially they are encouraged to include reliability issues in their mission statements, set reliability standards, teach the importance of reliability in training programs, appoint reliability teams to study specific services and recommend ways to improve reliability, measures error rates and reward error –free service.

Shipping /multimodal transportation operator companies can be able to build their reliability by picking the cargo from port of loading on time, showing interest to solve any kind of problem that the customer might face, performing the service correctly starting from day one, delivering the cargo on the promised time…etc.

2.1.5. Logistics performance

The overall logistics performance of Ethiopia is at low performance as compared to relevant peer countries. As per the reports of World Bank, 2018, the World Bank Logistics Performance Index (LPI) provides a comprehensive measure of the state of trade logistics in a country facilitates comparisons with other countries. Ethiopia ranks at the lower end of the surveyed countries (126 out of 160 countries in 2016). It is not only below the average for sub-Saharan Africa in all the six key dimensions (Customs, Infrastructure, International shipments or competitiveness on cost, Logistics service quality or competence, Tracking and tracing and Timeliness) of logistics performance measured, but also lags behind in the direct comparison with neighboring Kenya and Tanzania. Generally Ethiopia is considered as "logistics unfriendly."

The logistics system in Ethiopia has not improving as it is expected through time, according to the LPI, the ranking of Ethiopia shows a relative deterioration between 2007 and 2016. In the first LPI of 2007, Ethiopia still ranked 104 out of 150 economies; in 2010, it ranked 123 out of 155 economies; and in 2012, ranked 141 out of 155, ranked 126 and 104 in 2014 and 2016 consecutively out of 160. The situation gets even more worrisome if one includes in the consideration Djibouti, Ethiopia's only gateway to the world in terms of land transportation. Djibouti ranked 145, 126, 154, 154 and 134 respectively for 2007, 2010, and 2012, 2014, 2016 (World Bank Report, 2018)

2.1.6. Infrastructure development in Ethiopia

It is clear that most developing countries infrastructure facility, transport equipment and networks are usually inadequate and generally of poor technologies for developing multimodal transport activities. Ethiopia is no exception, so it has been one of the major focus areas for the government to develop infrastructure facilities and improve technologies of transport equipment.

The limited number and small scale of railway and highway terminals make it difficult to form a hinterland multimodal transport system network. Inadequate infrastructure facilities in most inland haulage areas, there is still a great shortage of containers freight stations and distribution centers that are of certain scales. Construction of railway and highway inland transport access strip for the multimodal transport centers has not been given full attention in the development plan of cities for which are transport hubs.

When transportation infrastructure is poor, the development of multimodal transport may not be easy. In order to be able to attain maximum benefit from multimodal transport, infrastructures that are capable of handling containers must be in place, Banomyong, (2000). Multimodal transport needs efficient transport system supported by efficient infrastructural and institutional facilities in order to move goods easily, safely and rapidly from door to door. The major infrastructure facilities are railroads, roads, air ports, seaports, inland container depots and container freight stations (Sanders, 1990). Containerized cargo does require less but better qualified human power in ports, where reform is still pending in many developing countries (Nassoro (2011). It also requires port, rail and road infrastructures, as well as the corresponding regulations and labor regimes. In many developing countries, particularly less developed countries, these inland links are often incomplete and poorly maintained.

Infrastructure is one of the main practical obstacles to transport providers providing multimodal transport (UNCTAD, 2003). Multimodal is a quality indicator of the level of integration between different modes: more multimodal means more integration and interconnectivity between modes, which provides scope for more efficient use of the transport system.

In the 2017/18 World Economic Forum (WEF) The Global Competitiveness Report, Ethiopia's infrastructure development is ranked 115 out of 137, on the survey infrastructure includes the quality of road, railroad, port and other facilities.

Transport Infrastructure is one of the most important elements of infrastructure now days. Transport

infrastructure facilitates the development of connections between regions within a country and between countries, and consequently, it supports the formation of mutual economic, social, cultural relations. Transport infrastructure improvement to facilitate transfer of vehicles and/ or vehicle components between modes, and development of multimodal network. This has an impact on the efficiency and effectiveness of multimodal transport system by improving mobility, congestion and other conditions. It includes various facilities such as warehouse or storage facilities, port machineries or equipment's, vehicles, roads, IT infrastructure, and any other facilities.

Ethiopia is a land-locked country with no direct access to the sea, hence, is dependent on ports in neighboring countries. The main corridor into Ethiopia is through Djibouti port for commercial, government and humanitarian cargo. 95 % of the goods handled by Djibouti Port are destined for Ethiopia. Alternative ports are Port Sudan and Berbera. Ethiopia is to complete the formal possessing of acquiring land at Sudan to develop its own port. In different occasions the two countries agreed to develop a port in Sudan that will be an optional sea outlet for land locked Ethiopia.)Use of Mombasa port could be an option for southern parts of Ethiopia, but is currently not a time- or cost-efficient option. Ports in Southern Somali were not accessible due to the on-going conflict and the ports of Assab and Massawa in Eritrea, but following the agreement reached between the Ethiopia and Eritrea, a decision was made to resume telecommunication lines, transport services and trade relations between Ethiopia and Eritrea for the first time in 20 years. In line with this, preliminary preparation has also commenced by the two countries (to repair roads leading to the port and upgrading infrastructural facilities) in order to enable Ethiopia reuse the Port of Assab, and facilitates its sea-borne trades which geographically would have been natural options, are not probable due to the current political climate between the countries.(WFP, 2020)

The Government of Ethiopia (GOE) has steadily expanded its road network in recent years. As of the end of 2018/19, Ethiopia had 138,127 kilometres (85,825 miles) of all-weather roads – about 39% of the required road network in the country. The Ethiopian Roads Authority plans to build an additional 10,000 kilometres of road at a cost of 41 billion Birr ($1.24 Billion) in the coming year. In the past fifteen years, the GOE has been vigorously engaged in new road construction as well as expansion of the existing road network through Ethiopia's Road Sector Development Programs (RSDP).

The Addis Ababa–Djibouti Railway is a new standard gauge international railway that serves as the backbone of the new Ethiopian National Railway Network. The railway was inaugurated by Prime Minister Hailemariam Desalegn on January 1, 2018.

2.1.7. The Economic Impact

A study commissioned by the APEC Policy Support Unit (2009:126) used a general equilibrium model to assess the potential gains from a 1% increased productivity of the transport sector in APEC economies. The increase in productivity has two key effects. First, it lowers the cost of distributing inputs and outputs (thus lowering their price). Second, it increases income and therefore increases the demand for goods and services. This increase in the level of goods and services demanded is offset, at least in part, by the reduction in the cost of delivering goods. The simulations were restricted to those APEC economies with relatively large transport sectors. In the developing economies, the combined effects of income growth and falling prices is substantial in Chile; China; Peru;, the Philippines; and Thailand – with income growth ranging from 7% for Chile to 2% in Peru, with average price falls of 2%. In the industrialized economies with extensive transport systems, income growth ranges from 1.3% in the US to 3.1% in Japan while price falls between 0.4 to 1.3%.

A report prepared for the APEC Supply Chain Symposium held in May 2009 (The CIE 2009: 6-7) used a general equilibrium model to estimate the gains from improving supply-chain connectivity in the region. The impact of a 10% improvement in the efficiency of transporting goods between the borders of APEC economies is estimated to be over US$21 billion (in 2004 real dollars) with Thailand and Viet Nam having the largest relative gain in terms of per cent change in real GDP. Captured in this simulation are some benefits from improvements at-the-border, such as in customs documentation and administration as well as in port handling. Asia-Pacific Economic Cooperation, (2010),

The impact of multimodal transport on trade flows is positive and highly statistically significant. A one percentage point improvement in performance is associated with a nearly 3% increase in exports as a unilateral impact, and before accounting for reallocation effects across economies. This effect is stronger than for any of the component indices on their own. When the possibility of a virtuous cycle‖ between multimodal performances is accounted for, the effect is weaker but still statistically significant.

An improvement in overall multimodal performance would significantly boost exports. Taking into account the virtuous cycle‖ between multimodal transport performance and trade as well as the complex reallocations of exports that occur when economies reform simultaneously, the counterfactual simulations show that a 5% improvement in overall multimodal performance would increase exports to the world by nearly $500b annually or an increase of 4%. The range for individual

member economies is between 2% and 6% of baseline exports. In dollar terms, this equates to an impact gain of between $850m and $115bn per member economy. High performers in multimodal transport have the most to gain: 5% improvements in these economies represent substantial performance upgrades.

In more developed countries, shipping companies and other carriers use container tracking system to manage their assets and provide clients with necessary information about the whereabouts of their shipment across the entire multimodal supply chain.

In most developing countries the government themselves own these infrastructures and are directly responsible for their maintenance and development. The policies are then directed towards improving them and making them suitable for multi-modalism. The task of building and maintaining infrastructure such as rail, road, communication and service is difficult due to the problem of allocation of scarce resource.

The development of multimodal transport is directly related to the development of transport infrastructure facilitates. Hence, if the transport infrastructure is poor; the development of multimodal transport may not be easy (Banomyong, 2000).

2.1.8. Tracking and Tracing of Shipment

UNCTAD's Division for Services Infrastructure for Development and Trade Efficiency designed, developed and installed Advance Cargo Information System (ACIS). ACIS is a logistics information system designed to improve transport efficiency by tracking equipment and cargo on transport modes (rail, road, and lake/river) and at interfaces (ports, internal clearance depots) and by providing information in advance of cargo arrival. ACIS provides both public and private transport operators and ancillaries with reliable, useful and real-time data on transport operations such as the whereabouts of goods and transport equipment, and thus improves day-to-day management and decision-making. It also produces regular statistics and performance indicators which enable management to remedy deficiencies and to make full use of the existing infrastructure and equipment capacity. (UNCTAD 1990).

According to AHM and Helo (2011), a literature review reveals that without tracking system it is almost impossible to find out delivered items and often considered as lost or stolen item that causes business loss.

2.1.9. Performance Measurement

Measuring performance is to accurately assess how well a business is performing; that require developing some quantifiable measures. The measures must clearly identify those aspects of the business processes that need improvement and those that are working well. It can also be used a performance measurement to evaluate the company's productivity over a set of period of time. According to Weekly (1995) Measurement is the first step that leads to control and improvement. If you cannot measure something, you can't understand it. If you can't understand it, you cannot control it. If you cannot control it, you cannot improve it. Performance as defined by Sink, (1991) refers to "action that an organization carries out to accomplish its principles missions and functions for the generation of profit." performance measurement is a metric that can be used to quantify performances. According to Rose (1995) performance measurement activity is a process that records measures, display results, subsequent actions. Performance measurement activities and processes is the issue that "performance indicators are to a large extent domain specific" (Lai et al., 2004). Hence, there is no unique subset of indicators that can be selected.

According to Weely (1995) 'performance measurement is a popular issue that is widely discussed but rarely defined.' Hence, it is necessary to introduce certain relevant definition of performance measurement and present related discussion points about the concept of performance, frameworks and approaches in performance measurement in light of third party logistic (3PL) service providers.

2.2.Empirical Literature

Researches about multimodal transport system have done by some academicians by different people at different times while they have their own limitations evaluated empirically. Accordingly, researchers has evaluated the following research titles which were directly related the study under investigated.

Customer Satisfaction on Multimodal Transport System The study conducted by Belay (2016) titled as assessment of customer satisfaction on multimodal transport system: the case of selected private import business. According to this study, customer satisfaction was measured with three measurement dimensions such as multimodal transport service value (MMTS), logistics service value (LSV) and customer service quality (CSRQ).

The result showed under the descriptive analysis of multimodal transport indicates that the majority of customers are satisfied with regard to variables such as documentation, arrangement of inland transportation, schedule reliability, customs clearance. Contrary to this, World Bank (2017) report shows that Ethiopian logistics service sector is characterized by long transit time; the business requires obtaining more documents, problems in ICT infrastructure facilities, non-dependable port and customs clearance process and higher transport cost. Research findings are limited to both time and place. The study should be appropriately surveyed to get the real picture of the study and has to be supported by other evidences collected in collaboration with questionnaires.

Multimodal Freight Transport Performance In addition to the above study, the study performed by Amentae (2015) "Multimodal Freight Transport Performance by Customers and Employees: Towards International freight Shipping and Logistics Services Enterprise." This study has not explicitly stated the basic research gaps which are basically used as spring board to perform the study. Research gap is identified by conducting preliminary study or by reading secondary sources of data and any other sources. It has to be clearly stated in order to create a reader to understand what the study wants to investigate.

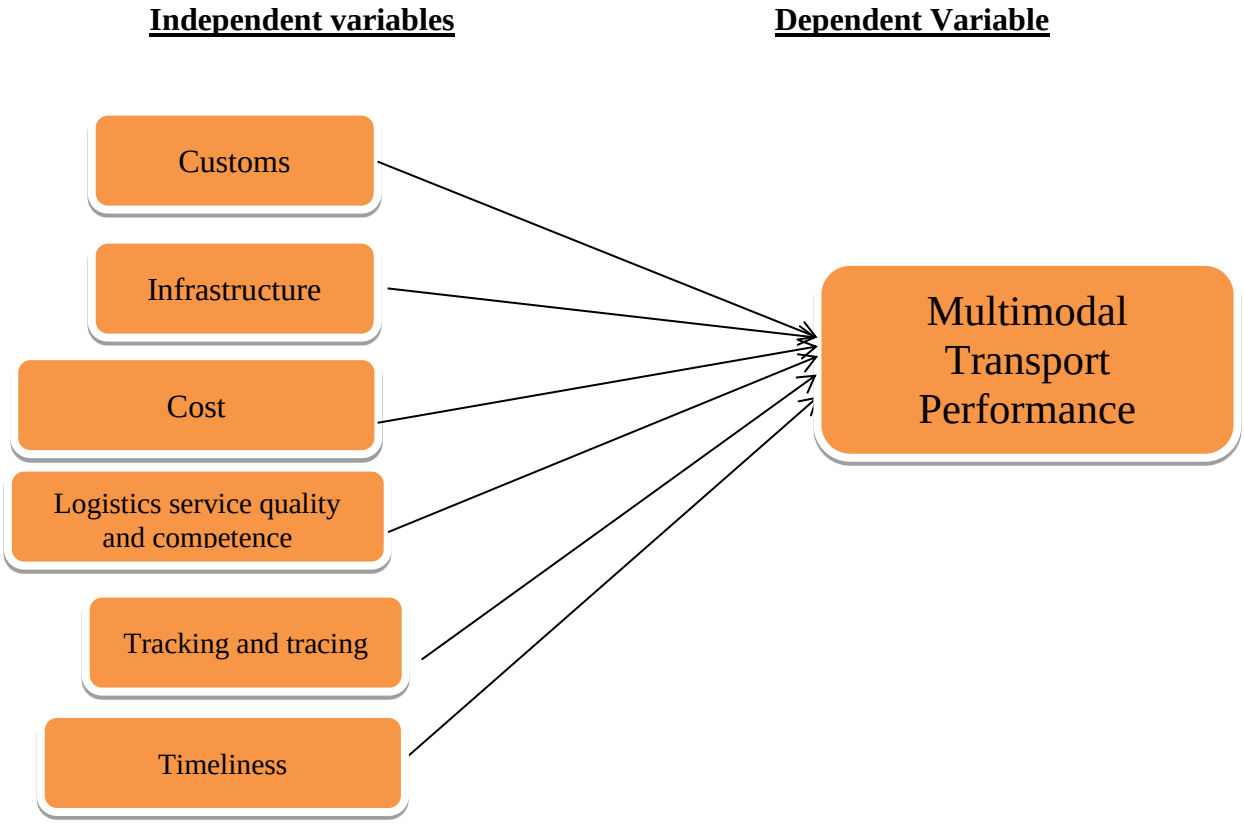
Habtesilase (2018) assessed the challenges of multimodal transport service of ESLSE in the Europe trade routes operation from origin up to destination. The findings of the researcher revealed that multimodal transport service was impacted by lack of skilled logistics personnel.

Generally, the above and other studies conducted over multimodal transport system are mainly performed using descriptive research design. Using this type of research design, cannot show the validity, reliability, the relationship between dependent and independent variables, the strength and predictability of variables. Strong research's has to be done both descriptively and inferentially which are tasted by various statistical tools.

2.3. Conceptual Framework

Following from the literature review, the relationship between multimodal transport service components and multimodal transport system operation performance can be shown as below on the following diagram. In this conceptual model the six logistics performance components have been selected for this research to assess multimodal transport system operation performance.

Figure 3.1 Conceptual Framework



Source: adopted and modified from World Bank the Logistics Performance Index and Its Indicators (2018)

CHAPTER THREE
3. RESEARCHMETHODOLOGY

This chapter presents details of the research methodology. This includes description of the study area, research approach and design, data type and source, target population & sample size, sampling techniques, data collection & data analysis, variable description, validity & reliability and ethical consideration.

3.1. *Description of the Study Area*

To maintain the commendable economic growth that has been registered in the country over the last several years, one of the strategic measures taken by the Federal Government of Ethiopia is merging 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.

The Ethiopian Shipping and Logistics Services Enterprise (ESLSE) is the result of this merger. This newly amalgamated enterprise came into being following the issuance of Regulation by the Council of Ministers (Regulation No. 255/2011), and is vested with the huge responsibility of rendering sea-transport & logistics services to the country's importers, exporters, and investors in a more effective and efficient way, by reducing transit time, cost and handoffs. Besides, a truck operating company named Comet Transport SC has recently been transferred to ESLSE following a government decree issued in the mid of 2014. Hence, the study will be focused on the assessment of performance of multimodal transport service operation the case of Ethiopian Shipping and Logistics Services Enterprise has its headquarters located in the heart of Addis Ababa Kirkos Sub-city, Ethiopia, with main branches at Djibouti, Modjo, and Kality (the former Comet) and other branches in Mekelle, Dire Dawa, Kombolcha, Semera, Gelan, Hawassa and Woreta towns. It also has a Maritime Training Institute at a place called Babogaya in Bishoftu formerly (Debrezeit) town (Company profile, 2015).

The vision of ESLSE is by providing competitive shipping & logistics services, to become preferred and renowned African logistics company by 2025. Comply with its vision ESLSE stated that the following mission statement:- through building and upgrading organizational capacity; to render world class and competitive shipping & logistics services; thereby contributing towards the rapid economic growth of the country. To achieve these missions, Ethiopian Shipping and Logistics

Services Enterprise strive to perform the following activities:-receiving and delivering cargoes; cargo loading and; stuffing and un-stuffing of container goods temporary storage for import and export cargoes; container cleaning and maintaining, Custom control and clearance and banking and insurance

3.2. *Research Approach*

Mixed research approach (qualitative and quantitative) in any research use for a better understanding of the research problem than either of each alone and provides a ground for the use of several means (methods, data sources and analysis) to examine the same subject matter under the study. (Bhattacherjee , 2012). Thus, in the proposed study mixed research approach will be used to assess the performance of multimodal transport operation system of ESLSE.

3.3. *Research Design*

Leedy (1997) defines research design as a plan for a study, providing the overall framework for collecting data. MacMillan and Schumacher (2001) define it as a plan for selecting subjects, research sites, and data collection procedures to answer the research question(s).

A combination of descriptive and explanatory research designs are followed in this study. Descriptive approach will be used because it seeks to describe in depth understanding of the reality of multimodal transport service performance. On the other hand, to identify the relationship between service performance indicators and multimodal transport service performance explanatory research design will also be applied in this study.

3.4. Unit of Analysis

As indicated by Saunders et.al (2009) unity of analysis covers what actually the case is about, for instance; an individual, organization, and event or an entity. From this, the case is about Multi Modal Transport performance and mainly constitutes multimodal transport customers of ESLSE.

3.5. Population of the study

The target population of the study comprises the entire number of ESLSE Multimodal transport customers. From ESLSE unpublished data in year 2020the enterprise has more than 3500 multimodal transport loyal customers. The target population has direct interaction with the multimodal transport service and it is assumed to have adequate information on the subject.

3.6. Sampling Procedures and Sample Size

Both of probability with simple random sampling was used for the minor customers and non- probability with purposive sampling technique for corporate customers to get response from the study participants. Because, ESLSE has already selected & notify 120 customers as a'' corporate '' which have a special attention by the company as well as the government due to their direct contribution in the country economic growth.

The customers are considered homogenous in their nature so Israel (1992) simplified formula was used to calculate the sample size. Based on this formula confidence level is 95% and level of precision is 5%. The value of $\sigma/2$, $Z\alpha = 0.05$. From the Z standard table $\mathbf{Z_{0.025}}$ =1.96,, taking p and q equally proportional since the customers are homogeneous in nature so that p=0.2 and q=0.8 were applied and the marginal error e was limited to 0.05 where e^2 is the margin of error, σ^2 is the population variance.

$n_0 = \frac{Z^2\alpha/2pq}{e^2}$ **(Israel, 1992)**

$$\mathbf{n=} \quad \frac{\mathbf{n_0}}{1+\frac{(n_0-1)}{N}}$$

Using the above formula the sample size resulted to be 230. Out of those, 120 customers are already known as corporate customers by ESLSE.

3.7. Variable description

Descriptive data will be analyzed and interpreted using mean, frequency and Percentages for findings.

- Independent Variables: are defined as a characteristic that ones who are conducting the experiment or manipulate to identify a particular factor. And also known as factor or prediction variable. In this study Customs, Infrastructure, International shipments cost competitiveness, Logistics quality and competence, Tracking and tracing and Timeliness are selected as factors that affect the dependent variable.
- Dependent Variables: are the second types of variables that are measured using independent variables and are answer the question: 'What is it that we are testing?' and 'What is the measured response to various levels of the independent variable?'. Hence, in this study multimodal transport service operational performance (dependent variable) was measured by independent variables.

3.8. Data Sources and Data Collection Methods

Both of primary and secondary data sources were used to get the information that can be an input to conduct the study. More of the primary data collection method was performed through questionnaires for high degree of accuracy and reliability.

In addition to primary data sources, secondary data sources like company profile, past studies, annual reports, visiting different libraries to obtain some reliable literature and empirical findings, books, internet, journals, and articles will be used in order to have a better understanding of the subject area.

3.9. Validity and Reliability Test

Validity

The validity of a measuring tool such as the validity of questionnaire means that it can measure the relevant specification not any other variable. Content validity was used for measuring the validity of the questionnaires for this research. For this purpose, the content of the questionnaire was prepared by referring to related literatures relevant to the subject, consulting expert in the area and the questions of the research. Amendments have done by advisor and pre –questionnaire will be distributed to check the validity and reliability of questions to further data collection process.

Reliability Test

Reliability refers to a condition in which similar results was achieved when an instrument designed for measuring variable is used in different places or at different time under similar conditions. The reliability of the questionnaires was statistically calculated using Cronbach's Alpha. The result obtained from STATA range between 0.8029-0.9244.

The Cronbach's Alpha result depicted that for the whole questionnaire is a good reliability. If Cronbach's Alpha result is below than 0.7 the questionnaire showed be rejected (Julie, 2005). Thereby, it can be said that it is proved that the questionnaire is valid, reliable.

Table 3.1: The Cronbach's Alpha test result from STATA

Variables	No. of Items	Cronbach's Alpha
Custom Performance	6	0.8029
Infrastructure Performance	8	0.9095
Service Quality Performance	7	0.8875
Timeliness Performance	5	0.893
Cost Performance	5	0.9244
Tracking and Tracing Performance	4	0.9024

Source: Survey result, 2021

3.10. Data Analysis Method

During data analysis the response that was obtained from the questionnaires has clearly edited, coded, organized to analyze. The row data is checked whether it is incomplete or unusable and analyzed through the software program called STATA version 12. Furthermore, it was interpreted in terms of descriptive statistics tools such as frequency, percentage, mean and standard deviation to assess the performance of multimodal transport service operation in ESLSE. Correlation and regression analysis was used to identify the relationship between multimodal transport service dimensions and multimodal transport service performance.

The regression model developed to show the link between multimodal transport service dimensions and multimodal transport service performance, thus, the following regression equation to be estimated.

$$Y = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + e$$

Where;

Y= Multimodal Transport Service performance

a= constant

b1-5 = Coefficient of factors

X1-5 = multimodal transport service dimensions, X1= customs, X2= infrastructure, X3= service quality, X4= timeliness, X5=cost, X6= tracking/tracing

E=error term

3.11. Ethical Consideration

All information gotten from the respondents were treated with confidentiality without disclosure of the respondent's identity. Moreover, no information was modified or changed, hence information gotten was presented as collected and all the literatures collected for the purpose of this study were appreciated in the reference list.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1. Introduction

The research design and methodology used to collect and analyze data in order to answer the research questions have been discussed in chapter three. The purpose of this chapter is to analyze the data collected from the 207 respondents and present the analysis results accordingly. The purpose of this study was to assessment on multimodal transport service operation performance in ESLSE Addis Ababa, based on the data which was obtained from sample respondents through instrument for data collection which is questionnaire.

As discussed in chapter three, a sample of 230respondents were used a data collect by using random sampling method and purposive sampling methods respectively. Out of which total of 23responses were not returned. Hence, 90% of the response was used for the study.

The data collected was coded, edited and analyzed using a software program called STATA and using Microsoft Excel application to identify the important criteria of statements. The study employed both descriptive and inferential analysis tools. By using frequency distribution, percentage, mean and standard deviations were used to describe and analyze the data. Correlation and regression analysis were also employed in this research to see the relationship with the variables so as to infer to the population. Interpretation was made for different statistical analysis output and discussions and recommendation were done and indication of areas needed focus.

The performance of multimodal transport service operation survey was conducted on ESLSE corporate and minor customers. In this section, variables related to general characteristics of respondents, are described on below.

4.2. Respondents Demographic Profile

In this study, the researcher described respondent profile in terms of gender, age, occupational status, educational level, experience with ESLSE, purchase reputation and ownership type of the company. Respondents were asked to state their characteristics for purpose of classifying and comparing them thereafter. The study employed a close ended questioner to categorize respondent's profiles and their responses were analyzed using frequencies and percentage distributions as shown below**.**

Table 4.1: Personal information of Respondents

Item	Description	Frequency	Percent
Sex	Male	178	85.99
	Female	29	14.01
	Total	207	100
Age	< 30 years	13	6.28
	31-45 years	97	46.86
	46-60 years	81	39.13
	Above 60 years	16	7.73
	Total	207	100
Occupational status	Expert	64	30.92
	Manager	69	33.33
	Business Owner	48	23.19
	other	26	12.56
	Total	207	100
Educational Level	High school graduate	7	3.38
	Certificate	16	7.73
	College Diploma	27	13.04
	Degree	108	52.18
	Masters and above	49	23.67
	Total	207	100

Source: Survey result, 2021

From the result on Table 4.1, the number of male and female respondents is not equal. The survey showed that there were more male respondents as compared to females as presented by 178(85.99%) and female were minority 29(14.01%). Thus, this finding revealed that majority of male customers was participated in this study.

Classifying respondents in terms of their age was found as an important characteristics in order to understand their views about the companies service delivery problem .There are 13 respondent's (6.28%) who are under the age of 30 years old and 97 (46.86%)who are in the range of 31-45 years old. Another 81 or 39.13% respondent's whose age is within 46-60 years old. Lastly 16, 7.73% are above 60 years old. The result implies that the highest (46.86%) proportion is occupied by those individuals whose age is

found between 31-41 years of age. Thus are adult age groups, that level of maturity of individuals indicates more to give reliable data in a responsible manner with regard to company relationship.

As it can be observed from the result regarding the occupation status of the respondents, 64(30.92%) are expert. 69 (33.33%) of the respondents are manager and 48(23.19) are business owners last 26(12.56%) of are out of these. Most of respondent's are Experts and managers& this tells those respondents are the main sources to know the performance of the company. Because it assumes that the experts have the exposure and managers are in a higher position to be aware of the level of performance of business partners.

Concerning to the education qualification, over half of respondent's had a professional qualification. This revealed by respondent's with college diploma, certificate, high school qualification being 27(13.04%), 16(7.73%) and 7(3.38%) customers respectively. Respondents in the category of degree holder and masters and above are 108(52.17%) and 49(23.67%) respectively. The largest amount of respondent 108 (52.17) are degree holder. According to the results majority of the respondents are degree holders & above and seems to assume that they have high understanding & can give their reliable information responsibly.

Table 4.2: Operational Characteristics of the Respondents

Item	Description	Frequency	Percent
Experience with ESLSE	Less than 5 years	16	7.73
	6-10 years	57	27.54
	11-15 years	88	42.51
	16- 20 years	35	16.91
	Above 20 years	11	5.31
	Total	207	100
Purchase repetition	Once a month	106	51.21
	Once a three month	51	24.64
	Once a six month	24	11.59
	Once a nine month	10	4.83
	Once a year	13	6.28
	only once	3	1.45
	Total	207	100
company type	Government	43	20.77
	private	164	79.23
	Total	207	100

Source: Survey result, 2021

Basically, longer customer experience with the service provider can be an indicator of having more information. According to the above result in regards to the customer experience with the company 16(7.73%) respondents have been customers for the company ESLSE for less than five years, 57(27.54%) respondent's for a period of ranging between 6-10years, 88(42.51%) respondent's had customers for a period ranging between 11-15 years, 35(16.91%) respondent's had for ranging between 16-20 years and 11(5.31%) had ESLSE customers for more than 20 years. This indicates that, majority of the ESLSE customers had knowledge and experience about the company since they had been ESLSE customers for relatively long period of time that is more than 10 years.

Frequency is a signal that depicts the amount of transaction that a company has with its customers. The higher is the frequency, the higher is the contact with ESLSE and the knowledge about ESLSE and its services performance.

The customers vary from one time users so far to those who use the services every month. Over half of respondent's have been used the service of ESLSE.

From total sample respondent's, largest groups of them 164(79.23%) of the respondents were from private owned customers and the rest 43 (20.77%) of customers were government owned company.

4.3. Descriptive Analysis

Analysis was conducted and presented on data gathered from 207 customers of ESLSE to assess the performance of multimodal transport service operation based on the six performance indicator dimensions that are categorized as custom, infrastructure, logistics service quality, timeliness, cost and trucking and tracing. A five-point Likert scale with 1 = strongly disagree; 2 = Disagree 3 = Neutral; 4 = Agree; 5 = strongly agree was used to rate the performance of Multimodal practice of Ethiopian Shipping and Logistic Service Enterprises. Analysis of the data was done using descriptive statistics means and standard deviations.

4.3.1. Custom Performance

The main function of customs in general is duty collection, protection of the domestic industry, and control of smuggling and prohibited items. However, facilitation of foreign trade is becoming a new function of customs around the world nowadays. The customs procedure might be a possible bottleneck in the entire logistics of any country. It takes a strong will and determination of the policy

makers to facilitate the customs clearance procedures in order to promote trade with foreign countries. (Seiichi Nagatsuka, 2008)

Table 4.3: Descriptive Statistics Value of Custom Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
There is a system or procedure of Customs clearance prepared for multimodal transport service	207	4.20	0.92	1	5
The custom clearance process is Efficient based on Speed , Simplicity and predictability of formalities	207	2.14	1.14	1	5
The customs clearance procedure is transparent	207	2.88	1.36	1	5
Customers receive adequate and timely information when custom regulations changed	207	3.69	1.33	1	5
There is a system that customers can demonstrate high levels of compliance	207	2.13	1.20	1	5
There is strong coordination between customs and ESLSE offices	207	2.29	1.26	1	5
Average Score	207	2.89	1.20	1	5

Source: Survey result, 2021

Table 4.3 shows the descriptive statistics outcome of custom perspective in evaluating the performance of multimodal transport service based on arithmetic mean and standard deviation. It is based on the responses of 207 sample respondents on the six variable descriptions itemed on the table.

From table it show that there is a system or procedure of customs clearance prepared for multimodal transport service with a mean score value of 4.20 and standard deviation value equal to 0.92and customers receive adequate and timely information when custom regulations change with a mean score value of 3.69and standard deviation value equal to 1.33 that both have scored the highest mean value because most respondents do strongly agree and just agreed respectively.

The majority of the respondents negatively evaluated the custom performance with a mean value range from 2.13 to 2.88 and a standard deviation value of ranging from 1.14 to 1.36on the remaining four variables that indicates the respondents were disagreed and have very close response to the same

idea. As agreed by the majority of respondents, the custom developed a system or procedure for clearing multimodal transport cargos and makes a way to inform same for the customers but when it come to the effectiveness the customers are dissatisfied on the custom clearance process, reflected by lack of efficient based on Speed, Simplicity and predictability of formalities, transparency, compliance resolution and coordination between customs and ESLSE.

Over sum, the average mean and standard deviation value of 2.89 (disagree) and 1.26 was obtained in relation to custom performance and this displays the custom clearance process is not apposite to provide efficient multimodal transport service.

As per Temple (2001), it portrays that at least two sets of customs procedures known to be present the international supply chain. Therefore a simplified and effective system is required for the smooth flow of commercial cargo and for investment. When customs procedures prevent containers from penetrating deeper the movement will be impeded and the Inland Container Depot (ICD) becomes less productive. So it will result in more transit time, transport cost and uncertain schedule reliability due to multiple handling of cargo.

4.3.2. Infrastructure Performance

Multimodal transport service requires efficient transportation system supported by efficient infrastructural and institutional facilities so that goods movement to be smooth, safe and rapid from point of origin to destination. The major infrastructural facilities include railway, road, airport, seaport, inland container depot and container freight station (Sanders, 1990).Ethiopia being a land locked country is using the neighboring Djibouti port as the main access to sea port for its import export business. Paved road connecting Ethiopia and Djibouti was used to transport the inland cargo, and recently a railway connection Addis Ababa – Djibouti has introduced in 2018G.C.

Table 4.4: Descriptive Statistics Value of Infrastructure Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
The road transport is adequate to provide multimodal transport service	207	3.14	1.37	1	5
The railway transport is adequate to provide multimodal transport service	207	3.57	1.45	1	5
There is enough number of trucks with significant capacity	207	2.54	1.43	1	5
ESLSE have enough number of own ships with significant capacity	207	1.64	0.71	1	4
ESLSE has enough number of Dry ports all over the country with convenient location	207	2.14	1.32	1	5
Dry ports, terminals and warehouses are adequate and well equipped with the necessary equipment and facilities	207	2.05	1.16	1	5
There are sophisticated ICT infrastructures for real time information exchange use.	207	2.20	1.18	1	5
The dry ports and terminals do have enough space and capacity to accommodate incoming and outgoing cargos even in peak periods.	207	2.69	1.36	1	5
Average Score	207	2.50	1.25	1	4.88

Source: Survey result, 2021

As indicated in table 4.4 eight variables have been provided to evaluate the infrastructure dimension in providing efficient multimodal transport service. Out of the above stated variables, only two variable, that are road and railway transport adequacy to meet the need of inland cargo movement have score a mean value of 3.14 and 3.57 and standard deviation value of 1.37 and 1.45 with positive response respectively. This shows that the majority of the respondents were agreed on these two variables.

On the remaining six variables, the mean score of 2.54, 1.64, 2.14, 2.05, 2.20, &2.69 and a standard deviation ranging from 0.71 to 1.43 were obtained for enough number of trucks and own ships with significant capacity, enough number of Dry ports all over the country with convenient location ,Dry ports, terminals and warehouses are adequate and well equipped with the necessary equipment and

facilities, There are sophisticated ICT infrastructures for real time information exchange use and The dry ports and terminals do have enough space and capacity to accommodate incoming and outgoing cargos even in peak periods respectively. This indicates that the majority of the respondents were disagreed on the infrastructure performance.

In summary the majority of the customers evaluated the infrastructure performance as disagree with the average mean value of 2.50 and standard deviation value of 1.25. This implies that the existing infrastructure is not suitable to provide efficient and effective multimodal transport service.

As per Amentae Kenea Tadesse, (2015, the ability of the country to provide efficient and cost-effective multimodal transportation service depends on several factors including the use of advanced technology and infrastructure. Ethiopia is not particularly free from the challenges in this regard, rather it can be significant.

4.3.3. Service Quality Performance

Mentzer(1989), defined the quality in logistics service in terms of two complementary elements, i.e. marketing customer service and physical distribution service. The physical distribution service refers to the service outcomes and marketing customer service refers to the process of service delivery. The service quality is measured by the ability to fulfill the customers' orders. This definition is an intelligent base for the integration of marketing and logistics activities. Previously, this concept was referred as technical quality and functional quality, where technical quality refers to the service outcomes and functional quality refers to the process of service delivery.

Table 4.5: Descriptive Statistics Value of Service Quality Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
There is enough expertise in ESLSE to operate multimodal transport systems	207	3.22	1.23	1	5
Multi modal transport service provides single window service	207	2.02	1.08	1	5
Provides timely response to customer complain	207	2.26	1.17	1	5
The service provided by Multimodal transport has online Booking	207	1.33	0.47	1	2
The coordination level among stakeholders in providing integrated multimodal transport service is strong.	207	2.59	1.17	1	5
The overall safety and security of freight shipments against damage or loss is satisfactory	207	3.45	1.05	1	5
There is good documentation performance on time issuance and delivery of bill of lading, rail or road consignment note	207	3.08	1.24	1	5
Average Score	207	2.57	1.06	1	4.57

Source: Survey result, 2021

To evaluate the logistics service quality performance of multimodal transport service seven questions have been provided to the respondents. Accordingly 3 of them were to be in positive response with mean score of 3.22, 3.45 and3.08 at standard deviation of 1.23, 1.05, and 1.24, The customers agreed on the ideas that there is moderate skill and expertise in ESLSE to operate multimodal transport systems, the overall safety and security of freight shipments against damage or loss is satisfactory and good documentation performance on time issuance and delivery of bill of lading, rail or road consignment note.

In contrary four questions were responded negatively with mean 2.02, 2.26, 1.33 and 2.59 and a standard deviation value 1.08, 1.17, 0.47and 1.17 was obtained in regards to multi modal transport service provides single window service, provides timely response to customer complaint, the service provided by Multimodal transport has online booking and the coordination level among stakeholders in providing integrated multimodal transport service is strong. These indicate the majority of respondents were agreed on this issue and the standard deviation result show closed customer response.

In summary the average mean score of 2.57 disagreements and standard deviation of value of 1.06 closer responses to the same idea was found respectively for the performance of logistics service quality. This indicates that there is no single window service with low level of coordination between different sectors within the company and outside with stakeholders at the same time provision of timely response to customer complaint is weak. The service provided is not supported by online booking system that the customer can use the service from where they are.

According to Fekadu (2013), literature review reveals that availability of skilled manpower, conducive labor and business environment promotes economic activities. On the most of these criteria, Ethiopian logistics system is found to be poor. The main freight transport companies lack capacity in terms of skilled human resources and management skills that will result in inefficiency.

4.3.4. Timeliness Performance

Timeliness of shipment in reaching the assumed destination measures how reliably the shipment meets the promised delivery time. More reliable delivery lowers transit time of transport from point of origin to destination and will enable a greater control of cost, schedule and cargo safety (World Bank (2015).

Table 4.6: Descriptive Statistics Value of Timeliness Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
Shipments are coming with reasonable process and transportation time	207	3.15	1.45	1	5
Shipments reach the designated dry ports within the scheduled or expected delivery time	207	3.62	1.37	1	5
Cargo handling time at dry port is short and the cargo is provided easily within acceptable waiting time	207	2.01	1.33	1	5
The customer received their shipments within the free time from designated dry ports.	207	1.90	1.05	1	5
Average Score	207	2.67	1.30	1	5

Source: Survey result, 2021

From the above four descriptions on Timeliness performance two questions are agreed and the other two are under disagree by customers response. The queries shipments are coming with reasonable process and transportation time have scored mean value 3.15 with standard deviation 1.45 and

shipments reach the designated dry ports within the scheduled or expected delivery time got mean score 3.62 and standard deviation 1.37.

Cargo handling time in dry port is short and provided easily with acceptable waiting time was scored mean value of 2.01 and standard deviation 1.33 and the customer received their shipments within the free time from designated dry ports scored mean value 1.90 and standard deviation 1.05.

In summary the majority of the respondent's evaluated timeliness as disagrees with an average mean value of 2.67 and a standard deviation value of 1.30. These imply that the majority of the respondent disagreed and dissatisfied with the ESLSE performance on meeting scheduled/expected delivery time. This implies that the ESLSE performance on meeting scheduled or expected delivery time is poor. To show the overall shipment cycle as per the information obtained from 2020 annual report of ESLSE 6.57 days is the average time to load containers from port of load and the average transit time on sea is 24.37 days, the average time taken for discharging cargo from own vessel was 14.6 days and the average dwelling time at Djibouti port of container cargo is 9.53 days whereas for vehicle/RORO is 23 days. When we see the average dwell time of container at dry ports is 19 days that is over the demurrage and storage free time. Even though customers agreed that shipments are coming with minimum process time and reasonable transportation time to reach dry ports the problem arises after reaching dry ports.

The impact of spending an extra day on getting across border has a significantly greater negative impact on trade flow compared with an extra day spent at sea delivering a container of goods (Korinek & Sourdin, 2009).

According to the above, the overall service performance of ESLSE multimodal transport system regarding timeliness is poor. This means the existing multimodal system is more of time consuming exposing the customers to pay extra cost.

4.3.5. Cost Performance

If there is no port and terminal competition, the quality of service is restricted, transit time and transport cost also increase, Islam (2005), In the case of Ethiopia multimodal transport service is operated by one government owned organization ESLSE that wouldn't give a room for price competition. On the other hand, the inland transport market is nearly enjoying an effective competitive regime, which is free from government preventive regulation. Competition in freight market is an essential element for adopting globalization, and multimodal fright transport development.

Table 4.7: Descriptive Statistics Value of Cost Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
ESLSE has flexible tariff with flexible payment mode	207	1.97	1.28	1	5
Cost of Sea Freight is Reasonable	207	1.89	1.00	1	5
Cost of Inland Transport is Reasonable	207	3.09	1.44	1	5
Cost of Storage and Demurrage is Reasonable	207	3.42	1.40	1	5
The purposes of costs that multimodal customers are requested to pay are clear and understandable.	207	3.60	1.35	1	5
Average Score	207	2.79	1.29	1	5

Source: Survey result, 2021

As per the above table 4.7 five questions have been provided to evaluate the cost performance, the mean value of 1.97 and 1.89 (strongly disagree) and a standard deviation of 1.28 and 1.00 were obtained for questions ESLSE has flexible tariff with flexible payment mode and Cost of Sea Freight is Reasonable respectively that reflects the majority of the respondents disagreed and the standard deviation value shows a close customer response.

Cost of inland transport is reasonable, cost of storage and demurrage is reasonable and the purposes of costs that multimodal customers are requested to pay are clear and understandable by them queries score mean of 3.09, 3.42 and 3.60 standard deviation range from 1.35 to 1.44 that the majority of the customers agree.

In summary cost competitiveness was evaluated as disagree by the majority of the respondants with average mean value of 2.79 and standard deviation value of 1.29. This implies that the multimodal transport service is not competitive in rendering quick and quality service with reasonable price. Thus, the majority of customers are not satisfied with the monopolistic privilege of the government owned enterprise ESLSE. Such high cost of logistics causes to increase in the cost of imported goods which impacts the overall economy of the country.

4.3.6. Tracking and Tracing Performance

Tracking and tracing is a system of recording the movement of cargo during transportation. At every processing location, the goods are identified and data relay to the central processing system. This data is then used to give status/update of the goods location to the shippers. With the help of tracking, the carrier always knows the location during the shipment of goods. Tracking is also

relevant in terms of safety, by creating difficulty for any attempt to steal.

Table 4.8: Descriptive Statistics Value of Tracking and Tracing Performance

Variables	Obs	Mean	Std. Dev.	Min	Max
Tracking and Tracing shipment is supported by improved computerized system	207	2.69	1.47	1	5
ESLSE provides the particular status or location of a shipment at a reasonable time	207	2.41	1.38	1	5
Cargos are easily located in identifiable way in dry ports and terminal	207	2.76	1.54	1	5
ESLSE provide arrival notification to its customer	207	3.57	1.41	1	5
Average Score	207	2.86	1.45	1	5

Source: Survey result, 2021

Among the four descriptions under tracking and tracing performance dimension only one question lied on positive agreement by customers' response with mean value 3.57 and standard deviation 1.41 that ESLSE provide notification of their cargo arrival to customers. These imply that the majority of the customers were agreed and the standard deviation value shows that the customers have closed response on the same idea.

On the other hand, mean value scored 2.69, 2.41, and 2.76 on the remaining four descriptive items for tracking and tracing shipment is supported by improved computerized system, ESLSE provides the particular status or location of a shipment at a reasonable time and cargos can be easily located in identifiable way in dry ports and terminal respectively and a standard deviation value ranging from 1.38 to 1.54 that indicate the respondent agreeing with same issue.

In summary the majority of the respondents' evaluated tracking and tracking performance as disagree with average mean value of 2.86 and standard deviation value of 1.45. This indicates that the multimodal transport service is not supported by modern technology to provide efficient information to follow up their shipment frequently anytime and from anywhere.

According to Korinek and Sourdin (2011), most stakeholders are benefited significantly from

improved tracking and tracing system, because of this tracking and tracing can be considered as one of priority area for future investments in trade logistics. The development of information and communications technologies (ICT) provides a convenient way of improving LPI tracking and tracing performance by enabling cost-efficient gathering, organization and distribution of information at a global level.

4.3.7. Summary on Independent Variables

On the study customs, Infrastructure, logistics service quality, Timeliness, Cost and Tracking and Tracing are the factors taken that affect Performance of Multimodal operation Service, and this does not mean that all factors equally affect. From the response of the customers it is summarized as below customs clearing factor does ranked as first.

Table 4.9: Comparison of the major factors

Variable	Obs	Mean	Std.Dev.	Comparison Rank
custom	207	2.89	1.20	1st
infrastructure	207	2.50	1.25	6th
Service quality	207	2.57	1.06	5th
timeliness	207	2.67	1.30	4th
cost	207	2.79	1.29	3rd
tracking and tracing	207	2.86	1.45	2nd

Source: Survey result, 2021

4.4. Inferential statistics

4.4.1 Correlation Analysis

To determine the relationship between multimodal transport service determinants (custom, infrastructure, service quality, timeliness, cost and tracking/tracing) and overall performance of multimodal transport service, Pearson correlation was computed. Correlation analysis deal with relationships among variable and helps to gain insight in to the direction and significance of relation between the variables. Correlation coefficient take values between -1 and 1 ranging from being negatively correlated (-1) to uncorrelated (0) to positively correlated (1). A correlation result which is 0 indicates zero correlation , a result between 0.1 to 0.3 indicates weak correlation, a result which is between 0.4 to 0.6 indicates moderate correlation and a correlation coefficient between 0.7 to 0.9 indicates a strong correlation and a result which is equal to 1

indicates perfect correlation. Table 4.15 below presents the results of Pearson correlation on the relationship between multimodal transport service determinants and overall performance of multimodal transport service.

Table 4.10: Correlation between multimodal transport service determinants and overall performance of MTS (STATA result)

	mtsper~e	custom	infras~e	servic~y	timeli~s	cost	tracka~e
mtsperform~e	1.0000						
custom	0.7623	1.0000					
infrastruc~e	0.4058	0.0954	1.0000				
servicequa~y	0.6785	0.8709	0.0923	1.0000			
timeliness	0.2057	0.3209	-0.1409	0.1064	1.0000		
cost	0.6423	0.5230	0.3653	0.5049	0.2818	1.0000	
trackandtr~e	0.0334	0.3346	-0.2339	0.3868	-0.0297	-0.2916	1.0000

Source: Survey result, 2021

The correlation between performance of MTS and MTS dimensions as shown above table, there is a positive correlation between MTS performance and MTS determinants (custom, infrastructure, service quality, timeliness, cost and tracking/tracing) (r= 0.76, 0.41, 0.68, 0.21, 0.64 and 0.03 respectively. There is strong positive correlation between MTS performance and customs. There is also a significant moderate positive correlation in between MTS performance with infrastructure, service quality&cost and week positive correlation with timeliness and tracking/tracing.

4.4.2 Assumption of Normality

In research, statistics and data science, normality tests are used to determine if a data set is well modeled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. The values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George & Mallery, (2010) Additionally Hair and Barry (2010) argued that data is considered to be normal if Skewness is between -2 to +2 and Kurtosis is between -7 to +7. Therefore, as we have seen in below table, the data distribution is normal.

Table 4.11 Normality of data-Skewness and kurtosis (STATA Result)

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
mtsperform~e	207	0.4798	0.0000	.	.
custom	207	0.0275	0.0005	14.22	0.0008
infrastruc~e	207	0.3598	0.0000	.	0.0000
servicequa~y	207	0.0000	0.5340	23.22	0.0000
timeliness	207	0.0000	0.0136	26.16	0.0000
cost	207	0.0571	0.0000	.	0.0000
trackandtr~e	207	0.0043	0.0028	14.37	0.0008

4.4.3 Assumption of Multicollinearity

One of the assumptions of multiple linear regressions is that the independent variables should not have a very high association or correlation. When the independent variables are highly correlated, it is regarded as a problem in the model and this problem is called multicollinearity. Gujarati, D. (2003) stated that the existence of multicollinearity can be tested by analyzing the values of tolerance and Variance Inflation Factors (VIF). As most authors have suggested, a tolerance (1/VIF) of < 0.10 and/or a VIF >10 indicates a multicollinearity problem. The results regarding this were summarized and presented in table 6 below. (Liu2010) also suggests that a VIF value greater than 10 is because for concern and in these research data the values are below 10 for all predictors. It seems from these values that there is no issue of multicollinearity between the predictor variables.

Table 4.12- VIF Table (STATA Result)

Variable	VIF	1/VIF
servicequa~y	5.67	0.176459
custom	5.45	0.183444
cost	2.62	0.382356
trackandtr~e	1.94	0.516361
timeliness	1.47	0.679078
infrastruc~e	1.29	0.777610
Mean VIF	3.07	

Source: Survey result, 2021

4.4.4 Regression Analysis

Regression analysis allows researchers to analyze relationships between one independent and one dependent variable. The dependent variable is usually the outcome we care about, while the independent variables are the instruments we have to achieve those outcomes with. It can also help make predictions. Regressions have been used to find an equation which would predict the impact of independent variables on a dependent variable. In this study, such equations have been developed for each independent variable to comprehensively find the effect of each of the multimodal transport service elements on its performance.

Y = a + b1X1 + b2X2 + b3X3 + b4X4 +b5X5+b6X6+ e Where;
Y= Multimodal Transport Service performance

X1= customs

X2= infrastructure

X3= service quality

X4= timeliness

X5=cost

X6= tracking/tracing

E=error term

a= constant

Table 4.13- Regression model for MTS

Source	SS	df	MS		Number of obs =	207
					F(6, 200) =	89.35
Model	290.166344	6	48.3610574		Prob > F =	0.0000
Residual	108.249115	200	.541245573		R-squared =	0.7283
					Adj R-squared =	0.7201
Total	398.415459	206	1.93405563		Root MSE =	.73569

mtsperformance	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
custom	1.063514	.1392216	7.64	0.000	.788984	1.338045
infrastructure	1.219729	.2007931	6.07	0.000	.8237862	1.615672
servicequality	.1426828	.3304214	0.43	0.666	-.5088739	.7942394
timeliness	-.0699909	.1365217	-0.51	0.609	-.3391976	.1992159
cost	.5186175	.1867457	2.78	0.006	.1503743	.8868606
trackandtrace	-.3778307	.2056035	-1.84	0.068	-.7832595	.0275981
_cons	-3.612798	1.012987	-3.57	0.000	-5.610302	-1.615293

Source: Survey result, 2021

As the constant and b values are known. The model for this regression was:

Y= -3.61+1.06X1+1.22X2+0.14X3-0.07X4+0.52X5-0.38X6+0.05.

As it is seen in the above regression table, all independent variables together are significantly affects the dependent variable which is presented by prob> F which is less than 1% which is 0.000 and conclude that all independent variables together are determinant factors. The AdjR^2value, 0.72 showed that custom, infrastructure, service quality, timeliness, cost and tracking/tracing were predicted approximately by 72 percent of the variations in performance of MTS. It indicates the contribution of custom, infrastructure, service quality, timeliness, cost and tracking/tracing performance in explaining the performance of MTS is 72% while the remaining 28% is influenced by another variable/s that was not observed.

Regarding the individual significant level, only three variables are significant or significantly influence MTS performance at 95% confidence interval. The results of p> | t| found that the variable custom (0.000), infrastructure (0.000) and cost (0.006), has significant influence over the dependent variable or MTS performance because the results of significance value are less than 0.05. The influence of service quality, timelines and tracking and tracing on MTS performance is not that much significant because the results of significance value is greater than 0.05 which is 0.666, 0.609 and 0.068 respectively.

Based on the above result infrastructure has strongest and positive effect on the performance of MTS (1.22) which means 1% improvement in infrastructure development increases MTS performance by 1.22 followed by customs (1.06) this means a 1% improvement in customs clearance performance results 1.06 increment in MTS performance, cost (0.5186) a 1% improvement in the cost performance brings 0.5186 increases in performance of MTS and service quality (0.1426) this means a 1% improvement in service quality results 0.1426 increment in MTS performance .

Timeliness and tracking and tracing negative and insignificant effect on MTS performance (-0.0699) and (-0.3778) as poor performance of timeliness and tracking increase by one unit MTS performance decrease by 0.0699 and 0.3778 respectively.

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

This chapter presents three major sections. These include the summary of the findings, conclusion of the study and recommendations.

5.1. Summary of Major Findings

This paper is conducted on the Assessment on Multimodal Transport Service Operation Performance the Case of Ethiopian Shipping and Logistics Service Enterprise (ESLSE) to examine the current multimodal service operation performance. This study used self-administered questionnaire that contained 35 performance statements related to the six dimensions customs, infrastructure, timeliness, logistics service quality/competence, cost competitiveness and trucking and tracing. The data collected is analyzed through descriptive and inferential statistics using STATA version 12 software. In order to start the study, 230 questionnaires were distributed and 207 has been duly filled and returned. In the demographic characteristics, gender showed that 85.99% of the respondents are male, age of the respondents, 46.86%)are from 31 to 45 years old and the majority of the customers 33.33% are managers. Regarding the education level, 52.17% of the respondents are first degree holders and with regard to relationship, 42.51%) % of the respondents have up to 11-15 years relationship with ESLSE with majority of every month transaction with the company. More than79.23% of customers are owned business companies.

The overall service performance of ESLSE multimodal transport system regarding the six determinants customs, infrastructure, timeliness, logistics service quality/competence, cost competitiveness and trucking and tracing is found to be poor the average score mean2.89, 2.50, 2.57, 2.67, 2.79 and 2.86respectively with standard deviation range between1.06 to 1.45.

Even if there is a formulated customs clearance procedure and customers do receive information when these regulations got change customers are dissatisfied with the custom clearance process, reflected by lack of efficient based on speed, simplicity and predictability of formalities, transparency, compliance resolution and coordination between customs and ESLSE that indicates the custom clearance process is not suitable to deliver efficient multimodal transport service.

According to the customers evaluation of the infrastructure, problems exist in the multimodal transport sector with regard to supporting the service with sophisticated ICT infrastructure, having enough number of trucks, own ships and dry ports, warehouses and terminals with the necessary equipment and have sufficient room and capacity to handle and accommodate all incoming and

outgoing multimodal goods to render the service adequately with mean score range between1.64&2.69and a standard deviation ranging from 0.71 to 1.43. The inland railway and road transport is fairly suitable and sufficient for moving goods door to door on the eyes of the customers.

Customers agree the MTS is supported moderate skilled and expertise in ESLSE with good safety and security of freight shipments against damage or loss and documentation on the contrary there is no single window service with low level of coordination between different sectors within the company and outside with stakeholders at the same time provision of timely response to customer complaint is weak. The service provided is not supported by online booking system that the customer can use the service from where they are.

The majority of the respondent's evaluated timeliness by disagreement the parameters stated with an average mean value of 2.67 and a standard deviation value of 1.30. These imply that the majority of the respondent disagreed and dissatisfied with the ESLSE performance on meeting scheduled/expected delivery time. This means the existing multimodal system is more of time consuming exposing the customers to pay extra cost.

Cost competitiveness was evaluated as disagree by the majority of the respondants with average mean value of 2.79 and standard deviation value of 1.29. This implies that the multimodal transport service is not competitive in rendering quick and quality service with reasonable price. Thus, the majority of customers are not satisfied with the monopolistic privilege of the government owned enterprise ESLSE.

Tracking and tracing shipment is not supported by improved computerized system that ESLSE couldn't provide the particular status or location of a shipment in reasonable time and cargos can't be easily located in identifiable way in dry ports and terminal that score minimum mean.
From the inferential Analysis the correlation matrix result shows performance of Multimodal Transport operation service (dependent variable) has direct and positive relation with Custom, Infrastructure, Competence, Timeliness, and Competition, Tracking and Tracing dimensions (independent variables).

5.2.Conclusion

In conclusion, based on the findings of the research in the case of Ethiopian Shipping and Logistic and Service Enterprise it can be concluded that Customs, Infrastructure, Competence /logistics service quality/, Timeliness, and Competition/Cost/, and Tracking and Tracing dimensions are all determinant factors for Operational Performance of Multimodal Transport Service. However, the individual significant level vary from one to another that Customs, Infrastructure and Cost have significant influence over MTS performance whereas the influence of service quality, timelines and tracking and tracing on MTS performance is not that much significant. From the study it was assessed the performance of all the six is not as such satisfactory that force to inclined to conclude the performance of MTS is low .

Therefore, the management can use the specific result obtained from the measurement findings in their strategies and plans. This will help organization to better understand the approach to be followed giving a priority step by step in order to tackle the problem by giving appropriate solutions. Thus, understanding customer needs will increase through time the performance of the company by in large. Whereas, the result shows with research evidence that multimodal transport service is not in good demand when we compute under the mentioned LPI determinants.

5.3.Recommendations

In relation to the finding, the researcher came up with the following recommendations:-

- The most important key for the international competitiveness is to shorten the time to release shipments. Thus, drastic change and modernization of the Customs Clearance System is critical for the progress of an economy and for the improvement of the total logistics system. Customs need to come up with clear procedures and system that supports the clearance process amending over time. The process shall be transparent creating awareness to customers so as they shall participate to support the clearance process willingly with loyalty. Improve the coordination level with all stakeholders that involve in the custom clearance to speed up the process by balancing the facilitation with controlling.
- It is clear that all the infrastructures that are essential for MTS are not under the mandate of only ESLSE, so ESLSE should work in collaboration with the government for the development of high level infrastructures such as road, rail, dry port and terminal infrastructure give focus on outfitting dry ports, stations and storage facility with state-of-the-art loading / unloading machines, new fuel-efficient and high-volume trucks, vessels and ICT infrastructure development.

- Timeliness of shipments in reaching the expected destination within the scheduled or promised delivery time. Dwelling time of cargo should be reduced at Djibouti and Dry Ports. To shorten the dwelling time at Djibouti, the government of Ethiopia should reduce the transit time and waiting times for different activities.
- ESLSE need launching up a higher institution / training academy for the transport and logistics service sector to provide the industry with various educated and intellectuals on the new modernized logistics operation. And up-to-date its service with the existing world class service quality requirements. It is suggested that ESLSE provide a timely and essential capacity building program such as developing customer credibility, training and professional qualification improving of the employees.
- As the current policy of government supports privatization ESLSE shall prepare itself on promoting the spirit of competition between private companies and multimodal transportation operators. ESLSE must also work on cost efficiency to provide quality service with competitive price.
- Cargo tracking system has to be installed and supported by modern technology such as Electronic Cargo Tracking System, GPS to follow up the status of cargo and equipment at each stage and handovers.

5.4. Limitations of the Study

The findings of this study should be viewed with consideration in mind that certain limitations do exist. The non-response rate was one of the limitations that only 207 respondents returned back the questionnaires from the 230 questionnaires distributed. Few of the respondents did not return back the questionnaires and some o seemed sensitive about revealing facts out of trust that increased the difficulty of doing this research. The study only focused on multimodal transport system of imports that the export cargos have not been considered in this study.

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Appendix

Survey Questionnaire for Customers

Addis Ababa University School Post graduate Studies

A Survey Questionnaires for research project to be conducted in partial fulfillment of MA

This survey is required to study on the assessment of performance of multimodal transport service operation: the case of Ethiopian Shipping & Logistics Service Enterprise (ESLSE)

Please note that, the information provided will kept confidential and used for academic purposed only. Your cooperation in completing the survey questionnaire by providing quire and reliable information is highly valuable and greatly appreciated. Thanking you in advance for giving your time and sharing experience.

Part I

Back ground information (**Make Circle**)

1. Sex: ☐ Male ☐ Female
2. Age: ☐ < 30 y ears ☐ 31-45 years ☐ 46-60 years ☐ Above 60 years
3. Occupational status in your company

☐ Expert ☐ Manager ☐ Business Owner Any other _____

4. Educational Level

☐ High school graduate ☐ Certificate ☐ College Diploma ☐ Degree

☐ Masters and above ☐ other (please state) _____

5. How long have you used ESLSE services?

☐ Less than 5 years ☐ 6-10 years ☐ 11-15 years

☐ 16- 20 years ☐ Above 20 years

6. How often do you use the services delivered by ESLSE?

☐ Once a month ☐ Once a three month ☐ Once a six month

☐Once a nine month ☐Once a year ☐so far, only once

7. Which best describes your company's type?

☐Government ☐ private

Part 2

Please indicate your degree of agreement or disagreement with the following statements by **encircling** the appropriate number (1-Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strongly Agree).

Key: SD= Strongly Disagree; D=Disagree; N= Neutral; A= Agree; SA= Strongly Agree

I. Custom Performance (The efficiency of customs and border management Clearance)

No.	Variables	**Your Evaluation**				
		SD	D	N	A	SA
1	Customs have developed a system or procedure of clearance for multimodal transportation.	1	2	3	4	5
2	The custom clearance process for multimodal shipments is Efficient based on Speed , Simplicity and predictability of formalities	1	2	3	4	5
3	The customs clearance procedure for multimodal shipments is transparent.	1	2	3	4	5
4	Customers receive adequate and timely information when custom regulations change.	1	2	3	4	5
5	There is a system that customers can demonstrate high levels of compliance	1	2	3	4	5
6	The existing coordination level between customs offices and ESLSE is strong	1	2	3	4	5

II. **Infrastructure Performance (**The quality of trade- and transport-related infrastructure)

No.	Variables	**Your Evaluation**				
		SD	D	N	A	SA
1	Road transport is adequate to meet the need of inland cargo movement.	1	2	3	4	5
2	The railway is capable of meeting the need of inland cargo movement.	1	2	3	4	5
3	ESLSE have enough number of trucks with significant capacity to render effective and efficient multimodal transportation service	1	2	3	4	5
4	ESLSE have enough number of own ships with significant capacity to render effective and efficient multimodal transportation service	1	2	3	4	5
5	Dry ports coverage for the multimodal freight customers are convenient / ESLSE has enough number of Dry ports all over the country /					
6	The dry ports, terminals and warehouses are adequate and well equipped with the necessary equipment and facilities for handling multimodal cargo	1	2	3	4	5
7	There are sophisticated ICT infrastructures for real time information exchange use.	1	2	3	4	5
8	The dry ports do have enough space and capacity to accommodate all incoming and outgoing cargos even at peak periods.	1	2	3	4	5

III. Service Quality Performance (The competence and quality of logistics services)

No.	Variables	**Your Evaluation**				
		SD	D	N	A	SA
1	There is enough expertise in ESLSE to operate multimodal transport systems	1	2	3	4	5
2	Multi modal transport service provides single window service	1	2	3	4	5
3	Provides timely response to customer complain	1	2	3	4	5

4	The service provided by Multimodal transport has online Booking	1	2	3	4	5
5	The coordination level among stakeholders in providing integrated multimodal transport service is strong.	1	2	3	4	5
6	The overall safety and security of freight shipments against damage or loss is satisfactory	1	2	3	4	5
7	There is good documentation performance on time issuance and delivery of bill of lading, rail or road consignment note					

IV. Timeliness Performance (The frequency with which shipments reach consignees within the scheduled or expected delivery time)

No.	Variables	**Your Evaluation**				
		SD	D	N	A	SA
1	Shipments are coming with minimum process time in Djibouti and reasonable transportation time than ever	1	2	3	4	5
2	Shipments reach the designated dry ports within the scheduled or expected delivery time	1	2	3	4	5
3	Cargo handling time in dry port is short and provide the cargo easily within acceptable waiting time	1	2	3	4	5
4	The customer received their shipments within the free time from designated dry ports.	1	2	3	4	5

V. **Cost Performance (**The ease of arranging competitively priced international shipments)

No.	Variables	**Your Evaluation**				
		SD	D	N	A	SA
1	ESLSE has flexible tariff with flexible payment mode	1	2	3	4	5
2	Cost of Sea Freight is Reasonable	1	2	3	4	5
3	Cost of Inland Transport is Reasonable	1	2	3	4	5
4	Cost of Storage and Demurrage is Reasonable	1	2	3	4	5
5	The purposes of costs that multimodal customers are requested to pay are clear and understandable.	1	2	3	4	5

VI. Tracking and Tracing Performance (The ability to track and trace consignments)

No.	Variables	Your Evaluation				
		SD	D	N	A	SA
1	Tracking and Tracing shipment is supported by improved computerized system	1	2	3	4	5
2	ESLSE provides particular status or location of a shipment in a reasonable time	1	2	3	4	5
3	Cargos are easily located in identifiable way in dry ports and terminal	1	2	3	4	5
4	ESLSE provide arrival notification to its customer	1	2	3	4	5

VII. Overall multimodal transport service performance

No.	Variables	Your Evaluation				
		SD	D	N	A	SA
1	The Overall performance of multimodal transport has excellent performance	1	2	3	4	5