



**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**THE PRACTICES AND CHALLENGES OF MULTIMODAL  
TRANSPORT OPERATION IN ETHIOPIAN SHIPPING AND  
LOGISTICS SERVICES ENTERPRISE**

**BY  
TAGEL GEBREMICHAEL KALLO**

**JUNE 2014  
ADDIS ABABA, ETHIOPIA**

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**A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF  
GRADUATE STUDIES IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS  
ADMINISTRATION**

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## **DEDICATION**

*I dedicate this research work to my mother.*

# TABLE OF CONTENTS

TITLE	
TABLE OF CONTENTS	i
ACKNOWLEDGEMENTS	iv
LIST OF ABBREVIATIONS AND ACRONYMS	v
LIST OF TABLES	vii
ABSTRACT	viii
<b>CHAPTER ONE: INTRODUCTION</b>	
1.1. Background of the Study	1
1.2. Background of the Organization	4
1.3. Statement of the Problem	7
1.4. Research Questions	10
1.5. Objectives of the Study	10
1.5.1. General Objectives of the Study	11
1.5.2. Specific Objectives of the Study	11
1.6. Definition of Terms	11
1.7. Significance of the Study	12
1.8. Delimitation/Scope of the Study	12
<b>CHAPTER TWO: REVIEW OF RELATED LITERATURE</b>	
2.1. Theoretical Literature Review	14
2.1.1. The Historical Evolution of International Transportation	14
2.1.2. The Definitions and Concepts of International Transportation	19
2.1.2.1. The Definitions of Transportation	19
2.1.2.2. Modes of Transportation	20
2.1.2.3. The Concepts of Transportation	23
2.1.3. The Importance of International Multimodal Transportation System	29
2.1.4. The Requirements of International Multimodal Transportation system	30
2.1.4.1. Infrastructure and Technologies	31

2.1.4.2. Security and Safety	31
2.1.4.3. Facilitation	32
2.1.4.4. Legal Aspects	32
2.1.4.5. Market Access	33
2.1.5. The Practices and Challenges of International Multimodal Transportation System	33
2.1.5.1. The Practices of International Multimodal Transportation	34
2.1.5.2. The Challenges of International Multimodal Transportation	35
2.1.6. The Developmental Status of Ethiopian Foreign Trade	36
2.1.7. The Infrastructural Developments of Ethiopia	37
2.1.7.1. The Developmental Status of Transport Networks	38
2.1.7.2. The Developmental Status of Communication Networks and Energy Supply	40
2.2. Empirical Literature Review	41
<b>CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY</b>	
3.1. Research Design	43
3.2. Population and Sampling Technique	43
3.2.1. Sampling Technique	43
3.2.2. Sample Size Determination Method	44
3.3. Types of Data and tools/Instruments of Data Collection	46
3.3.1. Types of data and Sources of Data	46
3.3.2. Instruments of Data Collection	46
3.4. Procedures of Data Collection	46
3.5. Reliability and Validity Analysis	47
3.6. Methods of Data Analysis	48
3.7. Ethical Considerations	48
<b>CHAPTER FOUR: RESULTS AND DISCUSSION</b>	
4.1. General Profile of Respondents	49
4.1.1. Sex of Respondents	49
4.1.2. Educational Background of Respondents	50
4.1.3. Job Position of Respondents	50

4.1.4. Work Experiences of Respondents	51
4.1.5. Companies Foreign Trade Sector Type	51
4.1.6. Companies Business Sector Type	52
4.1.7. Ownership Title of Companies	53
4.1.8. Foreign Trade Experiences of Companies	53
4.1.9. Foreign Trade Partners Origin	54
4.2. Multimodal Transport Information Dissemination Performance	55
4.3. Dry Port and Terminal Services Performance	56
4.4. Inland Transport Service Performance	59
4.5. Sea Transport Service Performance	62
4.6. Customer Service Performance	64
4.7. Multimodal Transport Regulatory Structure	66
4.8. The role of Customs office in Multimodal Transport System	68
4.9. Summary of Open Ended Questions	69
4.10. Multimodal Transport Practices of ESLSE	71
<b>CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS</b>	
5.1. Summary of findings	72
5.2. Conclusions	74
5.3. Limitations of the Study	75
5.4. Recommendations	76
REFERENCES	79
APPENDICES	
DECLARATION	
ENDORSEMENT	

## ACKNOWLEDGEMENTS

First of all my full gratitude goes to “God” the creator and sustainer of the world, who has helped me with all my hardships by giving health, strength and perseverance to start, continue and finish this study.

Secondly, I would also like to extend my deep appreciation and thanks to my advisor Matiws Ensermu (PhD), for his critical reading of the paper from the proposal stage to the final stage, invaluable advise, suggestion and constructive comments on the paper making the work more articulate and without his persistent help the completion of this paper would not have been possible.

Thirdly, I would like to thank the following individuals and institutions, without whom, this research would not have been successful:-

- All managements and employees of Ethiopian Shipping and Logistics Services Enterprise and Maritime Affairs Authority for their multidimensional support given at every stage of the research work starting from permission stage;
- Ato Solomon Kassa, owner and manager of Solomon Kassa Customs Clearing Agency for his invaluable support given at data collection stage.
- Ato Abebaw Kassie, owner and manager of Yosabet and Abenezer Transit PLC for his assistance by duplicating the questionnaire to facilitate data collection process.
- Ato Tarekegn Ayalew, manager of Ramp Transit PLC and Ato Fitsum Edjigu for facilitating and coordinating of data collection activities.

Finally, I say thanks to my family members for their encouragement to continue my further studies.

Last, but not least I would like to say thanks indeed to all my friends for their unconditional support and encouragement to continue my further studies.

Tagel G/Michael Kallo

June 2014.



## ABBREVIATIONS AND ACRONYMS

ACIS	Advance Cargo Information System
AfDB	African Development Bank
ALADI	Latin American integration Association
ASEAN	Association of Southeast Asian Nations
ATD	Association of Djiboutian Transisters
AU	African Union
CSA	Central Statistics Agency
D.C.	District of Columbia
EEPCo.	Ethiopian Electric Power Corporation
ERA	Ethiopian Road Authority
ERC	Ethiopian Railway Corporation
ESL	Ethiopian Shipping Lines
ESLSC	Ethiopian Shipping Lines Share Company
ESLSE	Ethiopian Shipping and Logistics Services Enterprise
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic Product
GERDP	Grand Ethiopian Renaissance Dam Project
GIS	Geographic Information System
GIS-T	GIS in Transportation
GLSLB	Great Lakes Saint Lawrence Basin
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
ICC	International Chamber of Commerce
ICT	Information Communication Technology
KLM	Royal Deutch Airline
Km	Kilometer
Km/h	Kilo meter per hour
LPI	Logistics Performance Index
M/T	Motor Tanker or Motor Tugboat
M/V	Motor Vessel
MERCOSUR	Southern American Common Market
MMT	Multimodal Transport
MoFA and WMP PLC	Ministry of Foreign Affairs and Wafa Marketing and Promotion Private Limited Company

MoFED	Ministry of Finance and Economic Development
MT Convention	Marketing and Technology Convention
MTO	Multimodal Transport Operator
MTSE	Maritime and Transit Services Enterprise
MW	Mega Watt
NCFRP	National Cooperative Freight Research Program
PLC	Private Limited Company
RSDP	Road Sector Development Plan
SC	Share Company
SPSS	Statistical Packages for Social Sciences
UNCTAD	United Nations Convention on Trade and Development
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
USD	United States Dollar

## LIST OF TABLES

Table No.1	Reliability Statistics	47
Table No.2	Summary of Sex of Respondents	50
Table No.3	Summary of Respondents' Educational Background	50
Table No.4	Summary of Respondents' Job Position	51
Table No.5	Summary of Respondents' Work Experience	51
Table No.6	Summary of Companies Foreign Trade Sector Type	52
Table No.7	Summary of Companies Business Sector Type	52
Table No.8	Summary of Companies' Ownership Title	53
Table No.9	Summary of Companies' Foreign Trade Experience	54
Table No.10	Summary of Companies' Foreign Trade Partners Origin	54
Table No.11	Descriptive Statistics value of Multimodal Transport Information Dissemination Variables	55
Table No.12	Descriptive Statistics value of Dry Port and Terminal Services Variables	58
Table No.13	Descriptive Statistics value of Inland Transport Service Variables	60
Table No.14	Descriptive Statistics value of Sea Transport Service Variables	63
Table No.15	Descriptive Statistics value of Customer Service Variables	64
Table No.16	Descriptive Statistics of multimodal Transport Regulatory Aspects Variables	67
Table No.17	Descriptive Statistics of the role of Customs Office on Multimodal Transport Variables	68

## ***Abstract***

*For the last 50 years ESLSE served the country by rendering sea transport service but since three years back it has started to provide a multimodal transport service committing itself to give some additional transport services. The GoE introduced multimodal transport system with the intension of providing seamless logistics services with reduced transaction cost. This research work intended to assess the practices and challenges of multimodal transportation system exhibited during those three years. The research questions used to assess the practices and challenges of the multimodal transport system were what the practices of multimodal transport are, what challenges and their features are, and what policies and procedural measures were taken or to be taken by the government to safeguard system's operation. These questions were relevant to identify the practices, challenges and their features particularly. Primary data were collected from 205 customers and three managements through interview. Out of the 205 questionnaires distributed only 153 were successfully returned back. Descriptive analysis method was used to calculate the outputs (i.e. median and mode) using the most prominent statistical software called SPSS. The operational activities of the multimodal transport system were classified into seven distinct sections only for the purpose of the study. Based on the findings of the research most of the respondents were dissatisfied with the information dissemination performance, dry port and terminal services, inland transport services and customer service performances of the enterprise. Further the findings showed that most of the respondents were found neutral when examining the shipping services and the multimodal transport regulatory aspects performances level. Hence, based on the findings of the research it is possible to conclude that shortages of dry port spaces, port handling equipments and facilities, freight transport vehicles and multimodal experts are the major challenges of the system. These challenges were found to be sources of transit time extension, transport cost increment and dissatisfaction of customers ultimately. The main benefits planned to be secured were shortening of goods transit time, reduction of transport cost and foreign exchange outflow. But securing these benefits needs an extra effort from the enterprise, the public and other stakeholders in the future. However, the enterprise has been taking stage by stage measures to upgrade the multimodal transport service quality. Therefore, the enterprise has to equipped all the ports and terminals with latest machineries and facilities in the future. The inland transport service should also be enhanced by acquiring latest fuel efficient and high volume vehicles. Employees and customers should get trainings on how the system works and benefit our countries development move.*

**Key Words:** *Multimodal Transport System, Unimodal Transport System, Dry Ports, transit time and transport costs.*

# CHAPTER ONE

## INTRODUCTION

### 1.1. Background of the Study

The concept of logistics in early times was implemented predominately in military institutions in the way to ensure delivery of military supplies to war fronts. Bhat (2011) explains military logistics as the design and integration of all aspects of support for the operational capability of the military forces and their equipment to ensure readiness, reliability and efficiency. Most ancient books written in areas of logistics witness the reality in this manner.

Through time the concept of logistics and logistics management had shown a tremendous improvement in its scope and quality of operational efficiency. Ultimately it has become the common concept in international manufacturing and service business activities. Currently logistics has many branches and it has been customized and used both in manufacturing and service businesses. Different books written at different times in the past put the meaning, principles and purposes of logistics and logistics management in different approaches. However, all the principles, concepts and discussions raised have tried to convey a single message. All the efforts shown by the scholars so far have played their role for the developmental move of logistics and logistics management concepts.

Based on the ever changing demands of the business community for improved and quality services of logistics, the definition of logistics has been forced to accommodate many more operational activities of business in the supply chain management process. Due to this fact, the controlling and management endeavor in logistical operation become a key and an essential element for the successful completion of the missions of logistics activities in a supply chain process (Bowersox and Closs, 2000). Furthermore, the same authors explain the activities involved in logistics management in a more systematic way as: “Logistics involves the integration of information, transportation, inventory, warehousing, material handling, and packaging”. In order to provide effective and efficient logistics services, the operational areas stated in the definition must be interlinked and work as one and the same. Agrawal (2003) noted that inefficient logistical operation will result in delivery delay, high cost of logistics,

loss of customers, poor quality of service and discrepancy on quantity delivered, production interruption and extension of lead time.

Transportation is one of the basic and important elements of operational activities in international logistics operation and it plays a significant role in the successful completion of the logistical chain process (Bhat, 2011). Products produced at different places need transportation services to deliver them to the market place. Besides the transportation services information communications technology (ICT) has got a paramount importance in the contemporary business world, since it is seriously assisting transportation operations and the whole supply chain process at large. The recent advancement seen in technologies greatly supported the development of transportation and communication system by improving the efficiency and effectiveness of the supply chain process. Today it is common to book or track any shipment using products of information communication technologies very easily.

The historical evolvement of international transportation takes us to the history of human civilization. People in the early times used animals to transport agricultural products and people from place to place as a vehicle. Through time transportation had shown a remarkable improvement and continued to play its vital role in the development of international trade. The variable endowment of natural resources across nations forced nations to be interdependent on each other to satisfy the demands of their people resulted with international trade. Hence international transportation service eases the delivery of goods in different areas and strengthened the business relations of different nations across the world (Chary, 2006; Cherunilam, 2004; Hoeks, 2009; Bhat, 2011).

The waterways, railway, roadways, airways and pipeline are the major modes of transport used in the transportation world. According to Vishawakarma (2010) road transport is the cheapest mode of transport over short distance, and railway becomes cheapest over medium and a long distance and water transport is cheapest for very long distance in general.

The evolution of multimodal transport is usually related with the use of containers in international transport. Containers played a significant role in standardization of international cargo shipments. As per Breda (2009) in the 1950's shippers<sup>1</sup> began to use containers as they

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<sup>1</sup> The person or company who is usually the supplier or owner of commodities shipped (US Maritime Administration, 2008).

provided significant operational advantages to them, the carriers<sup>2</sup> and the consignees<sup>3</sup> as well. The introduction of container service in the international trade enabled cargo handling more efficient in terms of time and reduction of damage and facilitated the standardization of transshipment<sup>4</sup> of cargoes. Before the introduction of the container, cargoes were at risk at the time of transshipment and many problems were happening on the cargoes. Thanks to the containerization concept, transshipment problems have been significantly reduced for containerized cargoes and international trade had shown high dependence on containers to transport their cargoes to other place due to the benefits what a container provides to the cargoes.

Further containerization facilitated the emergence of multimodal transportation in the international trade experience. Before multimodal transport, international cargoes were transported by entering multiple transportation contracts with multiple carriers to get transportation service via unimodal transport system. However, modern international trade required the provision of transportation services in a consolidated manner from a single transportation service provider so as to save goods transit time and money. As per Bowersox and Closs (2000) unimodal transportation operation enhanced individual competitiveness between operators of different modes of transport and this trend has nothing to do with delivering of efficient transportation services to the final customers with minimum service cost.

Multimodal transportation service had been believed to reduce transportation and other costs by shortening transit time and ensuring safe delivery of goods than unimodal transport system provides.

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<sup>2</sup> Any person or entity who, in a contract of carriage, under takes to perform or procure the performance of carriage by rail, road, sea, air, inland waterway or by a combination of such modes(US Maritime Administration, 2008).

<sup>3</sup> A person or company to whom commodities are shipped (US Maritime Administration, 2008).

<sup>4</sup> A to transfer goods from one transportation line to another, or from one ship to another (US Maritime Administration, 2008).

According to (UNCTAD, 1981) the United Nations Conference on a convention on international multimodal Transport document, International Multimodal Transport is defined as:-

*“... 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. The operations of pick-up and delivery of goods carried out in the performance of a unimodal transport contract, as defined in such contract, shall not be considered as international multimodal transport”.*

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. In this case, shippers will be satisfied in supplying their goods with the lowest possible transportation cost and thereby the consignees will not face shortages of raw materials in manufacturing centers if it ensures early delivery. This scheme pools together one more modes of transport to render multimodal transport services via a single multimodal operator or multimodal service provider. Further the system avoids 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 (Breda, 2009).

## **1.2. Background of the Organization**

The Ethiopian Shipping and Logistics Services Enterprise formerly known as Ethiopian Shipping Lines S.C is one of government owned business enterprises coming to the forefront but little has been said about it both in local and international media about its significant contribution in the country's economy. March 10, 1964 was a historical day in which the agreement between the Ethiopian Government and the Taurus Investment Inc. was made to establish the Ethiopian Shipping Lines with an initial capital of 50,000 ETB and opened its head office in Washington DC (Walta, 2014). Taurus Investment Inc. of Washington DC agreed to subscribe to 51 percent of the capital requirements designating two directors of the company. However, the Ethiopian government has contributed the remaining 49 percent of the capital required designating two directors of the company. Eventually, the Americans sold



their share to the government of Ethiopia/GoE and the company fully owned by the government since 1969/70.

Then, ESL entered an agreement with VEROLME group of Holland not only for the delivery of ships but also for technical, operational and managerial assistances. The two cargo liners: the M.V "Lion of Judah" and the M.V "Queen of Sheba" as well as the oil tanker "Lalibela" were ordered for the first time and ceremoniously launched in 1966 at Rotterdam.

In recognition of the need for shipping services, ESLSC had been undertaking an extensive fleet expansion programs since then. Its reestablishment in 1994 with a capital of 122 million was aimed to render coastal and international marine transport services.

ESLSC is the only Company being involved in sea freight transport activity in the country. Having envisioned being a modern indigenous shipping company that renders reliable and competitive maritime transport to the country's export and importing trade, ESLSC had been exerting tremendous efforts to achieve its goals. The company, in its long years of marine transportation service managed to build a reputation of reliability, efficiency and good service.

According to the available documents, ESLSC launched its first service along the UK/North and West Europe routes, which was the major direction of Ethiopia's import and export trade at that time. It then expanded its services to the Mediterranean, Adriatic, the Far East areas, Gulf regions and the Red Sea. At present ESLSC uses the port of Djibouti as its base and provides reliable and efficient services, which persuaded many business institutions to show interests in using it.

ESLSC has effective agency networks in all its trading areas for assisting shippers from Ethiopia or abroad in arranging and consolidating their shipments, using the port of Djibouti as its base and provides liner services to specified ports on regular sailing schedules subject to sufficient encouragement.

Currently the company owns fifteen vessels and nine of them are newly built and received at the end of 2013 which were believed to enhance the operational capacity of the enterprise at large. Of which the two vessels are suitable for liquid cargo transport. The newly built vessels are named by the name of capital cities of Ethiopia's nine regions as M/V Gambella, M/V Jig Jiga, M/V Mekelle, M/V Assosa, M/V Finfine, M/V Semera, M/V Harar, MT Bahir Dar, and

MT Hawassa. The company has sold three old vessels called M/V Abbay Wonz, M/V Abyot and M/V Omo Wonz in the year 2010 and 2012. The remaining six old vessels M/V Shebelle, M/V Gibe, M/V Andinet, M/V Netsanet, M/V Admas and M/V Tekeze brought the total number of vessels to fifteen.

According to the Ethiopian Shipping and Logistics Services Enterprise Establishment Council of Ministers Regulation No. 255/2011, the former ESLSC has been officially merged with two other governmental enterprises called Maritime and Transit Service Enterprise (MTSE) which was rendering transit, customs clearing and logistics services to its customers for many decades and Dry port services Enterprise which was rendering dry port and terminal services since few years ago to pave the way to adopt the multimodal transport system. The new enterprise was reestablished as a public enterprise in 2011 with an authorized capital of ETB 3,760,000,000.00 of which ETB 940,799,000.00 was paid up in cash and in kind to give an efficient and integrated multimodal service to its customers being a single company. Following the reestablishment proclamation, the newly merged company named as “Ethiopian Shipping and Logistics Services Enterprise (ESLSE)” and it has been nominated to function as a Multimodal Transport Operator.

The enterprise shall be governed by the Public Enterprises Proclamation No. 25/1992 and its operation is directly supervised by Ministry of Transport and the office of Maritime Affairs Authority as it is clearly indicated in Maritime Sector Administration Proclamation No. 549/2007. According to the enterprise’s establishment regulation, the maritime and transit service enterprise establishment council of ministers regulation No.190/1994 and the Dry Port Service Enterprise Establishment Council of Ministers Regulation No.136/2007 are repealed. Whereas the rights and obligations of ESLSC and MTSE established under the Council of Ministers Regulation No.190/1994 and the Dry Port Service Enterprise established under the Council of Ministers Regulation No.136/2007 are hereby transferred to the new enterprise.

The enterprise’s establishment Regulation No. 255/2011 gave power to the enterprise to accomplish the following tasks:-

- To render coastal and international marine and internal water transport services;

- To render freight forwarding agency, multimodal transport, shipping agency and air agency services;
- To provide the services of stevedoring, shore-handling, dry port, warehousing and other logistics services for import and export goods;
- To provide container terminal services;
- To engage in the development, management and operation of ports;
- To establish and run human resources development and training center in the field of maritime profession;
- To study the country's import and export trade demand and thereby develop technological capacity in order to render efficient maritime and transit transport services; and
- To engage in other related activities conducive to the achievement of its objective.

Consequently, the enterprise has restructured its management and operational activities in four operational sectors having 2,002 permanent and contractual employees and started rendering multimodal transport services to its customers. Currently the enterprise has six dry ports in different level at different places specifically in Modjo, Semera, Gelan, Mekelle, Dire Dawa and Kombocha. The Head Office of ESLSE is located in Addis Ababa, Kirkos Sub City, Kebele 01 particularly around the area called "Legehare Rail Station".

### **1.3. Statement of the Problem**

Success in transport sector needs the development of infrastructural facilities which helps to render efficient and effective transportation service. Transportation infrastructure development is the main task to be done by governments as a duty. Countries which have been already developed their infrastructural facilities have managed to provide modern transportation and communication services with minimum cost and service time with noticeable differences in international business arena. In contrast developing countries were not lucky to support their international trade as needed because of their poor transport infrastructural facilities. The available communication and transport networks of most African countries still could not support even the internal trading system successfully let alone the international ones.

The governments of these nations are expected to stretch their hands to invest and show their endeavor by stepping up the infrastructural facilities and human resource development to the required level. That will ensure the easy flow of people, goods and information with the lowest cost possible. .

The contribution of transport and communication sectors to the country's GDP is still less than 10 percent while the government is investing a huge amount of birr to scale up the infrastructural facilities development in the sector (CSA, 2007). Development in transport and communication sector will have a substantial impact on logistics activities and ultimately fosters international trade that brings economic development to the country. More is expected from the sector to ensure a sustainable economic development that eventually make realized the country's vision of being a middle income country by the year 2025(UNDP, 2012; MoFED, 2013; Debela, 2013)

The infrastructural development in transport and communication sectors seem stagnated in the past decades and its continued stagnation is manifested by the poor logistics facilities we have. This infrastructural status cannot encourage transport service providers to invest in the sector and give time and cost efficient services. Poor networks of road, poor telecom facilities, interrupted energy supply and unavailability of qualified experts and lack of commitment from government side all have played their role to worsen the quality of the logistics sector. The real feature of Ethiopian logistics system has been precisely described by Debela (2013) in his research work and his concluding statement directly quoted as below:

*“Ethiopian logistics system is characterized by poor logistics management system and lack of coordination of goods transport, low level of development of logistics infrastructure and inadequate fleets of freight vehicles in number and age, damage and quality deterioration of goods while handling, transporting and in storage. This coupled with lack of sea port resulted in poor linkage of producers (farmers) to the consumers (market) and non-competitiveness of Ethiopian goods on global market, which compromised livelihood of the people and economy of the country. There is a very high rate of traffic accident (first in the world) and congestion in cities and at city inlets/outlets to which freight vehicles contribute significantly. Efficient and effective logistics system needs to be put in place to solve the socio-economic problems.”*

To end up the inefficient performance of international freight transport system, much is expected from the sector to introduce a very efficient means of freight transport system that would enhance the development of the country's export business. Once this is achieved it will not be a big task to create a seamless supply chain process to the manufacturing sector. The government of Ethiopia lately recognized the mess of not having sea ports and its devastating effect on the country's international trade development in particular and the country's economic development in general. Consequently, the government made subsequent discussions with the Djiboutian government how to establish a multimodal transport system without affecting the national interests of both. Finally, after long years of exhaustive negotiations, as per proclamation No. 520/2007 the two governments agreed and signed the Multimodal Transport system agreement on the 18<sup>th</sup> day of November 2006 at Djibouti to implement multimodal transport system using through bill of lading (Negarit Gazeta, 2007). At the time of signing the agreement the government of Ethiopia believed that the system would solve the major problems in relation to logistics and terminal services. Few years later ESLSE launched a Multimodal Transport service aiming to reduce goods transit time, cost of transport and foreign exchange outflow in general.

According to Breda (2009) 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. The same author emphasizes that it can help to increase productiveness and effectiveness of freight transport industry as a whole. Since effective multimodal transport ensures the use of the most efficient mode of transport at each stage and that ultimately reduces congestion, energy expenditure and pollution dramatically. Multimodal transport operation will not be a choice for a country which is landlocked like us. Since it is very costly to continue being dependent only on unimodal transport system.

The multimodal transport service was launched in 2011 as a new transport system to the Ethiopian foreign trade system. Following the commencement of the new service, unexpected situations happened in the daily operation of the enterprise and ultimately harmed the effective performance of the business communities. As a result the Ethiopian Shipping and Logistics Services Enterprise failed to bring shipments to dry ports in Ethiopia within reasonable period. This trend posed a strong challenge to the economy at large. At the introduction stage, the problem was very severe especially to the manufacturing companies. It

is because manufacturers and traders were not getting their raw materials and merchandise goods on time as they were getting in unimodal system. As a result, the country has been forced to pay huge amount of dollars to the government of Djibouti for demurrage and detention fees accrued for cargoes stayed for months.

Since its first day of operation a lot of improvements have been seen in the system. But still a lot is remaining to secure all the practical benefits what the government has planned to enjoy from the system. As per the multimodal transport system implementation performance appraisal report prepared by Maritime Affairs Authority (2013), the gain is far less compared to the effort exerted starting from the first day of implementation stage. From this report it can be inferred that the system is still lacking something very critical to its success.

Frankly speaking, the operation of multimodal transport system is very new to the country having a life of three years. As a result there are no research studies made earlier on the practical experiences of the new system as to the knowledge of the researcher. In spite of this fact, the researcher could not be able to refer research studies made on the same topic.

Therefore, this research study has assessed the actual practices of multimodal transport system and identified the challenges of the system.

#### **1.4. Research Questions**

Based on the above statement of problem, the study answered the following questions:-

- What are the challenges prevailed in the multimodal transport system?
- What are the features of those challenges existing in the multimodal transport system?
- What are the current practices of multimodal transport operation in ESLSE?
- What are the policy and procedural measures taken by government and/or planned to be taken in the future to safeguard the system's efficiency and effectiveness?

#### **1.5. Objectives of the Study**

This research study has two parts called general and specific objectives part. The general objective part presented the overall objective of the study and the specific objective part outlines the list of simpler objectives through which the general objective was attained.

### **1.5.1. General Objective of the Study**

The general objective of the study was to assess the practices and challenges of multimodal transport system and come up with possible and applicable recommendations based on the findings obtained from the study.

### **1.5.2. Specific Objectives of the Study**

The specific objectives of the research were:-

- Assessing the level of infrastructural facilities of the country to support the efficient operation of multimodal transport system;
- Identifying the current practices and challenges of multimodal transport system;
- Identifying measures taken or planned to be taken by GoE in order to improve the services of Multimodal Transport System.

### **1.6. Definition of Terms**

The following are operational definitions of terms which were used in the research (UNCTAD, 1981; AU, 2010; Agrawal, 2003):

***Modes of transport:*** - are ways of transport used by transportation service providers in order to render their services. Such as: waterways, railways and airways.

***Unimodal transport service:*** - is a transportation service provided using only a single mode of transport.

***Intermodal Transport:*** - is a particular type of multimodal transport, wherein the goods are moved in one and the same loading unit, for example: Containers. Intermodal Transport uses more than one mode of transport.

***Multimodal Transport Service:*** - it is a transportation service provided by using at least two or more modes of transport in a single chain of transport with a single transport contract and single multimodal transport operator.

***Containerization:*** - is the trend of packing or stuffing of trading goods in standardized container.

***Freight Transport:*** - refers to the movement or transporting traded goods from place of origination to the place of consumer or buyer, using any mode of transport available or preferred.

***Dry Port:*** - is an inland port in the form of container freight stations and inland container depots.

***Inland Transport:*** - road transportation service given using trucks and the like.

***Demurrage Cost:*** - port fees paid for containers or goods staying for more days than allowed.

***Goods Transit time:*** - is total time taken by the full chain of the multimodal transport system from the door of the shipper to the door of the consignee.

***Multimodal Transport Contract:*** - a multimodal transport agreement made by the multimodal transport operator to transport the goods with care and the shipper to pay the transporting fee.

***Multimodal Transport Operator:*** - a multimodal transport company which provides an integrated international freight transport services using different modes of transport.

***Logistics:*** - is an integrated flow of goods and services and information in the supply chain process.

### **1.7. Significance of the Study**

This paper can help the enterprise to know the current challenges and how these challenges are affecting the operation of multimodal transport system. Once the enterprise knows those challenges, it can also apply the possible recommendations provided based on the findings obtained or formulate own policy actions to tackle the problems. Further this research paper can serve as a reference material either to students or researchers who want to undertake further researches on the same or related topics in future. In fact there are no ample research works done before on the same topic as to the knowledge of the researcher.

### **1.8. Delimitation/Scope of the Study**

Naturally the research topic is vast in its scope. Despite the time and budget constraint the researcher had, the researcher could not address all the dry ports found in Ethiopia and Djibouti office. Due to this fact, the research only covered customers located only at Addis



Ababa, Gelan and Modjo dry ports. The researcher believes that better research outputs could be obtained if the research had incorporated all the operational sites of multimodal transport system found in different places including the Djibouti coordinating office.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

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 Review**

Many points have been raised by different authors in relation to the concepts and theories of international multimodal transportation practices, challenges and its importance so far. It has been tried to summarize and present those concepts and theories only relevant to the topic under study.

##### **2.1.1 The Historical Evolution of International Transportation**

Efficiently distributing freight and moving people has always been an important factor for maintaining the cohesion of economic systems from empires to modern nation states. With technological and economic developments, the means to achieve such a goal have evolved considerably. As a result domestic and international economic or business operators become highly interconnected than ever. According to Rodrigue, Comtois and Slack (2006) the historical evolution of transportation is very complex and it is related to the spatial evolution of economic systems. The authors have managed to summarize and classify the evolutionary background of transportation from the pre-industrial era to transportation in the early twenty-first century, in five major stages, linking each with specific technological innovations in the transport sector. Furthermore, the authors highlighted the major shifts that might be expected to happen in the transport sector in the future. Hence the researcher took the historical developmental stage of transportation in human history in short.

##### **A. Transportation in the Pre-industrial Era (Pre-1800s)**

Before the major technical transformations brought forward by the industrial revolution at the end of the eighteenth century, no forms of motorized transportation existed. Transport technology was mainly limited to harnessing animal labor for land transport and to wind for maritime transport. The transported quantities were very limited and so was the speed at

which people and freight were moving. The average over land speed by horse was between 8 and 15 kilometers per hour and maritime speeds were barely above these figures. Waterways were the most efficient transport systems available and cities next to rivers were able to trade over longer distances and maintain political, economic and cultural cohesion over a larger territory. It is not surprising to find that the first civilizations emerged along river systems for agricultural but also for trading purposes (Tigris–Euphrates, Nile, Indus, Ganges, Huang He).

Because the efficiency of the land transport system of this era was poor, the overwhelming majority of trade was local in scope. From the perspective of regional economic organization, the provision of cities in perishable agricultural commodities was limited to a radius of about 50 kilometers, at most. International trade did exist, but traded commodities were high-value (luxury) goods such as spices, silk, wine and perfume, notably along the Silk Road. The Silk Road was the most enduring trade route of human history, being used for about 1,500 years. Its name is taken from the prized Chinese textile that flowed from Asia to the Middle East and Europe.

Prior to the industrial revolution, the quantity of freight transported between nations was negligible by contemporary standards. For instance, during the Middle Ages, French imports via the Saint-Gothard Passage (between Italy and Switzerland) would not fill a freight train. The total amount of freight transported by the Venetian fleet, which dominated Mediterranean trade for centuries, would not fill a modern cargo ship. The inland transportation system was thus very limited, both for passengers and freight. By the late eighteenth century, canal systems started to emerge in Europe, initially in the Netherlands and England. They permitted the beginning of large movements of bulk freight inland and expanded regional trade. Maritime and fluvial transportation were consequently the dominant modes of the pre-industrial era.

### **B. The Industrial Revolution and Transportation (1800–70)**

It was during the industrial revolution that massive modifications of transport systems occurred in two major phases, the first centered along the development of canal systems and the second centered along railways. This period marked the development of the steam engine that converted thermal energy into mechanical energy, providing an important territorial expansion for maritime and railway transport systems.

Much of the credit of developing the first efficient steam engine in 1765 is attributed to the British engineer Watt, although the first steam engines were used to pump water out of mines. It was then only a matter of time before the adaptation of the steam engine to locomotion. In 1769, the French engineer Cugnot built the first self-propelled steam vehicle, along with being responsible for the first automobile accident ever recorded. The first mechanically propelled maritime vehicle was tested in 1790 by the American inventor Fitch as a mode of fluvial transportation on the Delaware River. This marked a new era in the mechanization of land and maritime transport systems alike.

From the perspective of land transportation, the early industrial revolution faced problems over bottlenecks, as inland distribution was unable to carry the growing quantities of raw materials and finished goods. Roads were commonly unpaved and could not be used to effectively carry heavy loads. The first Turnpike Trust was established in 1706.

Road freight transportation also improved due to the introduction in the 1760s of “flywagons”: a system of freight distribution involving changing horses and crews at specific stages and thus permitting day-long movements. In terms of international transportation, the beginning of the nineteenth century saw the establishment of the first regular maritime routes linking harbors worldwide, especially over the North Atlantic between Europe and North America. Shipbuilding was also revolutionized by the usage of steel armatures (1860), enabling to escape the structural constraints of wood and iron armatures in terms of ship size. Steel armature ships were 30 to 40 percent lighter and had 15 percent more cargo capacities. The main consequence of the industrial revolution was a specialization of transportation services and the establishment of large distribution networks of raw materials and energy.

### **C. Emergence of Modern Transportation Systems (1870–1920)**

By the end of the nineteenth century, international transportation undertook a new growth phase, especially with improvements in engine propulsion technology and a gradual shift from coal to oil in the 1870s. Although oil has been known for centuries for its combustion properties, its commercial use was only applied in the early nineteenth century. Inventors started experimenting with engines that could use the cheap new fuel. Oil increased the speed and the capacity of maritime transport. It also permitted to reduce the energy consumption of ships by a factor of 90 percent relative to coal, the main source of energy for steam engines prior to this innovation.

An equal size oil powered ship could transport more freight than a coal-powered ship, reducing operation costs considerably and extending range. Also, coal refueling stages along trade routes could be bypassed.

Ship size grew dramatically, from the largest tonnage of 3,800 gross registered tons (revenue making cargo space) in 1871 to 47,000 tons in 1914. The harbor, while integrating production and transshipping activities, became an industrial complex around which agglomerated activities using ponderous raw materials. This period also marked the golden era of the development of the railway transport system as railway networks expanded tremendously and became the dominant land transport mode for both passengers and freight. As the speed and power of locomotives improved and as the market expanded, rail services became increasingly specialized, with trains entirely devoted to passengers or freight. Rail systems reached a phase of maturity.

This era also marked the first significant developments in telecommunications. In 1844, Samuel Morse built the first experimental telegraph line in the United States between Washington and Baltimore, opening a new era in the transmission of information. By 1852, more than 40,000 km of telegraph lines were in service in the United States. In 1866, the first successful transatlantic telegraph line marked the inauguration of an intercontinental telegraphic network. The growth of telecommunications is thus closely associated with the growth of railways and international shipping.

#### **D. Transportation in the Fordist Era (1920–70)**

The Fordist era was epitomized by the adoption of the assembly line as the dominant form of industrial production, an innovation that benefited transportation substantially. Compared with steam engines, internal combustion engines have a much higher efficiency and use a lighter fuel: petrol. Petrol, previously perceived as an unwanted by-product of the oil refining process, which was seeking kerosene for illumination, became a convenient fuel. Initially, diesel engines were bulky, limiting their use to industrial and maritime propulsion, a purpose which they still fulfill today.

The internal combustion engine permitted an extended flexibility of movements with fast, inexpensive and ubiquitous (door to door) transport modes such as automobiles, buses and trucks.

Mass producing these vehicles changed considerably the industrial production system, notably by 1913 when Ford began the production of the Model T car using an assembly line. From 1913 to 1927, about 14 million Ford Model T cars were built, making it the second most important production car, behind the Volkswagen Beetle. The rapid diffusion of the automobile marked an increased demand for oil products and other raw materials such as steel and rubber.

However, the major change was the large diffusion of the automobile, especially from the 1950s as it became a truly mass consumption product. No other mode of transportation has so drastically changed lifestyles and the structure of cities, notably for developed countries. It created suburbanization and expanded cities to areas larger than 100 km in diameter in some instances.

#### **E. A new context for Transportation: The Post-Fordist Era (1970–)**

Among the major changes in international transportation since the 1970s are the massive development of telecommunications, the globalization of trade, more efficient distribution systems, and the considerable development of air transportation.

Telecommunications enabled growing information exchanges, especially for the financial and service sectors. After 1970, telecommunications successfully merged with information technologies. As such, telecommunication also became a medium of doing business in its own right, in addition to supporting and enhancing other transportation modes.

In a post-Fordist system, the fragmentation of production, organizing an international division of work, as well as the principle of “just-in-time” increased the quantity of freight moving at the local, regional and international levels. This in turn required increasing efforts to manage freight and reinforced the development of logistics, the science of physical distribution systems. Containers, the main agents of the modern international transport system, enabled an increased flexibility of freight transport, mainly by reducing transshipment costs and delays. The current period is also one of transport crises, mainly because of a dual dependency. First, transportation modes have a heavy dependence on fossil fuels and second, road transportation has assumed dominance. The oil crisis of the early 1970s, which saw a significant increase in fuel prices, induced innovations in transport modes, the reduction of energy consumption and the search for alternative sources of energy (electric car, adding ethanol to gasoline and fuel cells).

## **F. The Future of Transportation**

In the 200 years since the beginning of mechanized transportation, the capacity, speed, efficiency and geographical coverage of transport systems has improved dramatically. Despite the exhaustive efforts made in the past, in the major areas like technological, institutional and infrastructural helped to register remarkable achievements so far and transformed the transportation sector to a better stage being an engine. Also the continued efforts in improving the accessibility, quality, speed and affordability of transport services will generate additional benefits to the sector in future.

Technological developments have two significant consequences over transportation modes. The first involves the emergence of new modes and the second concerns an improvement of their operational speeds.

### **2.1.2 The Definitions and Concepts of International Transportation**

A lot has been said about the definitions and concepts of transportation by different scholars in different ways at different times. The researcher has tried to look some of them and summarized the most relevant ones to the study.

#### **2.1.2.1 The Definition of Transportation**

Transportation is the act of moving people or goods from one place to another (Encyclopedia, 2001). The book further explains that transportation takes people where they need or want to go, and it brings the goods they need or want.

As per Kveiborg (2005) transportation is a consequence of economic activities taking place at different geographic locations. According to this definition any economic activity concluded between two parties in two different locations results the demand of transportation services.

On the other hand Chopra & Meindl (2001) defines transportation from supply chain perspective as the movement of product from one location to another as it makes its way from the begging of a supply chain to the customer. In this definition, transportation has been considered as an important supply chain driver because products are rarely produced and consumed in the same location where most of the consumers are located.

On the other hand International Multimodal transport has been defined by different authors from different perspectives. However, in simple terms Breda (2009) defines multimodal

transport as the carriage of goods, by at least two different modes of transport, on the basis of a single multimodal transport contract, from a place in one country where the goods are taken in charge by the carrier, to a place designated for delivery situated in a different country. Actually we may come across with many more definitions of multimodal transport but the essence remains the same.

### **2.1.2.2 Modes of Transportation**

Transport modes are the means by which people and freight achieve mobility domestically and internationally. They fall into one of three basic types, depending on what surface they travel over: land (road, rail and pipelines), water (shipping), and air. Each mode is characterized by a set of technical, operational and commercial characteristics.

In shipping goods to warehouses, dealers, and customers, a company can choose among five main transportation modes. These are *road, rail, water, pipeline, and air*. The choice of transportation carriers affects the pricing of products, delivery performance, and condition of goods when they arrive—all of which affect customer satisfaction (Kotler and Armstrong, 2008).

Pipelines provide the cheapest means of transporting petroleum and natural gas. The cheapest way to move general cargo is water. Rail transportation costs about 3 times as much as water transportation, and truck transportation costs about 10 times as much as water transportation. Because air transportation is so costly, cargo planes usually carry only expensive, lightweight, or perishable merchandise (World Book, 2001).

#### **A. Road Transportation**

Road transport has become the dominant land transport system today. Automobiles, buses and trucks require a road bed. Such infrastructures are moderately expensive to provide, but there is a wide divergence of costs, from a gravel road to a multi-lane urban expressway. Because vehicles have the means to climb moderate slopes, physical obstacles are less important than for some other land modes. Most roads are provided as a public good by governments, while the vast majority of vehicles are owned privately. The capital costs, therefore, are shared, and do not fall as heavily on one source as is the case for other modes. All road transport modes have limited abilities to achieve scale economies (Rodrigue *et al.*, 2006).



## **B. Rail Transportation**

Railways require tracks along which the locomotives and rail cars move. The initial capital costs are high because the construction of rail tracks and the provision of rolling stock are expensive. Historically, the investments have been made by the same source (either governments or the private sector). These expenditures have to be made before any revenues are realized and thus represent important entry barriers that tend to limit the number of operators. It also serves to delay innovation, compared with road transport, since rail rolling stock has a service life of at least twenty years. The ability of trains to haul large quantities of goods and significant numbers of people over long distances is the mode's primary asset (ibid).

## **C. Water Transportation**

Shipping exploits the water routes that cross oceans as well as rivers and lakes. Many of the oceanic routes are in international waters and are provided at no cost to the users. In many coastal and inland waters too shipping lanes are "free", although national regulations may exclude foreign vessels from cabotage<sup>5</sup> trade. Physical barriers represent a particular problem for shipping in two areas. First are the sections of inland waterways where water depths and/or rapids prevent navigation. The second is where land barriers separate seas. In both cases canals can provide access for shipping, but they may be tolled. An example of the first type is the St. Lawrence Seaway, while the Suez and Panama canals are examples of the latter. Thus, except for canals, shipping enjoys rights of way that are at no cost to the users. Complementing this advantage are the relatively low operating costs of ships. Ships have the ability to carry large volumes with small energy consumption and limited manpower requirements. Shipping, therefore, is a mode that can offer very low rates compared with other modes.

Shipping has traditionally faced two drawbacks. It is slow, with speeds at sea averaging 15 knots (26 km/h). Secondly, delays are encountered in ports where loading and unloading takes place. The latter may involve several days of handling. These drawbacks are particularly constraining where goods have to be moved over short distances or where

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<sup>5</sup> Cabotage-means transportation between two terminals (a terminal of loading/embarkment and a terminal of unloading/disembarkment) located in the same country irrespective of the country in which the mode providing the service is registered (Rodrigue *et al* ,2006).

shippers require rapid service deliveries. Even if maritime transportation<sup>6</sup> has experienced remarkable improvements in safety and reliability, maritime routes are still hindered by dominant winds, currents and general weather patterns (ibid).

#### **D. Pipeline Transportation**

Pipelines are an extremely important and extensive mode of land transport, although very rarely appreciated or recognized by the general public, mainly because they are buried underground (or under the sea as in the case of gas pipelines from North Africa to Europe). In the USA, for example, there are 409,000 miles of pipelines that carry 17 percent of all ton/miles of freight. Two main products dominate pipeline traffic are: oil and gas, although locally pipelines are significant for the transport of water, and in some rare cases for the shipment of dry bulk commodities, such as coal in the form of slurry. Pipelines are almost everywhere designed for a specific purpose only, to carry one commodity from one location to another (ibid).

#### **E. Air Transportation**

Air transport, compared with other modes, has the obvious advantage of speed. This feature has served to offset many of its limitations, among which operating costs, fuel consumption and limited carrying capacities are the most significant. Technology has worked to overcome some of the constraints, most notably the growth of capacity, in which aircraft will soon be capable of transporting 500 passengers or 100 tons of freight (ibid). Among the most frequently air freighted products are perishables (fresh fish, cut flowers) and high-value, low-bulk items (technical instruments, jewelry). Companies find that airfreight also reduces inventory levels, packaging costs, and the number of warehouses needed (Kotler and Armstrong, 2008).

#### **F. Intermodal Transportation**

Shippers may also use intermodal transportation by combining two or more modes of transportation (Kotler and Armstrong, 2008).

- **Piggyback:**- describes the use of rail and trucks;
- **Fishback:**- when a shipper uses water and trucks;
- **Trainship:**- uses water and rail; and
- **Aitruck:** - in this case the shipper uses air and trucks.

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<sup>6</sup> Maritime Transportation- means all types of carriage of goods and passengers by sea (AU, 2010).

Combining modes provides advantages that no single mode can deliver to the shipper. Not only is piggyback cheaper than trucking alone but it also provides flexibility and convenience.

Therefore, in choosing a transportation mode for a product, shippers must balance many considerations: *speed, dependability, availability, cost, and others*. Thus, if a shipper needs speed, air and truck are prime choices. If the goal is low cost, then water or pipeline might be best.

### **2.1.2.3 The Concepts of Transportation**

The conceptual framework of transportation has been presented in summarized ways through fewer but very essential themes as described by Rodrigue *et al.*, (2006).

#### **A. The Purpose of Transportation**

The purpose of transportation is to overcome space, which is shaped by a variety of human and physical constraints such as distance, time, administrative divisions and topography. Jointly, they confer a friction to any movement, commonly known as the friction of distance. However, these constraints and the friction they create can only be partially circumscribed. The extent to which this is done has a cost that varies greatly according to factors such as the distance involved and the nature of what is being transported.

The goal of transportation is thus to transform the geographical attributes of freight, people or information, from an origin to a destination, conferring them an added value in the process. The convenience at which this can be done varies considerably. The under listed factors determine transportation service delivery generally.

- **Transportability:** - refers to the ease of movement of passengers, freight or information. It is related to transport costs as well as to the attributes of what is being transported (fragility, perishability, and price). Political factors can also influence transportability such as laws, regulations, borders and tariffs. When transportability is high, activities are less constrained by distance.
  
- **Direct derived demand:** - refers to movements that are directly the outcome of economic activities, without which they would not take place. For instance freight transportation, all the components of a supply chain require movements of raw materials, parts and finished products on modes such as trucks, rail or containerships.

- **Indirect derived demand:** - considers movements created by the requirements of other movements. The most obvious example is energy where fuel consumption from transportation activities must be supplied by an energy production system requiring movements from zones of extraction to refineries and storage facilities and, finally, to places of consumption.

Consequently, the fundamental purpose of transport is geographic in nature, because it facilitates movements between different locations. Transport thus plays a role in the structure and organization of space and territories, which may vary according to the level of development (ibid).

### **B. The Physical Constraints of Transportation**

Naturally the need of transportation posed by the distance and time gap exists between two places. The emergence of modern means of transportation has shortened the time that it takes to connect the two places much lower than before. This kind of tremendous achievement which have been seen in the last few decades, have contributed their part for the development of international trade and countries economy. Despite the above facts, the following factors remained a challenge to the efficiency and effectiveness of international transportation service.

- **Topography.** Features such as mountains and valleys have strongly influenced the structure of networks, the cost and feasibility of transportation projects. The main land transport infrastructures are built usually where there are the least physical impediments, such as on plains, along valleys, or through mountain passes. Water transport is influenced by water depths and the location of obstacles such as reefs. Coastlines exert an influence on the location of port infrastructure. Topography can impose a natural convergence of routes that will create a certain degree of centrality and may assist a location in becoming a trade center as a collector and distributor of goods. Topography can complicate, postpone or prevent the activities of the transport industry.
- **Hydrography.** The properties, distribution and circulation of water play an important role in the transport industry. Maritime transport is influenced greatly by the availability of navigable channels through rivers, lakes and shallow seas.

Several rivers such as the Mississippi, the St. Lawrence, the Rhine, the Mekong or the Yangtze are important navigable route ways into the heart of continents and historically have been the focus of human activities that have taken advantage of the transport opportunities. Port sites are also highly influenced by the physical attributes of the site where natural features (bays, sand dunes, and fjords) protect port installations.

- **Climate.** Its major components include temperature, wind and precipitation. Their impacts on transportation modes and infrastructure range from negligible to severe. Freight and passenger movement can be seriously curtailed by hazardous conditions such as snow, heavy rainfall, ice or fog.
- **Absolute barriers:** - are geographical features that entirely prevent a movement. They must either be bypassed or be overcome by specific infrastructures. For instance, a river is considered as an absolute barrier for land transportation and can only be overcome if a tunnel or a bridge is constructed.
- **Relative barriers:** - are geographical features that force a degree of friction on a movement. In turn, this friction is likely to influence the path (route) selected to link two locations. Topography is a classic example of a relative barrier that influences land transportation routes along paths having the least possible friction (e.g. plains and valleys). For maritime transportation, relative barriers, such as straits, channels or ice, generally slow down circulation.

### **C. Transportation and the Spatial Structure**

All locations are relative to one another. However, locations are not constant as transportation developments change levels of accessibility, and thus the relations between locations. The development of a location reflects the cumulative relationships between transport infrastructure, economic activities and the built-environment. The following factors are particularly important in shaping the spatial structure:

- **Costs.** The spatial distribution of activities is related to factors of distance, namely its friction. Locational decisions are taken in an attempt to minimize costs, often related to transportation.

- **Accessibility.** All locations have a level of accessibility, but some are more accessible than others. Thus, because of transportation, some locations are perceived as more valuable than others.
- **Agglomeration.** There is a tendency for activities to agglomerate to take advantage of the value of specific locations. The more valuable a location, the more likely agglomeration will take place. The organization of activities is essentially hierarchical, resulting from the relationships between agglomeration and accessibility at the local, regional and global levels.

#### **D. The Importance of Transportation**

Transportation is very important element in any human activities in any circumstances. Business firms require transportation services to facilitate their economic activities and be able to move their raw materials, finished goods and employees from place to place. Transport creates valuable links between regions and economic activities, between people and the rest of the world. Transport is a multidimensional activity whose importance is:-

- **Historical.** Transport modes have played several different historical roles in the rise of civilizations (Egypt, Rome and China), in the development of societies (creation of social structures) and also in national defense (Roman Empire, American road network).
- **Social.** Transport modes facilitate access to healthcare, welfare, and cultural or artistic events, thus performing a social service. They shape social interactions by favoring or inhibiting the mobility of people. Transportation thus supports and may even shape social structures.
- **Political.** Governments play a critical role in transport as sources of investment and as regulators. The political role of transportation is undeniable as governments often subsidize the mobility of their populations (highways, public transit, etc.). While most transport demand relates to economic imperatives, many communication corridors have been constructed for political reasons such as national accessibility or job creation. Transport thus has an impact on nation building and national unity, but it is also a political tool.

- **Environmental.** Despite the manifest advantages of transport, its environmental consequences are also significant. They include air and water quality, noise level and public health. All decisions relating to transport need to be evaluated taking into account the corresponding environmental costs. Transport is a dominant factor in contemporary environmental issues.
- **Economic.** The evolution of transport has always been linked to economic development. The construction of transport infrastructures also permitted the development of a corresponding transport industry (car manufacturing, air transport companies, etc.). The transport sector is also an economic factor in the production of goods and services. It contributes to the value-added of economic activities, facilitates economies of scale, influences land (real estate) value and the geographic specialization of regions. Transport is a factor shaping economic activities, but is also shaped by them.

#### **E. The Contemporary Trends Identified for the Increasing Importance of Transportation**

There are a lot of evidences witnessing the increasing importance of transportation in the contemporary business world. Among them some are discussed here.

- **Growth of the demand.** The twentieth century, more than any other, has seen a considerable growth of the transport demand related to individual (passengers) as well as freight mobility. This growth is jointly the result of larger quantities of passengers and freight being moved, but also the longer distances over which they are carried. Recent trends underline an ongoing process of mobility growth, which has led to the multiplication of the number of journeys involving a wide variety of modes that service transport demands.
- **Reduction of costs.** Even if several transportation modes are very expensive to own and operate (ships and planes for instance), costs per unit transported have dropped significantly over recent decades. This has made it possible to overcome larger distances and further exploit the comparative advantages of space. As a result, despite the lower costs, the share of transport activities in the economy has remained relatively constant in time.

- **Expansion of infrastructures.** The above two trends have obviously extended the requirements for transport infrastructures both quantitatively and qualitatively. Roads, harbors, airports, telecommunication facilities and pipelines have expanded considerably to service new areas and add capacity to existing networks. Transportation infrastructures are thus a major component of land use, notably in developed countries.

In line with the world book (2001) signified the importance of transportation relating with the existence of trade. As per the book without transportation, there could be no trade. Also without trade, there could be no towns and cities. Since towns and cities are traditionally the centers of civilizations. Therefore, transportation helps making civilization possible.

#### **F. Space/time Relationships**

One of the most basic relationships of transportation involves how much space can be overcome within a given amount of time. The faster the mode, the larger would be the distance that can be overcome within the same amount of time. Notably improvements in transport systems, changes the relationship between time and space. When this relationship involves easier, faster and cheaper access between places, this result is defined as a space/time convergence because the amount of space that can be overcome for a similar amount of time increases significantly.

The outcome has been significant differences in space/time relationships, between developed and developing countries, reflecting differences in the efficiency of transport systems. Four major factors are relevant in this process:

- **Speed.** More recently, speed has played a less significant role as many modes are not going much faster. For instance, an automobile has a similar operating speed today than it had 60 years ago and a commercial jet plane operates at a similar speed than one 30 years ago.
- **Economies of scale.** Being able to transport larger amounts of freight and passengers at lower costs has improved considerably the capacity and efficiency of transport systems.



- **Expansion of Transport Infrastructures.** Transport infrastructures have expanded considerably to service areas that were not previously serviced or were insufficiently serviced. A paradox of this feature is that although the expansion of transport infrastructures may have enabled distribution systems to expand, it has also increased the average distance over which passengers and freight are being carried.
- **Efficiency of Transport Terminals.** Terminals, such as ports and airports, have shown a growing capacity to handle large quantities of traffic over a short time period in a timely manner. Thus, even if the speed of many transport modes has not increased, more efficient transport terminals may have helped reduce transport time.

### **G. The Geographic Information Systems for Transportation (GIS-T)**

In a broad sense geographic information system (GIS) is an information system specializing in the input, storage, manipulation, analysis and reporting of geographical (spatially related) information. Among the wide range of potential applications GIS can be used for, transportation issues have received a lot of attention. A specific branch of GIS applied to transportation issues, commonly labeled as GIS-T, has emerged. A geographic information system for transportation (GIS-T) refers to the principles and applications of applying geographic information technologies to transportation problems.

The four major components of a GIS, encoding, management, analysis and reporting, have specific considerations for transportation.

#### **2.1.3 The Importance of International Multimodal Transportation System**

The twenty first century will see a renewed focus on intermodal freight transportation driven by the changing requirements of global supply chains. The international multimodal transportation system has many practical benefits other than unimodal transport system in freight transport. Transport costs and transit time has been reduced greatly through adoption of effective international multimodal system in international transport activities. Furthermore the technological advancements are also upgrading the international multimodal transportation's service efficiency and effectiveness than ever.

According to Breda (2009) international multimodal transport system is better than unimodal transport system from legal perspective.

The author pointed out five convincing legal reasons why a shipper opts to adopt a multimodal transport system and finally concludes that considering the variety of cultures, languages and commercial practices at both ends of a trade transaction and the resulting complexity of assembling such an international transport operation, it is likely to appear reasonable to a trader to let one qualified operator organize and be responsible and accountable for the entire transport chain. International multimodal transport system is needed by international business operators and the governments in order to facilitate their trade activities and reduce cost of trade between nations. Further Atallah (2005) appreciated the importance of multimodal transport raising its diligent and continuous search to reduce costs and improve customer service which resulted in the integration of all activities in the supply chain.

It seems impossible to think multimodal freight transport without containerization concept these days. Over the last few decades multimodal transport has evolved across various dimensions globally, the advent of containerization has greatly helped the promotion of multimodal transport. The ever-increasing containerization of freight in global trade promoted multimodal transport system greatly. One of the key benefits to containerizing freight is that it becomes possible to quickly and inexpensively transfer it from ship to rail to truck, without unloading the contents of the container itself (Rahall Transportation Institute & Wilbur Smith Associates, 2004).

#### **2.1.4 The Requirements of International Multimodal Transportation System**

The adoption of multimodal transport system needs various structural changes in the economy. All way round infrastructural developments and liberalization of trade policies, rules and regulations to make it compatible with the international standards would be the vital improvements needed. That is the main reason that many authors in field advise the development of infrastructure and liberalization of trading policies and regulations in addition to increment of trade volume. Since the cost of multimodal infrastructural development is very expensive. In this regard UNCTAD (2003) noted five very essential areas to be seriously considered to improve the service quality and accessibility level of multimodal transport and logistics services.

#### **2.1.4.1 Infrastructure and Technologies**

In multimodal transport, the transport chain is usually containerized. Containerized cargo also requires less but better qualified personnel in ports, where reforms are still pending in many developing countries. It further requires port, rail and road infrastructure, as well as the corresponding regulations and labor regimes. In many developing countries, particularly least developed countries, these inland links are often incomplete and poorly maintained. This is one of the main practical obstacles to transport providers offering multimodal transport.

Electronic means of communication are used to exchange information, enter into contracts and trace goods during transit. Transport users and providers are using them internally and also to exchange information among them. Again, as with containerization in the past, there is a risk that developing countries are late in the introduction of these new technologies, which require investment in equipment, as well as the corresponding legislation, regulation and capacity building. A successful example of the use of ICT in developing countries is the Advance Cargo Information System (ACIS).

Increased competition and private sector participation empirically tend to encourage investment in infrastructure and the introduction of new technologies. The public sector maintains an important role with regard to investment in public infrastructure such as national telecommunication systems or access to ports. Here, Governments may have to invest themselves, or they may concession the construction and operation of infrastructure, in which case a new regulatory role of the public sector is required.

#### **2.1.4.2 Security and Safety**

In the case of transport and international logistics, corruption, theft and accidents not only imply a direct cost, but also reduce the competitiveness of exports. Especially at ports and other nodes where cargo is shifted from one mode to another, security risks are particularly high. Uncertainty and also weak legal systems are thus particular obstacles to multimodal transport, where often an original carrier located in a foreign country is supposed to cover the entire risk of the entire transport chain.

Fear of terrorist attacks is leading to new regulations and legislation, which add further obligations to shippers and transport providers, especially for exports to the United States. These obligations imply additional risks for those who have to provide more detailed and timely information.

Shippers have to guarantee to the carrier that the information given to him about the goods is accurate and that the carrier can use this information without risk of suffering a penalty or delay.

#### **2.1.4.3 Facilitation**

Coherent trade and transport facilitation measures are necessary for the development of international logistics and multimodal transport services. The international movement of cargo and vessels involves a potentially large number of controls and inspections about security concerns, and to the extent that such controls take too long, or their duration varies arbitrarily, this becomes an impediment to the planning and operation of services. Improvements depend on investments and reforms at the national level, and also on concerted efforts by international organizations such as the World Trade Organization and the World Customs Organization. With regard to customs, a successful example of trade facilitation is the introduction of an Automated System for Custom Data.

At the bilateral and regional levels, there are successful experiences concerning information sharing. Common customs posts, for example, or the sharing of information related to the port state control of maritime vessels, reduce the need to assign personnel and improve the quality of controls.

#### **2.1.4.4 Legal Aspects**

While much of international trade is now carried out on a door-to-door basis, under one contract and with one party bearing contractual responsibility, the current legal framework governing multimodal transport fails to appropriately reflect these developments. No international uniform regime is in force to regulate liability for loss, damage or delay arising from multimodal transport. Instead, the present legal framework governing multimodal transport consists of a complex array of international conventions designed to regulate unimodal carriage, diverse regional/sub regional agreements, national laws and standard term contracts. As a consequence, both the applicable liability rules and the degree and extent of a carrier's liability vary greatly from case to case and are unpredictable.

Over the years several attempts have been made at drafting a set of rules to regulate liability arising from international multimodal transportation, but none of these has brought about international uniformity. In view of the absence of international uniform regulation of liability, there has been a proliferation of diverse national, regional and sub regional laws and

regulations on multimodal transport. The lack of a global uniform regime has obliged developing countries to resort to solutions at the regional and/or sub regional level, such as the laws and regulations prepared by the Andean Community, the Latin American Integration Association (ALADI), the Southern Common Market (MERCOSUR) and the Association of South-East Asian Nations (ASEAN). While these laws and regulations are often based on the 1980 MT Convention and/or the UNCTAD/ICC Rules, significant differences on key issues among the different sets of rules create a trend of further “disunification” at the international level.

#### **2.1.4.5 Market Access**

Trade balances, the available transport mode options and economies of scale have a particularly strong impact on transport costs. The more cargo and transport mode options a service provider has at his disposal, the better he is positioned to choose the most adequate logistics mix of routes, transshipment points, frequencies, speed, volumes and transport modes. Any restrictions that unnecessarily limit his choices will also imply higher costs and lower quality services for the transport user.

On many borders, transport providers are still obliged to transfer cargo from one truck onto another, just as different rail gauges make international rail traffic rare in developing regions. In order to protect the national road industry, it is common to prohibit foreign trucks from carrying return cargo after delivering imports; this is particularly costly for landlocked countries that depend on foreign ports. In maritime transport, cargo reservation regimes tend to make it impossible to use available capacity efficiently because it is prohibited to combine national, regional and intercontinental liner services so that they form part of a single global network.

#### **2.1.5 The Practices and Challenges of International Multimodal Transportation System**

Multimodal transport system adoption requires infrastructural and human resource developments to support the efficient and effective operation of the new system. However, doing these improvements has not been seen simple to developing nations since it needs huge capital investment which cannot be carried by shoulder of their economy. Even after bypassing this stage, the service delivery may pose critical challenges to the service provider which can affect system’s efficiency.

### **2.1.5.1 The Practices of International Multimodal Transportation**

International multimodal transport practices are different from unimodal transport practices in different ways. Transportation services and facilities have grown rapidly in the United States and Europe in the wake of increasing demand by multinational corporations and their suppliers and distributors for seamless logistics services. Economic globalization requires firms to produce and deliver goods faster to customers around the world. In order to do so, corporations must manage their supply chains and integrate their logistics systems more effectively (Rondinelli and Berry, 2000).

Multimodal practices we know in different continents and countries in one or the other way are designed based on international multimodal transport conventions and agreements designed so far. The UNCTAD 1980's International Multimodal Transport Convention were ratified by certain world countries in 1981. The Rotterdam Rules of Multimodal Transport is the other one and there are several regional and sub regional binding multimodal transport conventions made to govern their multimodal transport operations considering their own social, economic and political scenarios. Then member nations or ratifying nations shall be obligated to act as per the agreement. In this regard we may state the provisions of the revised African Maritime Transport Charter which contains two chapters and several articles pertaining to Multimodal freight transport (AU, 2010).

According to the revised African Maritime Transport Charter (2010), Article 21(1), States Parties shall promote multimodal transport at national and regional levels through the:-

- a) Development of an appropriate regulatory framework
- b) Improvement of existing facilitation and transit policies
- c) Promotion of the development of integrated transport master plan for all modes of transport at national, sub regional, regional and continental levels;
- d) Construction, rehabilitation and modernization of infrastructure, equipment and transport services
- e) Training of transport services professionals
- f) Establishment of economic community and logistics platforms.

Article 21(2) says that States Parties shall work towards the establishment of a harmonized legislative and regulatory framework capable of ensuring the promotion and the guaranteeing of stability of multimodal joint ventures.

Whereas, Article 21(3) discusses that States Parties shall endeavor to participate in the negotiation, adoption and implementation of regional and international conventions on multimodal transport.

On the other dimension Article 22(1) tells us that States Parties shall undertake to cooperate towards the reform and efficiency of port services and promotion of competitiveness of African ports. According to the article 22(2) of the charter in connection to reform of ports services, States parties shall strive to encourage the:-

- a) Promotion of private sector participation in port operations
- b) Promotion of capacity building for port operators
- c) Adoption of a system of harmonized framework of port statistics and performance indicators.
- d) Strengthening of the existing regional organizations and associations of ports for the benefit of port development
- e) Promotion of the linkage of ports with development corridors
- f) Facilitation of development and acquisition of modern port facilities and equipment
- g) Promotion of efficient and effective channel management and port approaches
- h) Promotion of safe, secure and efficient port operations
- i) Application of internationally acceptable quality standards in port services
- j) Encouragement of consultation among the various port stakeholders through the establishment of port committees.

#### **2.1.5.2 The Challenges of International Multimodal Transportation**

Despite the many more benefits exhibited by the international multimodal transportation system, it is not uncommon to see the challenging situations in the system. In most cases these challenges prevail in developing nations than the developed ones. Differences in trade and investment policies and regulations, legal and political environment, infrastructural facilities and lack of professional human power are the basic challenge areas posed by different authors as factors affecting the normal operation of the system.

Bhattbhatt (2012) noted that multimodal logistics brings opportunities along several challenges. The areas sorted out by the author for the challenges are infrastructure, regulation and technology, which demand quite attention from stakeholders. As per the author, if

multimodal has to grow quickly, all stakeholders need to invest time and effort for its development.

The international multimodal transport activities are done through the integrated operation of people and organizations located in different areas and this could be also another source of challenge again for the system. In this regard Atallah (2005) underlined the absence of international rules governing the successive carriage of goods as a challenge to the system, which would result in crucial problems in the field of carrier's responsibility and the liability for loss or damage to the goods shipped under multimodal system.

The multimodal transport system has also an environmental impact with the means of transport used in the multimodal transport operation. The system produces chemicals which can easily pollute the natural environment. Rondinelli and Berry (2000) identified three sets of activities associated with transportation vehicle operations, equipment maintenance, and facilities operations which can have negative impacts on the environment. Further the author noted that in addition, transportation infrastructure construction and expansion often generate pollutants or endanger natural resources.

Countries always work to be competitive in the international business environment by producing quality products with affordable price and increase their export share. On the other way the competition further goes to selecting efficient transport modes. It is apparent that any quality product produced cheaply could not win to the international market unless it uses the efficient, safest and cost effective mode of transport. In this regard many countries transport policies fail to comply with each other to use as a single policy to give effective and efficient transportation services to the business communities. In this case Atallah (2005) reminded the need of harmonization of the legal environment of multimodal transport system as a challenge to ensure a uniform liability regime that protects the interests of concerned.

### **2.1.6 The Developmental Status of Ethiopian Foreign Trade**

Ethiopian foreign trade performance had shown a progressive improvement in the last two decades. Actually the export trade had not been grown as it had been expected to grow. Rather the import trade had grown with a huge gap compared with export trade. Actually country's economic growth record revealed by different international institutions kept showing slight differences with government's report. According to the report of MoFED (2013) the economy has registered a 10 percent GDP annual average growth in the three



year's GTP (Growth and Transformation Plan) implementation period. Agriculture, industry and service sectors has registered 7 percent, 16.9 percent and 11 percent average annual growth rate respectively in those three years. However, Ethiopia's export and import figures of 2012/2013 accounted 12.7 percent and 28 percent of country's GDP respectively (CSA, 2007; UNDP, 2012; MoFED, 2013; Debela, 2013).

### **2.1.7 The Infrastructural Developments of Ethiopia**

Despite the recent infrastructural developments seen in certain sectors, poor infrastructural development remained obstacle both for the manufacturing and service industry. As a result the increased cost of doing business eroded competitiveness, and limit access to markets, both domestically and internationally (AfDB, 2011). The infrastructural development in transport and communication sectors seems stagnated in the past decades and its continued stagnation manifested in poor logistics facilities which are not efficient in terms of cost and time. The poor network of road infrastructure has played its role in worsening the quality of the logistics sector. Ethiopian government has made significant investment on infrastructure over the last decade. It has made Ethiopia Airlines, a leading regional carrier, upgraded its network of trunk roads. However, according to (Arvis and Ojala, 2014) World Bank 2014 Logistics Performance Index (LPI) report Ethiopia scored 2.6 out of 5 from top 10 low-income groups of countries.

According to World Bank Report of 2011 as it is cited on (MoFA and WMP PLC, 2013), infrastructure contributed 0.6 percentage point to Ethiopia's annual per capita GDP growth over the last decade. Although Ethiopia's infrastructure indicators compare relatively well with low income country peers, they remain well below levels found in Africa's middle income countries. There are several challenges especially in the power and transport sector. Ethiopia needs to double its current power capacity to 8,700 megawatts of generating plant over the next decade to improve infrastructure endowment to region's middle-income countries. This will increase the infrastructure contribution growth by additional 3 percentage points. The transportation sector also faces challenges of rural accessibility and inadequate road maintenance. Ethiopia launched an ambitious investment program to upgrade its trunk network and established a modern funding mechanism for road maintenance in order to improve ground transportation (ERA, 2013).

### **2.1.7.1 The Developmental Status of Transport Networks**

Given the insignificant amount of budget allocated in the past to the transport sector, the country's transport networks remained impediment for the advancement of socio-economic activities for many years. As a result, agricultural produces had not got their real value for many years. However, the developments of infrastructural networks are essential to the successful installation of multimodal transport system. So we have no time to postpone advancing transport networks and communication technology facilities if the success of the system is needed.

#### **A. Road Transport Networks**

The government of Ethiopia is working to increase the country's road networks to a better level. The objective of developing road network is to support socio-economic development of the country through transport cost reduction to the economy. In order to support sustainable growth of the economy, road network development should be based on integrated and systematic road network development planning. In this case, the government is kept designing and implementing time bounded road sector development plan to upgrade the road network level of the country by maintaining the existing roads, building new roads and upgrading others (ERA, 2013).

The current government designed and implemented four road sector development plans since July 1997 and the fourth one is under operation and expected to last in June 2015. The government has been the major financier of the RSDP followed by the Road fund office and also the external sources are funding the sixteen years long road projects. Due to the effort of the government, the country's road network has increased from 26,550 km in 1997 to 85,966 km in 2013 (an increase of 224 percent). As result, the road density per 1000 sq. km has increased from 24 km in 1997 to 78 km in 2013. Further the substantial improvement has been registered in the conditions of the country's road network. The proportion of road network in good condition increased from 22 percent in 1997 to 70 percent in 2013(ibid).

ERA (2013) noted that since the year 2002, after the environmental impact assessment proclamation No.299 adopted by the house of peoples' representatives, efforts have been made to implement the law through the Environmental Protection Authority to save the environment from road projects possible damage.

## **B. Railway Transport Networks**

Ethiopian Railway transport has a long history of service but it had been forgotten for many years. As a result Ethiopia was not lucky to benefit the fruits of rail transport in foreign trade logistics operation. Railway transport is believed to reduce transportation costs in a multimodal transport system. The only railway that provides passenger and freight transport was the Ethio-Djibouti railway line which covers 681km in Ethiopian segment. In 1998, Djibouti and Ethiopia announced plans to revitalize the century-old railway that links their capitals and since then Ethiopia has made an effort to repair and maintain the line. As per ERC (2014) the Ethiopian Railway Corporation has identified eight railway corridors for study, design and subsequent implementation, the total estimated length with buffer of which is some 5,060km. Construction of about 2,000km of standard gauge railway infrastructure was planned to be undertaken in the GTP period and it is now under construction (MoFA and WMP PLC, 2013, ERC, 2014).

## **C. Air Transport Networks**

Expanding air transport is crucial for Ethiopia which is a mountainous country. Ethiopian, Africa's world-class airline, provides both domestic and international services. It has an outstanding safety records and is one of the few profitable African airlines. Ethiopian services include both passenger and cargo transport in its international flights and domestic routes. It also renders training and maintenance services to more than a dozen other African and Middle Eastern airlines. Domestic flight services are provided through 17 destinations across the country. The airline operates over 40 cargo destinations spread across Africa, Europe, Asia and the Middle East via its hub – Addis Ababa, and another cargo hub at Liege. In addition to Ethiopian, other airlines have flight schedules from and to Addis Ababa and these include airlines such as Emirates, KLM, Lufthansa, Kenyan and others (MoFA and WMP PLC, 2013).

## **D. Water Transport Networks**

The world economy is highly dependent on shipping and the relative cost of water transport is cheapest of all but slowest in terms of speed it goes. Ethiopia is a landlocked and has no ports. Ethiopia has no significant navigable waterways, although limited ferry<sup>7</sup> service is

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<sup>7</sup> Ferry Service- Where people are carried across relatively short bodies of water in a shuttle-type service (Rodrigue et al., 2006).

available on Lake Tana. The Baro and Awash rivers are navigable only in the rainy season. The Abay (Blue Nile) is not navigable within Ethiopia's borders (Library of congress of Ethiopia, 2005). Due to the above fact, Ethiopia is using the neighboring countries water resources to facilitate its import and export trade. Further the goods coming to and going from manufacturing areas use truck transport exhaustively (MoFA and WMP PLC, 2013).

### **2.1.7.2 The Developmental Status of Communication Networks and Energy Supply**

The sole telecom service provider, Ethio telecom, offers national and international telecommunications services using satellite, microwave digital radio multi-access system. Most of the energy requirements of the transport sector depend on imported fuels. Whereas for other purposes the country uses its own hydro electric power as it is main energy source (MoFA and WMP PLC, 2013).

#### **A. The Telecommunication and Internet Networks**

It is imperative that the improvement of communication technologies is vital for the growth of transport sector and country's economy. Ethiopia's information and communications technology (ICT) landscape is rapidly evolving. The current contribution of the communications sector to GDP is 2 percent versus the 4 percent average in the East Africa region. Ethiopian wireless penetration stands at about 6 percent versus the sub-Saharan average of 40 percent. However, fixed line teledensity in Ethiopia is 1.2 percent compared to the world average at 18 percent. Other than equipment provision and downstream services such as call centers and messaging all other services are solely provided by the governmentally owned telecom service provider (Foreign Commercial Service and U.S Department of State, 2013).

Few months ago Ethio telecom signed a 1.6 billion US dollar worth telecom expansion project contract with two Chinese companies: HUAWEI and ZTE companies earlier as per the government's multi-vendor market sharing strategy. The telecom expansion project undertaking market share for each company (ZTE and HUAWEI) is 50 percent (i.e. 800 Million USD worth project for each out of the total expansion project). The expansion project contract with two Chinese companies, ZTE and HUAWEI, shall be done in two lots and the first lot would incorporate the following tasks in its network lot-mobile service core networks, transmission and fiber optics capacity increase and utilizing of latest technology,

Radio access Network, Core network as well as tasks of power supply and environment, fixed line next generation network and internet Protocol backhaul (Ethio telecom, 2014).

## **B. The Status of Energy Supply**

The country's energy comes mainly from two sources; namely from imported fuel and the hydro electric power. Ethiopia pays a significant amount of foreign exchange to import petroleum products each year. Since our transport system is entirely depends on vehicles. Ethiopia faces an energy shortfall that may put a brake on the growth momentum. Ethiopia's hydropower potential is estimated at 45,000 MW and its potential for generating electricity from geothermal is about 5,000 MW. The country is also endowed with enormous potentials of other renewable energy sources like solar and wind. To attain the objective of becoming a middle country by 2025, Ethiopia should maintain the current high GDP growth rate in the coming years, i.e., a 1 percent GDP growth which correlates with more than 2 percent growth in electricity demand. Even when we see the power demand of Ethiopia during the last five years, it has been growing at an average rate of 25 percent per year and the demand is also estimated to grow by 32 percent per annum in the next five years as per organization's forecast record (EEPCo, 2014; MoFA and WMP PLC, 2013).

At present, the country is able to generate 2,075MW of electricity that has taken the national electricity coverage to 46 percent and all plants utilize renewable energy sources to generate electricity in line with the green economy strategy. The amount of power necessary to provide for this tremendous demand by the year 2015 is forecasted to be 10,000MW, significantly greater than the current output. To meet the gap the government has initiated a number of energy development programs and among these the Grand Ethiopian Renaissance Dam Project (GERDP) is one which is being built on the most prominent (Blue Nile) river is expected to generate 6,000MW hydro power at the time of completion (EEPCo, 2014, MoFA and WMP PLC, 2013).

## **2.2. The Empirical Literature Review**

Due to the newness of the research topic in Ethiopian perspective there is no research work made prior to this study which the researcher could easily find and use as an empirical evidence for this research. In spite of this fact, the researcher has been forced to focus on continental and global experiences of the study topic.

As per UNECA (2003) empirical evidence, the major weaknesses identified in field of multimodal transport and freight forwarding in Africa were the prevalence of inappropriate legal framework, need for strengthening national and sub regional forwarding associations, the existence of too many variations in structures among freight forwarders, faulty management systems coupled with poor delegation of power and lack of professional structure in the industry. So as to overcome these problems, priority areas for sub-regional training in Multimodal Transport/Freight forwarding has been identified and a sample training module has been prepared covering thirteen major areas in the field.

On the other hand, the research made by (NCFRP, 2012) with the objective of identifying the challenges and opportunities of multimodal freight transport system of GLSLB/Great Lakes–Saint Lawrence Basin/ found out the following constraints/barriers and prospects of multimodal transport system. Modal integration challenges, lack of jurisdictional coordination, lack of multimodal funding mechanisms, modal inequality, insufficiency of data and performance metrics, lack of awareness of importance and role of freight transportation system, and labor constraints are the constraints were listed as challenge. Whereas the opportunities or initiatives to improve performance of multimodal freight transport system were the existence of opportunity for better freight transportation performance data and performance measures, opportunity for gateway and corridor or supply chain specific performance analysis, opportunity for better modal and jurisdictional coordination, opportunity for regional strategic framework to identify multimodal freight transportation priorities, opportunity for multimodal funding and funding mechanisms, opportunity for greater infrastructure investment, and educating and raising awareness.

Finally, the researchers recommended undertaking of further research focusing on the three intertwined areas: namely data development and sharing, collaboration and coordination, and the development of a strategic framework to guide these efforts and freight transportation planning.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

This part of the research explains the research design and methodology deployed in order to undertake this specific research work. It has included some very important sub topics in it.

#### **3.1. Research Design**

Depending on the objectives of the study descriptive or explanatory research design was chosen and used. According to Kothari(2004) descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group, whereas diagnostic research studies determine the frequency with which something occurs or its association with something else. Selecting of the descriptive research method helped to describe the research findings using major statistical measures such as median and mode.

#### **3.2. Population and Sampling Technique**

The total population of the study comprises the entire number of multimodal transport customers of ESLSE. According to unpublished data of the enterprise currently the enterprise has more than 5,000 multimodal transport customers. Therefore, all the customers of multimodal transport system were the total population of the study and they have been represented by the sample group.

##### **3.2.1. Sampling Technique**

Collecting and analyzing of data from the entire population found to be costly to the researcher in terms of money, time and energy demand. Due to this fact, the researcher determined the sample group who represented the total population. For ease of sampling the sampling frame has been determined first. The sampling frame is the list of all customers of multimodal transport from which the sample group was taken. From probability sampling technique, simple random sampling method was used to determine the actual sample group who filled out the questionnaire prepared. It is because this method was found giving equal chance of being selected into the sample group for every member of a population.

Only three managers from the enterprise were given a chance for interview representing the enterprise. Unlike the sampling method used for customers, convenience and purposive

sampling methods from non-random sampling technique were used to identify the right interview members.

### **3.2.2. Sample Size Determination Method**

In different circumstances researchers question how large a sample size they should use to make the sample representative of the population. In reality, how large a sample should be is a function of the variation in the population parameters under study and the estimating precision needed by the researcher (Cooper and Schindler, 2003).

According to University of Florida (2014), in addition to the purpose of the study and population size, there are three criteria required to be fulfilled to determine the appropriate sample size. These are: - 1. The level of precision, sometimes called *sampling error*, which is the range in which the true value of the population is estimated to be. The range is often expressed in percentage points (e.g.,  $\pm 1$  percent). 2. The *level of confidence* or risk level is based on ideas encompassed under the Central Limit Theorem. The key idea encompassed in the Central Limit Theorem is that when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value.

Furthermore, the values obtained by these samples are distributed normally about the true population value. In a normal distribution, approximately 95% of the sample values are within two standard deviations of the true population value (e.g., mean). In other words, this means that if a 95% confidence level is selected, 95 out of 100 samples will have the true population value within the range of precision specified. There is always a chance that the sample you obtain does not represent the true population value. This risk is reduced for 99% confidence levels and increased for 90% (or lower) confidence levels and 3. The *degree of variability* in the attributes being measured refers to the distribution of attributes in the population. The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The less variable (more homogeneous) a population, the smaller the sample size required.

Considering the homogeneity nature of the population under study, the researcher determined the sample size to be 205 customers of multimodal transport using the following sample size determination formula. Given the homogeneity nature of the population, the researcher believes that the output obtained with this sample size properly represents the total



population. It is because if the items of the universe are homogeneous, a small sample can serve the purpose. But if items are heterogeneous, a large sample would be required (Kothari, 2004).

Using Census for small population, sample size imitation from similar studies, using published tables, and applying formulas are the four methods described to determine a sample size (University of Florida, 2014). For this specific research, the researcher used formula method using the sample size determination formula provided by the website of the university and calculated the sample size as below. Since the formula is the right method of sample size determination in case of infinite or large population size. As it is discussed earlier the population of the study is large and that witnesses the appropriateness of the formula method.

$$n = \frac{Z^2 pq}{e^2}$$

Where:-

n = denotes sample size,

$Z^2$  = represents the abscissa of the normal curve that cuts off an area at the tails (1- equals the desired confidence level, that is 95%). The value of Z is found in statistical tables which contain the area under the normal curve.

e = is the desired level of precision,

p = is the estimated proportion of an attribute that is present in the population, and

q = is 1-p.

Before calculating the sample size, the three most important criteria of the formula which are bases to use the formula, have been assessed and determined first as indicated hereunder.

Z= 1.96, for 95% confidence level, most social science researches maintain a 95% confidence level.

e = 5%, the desired level of precision, or sampling error.

p = 0.2, the researcher estimated the proportion of an attribute that is present in the population since the population is attributed by homogeneous character. It means that there is very less variability in the population.

q= 1-p

$$n = \frac{(1.96)^2 (0.2)(0.8)}{(0.05)^2} = \frac{(3.842)(0.160)}{0.003} = \frac{0.615}{0.003} = \underline{\underline{205}}$$

As it is indicated the sample size determined using the formula method is 205. The research used this sample size to define the sample groups who have been participated by supplying primary data through questionnaire.

### **3.3. Types of Data and Tools/Instruments of Data Collection**

This part describes the data types, sources of data and data collection instruments used for the study.

#### **3.3.1. Types of Data and Sources of Data**

This research study used only primary or firsthand data collected from primary sources. Since both primary data and sources are more reliable and dependable than secondary data and sources in different perspectives. As a result primary sources were used as a source for the primary data used.

#### **3.3.2. Instruments of Data Collection**

Primary data collection instruments or tools were used to gather first hand data. The study used the most basic primary data collection tools such as questionnaire and structured interview checklists. The survey questionnaire was the main data collection tool used to collect data from customers. Whereas the structured interview checklists were used as a supportive primary data collection tool.

### **3.4. Procedures of Data Collection**

Before undertaking the actual works of data collection, the researcher carried out the necessary activities which were prerequisite to the success of the data collection. Designing of the right questionnaire with the required copies and the interview checklist were the one. Then the researcher requested for arrangement the right time when to distribute and collect the questionnaires and undertake the interview with the selected managements. After that branch offices of the enterprise informed the arranged schedules, the researcher used the schedule to carry out the data collection activities to best of the enterprise willingness. Actually there was a frequent schedule revision to the interview session and finally succeed at the final stage.

### 3.5. Reliability and Validity Analysis

Reliability and validity are terms that refer to the quality of the measures used in a research study. Reliability refers to the consistency and validity refers to the accuracy of the measure (Dunn, 1999). Among several measures of reliability Cronbach's alpha is the most commonly used measure of reliability (i.e., internal consistency). It was originally derived by Kuder & Richardson (1937) for dichotomously scored data (0 or 1) and later generalized by Cronbach (1951) to account for any scoring method. Internal consistency concerns the reliability of the test components. Internal consistency measures consistency within the instrument and questions how well a set of items measures a particular behavior or characteristic within the test. For a test to be internally consistent, estimates of reliability are based on the average inter correlations among all the single items within a test. Alpha value ranges between 0 and 1. The acceptable level of reliability has traditionally been with alpha value 0.70 or higher. However an alpha value below 0.70 is considered as poor to measure reliability of items.

This specific study used the Cronbach's Alpha method with the pilot data collected from 41 respondents before the actual data collection is done to test the reliability. The test was carried out only for questions prepared in likert five scale formats to check the internal consistency of those questions or variables used.

**Table No. 1: Reliability Statistics**

<b>Cronbach's Alpha</b>	<b>N of Items</b>
.941	39

*Source: Questionnaire, 2014*

According to Table No.1 the Cronbach's alpha value obtained is 0.941. From the rule of Cronbach's alpha value point of view, this value could be taken as a good value. The value confirmed the internal consistency of the variables used.

On the other hand validity deals with whether an instrument is measuring what it is supposed to measure. According to Dunn (1999) a valid measure is one that truly measures or manipulates the construct of interest. There are several ways to conceptualize validity. Dooley (2003) explains that construct validity often plays the most important role in social research because it addresses the threat that the measures employed do not pertain to the theory in question. One way of assessing construct validity of a measure uses the statistical

procedure called factor analysis. Factor analysis uses the correlations among all the items of a test to identify groups of items that correlate more highly among themselves than with outside the group. Ideally a measure should consist of items reflecting just one construct (that is uni-dimensional).

### **3.6. Methods of Data Analysis**

The data collected through the questionnaire were processed and analyzed using the statistical software called Statistical Package for the Social Science/SPSS/. Descriptive statistics method was used to analyze the data. Descriptive statistics enable to describe or compare variables numerically. The median and the mode are the two most commonly used ways of measuring central tendency. These two measures of central tendency were used to analyze and interpret the output of likert scale questionnaire data collected. According to Saunders, Lewis and Thornhill (2003) the median or middle value can be calculated by ranking all the values in ascending order and finding the mid-point (50<sup>th</sup> percentile) in the distribution. For variables that have an even number of data values the median will occur halfway between the two middle data values. Both the median and the mode have the advantage that they are not affected by extreme values in the distribution. The median is a recommended measure of central tendency for ordinal data type. The mode is the most frequently occurring value in a set of observations (Shajahan, 2004). However, respondents' profile related data were described using the frequency statistics calculated by SPSS.

### **3.7. Ethical Considerations**

Ethical considerations of confidentiality and privacy were addressed. A concerted and conscious effort was made at all times to uphold this promise. A guarantee was given to the respondents that their names were not important in the questionnaire and any part of the information would not be used for other purpose than this specific research. In order to ensure the reliability of the data, it has been tried to include only respondents who have an exposure and well understanding of multimodal transport operation. The researcher requested and got the approval of both the ESLSE and the regulatory office called Maritime Affairs Authority prior to the commencement of the research work. Both organizations further ensured the ethicalness of the researcher's earlier background to undertake this specific research work.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

This part of the paper presents the data analysis section of the paper. Questionnaire was the main data collection tool used supported by interview. The data collected via questionnaire were summarized, organized and analyzed using statistical software called Statistical Package for Social Science/SPSS. Descriptive statistics method was mainly used to analyze the data. The three open ended questions which were included in the questionnaire have been summarized manually and presented in this chapter.

From the 205 questionnaires distributed only 153 (74.63 percent) questionnaires were filled and returned back to the researcher. The total number of questions included in the questionnaire was 51. Out of those questions 39 of them were designed in likert five scale formats. However, the other nine questions and three questions were profile related and open ended questions respectively. The likert questions were analyzed using the two measures of central tendency called median and mode since these measures are found to be the right measures for ordinal type of data. However respondents' profile data were presented using frequency tables. But the responses of open ended questions have been summarized manually and presented under separate section.

The likert five scale ranges from scale level 1 to 5. Hence, each number represents as 1=strongly disagree, 2=Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree.

#### **4.1. General Profile of Respondents**

The respondents profile has two parts. The first part tells us the personal profile of respondents themselves and the second part tells us the profile of the company which they were representing at that moment.

##### **4.1.1. Sex of Respondents**

As it is clearly seen on Table No. 2 out of the 153 respondents 85 percent of them were male and the remaining 15 percent were female. The reason behind the huge number gap seen between male and female respondents might be the nature of the job which favors men than women.

**Table No. 2: Summary of Sex of Respondents**

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	1 Male	130	85.0	85.0	85.0
	2 Female	23	15.0	15.0	100.0
	<b>Total</b>	<b>153</b>	<b>100.0</b>	<b>100.0</b>	

*Source: Questionnaire, 2014*

#### **4.1.2. Educational Background of Respondents**

As per Table No. 3 all of the respondents have disclosed their educational level. According to the table 2.6 percent of the respondents have completed primary education from grade 1 to 8 but 29.2 percent of the respondents were secondary education (8 to 12 grade) complete. However, 30.7 percent, 46.4 percent and 7.8 percent of them were college diploma, university first degree and university second degree graduates respectively. Finally the remaining 3.3 percent of the respondents did not fit to the given educational level alternatives.

**Table No. 3: Summary of Respondents' Educational Background**

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	1. Primary Education (Grade1-8)	4	2.6	2.6	2.6
	2. Secondary Education (Grade 8-12)	14	9.2	9.2	11.8
	3. College Diploma	47	30.7	30.7	42.5
	4. University First Degree	71	46.4	46.4	88.9
	5. University Second Degree	12	7.8	7.8	96.7
	6. Other	5	3.3	3.3	100.0
	<b>Total</b>	<b>153</b>	<b>100.0</b>	<b>100.0</b>	

*Source: Questionnaire, 2014*

#### **4.1.3. Job Position of Respondents**

As far as the respondents' job position is concerned, all of them have shown their job position. From Table No. 4 it is simple to understand that 49.0 percent of the respondents were having the position of customs forwarder or transitor but 18.3 percent of the respondents were entitled with company owner or manager in their company. However, respondents who were assigned as procurement manager, procurement officer and other title were 9.8 percent, 9.8 percent and 13.1 percent respectively. Those respondents who have

shown their job position as Customs forwarder or transiter might be either working as a transiter in their import or export company or representing customs forwarding/clearing company.

**Table No. 4: Summary of Respondents' Job Position**

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	1. Company owner or manager	28	18.3	18.3	18.3
	2. Procurement Manager	15	9.8	9.8	28.1
	3. Procurement Officer	15	9.8	9.8	37.9
	4. Customs forwarder or Transiter	75	49.0	49.0	86.9
	5. Other	20	13.1	13.1	<b>100.0</b>
	<b>Total</b>	<b>153</b>	<b>100.0</b>	<b>100.0</b>	

*Source: Questionnaire, 2014*

#### **4.1.4. Work Experiences of Respondents**

According to Table No.5 only 93.5 percent of respondents showed their work experience. The majority of respondents 86.3 percent of them worked at least between 0 and 10 years. But the remaining respondents 5.2 percent and 2.0 percent served their companies for years between 11-20 and 21-30 respectively.

**Table No. 5 : Summary of Respondents' Work Experience**

	<b>Years</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	0-10	132	86.3	92.3	92.3
	11-20	8	5.2	5.6	97.9
	21-30	3	2.0	2.1	100.0
	<b>Total</b>	<b>143</b>	<b>93.5</b>	<b>100.0</b>	
<b>Missing</b>	99 No Response	<b>10</b>	<b>6.5</b>		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

*Source: Questionnaire, 2014*

#### **4.1.5. Companies Foreign Trade Sector Type**

The summary Table No. 6 depicts that only 85.6 percent of respondents gave their correct responses. Out of which 60.3 percent of them were found engaging in import business and 37.4 percent of the respondents were found being engaged both in import and export business. The percentage distribution confirms our country's high dependence on import trade activities. However, only 2.3 percent of the respondents were engaged in export trade.

**Table No. 6: Summary of Companies' Foreign Trade Sector Type**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1. Exporter	3	2.0	2.3	2.3
	2. Importer	79	51.6	60.3	62.6
	3. Importer and Exporter	49	32.0	37.4	100.0
	<b>Total</b>	131	85.6	100.0	
Missing	99 No Response	9	5.9		
	999 Not Applicable	13	8.5		
	<b>Total</b>	22	14.4		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

Source: Questionnaire, 2014

#### 4.1.6. Companies' Business Sector Type

According Table No. 7 out of the total number of respondents 99.3 percent replied their answer properly and 0.7 percent not. The table portrays that 36.8 percent, 28.9 percent and 21.7 percent were engaged in service business, wholesale and retail business and more than one business respectively. But 9.9 percent were engaged in manufacturing business and the remaining 2.6 percent of the respondents were engaged both in construction and agricultural business equally. The fact shown on the table tells us that our foreign trade activities showed more support to service business and merchandise trading rather than manufacturing, construction and agricultural business.

5.

**Table No. 7: Summary of Companies' Business Sector Type**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1. Manufacturing business	15	9.8	9.9	9.9
	2 .Wholesale and Retail business	44	28.8	28.9	38.8
	3. Construction business	2	1.3	1.3	40.1
	4. Agriculture business	2	1.3	1.3	41.4
	5. Service business	56	36.6	36.8	78.3
	6. More than one	33	21.6	21.7	100.0
	<b>Total</b>	152	99.3	100.0	
Missing	99 No Response	1	.7		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

Source: Questionnaire, 2014



#### 4.1.7. Ownership Title of Companies

According to Table No.8, 99.3 percent of the respondents returned correctly filled questionnaires. The table shows that 82.9 percent of the companies were owned by local private investors. But 7.9 percent of the companies were governmentally owned. Whereas 3.9 percent, 3.3 percent, 1.3 percent and 0.7 percent are owned by local and foreign investors, government and local investors jointly, foreign investors and government with foreign investors respectively. This data shows that most of the companies represented by the respondents were owned by local investors.

**Table No. 8: Summary of Companies' Ownership Title**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1. Local investor	126	82.4	82.9	82.9
	2. Foreign investor	2	1.3	1.3	84.2
	3. Government	12	7.8	7.9	92.1
	4. Local & Foreign Investor	6	3.9	3.9	96.1
	5. Government and local Investor	5	3.3	3.3	99.3
	6. Government with foreign Investor	1	.7	.7	100.0
	<b>Total</b>	152	99.3	100.0	
Missing	99 No Response	1	.7		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

*Source: Questionnaire, 2014*

#### 4.1.8. Foreign Trade Experiences of Companies

As per Table No.9 only 79.1 percent of the respondents were interested to express their companies' foreign trade experience. Hence out of the total effective respondents 58.7 percent and 25.6 percent of respondents were working in companies having a foreign trade experience ranging from 0-10 and 11-20 years respectively. Whereas 8.3, 2.5 and 1.7 percent of them were working in companies having a foreign trade experience ranging from 21-30, 31-40 and 41-50 years respectively. Unfortunately 2.5 and 0.8 percent of the respondents were working in companies having a foreign trade experience ranging from 51-60 and more than 61 years respectively.

**Table No. 9 : Summary of Companies' Foreign Trade Experience**

	<b>Years</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	0-10	71	46.4	58.7	58.7
	11-20	31	20.3	25.6	84.3
	21-30	10	6.5	8.3	92.6
	31-40	3	2.0	2.5	95.0
	41-50	2	1.3	1.7	96.7
	51-60	3	2.0	2.5	99.2
	=>61	1	0.7	0.8	100.0
	<b>Total</b>	<b>121</b>	<b>79.1</b>	<b>100.0</b>	
<b>Missing</b>	99 No Response	<b>32</b>	<b>20.9</b>		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

Source: Questionnaire, 2014

#### 4.1.9. Foreign Trade Partners Origin

From Table No.10 it is possible to understand that 89.5 percent of respondents forwarded their reply. As per the table 34.3 percent, 33.6 percent and 20.4 percent have trade partners originating from China and India, more than one choice and Middle East and Far East countries respectively. Trade partners originating from Europe and America and other countries represented 8.0 percent and 3.6 percent respectively. The summary table shows that companies included in research have foreign trade partners mainly from China, India, and Middle East and Far East countries than others.

**Table No. 10: Summary of Companies' Foreign Trade Partners Origin**

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	1. Middle East and Far East	28	18.3	20.4	20.4
	2. Europe and America	11	7.2	8.0	28.5
	3. China and India	47	30.7	34.3	62.8
	5. More than one	46	30.1	33.6	96.4
	6. Other Countries	5	3.3	3.6	100.0
	<b>Total</b>		137	89.5	100.0
Missing	99 No Response	3	2.0		
	999 Not Applicable	13	8.5		
	<b>Total</b>	16	10.5		
<b>Total</b>		<b>153</b>	<b>100.0</b>		

Source: Questionnaire, 2014

## **4.2. Multimodal Transport Information Dissemination Performance**

The multimodal transport information dissemination system is one of the basic functions of multimodal transport system. It is expected to facilitate system's effectiveness and efficiency by disseminating on time shipment information to customers. In order to measure the effectiveness of information dissemination process, the researcher presented five positive statements to the respondents to rank their level of agreement or disagreement based on their evaluation. For all the five variables presented under the first category, the respondents ranking shows the same median and mode values.

According to Table No.11 the median rank value scored for the variable of multimodal transport awareness creation by the enterprise is 2.00(disagree) and that implies 50 percent of the respondents rank laid above and below the middle value. The rank further tells us that at least 50 percent of the ranks ordered are in a boundary of strongly disagree and disagree. From the middle value we can infer that more than half of the respondents were not satisfied with the activities of multimodal transport awareness creation performance. On the other hand the mode rank 2(disagree) confirms further the dissatisfaction of most of the respondents by the poor performances of the multimodal transport awareness creation activities. Generally both results imply that there was no a consistent program designed and implemented to create awareness about multimodal transport system both for customers and employees.

The median value 2.00(disagree) for the second statement revealed at least 50 percent of the respondents did not agree on the time when multimodal transport information is being disseminated to reduce all multimodal related costs. It implies that at least half of the respondents were thinking that the information has not been transferred at the right time to make them reduce multimodal transport costs and transit time as well. Not releasing the right multimodal transport information at the right time to customers became a problem because of not installing a fully fledged information network system as per the information obtained from the interview. The mode value also witnesses that most of the respondents were not satisfied with time efficiency level of the department.

The final statement which was provided to the respondents in this category summarizes the activities of the category and requests them to rank the dependability and reliability level to the multimodal transport information being released for business decision. The middle rank

obtained is 2.00(disagree) with modest rank 21. The median rank obtained tells us that at least 50 percent of the respondents were not thinking all the information disseminated by ESLSE operational sectors as reliable and dependable most of the time for business decision making. As per the mode rank obtained most of the respondents were not deadly sure on the reliability and dependability of the information being released.

The summary of the median rank and mode of all the variables shows that relatively most of the respondents did not agree with the multimodal transport information dissemination performance level. The poor information communication technology system, unavailability of internal and external software based integrated and networked system were the major reasons explained by the managements for the problem prevailing.

**Table No. 11: Descriptive Statistics Value of Multimodal Transport Information**

**Dissemination Variables**

Statistics					
Var . No	Variables	N		Median	Mode
		Valid	Missing		
10	Multimodal transport system concepts and practices have been adequately introduced to all staff members of the enterprise and the business community.	152	1	2.00	2
11	ESLSE’s shipment status information dissemination facilities have been serving well to reduce shipment transit time, demurrage and storage costs.	152	1	2.00	2
12	Multimodal transport customers are well aware of their rights, duties and responsibilities emanated from the new system.	152	1	2.00	2
13	The communication media used and the time when the information is disseminated are comfortable to the business community.	150	3	2.00	2
14	All the time the information disseminated by all sectors of ESLSE is reliable and dependable for business decision.	152	1	2.00	2

Source: Questionnaire, 2014

**4.3. Dry Port and Terminal Service Performance**

The dry port and terminal service is one of the fundamental services being provided by ESLSE under the multimodal transport system. As per the information obtained through interview from the enterprise’s higher officials, port and terminal service include port and

terminal services such as loading and unloading, temporary storage, stuffing, unstuffing services for incoming and outgoing goods. In this case the researcher provided ten different questions to the respondents pertaining to port and terminal service capacity and customer satisfaction level exploration. As per the summary of median ranks of all the ten variables provided to the respondents, the first five and the last variables have got 2.00 (disagree) rank and the other four variables have shown a 3.00(neutral) rank. As far as the mode rank is concerned, the first six and the last variables have got a 2(disagree) as the most frequently observed rank and unlike the other three variables have shown 4(agree) as modal rank.

This part contains somewhat more questions compared to other main categories of the multimodal transport system. That is made because most of the services of multimodal transport system are given at the local dry port and terminal areas.

According to Table No.12 the median and mode rank obtained regarding the availability of enough port and terminal machineries in dry ports was 2(disagree). The median value tells that more than half of the respondents ranked the two lowest ranks 1 and 2. That means the dry ports and terminals are not well equipped with required loading and unloading equipments as well as the facilities too. The mode value confirms the lowest rank given by more than half the respondents. As per the information gathered through interview, latest and new loading and unloading machineries are being procured and supplied to the dry ports. Especially Modjo, Gelan and other dry ports and terminals facilities have been showing improvement in equipments acquisition and facility development as per the interviewed officials.

On the other side, respondents were asked to rank port and terminal space related statement. Here the median and mode vale 2(disagree) scored indicates that more than half of the respondents ranked the availability of enough space to accommodate all the incoming and outgoing goods with lowest ranks 1 and 2. That means most of the respondents do not think that the available spaces in dry ports can accommodate and hold all the incoming and outgoing goods together not only in peak times even in regular times. Concerning this variable, the interview information witnessed the problem and remarked that a huge dry ports area expansion works are under operation in order to alleviate the problem of dry port space shortage.

Regarding the fairness and reasonability of the service cost that customers of dry port and terminal service are supposed to pay, the median and mode values scored were 2(disagree). That implies most of the respondents ranked the slowest ranks 1 and 2 when they judge the fairness and reasonability of dry port and terminal service charges they are paying right that moment. Under multimodal transport system usually customers expect fewer charges in relation to local port and terminal services compared to foreign ports in unimodal case. However, the interview information stressed the fairness and reasonability of the prices determined earlier and being used for the dry ports services.

**Table No. 12: Descriptive Statistics Value of Dry Port and Terminal Services Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
15	Dry port and terminal facilities are well accessed throughout the country.	153	0	2.00	2
16	All the available dry ports and terminals are well equipped with all the necessary equipments and facilities.	153	0	2.00	2
17	The available dry ports and terminals do have enough space and capacity to accommodate all incoming and outgoing cargoes even in peak periods.	150	3	2.00	2
18	Dry port and terminal services are provided easily with acceptable waiting time.	153	0	2.00	2
19	Dry port and terminal operations are well managed and efficient in their service.	150	3	2.00	2
20	The charges being requested for dry port, terminal and warehouse services are reasonable.	153	0	3.00	2
21	Dry port and terminal services are provided with the law of first come first served, if discrimination is needed justified and approved by higher officials.	149	4	3.00	4
22	Cargos are easily located in identifiable way and their safety is well ensured in any movement.	152	1	3.00	4
23	Cargo unstuffing service is well provided in all dry ports.	151	2	3.00	4
24	The overall management practices of dry port and terminal sector is satisfactory.	151	2	2.00	2

Source: Questionnaire, 2014

With regard to cargoes identification and safety level ensured by the dry ports and terminals, the median value obtained was 3(neutral) and the modest rank observed was 4(agree). The median value indicates that more than half of the respondents lay with the ranks between 1(strongly disagree) and neutral. The median value reveals that most of the respondents could not be able to definitely decide on the level of safety and easy identification mechanism being under implementation. But the frequent value ranked was 4(agree) and that does not entirely confirm the properties of the respondents position unless supported by the median value. From the interview it is learnt that easy cargo identification and cargo safety related problems were seen at the time of dry port and terminal services commencement stages and gradually been improved.

Finally the respondents have been requested to rank the overall management practices of dry port and terminal sector's performance satisfaction level. The median and mode of this variable were 2(disagree). The median value reveals that more than half of the respondents ranked the satisfaction level in between the lowest rank 1(strongly disagree) and 2(disagree). The mode which is the frequent rank observed in this variable confirms that most of the respondents were not happy with the dry port and terminal service satisfaction level delivered at that time. However the interviewed officials claimed together the newness of the multimodal transport service to the country as a reason for the poor satisfaction level achieved and to be improved later on. To the interviewed officials more than other factors, the poor integration level existed with multimodal transport system support offices; information communication and cargo identification system were explained as causes to lag the efficiency and effectiveness of dry port and terminal services which ultimately results in poor customer satisfaction.

#### **4.4. Inland Transport Service Performance**

Inland transport is an integral part of multimodal transport system which ensures the movement of cargoes from place to place using vehicles or some other land movables. The information obtained through interview confirms that our country's land transport system is entirely dependent on road transport using trucks. In multimodal transport system trucks are used to transport imported goods from Djibouti port to all available dry ports or/and to

bonded customers' warehouses<sup>8</sup> and also delivers export goods and empty containers to Djibouti port. Here some very important questions have been asked to rank the inland transport service performance level in order to identify the main challenges faced by the operational division currently.

**Table No. 13: Descriptive Statistics value of Inland Transport Service Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
25	Shipments are coming with minimum process time in Djibouti and reasonable transportation time than ever.	152	1	2.00	2
26	Shipments are brought to the designated dry ports timely and correctly.	151	2	2.00	2
27	The inland transportation service charge being charged by the enterprise is reasonable and competitive compared to private transporters.	152	1	3.00	4
28	The enterprise has enough number of trucks to render effective and efficient transportation service.	151	2	2.00	2
29	The transport division is responsive in case of customer complaint.	151	2	2.00	2
30	The overall management practice of inland transport division is satisfactory.	151	2	2.00	2

Source: Questionnaire, 2014

In relation to inland transport services performance level, six variables were provided to evaluate the operational level of the inland transport section of the multimodal transport system. Out of the six variables except the third variable all of them have shown a median and mode of 2(disagree). Only the third variable has got a median of 3.00(neutral) with a mode of 4(agree).

According to Table No.13 the first statement says in multimodal transport system shipments are coming to dry ports from Djibouti with in short period of time. In this case the median value 2(disagree) reveals that more than half of the respondents rank fall in a rank level

<sup>8</sup> **Bonded warehouse:** - is a warehouse prepared at the premises of authorized importers to facilitate outside goods inspection process and serves to store goods until the actual inspection is undertaken. Warehouse keys shall be kept at the hands of both customs and the customer and opening is possible with the presence of both parties.



ranging from 1(strongly disagree) and 2(disagree). Plus to that the mode value 2(disagree) assures that most of the respondents ranked the 2(disagree) rank. From the median and mode values it is possible to understand that the enterprise has a problem of ensuring on time delivery of imported goods especially from Djibouti to dry ports and/or bonded warehouses. As per the information gathered via interview, higher officials confirmed that the delay in transportation from Djibouti to Modjo or some other dry ports is definite. But lack of heavy trucks in the market and the load capacity of our old bridges found in between Djibouti and dry ports were cited as major problems and the later hinders to use the actual capacities of trucks. On top of these two problems the officials underlined the problem of overweight shipment practice of importers which is creating the above two effects.

To the statement talking about the competitiveness of the inland transport cost, more than half of the respondents ranking distributed from 1(strongly disagree) to 3(neutral) level. But the mode value was 4(agree). The mean value implies that most of the respondents were not in a position to judge the reasonability and competitiveness of the inland transport charge being charged with undisclosed reasons. But the information obtained from interview confirms the reasonability and competitiveness of the inland transport pricing compared with private transporters quote to private customers. Further the manager affirmed that customers will be better off in case of accident or damage that may happen on their cargos while it is under transit to its destination in multimodal system.

Concerning the availability of enough number of trucks to support the multimodal transport system, respondents' gave their own responses. According to the median and mode ranks, more than half of the respondents put their rankings in between the lowest rank 1(strongly disagree) and 2(disagree) level. The result implies that more than half of the respondents do not agree with the statement which confirms the availability of enough number of trucks to support multimodal transport in the enterprise. The interview information supports the respondents' response and the enterprise owns only around 55 trucks but the system needs up to 2,000 trucks at peak periods and the enterprise currently fills the gap through inland transport outsourcing mechanism. However, the interviewee explained the enterprise's believes on the railway system which is under construction to solve the inland transport problem in the near future.

As to the overall performance level of the division, the median and mode values were 2(disagree). That median implies that more than half of the respondents ranks fall in between the lowest rank 1(strongly disagree) and 2(disagree). That means more than half of the respondents were not happy with the inland transport services satisfaction level achieved by the enterprise. Since inland transport service is the only way to bring the imported goods to different parts of the country, all customers need to see efficiency and effectiveness on the management practices. The increased number of fleets required to pick up goods from ports using low volume trucks increases the operational cost of road transport and cargos queue waiting time as per the interview information. The interviewees also revealed that the trucks operational and management costs increases the unit cost of the service which would have been lower if railway system is incorporated in the multimodal system.

#### **4.5. Sea Transport Service Performance**

The sea transport service is given to both export and import customers. In the case of sea transport, shipments transit longer distances other than any modes available in the multimodal transport system. To find out the very important challenges faced by the sea transport under multimodal transport system, the researcher provided few questions to respondents to rank the level of service and come up with the following results.

As per Table No.14 except the first statement which scored a median of 4(agree), all the variables have scored a median of 3(neutral). As far as the mode is concerned, the first two and the fourth statements shown 4(agree) as a modal value. The most probable reasons for the neutral positions they stood could be the reality of not having professional ground to evaluate the service level of the shipping sector.

For the statement that says the available trade routes satisfies your sea transport service demand, the median value 4(agree) indicates that more than half of the respondents are satisfied with the business routes available. Since 50 years to date the ESLSE held the monopoly power of being the only option for sea transport service to local customers and this trend did help to establish trade routes almost around to all the main business partners favored by Ethiopian customers. In addition to accepting the given price and service quality for granted, the customers lost the chance to look the quotations of other similar service providers from a global competitive market due to the monopoly power existed.

For instance, in relation to the sea transport service cost reasonability respondents median value is 3(neutral). The result implies that the respondents were not able to examine and judge the reasonability and competitiveness of the service charge being paid. Not knowing other international market prices could be the possible reason here. More precisely the difference in the respondents' output would be the knowledge gap to examine the price. Actually as per the interview sea transport service price comparison has to base on some major factors all the time. The similarity of economic performance, balance of trade, level of competition existing and tax system on freight charges were the four basic foundations raised by the higher official of the enterprise on the interview session. This implies that simple comparison taking the freight amount would not be fair, dependable and reliable criteria to judge.

**Table No. 14: Descriptive Statistics Value of Sea Transport Service Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
31	The available trade routes are well satisfying your shipping service requirement.	151	2	4.00	4
32	The shipping sector is providing quality shipping service based on customers' requirement.	150	3	3.00	4
33	The service charge being charged for shipping service is reasonable and competitive.	150	3	3.00	3
34	The shipping sector has the capacity to facilitate multimodal transport operation in terms of physical and human resources.	150	3	3.00	4
35	The overall management practice of shipping sector is satisfactory.	150	3	3.00	3

*Source: Questionnaire, 2014*

When the overall level of management practice of shipping sector is examined, the median and mode value scored was 3(neutral). The mode value tells us that the most frequently observed rank in this statement was 3(neutral). The median value implies that more than half of the respondents ranked within the range 1(strongly disagree) and 3(neutral). However, the mode value confirms that most of the respondents were not in a position to witness or rank the efficiency and effectiveness of the shipping sector performance either positively or negatively. The reason for this could be lack of knowledge to properly examine the

management performances of the sea transport. However, after launching of the new multimodal system, the sea transport service functionality faced serious challenges at the begging time. Gradually the system has been showing stabilization and the sea transport performance level has shown a tremendous improvement so far. As a concluding remark here the sea transport performance level is well preferable than other services of the multimodal system as per the interview information.

#### 4.6. Customer Service Performance

The customer service department usually receives customer complaints regarding multimodal transport performance in the form of questions, opinions and suggestions from multimodal customers. Despite the newness of multimodal system, increasing number of complaints comes to the department daily. In connection to customer service operations performance the researcher forwarded certain questions which can help to examine the performance level of the department. To know how best the department is responding to the customers' requests. Out of the five positive statements forwarded for ranking to the respondents, the calculated median value of rank for the three statements were 2(disagree). And the remaining two statements result in a median of 3(neutral). Also the four statements have shown 2(disagree) as a modal rank or frequently observed performance level.

**Table No. 15: Descriptive Statistics Value of Customer Service Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
36	The customer service set up of multimodal operation is highly responsive.	151	2	2.00	2
37	Customer service complaints are resolved by information & customer service division within short period of time.	151	2	2.00	2
38	The enterprise has effective multimodal system network with different offices to provide efficient service to customers.	151	2	3.00	3
39	The overall shipment transit time and transaction costs have been significantly reduced by multimodal transport operation.	150	3	3.00	2
40	The overall multimodal transport customer service quality is satisfactory.	150	3	2.00	2

Source: Questionnaire, 2014

According to Table No.15 Generally the overall evaluation of the customer service performance level did not show good mark. For instance more than half of the respondents ranked a median value 2.00(disagree) in connection with the customer service department set up in solving multimodal transport problem with a mode rank of 2(disagree). That means more than half of the respondents were not happy with the customer service department's set up since they did not believe that the current department's arrangement can easily resolve their cases coming to the department.

When assessing the customer's service department's behavior of responding to customer complaints with in short period of time, the median value obtained is 2.00(disagree). Also the statement has registered 2(disagree) as the modest rank leveled by more respondents. The result implies that most of the respondents do think that the customer service department has not experienced resolving complaints within a short period of time. That means the enterprise's customer service department seems inefficient in terms of time utilization in resolving a case at hand. As per the interview information received from the concerned department, a lot of complaints or letters of appeal come to the department each day and each case takes longer investigation time before giving any kind of solution. That is because the cases might need the participation of different departments of the multimodal transport system before determining the solution. Finally the interviewee confirmed the longer time intake to study the cases from a grass root level and come up with feasible solution both to the customer and the enterprise.

In relation to the overall customer service performance quality, at least more than half of the respondents ranked within the range 1(strongly disagree) and 2(disagree) as indicated by the median value 2.00(disagree) and mode 2(disagree). The result implies that most of the respondents were not satisfied with the overall performance level of the customer service department. The interview information obtained from the customer service department confirms that the current customer service quality level has not been satisfying the needs of the customers. Further the overall poor level of multimodal transport service performance remains the source of dissatisfaction in the customer service as per the information obtained from interview. In line with the interviewee pointed out the progressive works being undertaken in every aspect of the system by the enterprise are believed to reduce the level of complaints being raised by customers in the future.

#### **4.7. Multimodal Transport Regulatory Structure**

The multimodal transport system as a system invites more transport actors and to work together as a single system. Obviously multimodal transport system is vast in its operational scope than unimodal transport system. Consequently each actor would have its own duties and responsibilities to be performed to ensure the normal operation of the system. For instance customers as part of the system are required to fulfill the requirements needed from them to get the full service of the multimodal transport operator by entering a multimodal transport agreement. After that the multimodal transport operator will deliver the service promised as per the agreement made with its customer. In certain situations these entities could be found not fulfilling what is agreed earlier or breaching their prior transport contractual agreement. This is the case where the regulatory framework becomes important to maintain the system's operation by resolving the differences that might happen among parties in the system. That means the regulatory framework will have a role of governing the operations of multimodal transport system.

In relation to the regulatory framework in the multimodal transport system, respondents have been given three positive statements to rank their level of agreement or disagreement in the questionnaire. Pertaining to strength of the surveillance system installed by the enterprise to ensure monitoring of rules violation in multimodal transport system, according to Table No.16 the median and mode values obtained were 3(neutral). The neutral position tells that the respondents are not quite sure to witness the strength or weakness of the surveillance system under operation right that time. That is why they showed their agreement level in the middle position. The median value further tells that the respondents were not in a position to rank the supervision level of acts of violence either positively or negatively with undisclosed reasons. The median and mode values of the responses further indicates the questionability of the enterprise's performance in relation to avoiding violation practices being committed on multimodal transport rules and regulations. Its performance in this regard needs more improvement in future as per the interview information gathered.

The second statement provided to respondents under the regulatory framework was concerning the level of compliance system used by the enterprise in connection to rules violation. As it is indicated on Table No.16 the median and mode values of ranks obtained were 3(neutral). The median and mode values imply that the respondents were not quite sure

to witness either the strengths or weaknesses of the level of compliance system being employed by the enterprise to monitor rules violation acts.

That means the compliance system under operation for rules violation need to be reviewed to check its effect. The same point was raised in the interview session and the enterprise needs to work a lot in this regard as the interviewee remarked.

**Table No. 16: Descriptive Statistics Value of multimodal Transport Regulatory Aspects Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
41	The surveillance system employed by ESLSE for monitoring rules violation is strong.	152	1	3.00	3
42	The compliance system employed by ESLSE for monitoring rules violation is strong.	151	2	3.00	3
43	The Board of Directors (BoD) are good enough in supervising ESLSE's Multimodal transport activities.	153	0	3.00	3

*Source: Questionnaire, 2014*

Like the first two variables the respondents showed a median and mode values of 3(neutral) when they rank the performances of top level supervisors of the multimodal transport system. Actually the board of directors is not the only supervisor of the enterprise's performance. The median and mode values implication tells us that the respondents were not able to rank the performance level of the supervisors either in agreement or disagreement level. However, the system needs quite supervision level to ensure system's operational efficiency and effectiveness as per the interview information.

According to the interview information the managements underlined the importance of efficient and effective multimodal transport operation regulatory system or framework. Further the managements stressed the importance of designing current multimodal transport rules and regulations to be put into effect to ensure the right operation of the new system. It is because the existing level of regulatory framework of the enterprise does not have the right capacity to support the operation of the multimodal transport system in rules and regulations violation being committed in all areas of the system.

#### 4.8. The role of Customs Office in Multimodal Transport System

According to the interview information, multimodal transport system is not a system which can work independently without the influence of other offices. Out of these external offices the support of customs office can be stated as the most important and determinant one. Since the customs office comes at the forefront in the multimodal transport services operation due to the reason that no shipment can be delivered to customers without fulfilling customs formalities. As a result the multimodal transport system becomes dependent on the services of customs office. The summary report shows that the median and mode values obtained for the five variables vary significantly.

**Table No. 17: Descriptive Statistics value of the role of Customs Office on Multimodal Transport Variables**

Statistics					
Var. No	Variables	N		Median	Mode
		Valid	Missing		
44	The customs offices' readiness and willingness to facilitate goods clearing process timely is excellent	151	2	2.00	2
45	The customs' goods clearing procedures well facilitate multimodal operation	152	1	3.00	2
46	The existing coordination level between customs offices and ESLSE is strong	151	2	3.00	3
47	Multimodal customers usually present full set of original documents complying with customs goods clearing procedures and directives.	152	1	4.00	4
48	The overall performance level of customs offices in relation to multimodal operation is satisfactory.	152	1	3.00	4

Source: Questionnaire, 2014

According to Table No.17 respondents were given five positive statements in relation to customs and multimodal operation to rank based on their knowledge. In connection to the willingness and readiness of customs office in ensuring swift goods clearance process for multimodal shipments, most of the respondents ranked a median and mode values of 2(disagree). That means more than half the respondents were not happy with the service readiness shown by the customs offices to assist multimodal customers. As per the results



obtained the customs offices are not performing as per the requirements of multimodal transport system. That has been manifested by the unsatisfactory level of readiness and willingness showed by the customs offices to their multimodal transport customers.

The second statement was about how fast goods clearing procedures facilitate the multimodal transport operation. As to this statement the median and mode values obtained were 3.00(neutral) and 2(disagree) respectively. The median value indicates that more than half of the respondents were not sure to decide in either position and that is why they preferred to stay in a neutral position. But more respondents ranked 2(disagree) level as a modal value. However, the interview information revealed that the customs goods clearance procedures being used have not been supporting the new system as it is required. As per the explanation made by the managements the customs procedure needs many more documents to start goods clearing process which could have been reduced to very few number of documents as multimodal transport operation system uses in other countries. Plus to that the customs clearing procedure needs more days and this trend had affected the operation of the system negatively in the past especially increased goods transit time.

Finally the respondents evaluated the overall performance satisfaction level of customs offices in relation to multimodal transport operation. The result shows a median of 3.00(neutral) and mode of 4(agree). The median value implies that more than half of the respondents were not in a position to agree or disagree with the overall performance level of the customs offices. Meaning the customs offices were not supporting the operation of multimodal transport system as to the required level. There are known complexities in the operation of customs offices which are affecting the new system's efficiency. According to the interview information the enterprise knows that the customs operational set up, procedures and document requirement are not facilitating the operations of multimodal transport as it is supposed to be.

#### **4.9. Summary of open ended questions**

Three open ended questions were provided to the respondents in relation the subject under study. Their responses has been summarized and presented here in the research report. As per the collected data 26.8 percent of the respondents did not give any answer for the whole three questions. However 1.96 percent, 10.46 percent and 32.03 percent of the respondents did not answer only question no.49, 50 and 51 respectively.

The first open ended question delivered to the respondents, requested them to list some of the major challenges faced by multimodal transport system based on their own experience. The prevalence of poor inland transport facilities, lack of committed and ethically responsible professionals in operational areas, lack of port equipments and facilities, frequent interruption of communication networks, dry ports capacity limitation and extended customs goods clearing procedures were disclosed as the main challenges to system's operation. Further they pointed out few more points such as the poor networks of integration with external support offices, system's awareness gap by customers, corruption at operational areas, unavailability of safe parking area, unavailability of standard restaurants and resting rooms at dry ports, frequent meeting programs by supervisors and longer time taking case settlement style are believed by respondents as additional challenge to multimodal transport system.

The second question gave chance to the respondents to forward possible solutions that they think helpful to get rid of those challenges which they stated above.

Most of them believe delivering continuous task oriented and ethical trainings for the existing employees and recruiting of professionals for new posts will improve the service quality of the new system at this level. Also they added that deployment of modern heavy trucks and latest port handling equipments and improvement of means of communication and building dry ports around Addis Ababa, periodical customer satisfaction measurement scheme, making the service customer focused and delivering service always in accordance with the rules, regulations and directives of the enterprise will have a vital role. Few of the respondents further believe that only doing the above changes will not assure the quality service that they need. Rather they strongly recommend that undertaking of continuous research based discussions both with business communities and other stakeholders, receiving and using strong comments of customers, looking to restructure the current set up of the enterprise, reduction of monopoly power and reduction of bureaucratic procedures both in the enterprise and customs office and transforming the service into single window service as an important measures to upgrade the quality and capacity of the service.

At last the respondents have been given another opportunity to forward points which have not been incorporated in the questionnaire as a question but relevant to the research work. Here the respondents underlined again and again their understanding about the importance of the system to the country. Few of them expressed their readiness to play their role as a public and

business community besides the role of the government to upgrade the quality of the service. In contrary few respondents explain that multimodal system has brought problems than solutions compared to unimodal service. And if the multimodal system service quality continuous as it is they tend to prefer getting unimodal transport service. Most of the respondents showed their interest of getting updated shipment information timely and in other direction raised the unfairness of collecting container damage fee severally for container which has been already damaged and paid once until new one is replaced for use. As a concluding remark the respondents requested the enterprise to avoid multimodal transport service impediments and render them quality multimodal transport service on behalf of multimodal transport customers.

#### **4.10. Multimodal Transport Practices of ESLSE**

The enterprise follows a certain operational procedures to give a multimodal transport service both to import and export customers. For instance for imported goods to start the multimodal transport operation the shipment has to be made from the loading port and the logistics department has to receive shipment manifest document. Once the logistics team receives the manifest document automatically they will open operation identification number to that specific shipment and send documents to Djibouti office to begin transit process. Then team of ESLSE in Djibouti completes Djibouti's port formalities through the Association of Djiboutian Transitets/ATD/. After that the ESLSE assigns inland transporter to bring the goods from Djibouti to Ethiopian dry ports or directly to customer's warehouse and return empty container back to Djibouti (ESLSE, 2014).

The local dry ports and terminals provide the following services to the multimodal shipments.

- Loading, unloading and warehousing services to incoming and outgoing goods;
- Stuffing and unstuffing services for incoming and outgoing goods;
- Provides container storing and container related services

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1. Summary of findings

The Ethiopian shipping and logistics services enterprise is currently known as a multimodal transport operator by providing a multimodal transport service to customers who are engaged in foreign trade activities and others. The multimodal transport service is currently being provided by consolidating the sea transport, inland transport and other support activities under a single multimodal transport contract in a through bill of lading system. Unlike the uni-modal transport system shipments will not be allowed to stay longer days at the port of discharge (Djibouti port). As per the multimodal transport agreement made between Ethiopia and Djibouti multimodal shipments are allowed to enter to Ethiopian dry ports prior to starting local customs clearance process by customers which was taking longer time in uni-modal transport system.

For the purpose of easing the research work, the researcher has been classified the multimodal operational activities into seven distinct parts. These activities were the multimodal information dissemination services, dry port and terminal services, inland transport services, customer service, multimodal transport regulatory activities and the role of customs offices in multimodal transport system. The classification was made mainly to assess the performance level of each sub operational departments and ultimately to know the success level of the whole multimodal transport system in general terms. Those sub operational departments have been well addressed by the questionnaire and interview questions designed. With regards to multimodal transport information dissemination trend of the enterprise, it has been tried to assess the operational success using five questions. Generally the findings obtained from the respondents indicate that the most of the respondents were not comfortable with the information dissemination mechanism being used by the enterprise and also they had question on the reliability and dependability of the information being disseminated. That is because business decision requires dependable and reliable information from reliable and dependable sources in order to reduce business risks. In this case customers need to trace or book their shipments using the multimodal transport information system.

For the multimodal dry port and terminal operation's performance evaluation ten questions were provided to the respondents. As per the information from the respondents most of them were not satisfied with the level of dry port and terminal operational activities as far as the seven measurement questions were concerned. And for the remaining three measurement questions they have shown their neutral position. The sum up result shows that most of the respondents tend to disagree with the overall performance level of the port and terminal sectors. In order to assess the operational practices and challenges of the inland transport part of the multimodal transport system, six questions were provided to the respondents to rank the level of performance. According to the median and mode value calculated almost all the respondents have shown their disagreement in evaluating the performance level of the inland transport section of the multimodal transport system. The findings obtained with regard to the sea transport service performance level indicated that the performance level of the section has well satisfied the customers compared to any other operational divisions of the multimodal transport system. That is why most of the respondents agreed with positive statements provided to them.

In relation to the performance level of customer service section of multimodal transport system, five positive statements were given to the respondents to rank the service level. As per the median and mode results obtained most of the respondents have shown their discomfort with current customer service performance level.

So as to evaluate the multimodal transport regulatory performance only three questions were delivered to the respondents. The findings obtained indicate that most of the respondents were fall in neutral position. That is because as a culture usually Ethiopian people do not dare to blame the regulatory aspect of the government offices. They think doing that will have a spoiling effect on their business but the reality may not work in that sense. As far as the role of customs is concerned five statements were provided to the respondents to rank the support level of customs office being provided in order to facilitate the operation of multimodal transport service in general. According to the findings obtained from the respondents most of the respondents shown their disagreement with the first two statements and neutral position for the other two statements and agreed with the remaining one statement. When we summarize the findings of the respondents most of them were not satisfied with half of the measuring statements results and likewise most of them also shown their neutral position for two measurements.

## **5.2. Conclusions**

The interest of receiving quality multimodal transport services remains being the question of multimodal transport customers. However the expectation of customers may not match with the level of service provided by the multimodal transport service provider/operator. Therefore, service providers are required to work diligently always to satisfy the requirements of their customers. Based on the findings of the research it is possible to conclude the following.

Efficiency and effectiveness in dissemination of multimodal information remains the most essential activity required by the system. It is because it has a great role in minimizing costs of multimodal transport operations. As per the findings of the research the multimodal information dissemination performance of the enterprise has not reached to the level required by the multimodal transport system. Therefore, it is possible to conclude that the multimodal transport information dissemination mechanism is not supporting the new system as to the level of support required. Local dry port and terminals substantially supports the operation of multimodal transport activities being the final destinations for incoming cargoes and stuffing places for export goods as well. As per the findings of the research in this regard the current performance level of local dry ports and terminals services has not shown a real cost reduction to the customers from total transaction cost point of view. The poor infrastructural facilities of the dry ports and terminals have not helped the enterprise to succeed what it has planned to achieve from the multimodal transport system.

The inland transport system which is an integral part of multimodal transport system of the country is entirely dependent on road transport system which is the most ineffective, inefficient and the most air pollutant transport system than other modes. The fleet management activities of road transport are not as simple as other modes of transport. According to the results of the study, it is likely to conclude that the service of road transport has not fulfilled the expectations of the multimodal transport customers so far. Also the inland transport would continue being the most challenging factor to the multimodal transport system in the future. As per the findings of the research it is most likely to conclude that the sea transport sector has supported the enterprise to secure what it has planned to get from the new transport system. Actually the shipping sector has a sound material and human resource asset to support the multimodal transport system.

The findings confirmed that the customer service department frequently receives letter of complaint on the major services of the multimodal transport system and takes longer time to resolve the problems. So it is likely to conclude that the customers' service department has not got the capacity to give appropriate solutions swiftly. The legal and regulatory aspects of multimodal transport system naturally need the active participation of the concerned bodies for the good of the system's quality service. Standing from the results of the research it is very likely to conclude that the compliance of rules and regulations of the system has not been ensured so far and it might have created bad impression on customers. The customs operation has its own impact on the multimodal transport system either by stretching or shrinking the multimodal transport transit time. As per the findings of the research it is possible to conclude that the excessive procedures and too many clearing documents requirement by customs offices generally has worsen the role of customs office to the success of multimodal transport system so far.

As a general conclusion standing from the research findings, all the sectors of the new system have not reached to the same level of development or readiness by acquiring equipments and facilities required to render multimodal transport service at the time of launching the new transport service. Finally the total system's efficiency and effectiveness has been affected by the inefficient and ineffective operation of most of the sub systems.

### **5.3. Limitations of the Study**

The findings of this study should be viewed with certain limitations in mind. The non response rate was the limitation of the research. Only 153 respondents returned back the questionnaires after proper administration from the 205 questionnaires distributed. Due to the nature of the works of the respondents few of them did not return back the questionnaires with lack of time. Some of the respondents also seemed sensitive about revealing confidential company information, which increased the difficulty of doing this research.

Another limitation of the study relates to the characteristics or demographics of the sample. The study was conducted on multimodal transport customers dominated by mostly male participants engaged in import and export, wholesale and retail trade and service businesses. Results might have been different if percentages of respondents' gender, foreign trade sector, business sector, educational level, service year and company's foreign business experience

were different. However it does not mean that the results of this research would not be worthless.

Thus, these findings obtained from the sample group can be generalized to the entire population of multimodal transport customers. Generalization of the present findings should therefore be examined in future research by extending the geographical scope and using more heterogeneous samples.

Despite these limitations this study shall contribute its part in extending the empirical literature by explaining the practices and indicating the challenges of Ethiopian multimodal transport system associating it with the country's foreign trade development move.

#### **5.4. Recommendations**

According to the findings of the study the researcher forwarded the following points as recommendation. The researcher has a strong believe that applying those recommendations would reduce the challenges of multimodal transport system and upgrade the qualities of multimodal transport services to some extent. Unless the enterprise takes such kind of measures the multimodal transport system will not achieve the intended objectives of reducing transit time, foreign exchange outflow and cost of transport at large. For the mere success of the multimodal transport system every component of the system should work intertwined with one another.

- The enterprise should deliver on job and off job trainings to its existing employees with different schedules in order to create awareness of multimodal transport system. The training should have to incorporate topics of service business ethics in addition to creating awareness on how the system works. Since the findings obtained from port and terminal operations revealed the prevalence of corrupted practices. Besides to this the enterprise has to assign experts and confident managements in higher posts so as to facilitate and improve the decision process of multimodal transport system.
- Information communication technology is the most important element in determining the service quality of multimodal transport system. In order to improve the information communication system of multimodal transport system, the enterprise has to install full-fledged information communication networks to link internal and external offices. This would help the business community to book, trace their



shipments easily or get updated shipment information without the help of someone else from the enterprise being anywhere at any time.

- The enterprise should gradually exclude the use of trucks for longer distances because roadways are not an advisable mode of transport for long distances due to its cost. Plus to above reason the use of trucks has an environmental polluting effect, high operational and administrative costs. Therefore, the enterprise should introduce a cost and time efficient modes of transport in the multimodal transport chain for longer distances to replace the roadways. Railway should be taken as a best alternative mode for longer distances. Railway transport is the most cost effective and widely implemented land transport system in freight multimodal transport system in the world due to its efficiency and environmental conformity.
- The number of dry port loading and unloading equipments should be increased, dry port spaces should be expanded and facilities of dry ports have to be improved also. For instance quality and standard restaurants and recreational centers should be built near to the compounds of dry ports.
- The enterprise has to significantly reduce paper works and more document requirement gradually. This can be done by shrinking or consolidating some two or three procedures, steps and offices into one systematically.
- Customized international multimodal transport performance measuring standard has to be prepared by the enterprise and the service performance level and customers' satisfaction level should be measured periodically. Then based on the result corrective actions should be taken so as to improve the quality of the service.
- The enterprise's customer service department or any others should have to develop a system to react to the complaints of customers very swiftly not to affect the business activities of customers.
- The influences of external support offices can also negatively affect the entire process of multimodal transport system. So to avoid the negative effects of those offices the multimodal transport operator should have to establish strong communication level with them.

- The enterprise should have to share, customize and implement the experiences of other countries on the legal framework and other operational activities of the multimodal transport system.
- The enterprise should have to request the inclusion of international multimodal transport courses in government universities curriculums hereafter. This would help the enterprise to solve the problem of having qualified experts in the area.
- The enterprise should strongly work together with the customs office until the customs goods clearing procedures and document requirement fit to the multimodal transport system. That is because the customs goods clearing procedures and document requirements should be very minimal. That could be achieved through examining critically and sorting out the most relevant documents and procedures to stick with and delete out the less important ones.
- It is better for the enterprise to call private investors to build dry port and terminal facilities and support the government's effort in dry port and terminal development. Since the investment of multimodal transport infrastructure requires huge capital outlay and the system needs the adoption of modern transport system.
- The enterprise should base its strategic multimodal transport system decision on research and development outputs. Definitely doing that would help the organization to make informed decision.
- Generally it would be better for the enterprise to ensure its readiness in different aspects before launching any new kinds of service in the multimodal transport system.

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# **APPENDICES**





6. Where does your major foreign trade partners originate?
- Middle East and Far East       Africa
- Europe and America       More than one.
- China and India       Other Countries
7. Sex
- Male       Female
8. Educational Status
- Primary Education (Grade1-8)       University First Degree
- Secondary Education (Grade 8-12)       University Second Degree
- College Diploma       Other
9. What is your role at the company where you are working in or representing for?
- Company Owner/Company Manager       Customs forwarder/Transitor
- Procurement Manager       Other
- Procurement Officer

**Section II. Regarding ESLSE Multimodal Transport System Operational Activities**

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

No.	Variables	SD	D	N	A	SA
<b>Multimodal Operation Information Dissemination</b>						
10	Multimodal transport system concepts and practices have been adequately introduced to all staff members of the enterprise and the business community.	1	2	3	4	5
11	ESLSE's shipment status information dissemination facilities have been serving well to reduce shipment transit time, demurrage and storage costs.	1	2	3	4	5
12	Multimodal transport customers are well aware of their rights, duties and responsibilities emanated from the new system.	1	2	3	4	5
13	The communication media and time being used by the enterprise to disseminate information are comfortable to the business community.	1	2	3	4	5
14	All the time the information disseminated by all sectors of ESLSE is reliable and dependable for business decision.	1	2	3	4	5

No.	Variables	SD	D	N	A	SA
<b>Dry port and Terminal Services</b>						
15	Dry port and terminal facilities are well accessed throughout the country.	1	2	3	4	5
16	All the available dry ports and terminals are well equipped with all the necessary equipments and facilities.	1	2	3	4	5
17	The available dry ports and terminals do have enough space and capacity to accommodate all incoming and outgoing cargoes even in peak periods.	1	2	3	4	5
18	Dry port and terminal services are provided easily with acceptable waiting time.	1	2	3	4	5
19	Dry port and terminal operations are well managed and efficient in their service.	1	2	3	4	5
20	The charges being requested for dry port, terminal and warehouse services are reasonable.	1	2	3	4	5
21	Dry port and terminal services are provided with the law of first come first served, if discrimination is needed justified and approved by higher officials. .	1	2	3	4	5
22	Cargos are easily located in identifiable way and their safety is well ensured in any movement.	1	2	3	4	5
23	Cargo unstuffing service is well provided in all dry ports.	1	2	3	4	5
24	The overall management practices of dry port and terminal sector is satisfactory.	1	2	3	4	5
<b>Inland Transport Services</b>						
25	Shipments are coming with minimum process time in Djibouti and reasonable transportation time than ever.	1	2	3	4	5
26	Shipments are brought to the designated dry ports timely and correctly.	1	2	3	4	5
27	The inland transportation service charge being charged by the enterprise is reasonable and competitive compared to private transporters.	1	2	3	4	5
28	The enterprise has enough number of trucks to render effective and efficient transportation service.	1	2	3	4	5
29	The transport division is responsive in case of customer complaint	1	2	3	4	5
30	The overall management practices of inland transport division is satisfactory	1	2	3	4	5
<b>Shipping services</b>						
31	The available trade routes are well satisfying your shipping service requirement	1	2	3	4	5

No.	Variables	SD	D	N	A	SA
32	The shipping sector is providing quality shipping service based on customers' requirement	1	2	3	4	5
33	The service charge being charged for shipping service is reasonable and competitive.	1	2	3	4	5
34	The shipping sector has the capacity to facilitate multimodal transport operation in terms of physical and human resources.	1	2	3	4	5
35	The overall management practices of shipping sector is satisfactory	1	2	3	4	5
<b>Information and customer service</b>						
36	The customer service set up of multimodal operation is highly responsive.	1	2	3	4	5
37	Customer service complaints are resolved by information & customer service division within short period of time.	1	2	3	4	5
38	The enterprise has effective multimodal system network with different offices to provide efficient service to customers.	1	2	3	4	5
39	The overall shipment transit time and transaction costs have been significantly reduced by multimodal transport operation	1	2	3	4	5
40	The overall multimodal transport customer service quality is satisfactory.	1	2	3	4	5

### Section III. Regarding Regulatory Aspects

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

No.	Variables	SD	D	N	A	SA
<b>Regulatory Aspects</b>						
41	The surveillance system employed by ESLSE for monitoring rules violation is strong	1	2	3	4	5
42	The compliance system employed by ESLSE for monitoring rules violation is strong	1	2	3	4	5
43	The Board of Directors (BoD) are good enough in supervising ESLSE's Multimodal transport activities	1	2	3	4	5

**Section IV. Regarding Customs’ role in Multimodal transport Operation**

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

No.	Variables	SD	D	N	A	SA
<b>Customs’ role in Multimodal Transport Operation</b>						
44	The customs offices’ readiness and willingness to facilitate goods clearing process timely is excellent	1	2	3	4	5
45	The customs’ goods clearing procedures well facilitate multimodal operation	1	2	3	4	5
46	The existing coordination level between customs offices and ESLSE is strong	1	2	3	4	5
47	Multimodal customers usually present full set of original documents complying with customs goods clearing procedures and directives.	1	2	3	4	5
48	The overall performance level of customs offices in relation to multimodal operation is satisfactory.	1	2	3	4	5

49. Based on your own experience would you list some of the major challenges that the multimodal transport operation is currently facing?

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50. In your own personal view what sort of measures would improve the quality and efficiency of the multimodal transport’s operation better?

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51. If you have any other additional general comment?

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**Notice:** You are kindly requested to return back the questionnaire to the person assigned quickly with due attention after completion.

## **APPENDIX: B**

### **STRUCTURED INTERVIEW QUESTIONS I**

**Saint Mary's University  
School Graduate Studies  
Masters of Business Administration**

**Check List for in-depth Interview Questions for Information and customer service Division**

**Manager**

1. What are the basic differences and similarities between multimodal transport system and unimodal transport system?
2. What are the unique benefits provided to customers by multimodal transport system?
3. How do you explain the effectiveness and efficiency of the current multimodal transport service level from customers' point of view?
4. What are the major problem areas of customer service in multimodal transport system?
5. What are your mechanisms being used and planned for use to improve the customer service quality in the future?
6. How do you see the coordination level of different departments or offices in providing integrated multimodal transport service?
7. Can we say that the current customer service performance level is satisfactory? If not why?
8. Do you receive frequent complaints from multimodal customers? If yes, in which areas?
9. Can we say that all the complaints forwarded by multimodal customers can be solved by the multimodal customer service department?
10. What are the very important changes made after commencing the multimodal transport system to upgrade the customer service level?
11. Do you have something left to be added on?

## APPENDIX: C

### STRUCTURED INTERVIEW QUESTIONS II

Saint Mary's University  
School Graduate Studies  
Masters of Business Administration

#### Check List for in-depth Interview Questions for Inland Transport Division Manager

1. What are the main roles of inland transport division in multimodal transport operation and resources used to accomplish its duties?
2. How effective are you using the available resources to provide an effective and efficient inland transport service to multimodal customers?
3. Is there any challenge that could be taken as an impediment by limiting the provision of effective and efficient inland transport services?
4. If there are challenges to the inland transport sector, what kind of mechanisms are you using to reduce the existing challenges and also their effects too?
5. Are you using only your own trucks to provide inland transport services to multimodal customers? If the enterprise uses trucks of other transport organizations, in what basis does the system allows?
6. What is the enterprise's future plan with regards to improving the services accessibility and quality level of inland transportation?
7. Do you think that the inland transportation service charge of the enterprise is reasonable and competitive compared to private transporters?
8. Can we say that the inland transport sector is accomplishing its duties successfully with required level in assisting the entire multimodal transport system objectives? If not why?
9. Is there anything that you would like to say in relation to inland transport service under multimodal system?

## **APPENDIX: D**

### **STRUCTURED INTERVIEW QUESTIONS III**

**Saint Mary's University  
School Graduate Studies  
Masters of Business Administration**

#### **Check List for in-depth Interview Questions for Shipping Sector Deputy CEO**

1. What are the major roles of the shipping sector in the multimodal transport system and resources used to accomplish the sector's duties?
2. How effective are you using the available resources to provide an effective and efficient multimodal transport service?
3. Is there any challenge/problem that could be taken as an impediment affecting the effective and efficient functioning of the multimodal transport system?
4. What kind of mechanisms are you using or planning to use in order to reduce the negative impacts of the existing problems or challenges on the shipping sector?
5. Do you think that the available numbers of vessels are enough to provide full fledged sea freight transportation service to outgoing and incoming goods of Ethiopia in both in multimodal and uni-modal system?
6. What are the major theoretical and practical benefits/advantages that the country secures by introducing multimodal transport system than unimodal in sea transport perspective? Disadvantages if any?
7. Do you think that our country's shipping and logistics service is competitive in terms of rendering quick and quality service with reasonable price compared to global shipping and logistics market?
8. How did you evaluate the performance of multimodal transport system in the past three years?
9. What is the enterprise's plan to advance the multimodal transport operation in terms of quality, accessibility and cost of service?
10. Is there anything that you would like to add in relation to shipping sector service under multimodal transport system?

## DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of \_\_\_\_\_ . All sources of materials used for the thesis have been duly acknowledged. I further confirm that this thesis has not been submitted in part or in full to any other higher learning institution for the purpose of earning any degree.

\_\_\_\_\_  
Name

**St. Mary's University, Addis Ababa**

\_\_\_\_\_  
Signature

**June, 2014**



## **ENDORSEMENT**

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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Advisor

**St. Mary's University, Addis Ababa**

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Signature

**June, 2014**