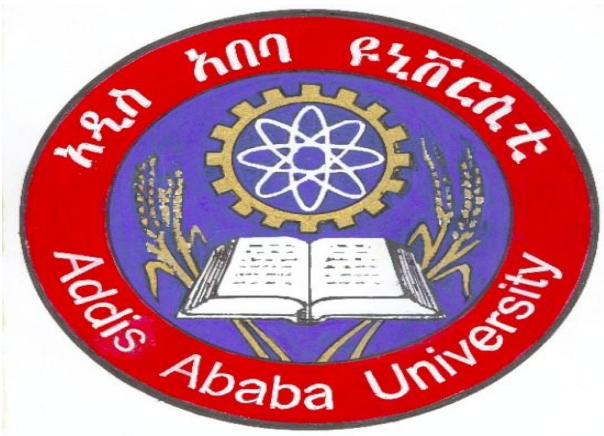


ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS SCHOOL OF COMMERCE

FACTORS AFFECTING RAIL TRANSPORTATION SERVICE IN LOGISTICS PERFORMANCE CASE OF ETHIO – DJIBUOTI STANDARD GUAGE SHARE COMPANY (EDR)

BY GETU REGASSA

ADVISOR MATIWOS ENSERMU (PH.D)

A THESIS SUBMITTED TO THE SCHOOL OF COMMERCE OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

JUNE, 2020

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS SCHOOL OF COMMERCE

FACTORS AFFECTING RAILTRANSPORTATION SERVICE IN LOGISTICS PERFORMANCE IN CASE OF ETHIO – DJBOUTI STANDARD GUAGE SHARE COMPANY

BY GETU REGASSA

APPROVED BY BOARD OF EXAMINERS

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

Declaration

I, the undersigned, declare that this thesis entitled as “Factors affecting Rail Transportation Service in Logistics Performance the Case of Ethiopian Djibouti standard gauge Share Company” is my work and has not been presented for the award of any degree or diploma in this or any other university. All sources of materials used in the thesis have been accordingly acknowledged.

Declared by: - Getu Regassa Worji

Signature: _____

Date: June, 2020 Place of Submission: Addis Ababa University School of Commerce, Addis Ababa, Ethiopia

June, 2020

Statement of Certification

This is to certify that this thesis entitled as "Factors Affecting Rail Transportation Service in Logistics Performance the Case of Ethio - Djibouti standard gauge Share Company", submitted in partial fulfillment of the requirements for the degree of Master of Arts in Logistics and Supply Chain Management to the School of Commerce of Addis Ababa University, done by Getu Regassa is an authentic work carried by him under our guidance.

Matiwos Ensermu (Ph.D)

Addis Ababa, Ethiopia

Advisor Place

Abstracts

Factors affecting rail transportation service in logistics performance in case of Ethio – Djibouti railways transport service in terms of World Bank logistics performance index were examined. The study assesses the effects of customs clearance, Rail infrastructure, easy arranging shipment price, service quality & competency of logistics service, tracking and tracing as well as timeliness of rail transport. The geographical focus of the study is Addis Ababa– Djibouti passenger & freight cargo rail transports in and out of Ethiopia. The study approach was both quantitative and qualitative research approach. Based on the statics the correlation analysis, it show that rail transport service have statistically significant effect on the logistics performance cost. It is evident that at 95% confidence level that the independent variables of customs; competence and quality of logistics service; Track and Trace & timeliness are highly significant. The regression analysis further showed that that 64.2% of the alteration in EDR's rail transportation service affects logistics performance cost. On the other hand, it is evident that at 95% confidence level that the independent variables of customs, quality and competency of logistics activities, trucking and tracing activities & timeliness activities have positive effect on the logistics performance speed and are highly significant. The regression analysis showed that 65% of the alteration in EDR's rail transportation service activities affects logistics performance speed.

Acknowledgement

I am gratified to the God for giving me the courage to finish this study. Firstly, I would like to thank my Advisor Associate professor Matiwos Ensermu (Ph. D) for his constructive suggestions and useful comments. My gratitude also goes to Ethio – Djibouti railways managements and staffs those who gave me the required data from sample determination and support in the collection of data.

Finally, my gratitude goes to my lovely wife Edom and my son's Natolli and milki for making me sacrifices over the past two years, by allowing me the time to conduct this master's degree program and care during my study.

I dedicate this thesis for those people who have lost their life due to the current global pandemic COVID – 19.

Stay Safe!

Table of Content

List of Figures

List of Tables

ABBREVIATIONS

ANOM: -Analysis of Means

ANOVA: - Analysis of Variance

CCECC:-China Civil Engineering Construction Corporation

DoT :-Department of Transport

EDR :-Ethio-Djibouti Standard Gauge Railway Share Company

ERC:-Ethiopian Railways corporation

FDI:- Foreign Direct Investment

IJEDR:-The International Journal of Engineering Development and Research

IMD:-International Institute for Management Development

ITF:-International Transport Forum

JIT:- Just in Time

LPI:- Logistics Performance Index

MDS:- Market Demand Strategy

MSP:- Municipal Service Partnership

OECD:- Organization for Economic Co-operation and Development

WEF:- World Economic Forum

WB:- World Bank

WBTE: - World Bank Trade and Economy

Chapter One

INTRODUCTION

1.1 Background of the Study

Logistics plays the most significant role in the supply chain operation. The council of logistics management defined logistics as part of the supply chain process that plans, implements, and controls the efficient, effective forward and revere flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements. In the whole logistics activities transportation service plays the most important and significant role over the logistics performance. Transportation ensures efficient product delivery to the final consumer and that the ultimate customer needs are served better, and the organization yields maximum returns (Shankar 2001). Rail transport is one of the most important modes of transport which plays major role in the logistics activities.

The International Journal of Engineering Development and Research defined 'Rail transport is a means of transferring of passenger and goods on wheeled running on rail, also known as tracks, tracks usually consist of steel rails, installed on ties (sleepers) and ballast. Railways transport is capable of high level of passenger and goods utilization and energy efficiency but is often less flexible and more capital intensive than road transport when tower traffic levels are Rao, 2018)

Rail transport, which started about the time of the Industrial Revolution after the 1810s and 1820s, has been serving the world for nearly 200 years. There are many types of rail transportation. The first phase featured a kind of train drawn by horses, followed by steam-powered train, followed by the street car. Next came the different types of rail transport modes: the regular surface railway, metro or subway, monorail, guided bus, trolley bus, etc. The rail transport system is classified as Light Rail Transit (LRT) and Heavy Rail Transit (HRT) Temesgen A. (2006)

In Ethiopia rail transport has been providing service since the 1910s, granted that there was only one railway line. The Ethio-Djibouti railway line was the only rail transport the country had. While the total distance covered by the line was 781 Km, the 681 Km-stretch lies within Ethiopian territory.

According to Fetiha (2018), more than 90% of the Ethiopian cargo is handled by the port of Djibouti and agreement is made on the port utilization between Ethiopia and Djibouti. Ethiopia has also signed bilateral port utilization agreements with Djibouti and Sudan and signed memorandum of understanding between Somaliland and Kenya to use port Djibouti, Sudan, Barbara and Mombasa respectively. The Ethiopian strategic plan identified the development logistics infrastructure and review of regulations and lows as the components that need to be given priority as its moving towards implementation of trade and transport facilitation. The Ethiopian railways corporation (ERC) has one part of the strategic plans playing great contribution to the development of the logistics industry in the country. Despite of the fact, there is still a need to assess the performance of logistics industry in Ethiopia; it is useful to review the logistics performance in terms of the World Bank logistics performance index indicators.

As cited on Fasil (2014), Railways freight and passenger transport service is vital to the Ethiopian economy. According to Fasil Rail freight has a serious advantage on freight and passenger's transportation including larger capacity, chipper transport cost, high efficiency, low carbon, suitable for bulky and heavy goods, free of climate and geographical condition comparatively. A well-operated railways logistics system could increase the competitiveness of the public and privet enterprises and attracts foreign direct investment.

According to the EDR's annual report, Ethio-Djibouti Standard Gauge Railway Share Company (or Shortly Ethio-Djibouti Railway (EDR)) was established in April 2017, based on the Bilateral Agreement signed on 16thof December 2016 between the two states, the Federal Democratic Republic of Ethiopia and the Republic of Djibouti. Based on the report Shareholders have agreed to establish an Ethiopian share company, having an initial share capital of USD 500,000,000.00 consisting of 10,000 shares of USD 50,000.00 each, for the purpose of Operating and maintaining the (Addis Ababa – Djibouti Standard Gauge Railway) Line and operating freight and passenger transport services on the Line. (EDR web, 2018). Among these share Ethiopian railways corporation(ERC) owned: 7,200 shares being **72%** of the total share capital of EDR; **SDCF** (SociétéDjiboutienne des Chemins de Fer): 2,500 shares being **25%** of the total share capital of EDR;**MPE** (The Ministry of Public Enterprises Ethiopia): 100 shares being **1%** of the total share capital of EDR; **MoT** (The Ministry of Transport Ethiopia): 100 shares being 1**%** of the total share capital of EDR; **MOFEC** (The Ministry of Finance and Economic Cooperation Ethiopia): 100 shares being **1%** of the total share capital of EDR;

A 750-kilometer standard-gauge railway linking Ethiopia's capital Addis Ababa with Djibouti and its port of Doraleh has been built at a cost of approximately $4.5 billion (EDR, 2018). With financing from the China Exim Bank, operations were inaugurated in January 2018. The railway line has a capacity of 25 million tons per year. (*Source:* ERC.2018) The share company has the vision to be Leading Transport Provider Company in East Africa by 2025 with a mission of operating and maintaining the Ethio-Djibouti Railway, to provide seamless, reliable, and dependable Freight and Passenger Transport services between Stations in Ethiopia and Ports of Djibouti.

1.2 Statement of the Problem

Logistics includes transportation, transportation and handling, storage, packaging, distribution, distribution processing, transfer goods from one place to another, loading and unloading, logistics information processing as well as distribution processing and other basic functions. Transportation is the most important link in the whole logistics system. Transportation refers to the channels through which raw materials and finished products are moved to and from the organization.

In this thesis the researcher focused on inland rail transportation along the route of Djibouti to Addis Ababa which has high economic importance in the importing and exporting transport system in Ethiopia. The newly constructed inland rail transportation system expected to improves the passengers travel time to 8 hours per trip which is much better from two days taken by the inland road transportation and improves the cargo travel time to 18 hours per trip which is much better from 3 to 4 days taken by the inland road transportation and more tons per Km in case of goods transport per energy unit consumed than other vehicles. However, it is now performing under low efficiency. The customs process is taking too long, infrastructures are performing inefficiently, they lack modern technologies for trucking and tracing activity and there are delays in both passengers and freight cargo transport. Based on the annual report of EDR, the rail transport operation performance is below target and negatively impacted.

According to Brooks (2008) trade networks demand superior logistics services and centers. Brooks (2008) also stated that, minimizing time and costs while ensuring reliable delivery of goods depend on an efficient logistics system. These rail transportation infrastructures have

resulted in higher cost of transportation and delays on both the freight and passengers movement as referred to the standard.

According to the World Bank study Ethiopia is ranked 126 out of 160 countries by scoring an average of 2.38. The study mainly focuses on the six dimensions of the logistics performance index such as Customs- efficiency of the customs clearance process; Infrastructure – quality of trade and transport infrastructure; International shipment - easy of arranging competitively priced shipment; Logistics quality - competence and quality of logistics service; Tracking and tracing – ability to track and trace consignment; Timeliness- frequency with which shipment reach a consignee within the scheduled or expected time. The study addresses how much the rail transportation service affects the overall logistics performance using the World Bank logistics performance indexes and also measures in terms of time and cost.

1.3 Research Question

The research will answer the following:

i. How customs related to rail transport affects the logistics performance in EDR?
ii. How rail transport infrastructure affects logistics performance in EDR?
iii. How the competitively priced shipment in rail transport affects the logistics performance?
iv. How the service quality & competency of logistics service in rail transport affects the logistics performance?
v. How tracking and tracing in a rail transport affect the logistic performance in EDR?
vi. How timeliness in rail transport service affect the logistics performance?

1.4 Research Objectives

General objective

Assess factors affecting railways transportation service in logistics performance in Ethiopia.

Specific objective

The specific objective is to assess the following main factors:

i. Assess customs related to rail transport affects the logistics performance in EDR.

ii. Assess rail transportation infrastructure affects logistics performance in EDR.
iii. Assess the easy arranging competitive shipment price in rail transportation affects the logistics performance.
iv. Assess the quality & competency of logistics service in rail transport affects the logistics performance in EDR.
v. Assess how tracking and tracing in a rail transportation affect the logistic performance in EDR.
vi. Assess the extent timeliness of rail transport service affect the logistics performance.

1.5 Significance of the Study

The study will be beneficial for top management, employees, new researchers, policy makers, management contractors, importers and exporters, investors and all stakeholders of EDR. It helps the executive bodies to assess the factors affecting of rail transport on the countries logistics performance and take a corrective action to improve the logistics performance level of Ethiopia. Moreover, the research provides the major determinant factors affecting the logistics activity.

1.6 Scope of the Study

The scope of the study is delimited to railways transportation service delivery between Ethiopia and Djibouti port. The study considers the current system of railways transport service in the EDR, the current performance of the EDR transport service and its effect based on logistics performance and its operations in order to enhance the services to satisfy its customers and also to improve the logistics performance level in Ethiopia. The study will not cover measure of time/speed and cost for logistics activities on the documentation. It also assesses the effects of customs clearance, Rail infrastructure, easy arranging shipment price, service quality & competency of logistics service, tracking and tracing as well as timeliness of rail transport. The geographical focus of the study is Addis Ababa –Djibouti passenger & freight cargo rail transports in and out of Ethiopia.

1.7 Limitation of the Study

In the study the researcher use questioner for collecting data hence limitations on the respondents might replay based on their own perception and subjectivity which is not acknowledged. The

study will only focus on the workers and major stakeholders of Ethio- Djibouti railways Share Company. Since the establishment of the company is not much longer, there might be shortage of sufficient information and archive data. The study does not cover the light rail transportation service. The sample size does not include employees who are trainees in the management contractor.

1.8 Definition of Terms

Logistics: -*Council of Logistics management (1991) defined that logistics is 'part of the supply chain process that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.*

Logistics Performance: -*According to Chowet al. (1994) conceptualized that logistics performance is a subset of a larger organizational performance. According to Fugate et al. (2010) the concept by highlighting that logistics performance positively impacts organizational performance.*

Efficiency:-*The ratio of resources utilized against the result derived (Mentzer and Konrad, 1991) the internal functioning of logistics and generally is considered best represented through some ratio of the normal level of inputs to the real level of outputs Chamberlain (1968); Van der Meulen and Spijkerman, (1985). The measure of how well the resources expended are utilized (Fugate et. al. 2010).*

1.9 Organization of the Study

The paper has been divided into five chapters; the first chapter was an introduction and which contains the background of the study, statement of the problem, research questions, research question, general and specific objectives, significance, scope, limitations and definitions of terms. The second chapter deals with previous theoretical and empirical studies that are related to the research topic have been reviewed. The third chapter was concerned with the methodology used for the study. The fourth chapter was presented with data analysis, interpretation and presentation of the result. The final chapter outlined summary of findings, conclusions, recommendations, managerial implications and suggestions for future studies would have been addressed.

Chapter Two

REVIEW OF RELATED LITERATURE

The literature review of this study has theoretical literature review, empirical Literature review and conceptual framework 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 research and conceptual review part is the sum of both theoretical and empirical review parts.

2.1 Theoretical literature

2.1.1 Logistics

Logistics is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point-of-origin to the point-of-consumption in order to meet customer requirements and satisfies the requirements imposed by other stakeholders such as the government. (Cooper et al., 1997). Specifically, logistics affects trade performance of a country in terms of cost, time, reliability and predictability and customer services, which further affect overall competitiveness of the export in the international market other things being constant Arvis et.al (2007). Logistics could also improve business performance through its flexibility and advanced technology application, thus leading to organizational success (Tracey, 1998). The remarkable expansion in external trade has brought higher demand for an efficient and effectiveness of logistics services (Ali, et. al 2008). Logistics activities encompass transportation, warehousing, inventories, administration, order processing, financial management and customer service. Logistics cost is an important element of total productivity because logistics may account for 10% or more of the delivered cost for some products and sometimes up to 30% of the total delivered cost (Roberts, 1999). And transportation costs are a particularly critical factor, as they can account for around 40% of total logistics costs, depending on the type of product. Transportation system performance characteristics can affect logistics costs through changes in travel time, reliability, and allowable vehicle sizes and weights Fitzroy*et al* (2011).In practice, the total logistics cost function is more

complex, as transportation costs can include not only direct transit costs, but also loading & unloading costs as well as loss & damage costs (DecisionTek, 2012).

In the context of Ethiopia, government practiced many reforms in response to changes in the economy specifically the country issued proclamations, deregulated the transport sector, merged logistics enterprises, restructured customs Authority, contracted railway lines and established dry ports connected by railway, which are the major move in the country that gave recognition to trade logistics. (The Global Competitiveness Report, 2010)

2.1.2 Relationship between Rail transport service and Logistics performance

The International Journal of Engineering Development and Research (IJEDR) defined that ' Rail transport is a means of transferring of passenger and freights on wheeled running on rail, also known as tracks, tracks usually consist of steel rails, installed on ties (sleepers) and ballast.' According to the journal study 'Rail transport is where train runs along a set of two parallel steel rails, known as a railway or railroad. Passenger transport maybe public where provide fixed scheduled service. Freight transport has become focused on containerization; bulk transport is used for large volumes of durable item. (IJEDR, 2018)

Ethiopia is one of the land locked country in east Africa. In this sense, the rail transport and logistics network are the backbone of the country's economy. Efficient Rail freight transportation is critical to countries economic development (IJEDR, 2018). IJEDR (2018) states, the availability of rail transport infrastructure and services affects national and global development patterns and can be a boost or barrier to economic growth.

According to IJEDR (2018) an important lesson from successful railways is the focus on improving operational efficiency and taking a holistic view of logistics from the perspectives of passengers, freight forwarders, and third-party logistics providers (3Pls) IJEDR (2018). Doing so requires an understanding of the drivers of logistics performance for specific segments of the economy. As it is cited on the journal, various studies show that reliability of service, price, travel time, flexibility of service, and control and security are critical. Bernard, (2019) for rail to be part of a holistic logistics service, rail organizations must cultivate a reputation for efficient, competitive, and reliable services. According to the World Bank study (2018), limited integrated planning and investment in rail freight and passenger transport has resulted in inefficiencies that have contributed to increasing logistics costs and that have curtailed the competitiveness of companies and sectors that depend on the efficiency of their logistics performance. Railways

transport is capable of high level of passenger and freight utilization and energy efficiency but is often less flexible and more capital intensive than other modes of transport. Railway transportation of goods can be carried out by several types of rolling stock: closed bottom and hatch covers gondolas (for goods which are not afraid of atmospheric influences); covered wagons (for delivery of household appliances, furniture or clothing); isothermal wagons (for transportation of goods with limited shelf life); refrigerators (for transportation of food products); hoppers (for delivery of grain or cement); universal or fitting platforms (for transportation of metal, oversized, cargo, containers); transporters (for delivery of heavy and bulky cargoes); tanks (for transportation of liquid cargoes). The most common types of goods transported by rail are the usual goods and sea containers, railway transport can also carry: bulk (brick, ore, coal, wood, etc.); dangerous (gasoline, liquefied gas, oil, acids, etc.); bulk (sunflower oil, alcohol, molasses, etc.); quarantine (raw sugar, coffee beans, vegetables, etc.); heavy (construction and agricultural machinery, petrochemical equipment, boilers, etc.); controlled by the state veterinary Supervision (canned fish, meat and dairy products, animal feed, etc.).

Ling *et al*., (2008) highlight that the differences in the quality and cost infrastructure, policy, procedure and institution would affect the speed and cost of the logistics services across border. However, from the perspective of trade and transport facilitation, most consistent measures are port infrastructure, custom environment, regulatory environment and e-business environment (Otsuki, et.al2013).

Several literatures have explained rail transport modal as useful, cost effective, time management, efficient, and play a great effect to logistics performance and economic developments. The explanations clarify that the integration is primarily an intermodal facility where the modes of rail, road and shipping converge to facilitate the loading and unloading of cargo from ships onto and from road and rail trucks. According to Foolchand, (2006), the efficiency of operations determines the adequacy of infrastructure that is provided. Its successful demand the technological improvement in shipping especially through containerization, revolutionized ship design, cargo handling equipment, intermodal facilities, road and rail transport, port design, port investments and inland transportation. Efficient intermodal facilities mean that larger vessels can call only at a few ports known as hub ports where large volumes of containers would be consolidated by land transport, barges and small feeder vessels. Dedicated

rail and road terminal facilities in the vicinity of the quayside are required to facilitate the efficient transfer of goods to and from ships.

2.1.3 Railways transportation services:

According to OECD (2013), one of the major objectives driving rail transportation reforms has been to ensure that end-user prices are at an efficient level (considering the level of costs and the price of substitute services), productive efficiency is high (and therefore subsidies are low), and investment and innovation guarantee a satisfactory level of service quality, safety and variety. The journal states that, the appropriate role of intra-modal and inter-modal competition remains a live question due to several factors. First, fixed costs are sufficiently high and marginal costs sufficiently low that railways constitute a commonly cited example of "natural monopoly". Second, railways provide both market-based and subsidized (socially important) services, and the argument is regularly made that competition harms the ability for profitable services to cross-subsidize social services, thereby avoiding the need for explicit public support. Third, in the railway industry multiple services are provided over a common infrastructure and using other common inputs, which generates considerable joint and common costs that must be arbitrarily allocated to the different services. Fourth, high and regular investments are necessary to ensure quality and safety on the infrastructure, but privatization and competition may affect the incentives and the ability to guarantee the necessary level of investments. Fifth, coordination at various levels of the supply chain is important to guarantee a safe, efficient and smoothly functioning network, but this coordination is much more difficult if the infrastructure and the downstream operations are separated to ensure nondiscrimination, increase transparency and foster competition.

Train as one of modes of transport has various advantages compared to other modes. In addition to the large carrying capacity, train is also more energy efficient and environmentally friendly as well as safer than other land vehicles. Train is a choice of mode which may address various current issues related to transportation encountered by the government of Ethiopia, namely, among other things, (i) many damaged roads; (ii) traffic jam due to the increasing volume of traffic; and (iii) increase of fuel price leading to the increase of transportation costs.

Inter-modal competition; Air, water and road (trucks and cars) transport are all potential alternatives to the use of the railway. The extent of substitutability between these modes of transport, and hence the level of inter-modal competition railway services face, depends on the

geographic, demographic and economic features of different countries and the availability of these different modes. It also varies considerably between freight and passenger services.

In freight markets, railways typically move large lots, ranging from a wagonload weighing 50 tons to entire trainloads (unit or block trains) of 20,000 net tons or more. Rail freight services are typically relatively slow, with unpredictable arrival times due to marshalling and changes of locomotives and crews. This makes rail suitable for movements of large quantities of lower valued cargo over longer distances at low tariffs. By comparison, inland water transport tends toward even larger lots moving at a slower pace with lower tariffs, whereas trucks move shipments that are at most half a rail freight wagonload, but move them significantly faster and more dependably, and charge much higher tariffs. Air cargo moves smaller lots faster and at even higher tariffs. The competitive interfaces among the freight modes are determined by the availability of these alternatives (e.g. water transport is not an option in an area without rivers or sea), as well as by the shipper's logistics cost, which is in turn determined by cargo value, minimum shipment size, average speed of the alternative services, and tariffs. Rail passenger services can roughly be divided among commuters, regional low-density, conventional intercity and high-speed. Competitive modes are autos, buses and airlines, each with a different combination of frequency of service, speed, reliability, comfort, and fares. Generally, rail can offer faster and better service in suburban markets where road congestion is significant and parking at destination is costly. High-speed rail (HSR) services occupy a natural market starting at distances (~150 km) where their speed dominates the ready availability and flexibility of autos, but below distances (~800 km), where airplanes' higher speed eventually takes over. In addition, rail services can generate significant social benefits, such as lower highway or air congestion, reduced emissions of pollutants and greenhouse gases, higher land use density, easier access to city centers and lower accident rates. As a result, because market forces will normally not internalize those benefits, governments can intervene either directly through financial support, or indirectly through regulation, to influence the pattern of services that the market would otherwise provide. It is important to highlight that substitutes for the rail mode – in particular road transport, but also airlines – often do not face efficient usage and capacity charges for a number of policy and political reasons and this affects, and distorts, inter-modal competition.

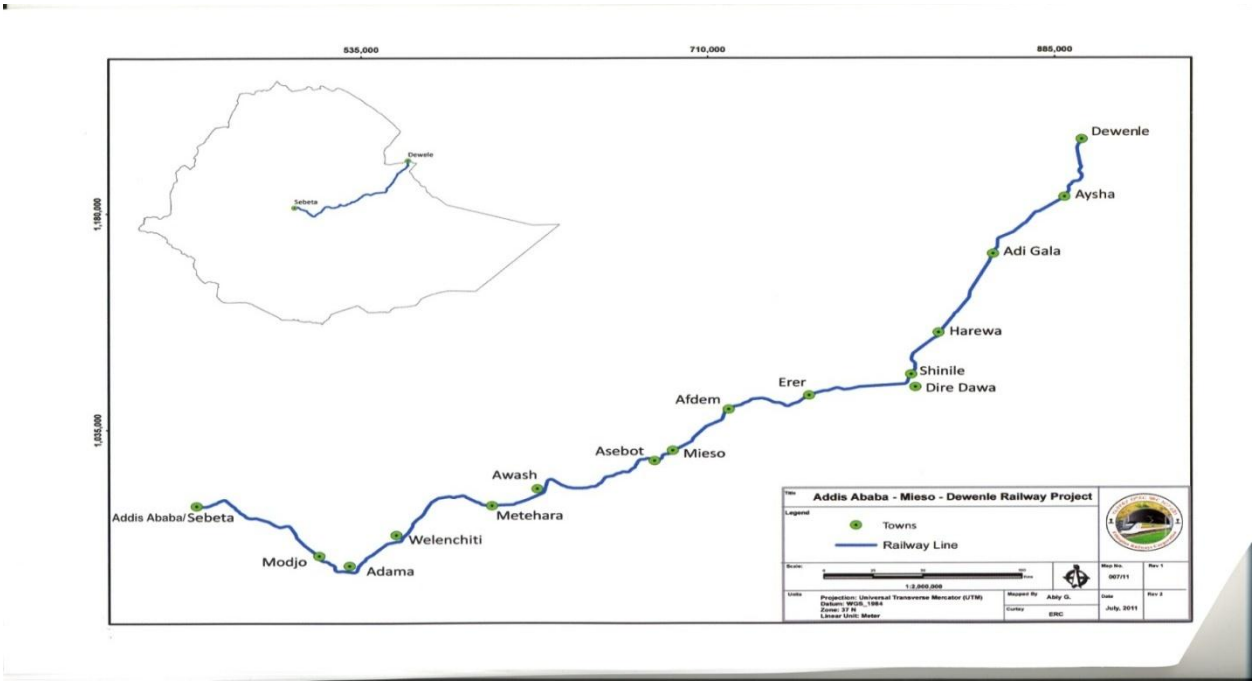
The regulator of railway industry in Ethiopia is the government, namely the Ethiopian Railways Corporation under the Ministry of Transportation. This corporation was established on 28 November 2007 by Regulation 141/2007 of the council of ministers of the Federal Democratic Republic of Ethiopia which expressly separates the regulator from the operator. The corporation has various mandates to develop railways infrastructure and provide passenger and freight transportation service in Ethiopia.

Currently, the railway in Ethiopia is administered by EDR; the company is conducting the administration of railway transport services. The services provided by EDR include the transportation of passengers and freight. As previously explained, the Shareholders Agreement subsequently signed on the 11thday of January 2017 among Public Bodies and State Enterprises of the two countries, to be administered pursuant to the commercial laws of Ethiopia.

EDR was established for the purpose of Operating and maintaining the (Addis Ababa – Djibouti Standard Gauge Railway) Line (including the maintenance and renewal of all the Line infrastructure and equipment) and operating freight and passenger transport services on the Line. Following the decisions of the Board of Directors, EDR had commenced the Operation and Maintenance activities of the Railway after a general takeover agreement between the EDR and the respective Railway Company ERC. In the general takeover agreement that had been signed on December 31, 2017 between the parties, it had been declared that the two state Railway Companies would hand over the completed railway infrastructure and the Rolling Stocks on or before March 31, 2018.

The passenger trains have been planned to operate from Lebu to Nagad and from Nagad to Lebu via Adama, Dire Dawa and Ali Sabieh as one international passenger train per day, (i.e. one passenger train departs every other day; on odd numbers days departs from Lebu and on even-numbered days departs form Nagad). Since Modjo Dry Port Connection (Property of ESLSE), is the only freight yard station available for operation, the company planned to transport containerized cargo. Thus, as for container trains, the maximum freight volume is 40t per train in average, with the dead load of 22.5t.There are more than 55 stations in EDR Sebeta, Lebu, Indode, Bushoftu, Modjo, Adama, Metehara, Awash, Mieso, Mulu, Afdem, Bike, Deredawa, Shinle, Dewanle and Djibouti port stations are the major ones in the project.

Figure 1Map of Ethio – Djibouti Railways



Source: Ethiopian Railways Corporation (EDR)

Based on the annual report of EDR (2018), the general conditions of facilities in Addis Ababa – Djibouti Railway includes Permanent way (Track), bridges, culverts, tunnels, and buildings and structures (indoor water and power supply).

i. **Permanent Way (Track):** The main line in Ethiopia is 670.7 km long and the station line is 60.8 km; the main line in Djibouti is 81 km long and the station line is 22.5 km (including the port branches).

ii. **Bridges, culverts and tunnels:** The number of 854-hole bridges and culverts in the Ethiopian territory is 174 and 1215, plus a 100m open cut tunnel; there are 18 bridges with 89 holes and 120 culverts in Djibouti;

iii. **Buildings and structures:** There are 189 buildings totally 33,626 m^2 at the SEBETA-MIESO station yard and 46 buildings totally 15,290 m^2 at the MIESO-NAGAD station yard.

iv. **Traction power supply system:** Traction power supply and contact system are converted to 1,797.6 kilometers. There are 18 traction substations and 3 sub-section stations at the Ethiopian section, and 3 traction substations at the Djibouti section. The construction length of the contact system line is 114.72 km for double line segment and 636.98 km for single line segment.

v. **Communication information system:** It includes wireless train dispatching system, digital dispatching system, transmission system, switch access system, passenger ticket system, etc., totally 727.85 km long communication lines along the railway.

vi. Rolling Stocks Takeover Status

The total rolling stocks purchased by ERC and presented to EDR as kind contribution during the formation of EDR are presented in the table below:

Table 2.1 Total rolling stock purchased by ERC

No.	Item	Qty/ Units
1	**Freight Electric Locomotives**	**32**
1.1	Spare Parts for Freight Electric Locomotives	1 Set
2	**Passenger Electric Locomotives**	**3**
2.1	Spare Parts for Passenger Electric Locomotives	1 Set
3	**Freight Wagons**	**1100**
3.1	Box Wagon	220
3.2	Uncovered Wagon	20
3.3	Covered Wagon	110
3.4	Hopper Uncovered Wagon	20
3.5	Hopper Covered Wagon	20
3.6	Flat Wagon	550
3.7	Refrigerated Wagon	10
3.8	Tank Wagon	110
3.9	Centre beam Wagon	20
3.10	Bi-Level Wagon	20
3.11	Spare Parts for Freight Wagons	1 Set
4	Passenger Coaches	30
4.1	Hard Seat Coach	20
4.2	Hard Sleeper Coach	4
4.3	Soft Berth Coach	4
4.4	Dinner Coach	2

4.5	Spare Parts for Passenger Coaches	*1*
5	Diesel Shunting Locomotives	6
5.1	Spare Parts for Diesel Shunting Locomotives	*1*
6	**Simulator**	**1**
6.1	Spare Parts forSimulator	*1*
7	**Training Package**	**1 Set**

Source: Ethio-Djibouti Railway report (EDR 2019)

The following Rolling Stocks had been taken over from ERC as of December 31, 2019:

Table 2.2 the rolling stock that had been taken over from ERC

No.	Item	Total Qty
1	Freight Electric Locomotives	32
2	Passenger Electric Locomotives	3
3	Diesel Shunting Locomotives	6
4	Passenger Coaches	30
5	Freight Wagons	
5.1	Flat Wagons	330
5.2	Box Cars	110
5.3	Tank Wagons	20
	Total taken-over Rolling Stocks until 2019	***531***
	Balance of Freight Wagons planned to be taken over in the next year	***640***

Source: Ethio-Djibouti Railway report (EDR 2019)

The Government as the owner of railway infrastructure and facilities, delegates the management and maintenance of infrastructure and facilities to EDR as the operator. For the maintenance performed by the operator, the Government pays an amount of budget referred to as the

infrastructure maintenance operation. In addition, the Government also pays subsidies for passenger transportation by the operator through the budget for public service obligation. The main freight revenue has been from container transportation from Djibouti port to Modjo dry port and vice versa. The major customer of container transportation is Ethiopian Shipping and Logistic Service Enterprise and Fertilizer transportation with Ethiopian Agricultural Business Corporation, wheat transportation with Ethiopian Trade Business Corporation and steel pipe transportation with Hengxin Shipping Co.LTD and other small customers (EDR, 2018).

The influence of rail transport on the logistics performance can be measured in a relation to cost and speed. Shirley and Winston argue that faster and more reliable transportation system enables firms to lower reorder point due to less uncertainty over when the orders will arrive. Increased reliability in speed and cost also facilitates just-in-time inventory management, which helps lower inventory and warehousing related costs.

2.1.4 Operational performance

Slack and Lewis (2011) categorized performance objectives in the five groups of quality, cost, speed, dependability and Flexibility. For the purpose of this study effects of rail transport Operations performance objectives will be discussed.

2.1.4.1 Speed

Speed includes the elapsed time between customer requesting transport services when they receive it. The faster the more likely the customer will buy it (Slack et al. 2016). It brings the solution to reduce the delivery services' time and affect costs as a fast delivery would increase them. Fast response to customers is greatly helped by saving time from decision making as well as movement of items and data within the operation. (Pagell and Krause, 2004).

2.1.4.2 Quality

Logistics infrastructure is important in attracting domestic and international investors in setting up and expands their business activities (Zuraimi et al., 2012). The efficiency of infrastructure enables country to achieve large economies of scales, reducing the average time shipments spent at sea and in ports (Brooks & Stone, 2010). In the context of Ethiopia, the logistics infrastructures have been improving gradually. Each operation is related to quality as an efficient objective owning a major impact on customer fulfillment or discontent.

2.1.4.3 Cost

Cost strongly linked to the price as main operation objective; as a result, every company will strive to maintain the cost-reduction (Slack et al. 2016). It is often a major objective within operation management. Cost has always been the main indispensable dimension in assessing the logistics performance (Andersson et al., 1989; Banomyong&Supatn, 2011). Thus, every organization tends to mitigate the cost of operation allowing them to set a lower price to their customers (Slack et al. 2016). The basic logistics cost consists of transportation and carrying inventory costs (Forslund, 2007; Kunadhamraks& Hanaoka, 2008). The level of efficiency is influenced by several variables such as cost, time used to deliver the services and levels of risk (M. Andersson&Banomyong, 2010).

2.1.4.4 Flexibility

Flexibility represents the capability "what", "how" or "when" it is doing, the ability of a system to cope with changes (Gupta and Buzacott, 1989). As a key solution, it increases the variety of volumes and delivery dates of services/products reducing costs thanks to quick decision-making and adaptability. It fosters adaptation as speedy service depends on the operation's flexibility while diminishing the waste of time in "changing over" from each task. Thus, maintaining the operation on time will forestall from unexpected events (Yu et al. 2015).

2.1.4.5 Dependability

Dependability has the aim of doing thing in time to provide products or services exactly when needed or are expected by the customer. The importance is attributed to the speedy and reliability fulfilling transport service delivery González-Benito (2010). Zhang *et. al,* (2002) saving time from any unexpected event, from inefficient time-management providing stability from its consequence regarding the quality in operation's time by maintaining it. Logistics players were highly depending on the information technology (IT) and electronic data interchange (Ali et al., 2008). Raus et al (2009) highlight that the usage of IT and EDI could prevent criminal activities, informal payments and improve cost efficiency.

2.1.5 Logistics performance

Logistics performance is defined as 'analysis of both effectiveness and efficiency in accomplishing a given task' (Mentzer and Konrad, 1991). Other scholar refers LP as a metric used to quantify the efficiency and or effectiveness of an action (Neely, Gregory, &Platts, 2005).

Researchers have found it difficult to define LP because organizations have multiple and frequently conflicting goals (Chow, Heaver, and Henriksson, 1993). As mentioned earlier that LP plays a vital role in achieving the organisational's goals (MPRA 2014). The evaluation is based on how well goal is met (Mentzer andKonrad, 1991) and to what extend the overall productivity and performance would reflect LP (Stabler, 1992). Consequently, LP helps the fulfillment of the organization's objectives and strategy (Braz, Scavarda, and Martins, 2011) as well as satisfying the customers (Kayakutlu andBuyukozkan, 2011).Logistics is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point-of-origin to the point-of-consumption in order to meet customer requirements and satisfies the requirements imposed by other stakeholders such as the government. (Cooper et al., 1997)

2.1.6 Logistics performance index (LPI)

According to OECD, (2015) the World Bank international benchmarking tool focusing specifically on measuring the trade and transport facilitation friendliness of a country and which help to identify key barriers for improvement. The World Bank LPI summarizes the performance of the countries through six dimensions that capture the most important aspect of the logistics environment. The six dimensions are: Customs - efficiency of the customs clearance process; Infrastructure – quality of trade and transport infrastructure; International shipment - easy of arranging competitively priced shipment; Logistics quality - competence and quality of logistics service; Tracking and tracing – ability to track and trace consignment; Timeliness- frequency with which shipment reach a consignee within the scheduled or expected time (Arvis. et. el. 2014)

According to Logistics Performance Index surveys conducted by the World Bank in partnership with academic and international institutions and private companies and individuals engaged in international logistics. 2009 round of surveys covered more than 5,000 country assessments by nearly 1,000 international freight forwarders (WB). The markets are chosen based on the most important export and import markets of the respondent's country, random selection, and, for landlocked countries, neighboring countries that connect them with international markets (WBTE, 2015). Among all countries, Germany has been the country with the best performance, with a score of 4.12 on the LPI (2016), and Syrian Arab Republic the worst one with 1.29.The

latest available World Bank Logistics Performance Indicator places Ethiopia ranked number 126 among 160 countries, with an overall score of 2.3768 on a scale from 1 to 5(1=low to 5=high).

2.1.6.1 The efficiency of customs and other border agencies

Based on the World Bank report OECD/ITF (2015), the customs clearance component of the LPI measures the efficiency and effectiveness of customs dispatch procedures in terms of speed, simplicity and predictability OECD (2015). The study which mainly focused on Turkey, that improvements in customs clearance performance are tied to overall trade policy environment. Even though the objectives, implementation capacities and resource availability differ greatly across countries, policies targeting customs performance basically cover: efficient risk management**;** optimal use of information and communications technology**;** effective partnership with the private sector, including programs to improve compliance**;** increased cooperation with other border control agencies**;** Transparency through information on laws, regulations, and administrative guidelines.

The analysis by OECD shows simple, transparent, and harmonized trade policies reduce administrative complexities, increase predictability, and reduce the incentives for market-distorting behavior and corruption. Base on the international transport forum report over the past 20 years, average tariffs have been cut in half in developing countries and non-tariff import barriers have been sharply reduced. Several customs administrations have improved their operations however too many still operate inefficiently. This adds considerable costs to trading activities while, at the same time, undermining the growth potential of national economies and the logistics performance. For many developing countries, reduction of trade barriers has not necessarily led to substantial trade integration (ITF 2015). According to Arvis (2014) customs efficiency is one of the two lagging components of the LPI in 2014, especially in low-income and lower middle-income countries, even after they have made the fastest progress in this dimension (Arvis, et al., 2014). Customs and other border agencies, including improvements of transit regimes, represent areas where companies can adopt comprehensive reforms.

2.1.6.2 The quality of trade and transport infrastructure

According to OECD's analysis this sub-dimension measures the quality of a country's transport and telecommunications infrastructure. Infrastructure development is essential for assuring basic connectivity and access to gateways. A low overall LPI performance often results from poor

scores for infrastructure. Poor transport and telecommunications infrastructure isolates countries and thus inhibits their participation in global production networks (OECD/ITF 2015).

The journal states remoteness is an important determinant of the real costs of trade and a country's ability to participate fully in the world economy. The World Bank report states, the average landlocked country has transport costs 50% higher than the average coastal economy (OECD/ITF 2015). However, the studies which mainly focus on Turkey further states, improving the infrastructure of the landlocked economy to the top quintile reduces this disadvantage by 12%; and improving the infrastructure of the transit economy reduces the disadvantage by a further 7% (Limao&Venables, 2001). The OECD's report states, improvements in customs administration, tracking and tracing, and logistics competence tend to enhance trade for countries at all levels of development (OECD/ITF 2015). In the case of infrastructure, however, the impact on trade appears to be the highest in middle-income countries. Korinek and Sourdin (2011) argue that improvements in port infrastructure do not seem to affect trade in lower-income countries at all. This is possibly due to the existence of strong barriers in other LPI dimensions.

Marti (2014), another factor at play may be asymmetric trading patterns that favor imports over exports; empirical evidence shows that improvements in infrastructure are particularly trade-enhancing for exporters (Martí, et al., 2014). High income countries also benefit somewhat less than middle income countries from improvements in infrastructure, possibly because they have already undertaken the most necessary investments (OECD/ITF 2015). Different findings suggest that some countries experience diminishing returns from further infrastructure improvements.

Based on the OECD (2015) report, the infrastructure dimension of the LPI covers both physical and telecommunications infrastructure. However, perceived differences in the quality of infrastructure are strongly linked to the quality of the roads and maritime facilities, which are the two major modes of freight transport. There exists a strong positive relation between at country's LPI score and the quality of their freight transport related infrastructure, particularly their port and road quality (Celebi, et al., 2014). Keeping transport infrastructure in good condition and providing the framework to develop physical infrastructure are core responsibilities of governments (OECD/ITF 2015). Superior transport infrastructure also supports intermodal transport systems, including access roads to terminals and seaport channels. Most intermodal facilities operate with low overall utilization rates but tend to suffer from occasional capacity

constraints due to highly variable transport demand. Flexible systems, better resource allocation, peak flow management and higher utilization of existing physical infrastructure all provide avenues for improving the transport infrastructure related logistics performance.

In the prospective of EDR, infrastructure refers to the sub-grade, bridge, culvert, tunnel, railway, communication, signaling, power supply, building, mechanical and electrical equipment, IT system and other stationary facilities. It is one of the goals of infrastructure maintenance to ensure good conditions of infrastructure and meet the requirements of normal operation. The key performance indicator for infrastructure maintenance is infrastructure availability for operation and it is defined as: the number of marshaled trains cancelled due to infrastructure management; the number of cancelled trains and total number of marshaled trains are counted and compared.

2.1.6.3 Ease of arranging competitively priced shipments

Based on the OECD's Turkish analysis the dimension gives an estimate of the country's performance in arranging shipments at competitive prices (OECD/ITF 2015). As it is stated on the report, availability of competitively arranged shipments is a significant factor in sourcing decisions and in turn has an impact on national competitiveness. Hausman et al. (2013) estimate that a 1% reduction in the 'distance' measure, which can be interpreted as shipping costs, increases trade by 1.4%. Similarly, a 1% reduction in the total trade-related processing cost would be associated with a 0.5% increase in bilateral trade (Hausman, et al., 2013). Shipping costs – i.e. the LPI's indicator relating to the ease of arranging competitively priced shipments – is often the weakest LPI component of top performers and tends to lower overall LPI scores in high income countries (OECD/ITF 2015). Arvis (2014) states, this may be related to macroeconomic factors, which generally make services more expensive and can make it hard to arrange low-priced shipments. In the last decade, this component of the LPI has gained more importance due to competition between freight carriers and shipping agents in response to stronger export dynamics, providing charters and services at increasingly competitive prices (Martí, et al., 2014).

This development is noteworthy for policymakers since the LPI score relating to 'international shipments' does not directly respond to public policies. Instead it is determined by the intervention of the private sector, which behaves according to market conditions. Yet government policies play an important role in promoting economic efficiency in the freight transportation sector. For example, landside congestion at ports can be reduced through the

development of cost-effective infrastructure to improve access, just as introducing scheduling systems based on advanced tracking technologies can reduce queuing.

In addition to constructing, operating, and maintaining infrastructure, governments regulate various aspects of the freight transportation sector. Governments also impose rules relating to safety, environmental and economic performance across all modes of transport, as well as regulating the sector in general (e.g. access to markets and mergers and acquisitions must be done in accordance with competition legislation) (WB 2016). The government needs to encourage competition in the supply of transport services where the market is large enough to support competition (WB 2016). Ease of arranging competitively priced shipments (1=low to 5=high) in Ethiopia was reported at 2.56 in 2016, according to the World Bank collection of development indicators, compiled from officially recognized sources (WBTE 2016).

2.1.6.4 Competence and quality of logistics services

The OECD's report which mainly based on Turkey states that, the LPI's indicator relating to competence and quality of logistics services measures the overall competence of the logistics services provided by parties within the logistics system. Achieving logistics excellence requires continuous improvement in reliability, responsiveness and well-functioning support services. The dedicated investments in logistics operations and adoption of continuous monitoring and recognized quality standards are mainly done by the private sector. Quality of logistics services plays an important role in facilitating the transport of international trade in goods.

According to Arvis (2014), the LPI results reveal that the quality of services indicator drives logistics performance in both emerging and developed economies. Analysis of the impacts of trade logistics in each country's trade by income category indicates that competence seems to impact trade flows by a similar magnitude regardless of the country's level of development. Improving logistics services (like third-party logistics, trucking, and freight forwarding) is typically a complex task for policymaking, with few success stories so far (Korinek&Sourdin, 2011). However, it can be seen that in "logistics friendly" countries, manufacturers and traders outsource logistics to third party providers (who arguably benefit from economies of scale and are generally technically better at delivering these services), thus allowing companies to focus on their core business.

Based on the World Bank study, various government actions can help the private sector develop its logistics competencies. These include increasing managerial capacity, setting quality

standards developed by professional organizations, regulating business certification and ensuring standardization of operations. Moreover, increasing logistics competence requires new labor force skill sets and more highly educated employees. Improved human resources are a key factor when it comes to LPI performance in the competence and quality of logistics services. Human resource development in logistics is often both a public and a private sector responsibility. To secure an adequate workforce to meet future labor needs in the logistics industry, decisive political efforts are necessary in the logistics industry (International Transport Forum, 2014). Competence and quality of logistics services (1=low to 5=high) in Ethiopia was reported at 2.37 in 2016, according to the World Bank collection of development indicators, compiled from officially recognized sources WBTE, (2016)

2.1.6.5 Ability to track and trace consignments

Traceability is a product of the logistics sector, since all parties in the supply chain contribute to this component. Since most stakeholders benefit significantly from improved tracking and tracing, it can be regarded as one of the priority areas for future investments in trade logistics (Korinek&Sourdin, 2011).

The development of information and communications technologies (ICT) provides a convenient way of improving LPI tracking and traceability performance by enabling cost-efficient gathering, organization and distribution of information at a global level. This includes information on products, services and trade regulations. Several companies use the Internet as an exchange mechanism for planning the supply chain with their partners. Major freight transport service providers provide information on their services, schedules and rates that can be easily accessed by their clients.

However, adequate traceability of shipments is still a major problem in most developing countries. This is partially due to a lack of understanding of how to manage new technology and adjust logistics procedures. Thoughinformation sharing creates benefits to the supply chain, many companies start by optimizing their internal processes before paying attention to their external relations.

One of the major barriers confronting companies in the uptake of advanced ICT systems is the high investment risk, which imposes uncertainties and affects the willingness of the private sector to invest. This is especially true if there is uncertainty surrounding governments' communications policy and spectrum allocation. Hence, policymakers need to keep up with the

rapid development of ICT and develop a stable communications framework that is conducive to logistics planning by the private sector (OECD, 2002).Ability to track and trace consignments (1=low to 5=high) in Ethiopia was reported at 2.18 in 2016, according to the World Bank collection of development indicators, compiled from officially recognized sources. (WBTE)

2.1.6.6 Timeliness of shipments in reaching destination

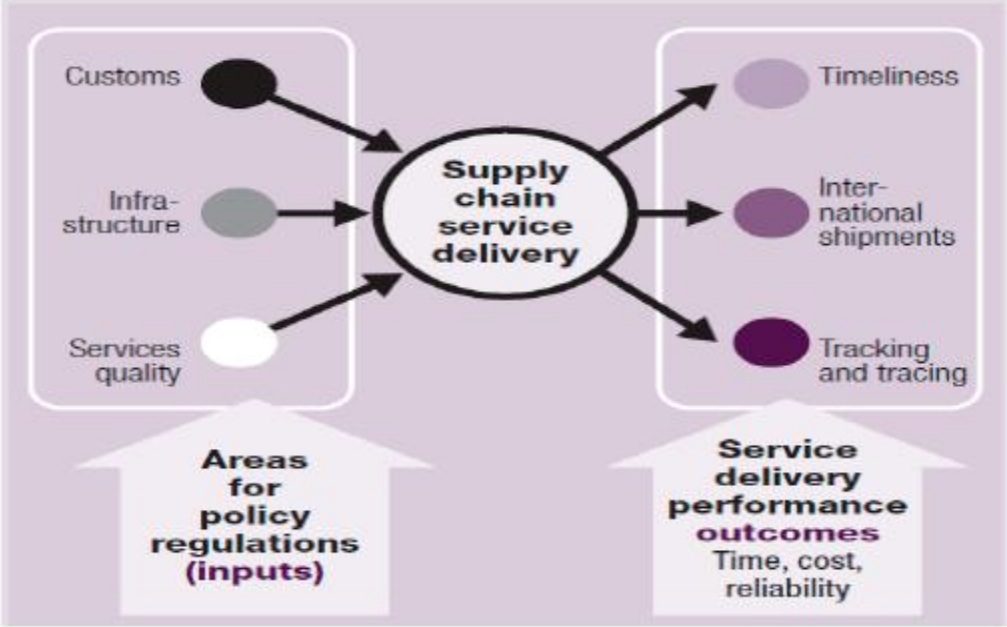
According to OECD's study, the timeliness of shipments in reaching destination measures the reliability of shipment delivery times. Delivery times depend on the nature of the product, planning and supply chain management, logistics services, and distance to customers and suppliers. Long lead time is not a problem if delivery is predictable and demand is stable. However, if there is uncertainty about future demand, long lead time is costly, even if the customer knows exactly when the merchandise will arrive. It has been estimated that a 1% reduction in exporter's processing time could increase bilateral trade by 0.4%, while a 1% reduction in the variability of shipping times could be associated with a 0.2% increase in bilateral trade (Hummels, 2001). In addition, the impact of an extra day spent getting across borders has a significantly greater negative impact on trade flows compared with an extra day spent at sea delivering a container of goods (Korinek&Sourdin, 2009). The results of the studies indicate that the time spent at the border and the cost of getting containers across borders has a strong impact on trade and transport.

Based on the study of international transport forum, the length of the lead time affects trade volumes and time variability mainly affects the efficiency of logistics systems. The more variable the delivery time, the buffer stocks are needed. Thus, even if average lead times are low, a high rate of variability can render a supplier uncompetitive and can be more damaging than having long, but predictable, lead times ITF/OECD, (2010). This impact is even higher in large and complex supply chains, due to the phenomenon known as the "bullwhip effect", which is the amplified variability of demand on upstream levels of the supply chain.

There is ample evidence that appropriately designed liberalization and introduction of competition in these sectors can improve efficiency (including timeliness), reduce costs and expand service access to users OECD, (2006).Frequency with which shipments reach consignee within scheduled or expected time (1=low to 5=high) in Ethiopia was reported at 2.37 in 2016,

according to the World Bank collection of development indicators, compiled from officially recognized sources. (WBTE).

Figure 2 World Bank LPI 1



Source: ***World Bank Group (2015)***

2.2 Empirical literature

As cited by Fekadu et al, (2013) the logistics performance of Ethiopia is characterized by lack of coordination in the supply chain, lack of coordination in the areas of inventory planning and warehouse management, less attention on customer satisfaction, inadequate vehicles in delivery of goods to customer, lack of coordination with transporters and lack of information sharing as well as using information technology across the supply chain. (Fekadu*et al*. 2013)

According to Fasil (2014) he examined the important quality indicator of rail freight transportation are Safety of cargoes during transportation, Regularity of cargo arrival, Just-in-time delivery, Security of carriages, Proper maintenance of the cargos and Availability of cargo handling equipment at loading points. Based on his descriptive statistical analysis most important quality indicators are Safety of cargoes during transportation found that the

respondents' overall expectation on a scale of 1 to 5 is 4.6069. The study realize that respondents expect a lot from the delivery of goods without losing, delivery of goods without contaminating and delivery of goods without damaging dimensions.

Habtamu (2017) analyze factors influencing passengers' satisfaction in AAC-LRTS. The results of Spearman's correlation analysis of the study indicated that there was a significant positive correlation of all independent variables; safety and security, reliability, comfort, ticket payment system, affordability, staff behavior, accessibility and availability with passengers' satisfaction. Based on the findings of the research, the LRTS management should sustain and continue the better provisions of the light rail transit services primarily to satisfy passengers and secondly to attain organizational goals.

Natnael 2015) assessed the freight transport and transportation infrastructures along the China-Djibouti-Addis Ababa (Ethiopia) trade route via Modjo dry port and discussed the logistics system of Ethiopia is characterized by poor logistics management system and poor transportation infrastructures. From the research it was found out that for containerized goods it is better to consider a variety of modes in combination so that the respective advantages/benefits of each mode are better exploited thus the Intermodal transportation ("Multimodal") have most significant positive impacts over the freight transport i.e. Considering other alternatives beyond the current Shipping → Trucking system of freight transport to Shipping → Rail → Trucking and Shipping → Pipeline → Trucking (Oil transport). The research stated that the state owned ESLSE being the only "multimodal" transport operator (MTO) should work together with different private stake holders in addressing the issues of customer's complaint and for the common benefit of the nation is expected rather than monopolizing the ongoing "multimodal" freight transport logistics service.

Brussels (2014:42) defines the competitive position of rail transport in the transport system is influenced by the factors such as rail transport costs and quality of rail services. Transport cost affects productivity and efficiency improvements; for example, if passing lowered operating costs to transport users can increase the attractiveness of the transport mode and again be used to enhance the technologies and invest in rolling stock and the quality of rail transport services also

affected by various factors such as journey time, reliability, frequency, flexibility and customer information (Brussels, 2014:42).

Debora (2017) assessed logistics performance of the Ethiopian Electric Power Corporation. The aim of the study is to increase Ethiopian Electric Power Corporation understanding of their current logistics performance and measuring the logistics performance index in terms quality, productivity, and cost and cycle time. Descriptive analysis method issued to describe the data. The study states that high logistics costs observed in warehouse cost and damage goods and discussed order entry and order processing time has too long.

Fetiha (2018) assessed the 3rd party logistics service providers operation on the logistics performance of the service provider using the World Bank logistics performance measurement dimensions. Among the World Bank uses six dimensions the study adopted customs clearance, tracking and tracing; and timeliness. The Data was obtained through questionnaire and analyzed using descriptive statics supported by SPSS 20.0software version. Based on the statics analysis, warehouse and transportation operation has significant influence on tracking and tracing and timeliness, respectively. However, customs operation and customs clearance have a weak relationship.

Brooks (2008) stated that, transportation infrastructures such as highways and railways can reduce distribution margins of the transportation cost in narrowing the gap between prices faced by producers and consumers, thereby facilitating better improvements for both; in general efficient transportation infrastructures lower transaction costs, raise value added, and increase potential profitability.

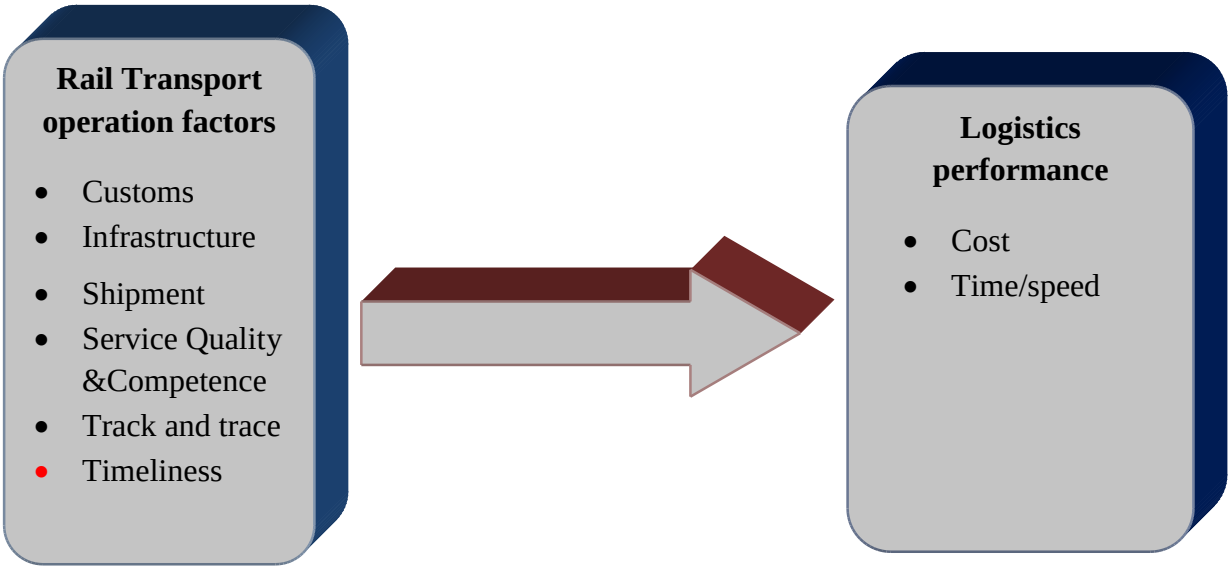
As cited by Debla (2013), the customs process check points for export goods due to the network problem, the software ASYCUDA ++ the authority uses is not working properly and trucks wait up to 8 hours until the checking is finished by manual system communicating head office staffs through telephone. By improving the network system and minimizing the check points, it is possible to lower the cost due to unnecessary delays.

According to Temple (2001), a literature review depicts that the international supply chain generally faces at least two sets of customs procedures. So, a simplified and effective procedure is essential for smooth flow of trade cargo and for investment. If customs procedures do not allow deeper penetration of containers the flow is hampered and the Inland Container Depot (ICD) will be less effective. It will result in more transit time, transport cost and uncertain schedule reliability due to multiple handling of cargo.

2.3 Conceptual Framework

Based on the theoretical framework presented in the previous section, this part highlights how the research is conceptualized. According to Miles and Huberman (1994, p18) ―Conceptual framework explains, either graphically or in a narrative form, the main things to be studied, the key factors, concepts or variables and the presumed relationship among them. The conceptual framework of the study below shows factors affecting rail transportation service in logistics performance.

Independent variable **Dependent variable**



Source: Adopted from World Bank& slack 2016

Literature Gap

The World Bank Logistics Performance Indicator (LPI 2016) places Ethiopia ranked number 126 among 160 countries, with an overall score of 2.3768 on a scale from 1 to 5(1=low to 5=high). Since Ethiopia occupied such position on the 2016 LPI, there is a need to identify all the indicators presented in the report and to study the effect that may represent logistical constraints in operations of rail transportation. The researcher assessed the factors affecting of rail transportation service on the logistics performance in terms of World Bank LPI.

Chapter Three

Research Methodology

3.1 Description of the Study Area

The study area mainly focused on the factors affecting of rail transportation service in logistics performance in terms of World Bank logistics performance index. An analysis has been made on six independent variables customs, infrastructure, competitive shipment price, quality and competency, trucking and tracing and timeliness of rail transportation service. The analysis is based on primary data from questionnaires of the staff and additional information from interview with managements of EDR. The findings from this analysis were discussed in more detail in the research.

3.2 Research Approach

The study approach was both quantitative and qualitative research approach. The researcher distributes questionnaires to rail transport service providers (management and employees) of EDR. The approach provides complete understanding in assessing the effect of rail transport on logistics performance.

3.3 Research Design

Depending on the objectives Descriptive and explanatory approach were used. The descriptive research method helped to describe the research quantitative findings using major statistical measures such as mean and standard deviation. Quantitative questionnaires will be distributed to internal management and experts. One of the goals of the study is to determine the relationship between dependent and independent variables in a population. A detailed analysis is required to gain an understanding of the topic and to explain the information in a logical manner using SPSS model.

3.4 Population and Sample

Due to geographical and resource constraints, the researcher will only targeted the EDR head office and management contractors' local staffs which found in Addis Ababa city; as of

November 2019 human resource and capacity building performance audit report, the number of EDR and MC local staffs composition shown below:

Table 3.1: EDR and MC Staff division and head Count.

S.No	Position	Head number	Location	
			EDR	MC
1	Chief	7	7	-
2	Managers	22	5	17
3	Lead Experts	49	12	37
4	Senior experts	7	7	-
5	Junior staffs	35	35?	-
Total		**120**		

3.4.1 Sample size

The main purpose of this study will be to get reliable data through assessing the practices within CCECC-CREC JV knowledge transfer of operation, maintenance and capacity building. The sample size calculated by using the Yamane formula by:

$$n = \frac{N}{1+N(e2)}$$

$$n = 54$$

Where,

- n= sample size
- N=total population
- e=level of precision (±10)

Accordingly, of the total 120 populations, sample size 54 will deploy considering ± 10 precision level.

3.4.2 Sampling techniques

To make the sample size optimum and assure the degree of efficiency, representativeness, reliability and flexibility the researcher use stratified random sampling method to distribute closed ended questionnaire by calculating the strata of each position respondent's through making disproportionate stratified sampling due to the fact that the number of some position in the organizational structures are smaller or larger over the other which have significant effect on the study result at the end. On the other hand, for open ended interview questionnaires, judgmental sampling method designed to use due to the fact that the number of higher officials are small in number and the researcher does not consider trainees as part of the population size due to less work experience and does not at work due to COVED-19 Pandemic case.

Therefore, as per the above table 3.1, the total population size and stratified sample size distribution calculated as follows:

Table 3.2 Sample size

S.No	Role	Head count	Proportionate sample size	Disproportionate sample size
1	Chief	7	3	3
2	Managers	21	10	10
3	Lead Experts	34	22	21
4	Senior experts	7	3	7
5	Junior staffs	35	16	13
Total		**120**	54	**54**

Table 3.2: Disproportionate stratified Sample size distribution to each position, Source (Own strata calculation)

As per the above table3.2, the sampling method designed to get reasonable respondents from each positions or role the staff play at both EDR head office and MC to enable the researcher get

balanced data which enables to reach at valid conclusion. In addition, disproportionate stratified sampling will apply to enabling to balance the number of respondents across each sample size.

On the other hand, the disproportionate stratified sampling will apply to take an appropriate number of EDR respondents to evaluate the capability of administering contract administration conditions over the MC's operation and maintenance and capacity building performance.

3.5 Data Sources and Types

The study will use both primary and secondary data sources. The primary data will be collected from the Company's experts and managements using questionnaire. The questionnaire contained two parts. The first part is designed to collect respondents' background information and respondents' general information. The second part is structured questions designed to measure each dimension and with the five-point Likert scale. Likert-type scale rate from 1=very small extent, 2= small extent, 3=Moderate, 4= great extent, 5= very great extent. This helped to make questions interesting to respondents and, thereby, enhance their cooperation, ultimately to ensure maximum response rate. In addition, key informant checklists were used to gather relevant data from project manager's key staffs. Secondary data collected from the company's reports and EDR manuals, brochure and journals. These data helped to assess the effect of rail transport service delivery (operation) on logistics performance of the country.

3.6 Data Collection Procedures

The primary data are collected in the field based on the existing and reality condition. This data collection will be conducted by questionnaire survey and key informant interview.The secondary data is data which is collected to support the primary data and as comparison to other studies. The secondary data in this research are obtained from the organizations associated with the research object such as EDR, MC (CCECC-CREC JV) and transport minister. Other sources were articles and websites.

Questionnaire: The questionnaire in this study was prepared by the researcher. The questionnaire for sample survey was composed of closed ended questions as well as open ended questions so that the closed ended questions assist to collect factual data from the options give whereas the open ended questions help to find the respondent's opinions at length.

Key informant interview: Open ended checklists were prepared and used to gather qualitative data from managers, department heads and key staffs.

3.7 Ethical Consideration

Data will be collected on a voluntarily basis, all information received can be treated as strictly confidential and the participants and their biographical information will remain anonymous. Research involving people must be developed ethically; particularly this includes the responsibility of the researcher to protect the privacy of the individuals that participate in the study. This privacy protection must extend to all people's, regardless of age, religion and race.

3.8 Data Analysis

The researcher carried out quantitative and qualitative analysis. The quantitative analysis will involve the use of descriptive and inferential statistics. There are several software packages for the analysis of quantitative data some of which are broader in scope and user friendly like the Statistical Package for Social Sciences (SPSS) software. SPSS may obviously not be the best but its user-friendly nature and the mastery we have of SPSS automatically makes it better for us. There may be spreadsheet packages that are better than the SPSS, but SPSS is widely in use now also.

Thus, the data was organized in the form of tables; figures and was analyzed and interpreted against the research question raised. Moreover, information was collected through review of documents; questionnaire and interview was analyzed based on the framework of the study objectives. After making the necessary coding, to analyze the usable data were collected from respondents; Statistical Package for Social Sciences (SPSS) version 20 was used. In order to come up with a better result, both descriptive and explanatory statistics was used to describe a set of data in terms of its frequency of occurrence, its central tendency, and its dispersion, regression analysis, correlation analysis and reliability test were explained through employing inferential statistics. Subsequently, they were analyzed by using descriptive statics. Before analysis, data were cleaned to eliminate discrepancies and then after, data were cowered and was keyed into the computer. The data was stored, tabulated and summarized using both description and explanatory statistics such as means, standard deviations, and regression analysis, correlations and relations tests. Tables and graphs were used for presentations of findings. Regression model was used to determine the relationship between variables. A regression

analysis model was used to determine the relationship between rail transportation services and logistics performance at LMD. In addition, qualitative data and secondary data were used to triangulate, analyze and interpret the data.

Multiple Regression model specification:

$Y= \beta_0+\beta_1X_1 +\beta_2X_2 + \beta_3X_3+\beta_4X_4 +\beta_5X_5 + \beta_6X_6 + \varepsilon$

Where:

Y = Dependent variable logistics performance (Cost and Speed/Time)

β_0= Constant

$\beta_1, \beta_2, \ldots\ldots, \beta_6$= Coefficients of the independent variables

$X_1, X_2, \ldots\ldots, X_6$= Independent variables

X_1= Customs

X_2= Infrastructure

X_3= Competitiveness

X_4= Quality and Competence

X_5= Track and Trace

X_6= Timeliness

ε = Error term

3.9 Validity and Reliability

The principles of validity and reliability are fundamental cornerstones of the scientific method and it is a key concept in quantitative research. Together, they are at the core of what is accepted as scientific proof, by scientist and philosopher alike. *Validity* measures the extent to which the results of the study measured what they were intended to measure. In the other hand, *Reliability* measures whether the research is replicable in the similar situations or not.

The validity of the data collection instrument will be determined through review of literature and adapting instruments of the World Bank logistics performance index measurement dimensions. To measure the reliability of the data collection instruments, an internal consistency technique

using Cronbach's alpha was used in this study. Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalization (Zinbarg 2005).

Table 3.3 Reliability analysis: Using Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.924	50

Source: SPSS output, 2020

As shown in the above table, the research had a Cronbach's Alpha of 0.924. This shows that average of all the variables had Cronbach's Alpha of more than 0.70 and hence the research instrument was reliable and valid, (Gottschalk, 1995).

Chapter Four

DATA PRESENTATION, ANALYSIS, AND DISCUSSION OF FINDINGS

4.1 Demographic Information

4.1.1 Response Rate

A total of 54 sample respondents were selected and interviewed. This indicated that the response rate was 100% as shown in Table 4.1. This response rate is considered very good to enable the determination of the phenomenon that exists as it is in line with Mugenda, O. &Mugenda, A. (2003) assertion/statement. They state that the response rate of above 75% is recommended for the generalization of the study findings.

4.1.2 The sex of respondents

This section sought to determine the sex of respondents based. This was important as it enabled determination of whether there was sex /gender/ balance and diversity among employees. The results presented in Table 4.1.

Table4. 1: Sex of respondents

Sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	44	81.5	81.5	81.5
	Female	10	18.5	18.5	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

The survey results indicated that 81.5% of the respondents were male while the remaining 18.5% were female.

The Age of Employees

Table4. 2: Age of respondent

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	10	18.5	18.5	18.5
	31-40	31	57.4	57.4	75.9
	41-50	10	18.5	18.5	94.4
	51-60	3	5.6	5.6	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

The response on table 4.2 shows that 57.4% of the respondents were in the age category of 31-40 years, 18.5% for age of 20-30 years, 18.5% for age of 41-50 years and 5.6% from age 51-60 years.

4.1.3 Educational Background

This section shows the educational background of respondents. The results are shown in table 4.3.

Table:4.3. Education status of the respondents

Education status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	diploma/TVET	3	5.6	5.6	5.6
	Degree	17	31.5	31.5	37.0
	masters and above	34	63.0	63.0	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

This data indicates that majority (63%) of the respondents had second degree and above, 31.5% had first degree and 5.6% had diploma/TVET level. This shows that the respondents were well qualified for providing response with the study subject and their respective profession.

4.1.4 Position of the Respondents

This section sought to look at the position held by the respondents. This was used as a measure of their involvement with the organization activities. The results obtained are shown in Table 4.4.

Table 4.4: Position of the respondent

Position					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	director/chief officer	3	5.6	5.6	5.6
	section manager	10	18.5	18.5	24.1
	team leader	21	38.9	38.9	63.0
	Expert	17	31.5	31.5	94.4
	Others	3	5.6	5.6	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

From the above table 4.4, the majority (39%) of the respondents were team leaders, 31% were experts while 18.5% were section managers and 5.6% were from director/ chief officers and 5.6% were from others. This implies that majority of respondents were team leaders and experts. This shows that the respondents were directly involved in rail transport and logistics operations, therefore they are familiar with the study topic.

4.1.5 Average monthly income of the respondent

This section depicts the average monthly income of respondents. This was important as it enabled to show the respondents monthly income diversity. The results presented in Table 4.5

Table 4.5: Average monthly income of the respondent in Birr

Average Monthly Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 5000	2	3.7	3.7	3.7
	5001-10000	17	31.5	31.5	35.2
	10001-15000	24	44.4	44.4	79.6
	15001-20000	8	14.8	14.8	94.4
	above 20001	3	5.6	5.6	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

The results obtained showed that 44.4% of the employees get monthly income of Birr 10,001-15000, 31.5% get monthly income of Birr 5001-10000, and 14.8% get monthly income of Birr 15001-20000. This shows that the majority of the respondents earn good average monthly income.

4.1.6 Work Experienced

This section shows the duration that the respondents had worked in the railways company. This was used in the rail transport activities. The result shown in Table 4.6: below.

Table4.6 Working experience in the railways company

Work Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	17	31.5	31.5	31.5
	6-10 years	27	50.0	50.0	81.5
	11 years and above	10	18.5	18.5	100.0
	Total	54	100.0	100.0	

Source: SPSS output, 2020

The findings shows that 50% of the respondent has work experience 6-10 years, 31.5% of the respondents have work experience of 1-5 years, and 18.5% of the respondents have work

experience of more than 11 years. This shows that majority of the respondents had been working in the railways company for a long period of time. Hence, it implies that the respondents had been working at their current positions for a considerable length of time and has knowledge of the nature of operations in their respective positions.

4.2 Descriptive Analysis

This section presents the descriptive statistics in relation to the study. Based on the response of the respondents the mean was computed for each item and the results found as in the tables bellow. Accordingly Mc Leod,S.A.(2008) the five point Likert Scale standards indicates that the extent they agree with statements that is categorized as a mean (M) score of 0-1.5 means that the respondents disagree, between 1.50 to 2.50 means they disagreed, 2.50 to 3.50 means the respondents were neutral, 3.50-4.50 means they agreed and a mean above 4.50 means the respondents strongly agreed Bertram, D. "Likert Scales "(2016).

4.2.1 Customs Clearance

The study sought to how customs in rail transportation service affect the logistics performance in EDR. The research questionnaire were designed in the item scales of five-point Likert type scales with 1 = very small extent, 2 = small extent, 3 = moderate, 4 =great extent, 5 = very great extent. The mean and standard deviations were generated from SPSS and are illustrated in Table 4.7 below.

Table 4.7: How customs in rail transport service affect the logistics performance in EDR

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1.Customs in rail transport increased utilization of computerized and automated clearance systems "ASYCUDA++"	54	1	5	3.19	.826
2.The clearance team or functional unit is independently organized to Coordinate activities of customs to allow the customers to get efficient services	52	2	5	3.27	.744

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
3.Border customs department and functional unit is adequately staffed with skilled personnel & facilities to deliver fast and quality services	54	2	5	3.20	.810
4.Clearly articulated customs guideline is in place to secure all necessary documents from customer before starting clearance process	54	2	5	3.39	.899
5.Customs in rail transport service promote cross-border cooperation in monitoring and clearing cargo	53	2	5	3.43	.797
Average				3.296	0.8152

Source: SPSS output, 2020

Based on the findings on Table 4.7, the majorities of respondents in the practice of customs clearance scores between in the rate of 2.50-3.50, which imply that, the respondents neutral to the fact that the implementation of customs clearance is moderate in affecting logistics performance. Besides, findings from the interview accordingly as evaluated their interview questions, majority of the respondents believe that the Customs in rail transport increased utilization of computerized and automated clearance systems "ASYCUDA++", The clearance team is independently organized to Coordinate activities of customs to allow the customers to get efficient services; Border customs department is adequately staffed with skilled personnel & facilities to deliver fast and quality services; Clearly articulated customs guideline is in place to secure all necessary documents from customer before starting clearance process; and promote cross-border cooperation in monitoring and clearing cargo as shown by the mean score of 3.19, 3.29, 3.20, 3.39, and 3.43 respectively. This shows that overall, customs clearance at EDR were moderately affect the logistics performance in meeting the set objectives as an average mean of 3.296 and standard deviation of 0.8152. From the interview with management, the customs process check points for import and export goods have network problem, the software ASYCUDA ++ the authority uses is not working properly and rail trucks wait from 3 to 5 days delay for loading and unloading at the dry port and freight yards and also there is longer boarder

inspection time. Inconsistency of the availability of the containerized cargo at Djibouti; Custom office of Djibouti is closed at the weekend (Friday and Saturday) which make difficult to load the cargo.

4.2.2 Rail Transport Infrastructure

The study sought to how **rail transport infrastructure affects the logistics performance in EDR**. The research questionnaire were designed in the item scales of five-point Likert type scales with 1 = very small extent, 2 = small extent, 3 = moderate, 4 =great extent, 5 = very great extent. The mean and standard deviations were generated from SPSS as illustrated in Table 4.8 below.

Table 4.8: How rail transport infrastructure affects the logistics performance in EDR?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. Rail transport infrastructure improves import & export in the domestic freight yards.	54	2	5	4.09	.996
2.Rail transport improves sufficient hinterland connection for intermodal transports.	54	2	5	3.91	.957
3.Adequate number of rolling stocks are available to support the rail transport operation such as locomotives, wagons, etc.	53	2	5	3.11	.824
4. Rail transport infrastructures are well equipped with the necessary equipment and facilities such as railway communication signaling, mechanical and electrical equipment, IT system and other.	54	2	5	3.48	.637
5. Rail transport infrastructure is accessible to sufficient fright yards and dry ports.	54	2	5	3.13	.674
6. Rail transport has sufficient link roads to access train station.	53	2	5	3.34	.807

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
7. Rail transports are equipped with sufficient electric energy supply for the service.	54	2	5	2.91	.759
Average				3.4242857	0.8077143

Source: SPSS output, 2020

From the above Table 4.8, the majorities of the respondents agreed to a moderate extent of mean 2.5-3.4 that the rail transport adequate number of rolling stocks are available to support the rail transport operation such as locomotives, wagons, etc.; well equipped with the necessary equipment and facilities such as railway communication signaling, mechanical and electrical equipment, IT system and other; accessible to sufficient fright yards and dry ports; sufficient link roads to access train station &equipped with sufficient electric energy supply for the service, as shown by the mean scores of 3.11, 3.48, 3.13, 3.34 and 2.91 respectively. On the other hand, respondents agree to a great extent mean of 3.5-4.5 that improves import & export in the domestic freight yards; and improves sufficient hinterland connection for intermodal transports as shown by the mean scores of 4.09 and 3.91 respectively.

The findings from the respondents of interview indicated that the main problem in rail infrastructures such as all purchased rolling stocks, spare parts, Station Water Supply systems, Telecommunication system connecting station, security management systems, station backup generators and Rescue Train sets are the major facilities and infrastructure supposed to be supplied by ERC. This implies that the rail transport is working with inefficient infrastructure and rolling stocks. On the other hand, lack of effective repair and maintenance of infrastructure and rolling stock maintenance schedule is the other factor which is affecting the logistics performance. The electric supply of both Ethiopian Electric power and Ethiopian Electric Utility are very poor, there are frequent power outages in the Overhead Catenaries System (OCS) which causes interruptions rail transport operation performance.

According to Berbard (2019) for rail to be part of a holistic logistics service, rail organizations must cultivate a reputation for efficient, competitive, and reliable services. Based on Bernard A.

(2019) "The rail freight challenge for emerging economies" analysis, limited integrated planning and investment in rail freight and passenger transport has resulted in inefficiencies that have contributed to increasing logistics costs and that have curtailed the competitiveness of companies and sectors that depend on the efficiency of their logistics performance. This is also true in this practice accordingly findings from both interview and questionnaire.

4.2.3 Ease of arranging competitive shipment price

The researcher tried to identify effect of ease of arranging competitive shipment price on logistics performance. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- Not at all, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in table below.

Table 4.9: How the ease of arranging competitively priced shipments in rail transport affects the logistics performance?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. Rail transport easy shipment provides services at increasingly competitive prices &reduces service barriers in the logistics sector.	54	3	5	4.06	.685
2. Rail transport shipment reduced costs of passengers and cargo transport to support logistics activities as compared to other modes.	54	2	5	3.96	.800
3. Rail transport competitive shipment price facilitates the movement of passengers & cargos within the country.	54	2	5	3.83	.666
4. The less cost of loaded and empty container cargo as compared with other modes of transport.	54	2	5	4.04	.889

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
5. Rail transportation service price stimulates multi-modal (intermodal) transport activities.	52	2	5	3.96	.839
6. Rail transport shipment price is competitive in comparison with other modes of transport in the market (road & Air).	54	2	5	4.02	.942
Average				3.9783333	0.8035

Source: SPSS output, 2020

From the Table 4.9, the majorities of respondents agreed to a great extent the easy shipment provides services at increasingly competitive prices &reduces service barriers in the logistics sector; reduced costs of passengers and cargo transport to support logistics activities as compared to other modes; competitive shipment price facilitates the movement of passengers & cargos within the country. The less cost of loaded and empty container cargo as compared with other modes of transport; service price stimulates multi-modal (intermodal) transport activities and shipment price is competitive in comparison with other modes of transport in the market as shown the mean scores of 4.06, 3.96, 3.83, 4.04, 3.96 and 4.02 respectively. On the other hand the findings show that the ease of arranging competitive shipment price was the great extent affects logistics performance with total variable average mean of 3.97 and standard deviation of 0.8035.

4.2.4 Quality & Competences of logistics service

The respondents were also asked Effect of Quality & Competences of logistics service on logistics performance. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- very small extent, 2- To a small extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in Table 4.10.

Table 4.10: How service quality &competences of logistics service in rail transport affect logistics performance in EDR?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. There is enough skill and expertise in the company to operate Rail transport systems as transport operator.	54	2	5	3.33	.890
2. The company uses proper queue management system to serve customers at the reception to minimize waiting time.	53	2	5	3.40	.840
3. Rail transportation service quotations are delivered to customers in standard time.	54	2	5	3.56	.769
4. Customers are informed in time in case of any supplementary work related to any change on schedule.	54	2	5	3.61	.899
5. In the company employees respond to customer enquiries in time.	54	1	5	3.46	1.059
6. The company ensures that maintenances and line check up are made in time to ensure safety and security.	54	1	5	3.87	1.010
7. Competency of rail transport allows increased scale of logistics service providers.	54	1	5	3.72	.940
8. Rail transport logistics service competency encourages integration of logistics services for import & export trade.	54	2	5	3.81	.803
9. Rail transport logistics service introduces modern supply chain management techniques such as increasing the reliability in online ticketing system & Targeting a new market niche.	54	1	5	3.06	.899
Average				3.53555556	0.901

Source: SPSS output, 2020

As show from Table 4.10, almost the majorities of respondents agreed that rail transport service quality and competency affect logistics performance to the great extent almost more than a mean of 3.50 in the implementing this variables in service quotations are delivered to customers in standard time; Customers are informed in time in case of any supplementary work related to any change on schedule; The company ensures that maintenances and line check up are made in time to ensure safety and security; Competency of rail transport allows increased scale of logistics service providers; and logistics service competency encourages integration of logistics services for import & export trade; items shows a means of 3.56, 3.61, 3.87, 3.72 and 3.81 respectively and enough skill and expertise in the company to operate Rail transport systems as transport operator; uses proper queue management system to serve customers at the reception to minimize waiting time; company employees respond to customer enquiries in time; introduces modern supply chain management techniques such as increasing the reliability in online ticketing system & Targeting a new market niche shows an average score of 3.33, 3.40, 3.46 and 3.06 respectively. All variables had a mean average and standard deviation of 3.53 and 0.901 respectively. This shows that the rail transport service quality and competency in great extent affects logistics performance. Findings from the interview, the main problem in rail transport service that affect logistics performance is lack of spare parts.

4.2.5 Tracking and Tracing

As indicated in Table 4.11, to examine the effect of tracking and tracing on logistics performance 5 questions are used. The details are explained underneath.

Table 4.11: How tracking and tracing in a rail transport affect the logistic performance in EDR?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. Rail transport improved information and communications technologies (ICT) to support logistics activities.	54	2	5	3.31	.907
2. Rail transportation service implemented utilization of tracking and monitoring systems.	54	2	5	3.30	.717
3. Rail transport introduces online systems (internet) for real time clearance monitoring.	54	1	4	2.56	.965
4. Rail transport introduces e-government services and e-signatures for government approvals.	53	1	4	1.91	.815
5. Rail transport service introduced public information platforms for sharing trade and logistics data.	54	1	5	2.57	.838
Average				2.73	0.8484

Source: SPSS output, 2020

As show in Table 4.11, the majorities of respondents agreed that rail transport tracking and tracing had moderate extent a mean of 2.70 in effect to logistics performance in improving information and communications technologies (ICT) to support logistics activities; utilization of tracking and monitoring systems; introduces online systems (internet) for real time clearance monitoring; introduced public information platforms for sharing trade and logistics data items a score means of 3.31, 3.30, 2.56, and 2.57 respectively and introduces e-government services and e-signatures for government approvals to the small extent mean of 1.91. All variables had a mean average and standard deviation of 2.73 and 0.8484 respectively. This shows that tracking and tracing in the railways transport had moderate extent effect on the logistics performance.

4.2.6 Timeliness

As per the response from respondents, the result shows that railway transport service simplify operations which cause delays in transportation, decrease variability of transport and handling times, and shorten operations required for border crossings had a mean square value of 3.83, 3.70, 4.06 and 4.28 respectively showing that timelines of rail transportation affects logistics performance in a great extent, rail transport improve management of handling perishable goods operations in freight yards and increase efficiency of logistics performance by novel management practices to the moderate extent had an average mean of 3.13 and 318 respectively.

Table 4.12: How timeliness in rail transport service affect the logistics performance?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1.Rail transport service simplify operations which cause delays in transportation;	54	3	5	3.83	.720
2. Rail transport service decrease variability of transport and handling times.	54	2	5	3.70	.768
3. Rail transport service decrease waiting times in border crossings.	54	2	5	3.59	.922
4. Rail transportation services shorten operations required for border crossings.	54	2	5	3.72	.920
5. Rail transportation services improve management of handling perishable goods operations in freight yards.	54	1	5	3.13	1.150
6. Rail transport service increase efficiency of logistics performance by novel management practices.	54	2	5	3.28	.899
Average				3.5416667	0.8965

Source: SPSS output, 2020

All variables had a mean average and standard deviation of 3.54 and 0.8965 respectively. This shows that timeliness in the rail transport service affects logistics performance on a great extent.

According to World Bank (2015), a literature review indicates that timeliness of shipments in reaching destination measures how reliably shipments meet the promised delivery times. More reliable delivery will lower transit time of transport from origin to destination and will enable a greater control of costs, schedules and cargo safety.

4.2.7 Cost

Table 4.13: How costs of rail transport service affect the logistics performance?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1.Rail transport minimized the transportation cost per unit in import and export process	54	2	5	4.13	.778
2.Rail transport is cheaper than other modes of transport	54	2	5	4.17	.637
3.The capital investment into rail transport add more value to the logistics activities	54	2	5	4.00	.890
4.Rail transport Maintenance cost maximize the logistics service cost	54	1	5	3.26	.955
5.Rail transport minimize the overall total inventory cost like holding, ordering and stock out	53	2	5	3.55	.748
6.Rail transport reduced loading and unloading cost as well as loss and damage cost	54	2	5	3.57	.716
Average				3.78	0.7873333

Source: SPSS output, 2020

As shown in Table 4.13, the majorities of respondents agreed that rail transport service cost had great extent effect in this variable. In minimized the transportation cost per unit in import and export process; cheaper than other modes of transport; capital investment into rail transport add more value to the logistics activities; minimize the overall total inventory cost like holding, ordering and stock out (demurrage cost); reduced loading and unloading cost as well as loss and damage cost items a means of 4.13, 4.17, 4.00, 3.55 and 3.57 and a mean average and standard

deviation of 3.78 and .787 respectively. Maintenance cost maximizes the logistics service cost affects in moderate extent with the mean of 3.2. This shows that the cost in the railways transport performance had great extent effect on the logistics performance.

The above finding shows that EDR has to identify areas of rail transportation cost to reply to special inquiry and work on those dimensions in order to improve the transportation which in turn improves the overall logistics performance efficiency resulting in improved organizational performance.

4.2.8 Speed/Time

Table 4.14: How speed/time of rail transport service affect the logistics performance?

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. EDR shorten time to deliver freight cargos and passengers	54	2	5	3.72	.738
2. Rail transport improve time of loading and unloading in freight yards	54	3	5	3.61	.627
3.Rail transport reduced lead time (time between order and delivery) in import and export logistics activities	53	2	5	3.60	.768
4.Trains arrive in the stations at the needed time by the customer	54	2	5	3.20	.959
5.The train traveling time increased level of incidence of cargo damage occurrence	54	1	5	2.72	.998
6.Reducing Train travel time improves safety and security of cargos and passengers	54	2	5	3.78	.861
Average				3.4383333	0.8251667

Source: SPSS output, 2020

As show in Table 4.14, the majorities of respondents agreed that rail transport service speed affects logistics performance in moderate extent. This variable in items shorten time to deliver freight cargos and passengers; improve time of loading and unloading in freight yards; reduced

lead time (time between order and delivery) in import and export logistics activities; and Reducing Train travel time improves safety and security of cargos and passengers score a mean of 3.72, 3.61, 3.6 and 3.78respectively. Trains arrive in the stations at the needed time by the customer and the train traveling time increased level of incidence of cargo damage occurrence score a mean of 3.2 and 2.78 respectively. In total a mean average and standard deviation of 3.43 and .861 respectively. This shows that speed in railways transport had moderate extent effect on logistics performance.

Based on interview with the management the following major challenges were encountered in the year 2019 in relation to operation activities: A major accident the company faced on April 4th of 2019 hugely affected its operational achievement; frequent power outages impeding the transport operation process; Container loading and unloading operations at DCT Port and Modjo dry port are taking too long time; Frequent accident on animals and people; theft and vandalism acts committed by the local people; insufficiency of wagons to transport containers becomes a problem; Even if the demand for transportation of wheat, fertilizer and cement continues to rise, EDR has only three sets of box train that can be put into transport, which is far from meeting the needs for transporting the above goods. ERC still didn't hand over the rest of the wagons to EDR; the capacity of freight yards, particularly Indode freight yard, and necessary equipments are not enough to increase the cargo volume around Addis Ababa; since most of the passenger stations are far from the urban area allocation of public transportation is mandatory. However the allocation of public transportation services to passenger stations like Lebu, Adama and Diredawa stations is not finalized yet. When the line has the capacity to handle the train speed for passenger 100-120km per hour and 80-100km per hour, the current situation of train operation speed is 50-60km per hour because the line is not closed and due to availability of several level crossings (More than 300 designed and undersigned). Thus people and livestock frequently cross the line and EDR has been forced to reduce the speed to avoid the hitting of animals.

Some flat wagons are forced to travel from Djibouti to Modjo empty due to reasons like document problems and mismatches, deformed container holes, seal damage… (On average one flat wagon is forced to travel empty in a single trip making the company lose a lot of revenue in the process).

4.3 Relationship of Rail Transport service and Logistics Performance

This section consists of correlation and regression analysis. The details are presented as follows.

4.3.1 Correlation analysis

Correlation analysis was done to achieve the study specific objectives which were to establish the effect of rail transport service in terms of six dimensions of the logistics performance index such as Customs; Infrastructure; easy of arranging competitively priced shipment; competence and quality of logistics service; Tracking and tracing; and Timeliness. The study addresses how much six dimensions of world bank LPI's in the rail transportation service affects logistics performance in relation with speed and cost at EDR. The findings are presented in Table 4.15.

Table 4.15 Correlation analysis

1) Correlation of the explanatory variables

Variables	No. of Items	Pearson Correlation	Customs	Infrastructure	Competitiveness	Quality and Competence	Track and Trace	Timeliness
Customs	5	Pearson Correlation	1					
		Sig. (2-tailed)						
Infrastructure	7	Pearson Correlation	.561**	1				
		Sig. (2-tailed)	.000					
Competitiveness	6	Pearson Correlation	.431**	.549**	1			
		Sig. (2-tailed)	.001	.000				
Quality and Competence	9	Pearson Correlation	.179	.464**	.711**	1		
		Sig. (2-tailed)	.196	.000	.000			
Track and Trace	5	Pearson Correlation	.255	.377**	.076	.460**	1	
		Sig. (2-tailed)	.063	.005	.585	.000		
Timeliness	6	Pearson Correlation	.544**	.720**	.290*	.473**	.675**	1
		Sig. (2-tailed)	.000	.000	.034	.000	.000	
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Source: SPSS output, 2020

Based on the above table the result of correlation matrix between each six logistics performance indexes in all variables there is both strong and weak relation between each other and with logistics performance.

As shown by Table 4:15, customs in rail transport has a significance effect on infrastructure with a correlation coefficients of .561**(r=0.561) and significance is 0.000; easy of arranging competitively priced shipment with a correlation coefficients of .431**(r=0.431) and significance is 0.001 and timeliness with a correlation coefficients of .544**(r=0.544) and significance is 0.000.However, customs in rail transport has an insignificance effect on quality and competence of logistics service with a correlation coefficients of .179(r=0.179) and significance is 0.196 and Tracking and tracing with a correlation coefficients of .255(r=0.255) and significance is 0.063. Globally, customs efficiency is one of the two lagging components of the LPI in World Bank report in 2014, especially in low-income and lower middle-income countries, even after they have made the fastest progress in this dimension (Arvis, et al., 2014).According to Temple (2001), a literature review depicts that the international supply chain generally faces at least two sets of customs procedures. So, a simplified and effective procedure is essential for smooth flow of trade cargo and for investment. If customs procedures do not allow deeper penetration of containers the flow is hampered and the Inland Container Depot (ICD) will be less effective. It will result in more transit time, transport cost and uncertain schedule reliability due to multiple handling of cargo.

The study established that infrastructure in rail transportation has a positive effect on Customs with a correlation coefficients of .561**(r=0.561) and significance is 0.000; easy of arranging competitively priced shipment with a correlation coefficients of .549**(r=0.549) and significance is 0.000; competence and quality of logistics service with a correlation coefficients of .464**(r=0.464) and significance is 0.000; Tracking and tracing with a correlation coefficients of .377**(r=0.377) and significance is 0.000; and Timeliness with a correlation coefficients of .720**(r=0.720) and significance is 0.000. This significance tells that there is genuine relationship between the others. This implies that increase of infrastructure will greatly affect logistics performance at EDR. There exists a strong positive relation between at country's LPI score and the quality of their freight transport related infrastructure, particularly their port and road quality (Celebi, et al., 2014). Keeping transport infrastructure in good condition and

providing the framework to develop physical infrastructure are core responsibilities of governments (OECD/ITF 2015). Brooks (2008) stated that, transportation infrastructures such as highways and railways can reduce distribution margins of the transportation cost in narrowing the gap between prices faced by producers and consumers, thereby facilitating better improvements for both; in general efficient transportation infrastructures lower transaction costs, raise value added, and increase potential profitability.

The findings revealed that easy of arranging competitively priced shipment has a positive and significance effect on Customs with a correlation coefficients of .431**(r=0.431) and significance is 0.001; infrastructure with a correlation coefficient of 0.549** and significance is 0.000; competence and quality of logistics service with a correlation coefficients of .711**(r=0.711) and significance is 0.000; and Timeliness with a correlation coefficients of .290*(r=0.290) and significance is 0.000 . However, Tracking and tracing with a correlation coefficients of 0.076 significance is 0.585 has negative and insignificant effect on easy of arranging competitively priced shipment in EDR. Transport cost affects productivity and efficiency improvements; for example, if passing lowered operating costs to transport users can increase the attractiveness of the transport mode and again be used to enhance the technologies and invest in rolling stock and the quality of rail transport services also affected by various factors such as journey time, reliability, frequency, flexibility and customer information (Brussels, 2014:42)

The findings also show that competence and quality of logistics service in rail transportation has a positive effect on rail infrastructure with a correlation coefficients of .464**(r=0.464) and significance is 0.000;easy of arranging competitively priced shipment with a correlation coefficients of .711**(r=0.711) and significance is 0.000; Tracking and tracing with a correlation coefficients of .460**(r=0.460) and significance is 0.000; and Timeliness with a correlation coefficients of .473**(r=0.473) and significance is 0.000. However, competence and quality of logistics service in rail transportation has a insignificant effect on Customs with a correlation coefficients of .179 (r=0.561) and significance is 0.196. This significance tells that there is genuine relationship between the others except customs. According to Fasil (2014) he examined the important quality indicator of rail freight transportation are Safety of cargoes during transportation, Regularity of cargo arrival, Just-in-time delivery, Security of carriages, Proper maintenance of the cargos and Availability of cargo handling equipment at loading points. This

implies that increase of competence and quality of logistics service will greatly affect logistics performance at EDR.

The findings also show that Tracking and tracing in rail transportation has a positive effect on rail infrastructure with a correlation coefficients of .377**(r=0.377) and significance is 0.005; competence and quality of logistics service with a correlation coefficients of .460**(r=0.460) and significance is 0.000; and Timeliness with a correlation coefficients of .675**(r=0.675) and significance is 0.000 . However, Tracking and tracing in rail transportation has a insignificant effect on Customs with a correlation coefficients of .255 (r=0.255) and significance is 0.063 and easy of arranging competitively priced shipment with a correlation coefficients of .076 (r=0.076) and significance is 0.585;. This significance tells that there is genuine relationship between the others except customs. This implies that increase of Tracking and tracing will greatly affect logistics performance at EDR except customs and easy of arranging competitively priced shipment.

The study established that timeliness in rail transportation has a positive effect on Customs with a correlation coefficients of .544**(r=0.544) and significance is 0.000; Infrastructure with a correlation coefficients of .720**(r=0.720) and significance is 0.000; easy of arranging competitively priced shipment with a correlation coefficients of .290*(r=0.290) and significance is 0.034; competence and quality of logistics service with a correlation coefficients of .473**(r=0.473) and significance is 0.000; and Tracking and tracing with a correlation coefficients of .675**(r=0.675) and significance is 0.000. This significance tells that there is genuine relationship between the others. This implies that increase of timeliness will greatly affect logistics performance at EDR.

4.3.2 Test on Multicollinearity

Table 4.16 when the dependent variable is Cost

Coefficients								
Model variables	No. of Items	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(Constant)		1.565	.365		4.292	.000		
Customs	5	-.323	.127	-.307	-2.544	.014	.464	2.155
Infrastructure	7	-.032	.142	-.032	-.225	.823	.335	2.989
Competitiveness	6	.105	.140	.128	.750	.457	.231	4.325
Quality and Competence	9	.546	.143	.636	3.827	.000	.245	4.090
Track and Trace	5	-.362	.104	-.446	-3.479	.001	.410	2.439
Timeliness	6	.573	.165	.579	3.475	.001	.243	4.115

Source: SPSS output, 2020

Based on the coefficient output on table 4.16.1 above multi co linearity statistics obtained VIF values of 2.155, 2.989, 4.325, 4.090, 2.439 & 4.115. This values lie between 1 and 10 reveling that there is no multicollinearity with in the data.

Table 4.17when the dependent variable Speed/Time

Coefficients								
Model variables	No. of Items	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(Constant)		.908	.356		2.555	.014		
Customs	5	.304	.124	.311	2.455	.018	.464	2.155
Infrastructure	7	.173	.138	.187	1.253	.216	.335	2.989
Competitiveness	6	-.076	.136	-.100	-.558	.579	.231	4.325
Quality and Competence	9	.674	.139	.844	4.839	.000	.245	4.090
Track and Trace	5	.029	.101	.039	.288	.775	.410	2.439
Timeliness	6	-.345	.161	-.376	-2.147	.037	.243	4.115

Source: SPSS output, 2020

Based on the coefficient output on table 4.17 above- multicollinearity statistics obtained VIF values of 2.155, 2.989, 4.325, 4.090, 2.439& 4.115. This values lie between 1 and 10 reveling that there is no multicollinearity with in the data.

4.3.3 Relationship of rail transport service to logistics performance

The study sought to establish the relationship between rail transportation service and logistics performance. The researcher then conducted a regression analysis to explain this relationship using SPSS version 20. The results obtained are presented in Table 4.18.

Table 4.18 Regression-1: When the dependent variable is Cost

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.683	.642	.31035

Source: SPSS output, 2020

a. Predictors: (Constant), Timeliness, Competitiveness, Customs, Track and Trace, Infrastructure, Quality and Competence

The research findings R^2value of 0.683indicated that the explanatory variables explain 68.3% of the variations in the rail transport service and the logistics performance cost of EDR. The value of the adjusted R-squared 0.642 denotes that 64.2% of the variation in EDR's rail transportation and logistics service cost is explained by the by explanatory variables. The remaining 35.8 % can be explained by other variables which were not included in the model.

Table 4.19 ANOVAs

ANOVA[s]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	9.752	6	1.625	16.874	.000[b]
	Residual	4.527	47	.096		
	Total	14.278	53			

Source: SPSS output, 2020

a. Dependent Variable: Cost

b. Predictors: (Constant), Timeliness, Competitiveness, Customs, Track and Trace, Infrastructure, Quality and Competence

Based on the ANOVA statistics, the study proven that the regression model had a significance level of less than 0.001% which shows that its less than the value of significance (P-value) 0.05%; this indicating that the data was ideal for making a conclusion on the population parameters & showing that there is a high significance; which means that all logistics performance indexes identified have a highly significant effect on the logistics performance cost. This statistics also shows that the result is very highly unlikely to have occurred by chance alone.

4.4 Results of the regression analysis

Table 4.20 standardized and unstandardized coefficients cost

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.565	.365		4.292	.000
	Customs	-.323	.127	-.307	-2.544	.014
	Infrastructure	-.032	.142	-.032	-.225	.823
	Competitiveness	.105	.140	.128	.750	.457
	Quality and Competence	.546	.143	.636	3.827	.000
	Track and Trace	-.362	.104	-.446	-3.479	.001
	Timeliness	.573	.165	.579	3.475	.001

Source: SPSS output, 2020

Analysis of how the railways transportation affecting logistics performance cost.

1. Customs: The sign of the coefficient of customs service has negative relationship with logistics performance cost and statistically significant (t-ratio of 2.544). The coefficient indicated that one percent increase in customs service will decrease cost of logistics performance by 32.3%. It is evident that at 95% confidence levels that statistically significant (t-ratio 0.014). The major reasons are costly customs clearance process particularly the bureaucratic and luck of accountability of customs officers, poor technology, time consuming and poorly coordinated documentation process in Ethiopian customs and revenue authority (ERCA) have been exerting effort to improve their performance.

2. Infrastructure: The explanatory variable rail way infrastructure has negative relationship with logistics performance cost. The coefficient showed that one percent increase in infrastructure will decrease cost of rail transport and logistics service by 3.2 percent. However, it is statistically insignificant (t-ratio 0.225). The major reasons is massive capital investment was made to expand rail infrastructure service. In order to reduce transport cost the government should committee to make very large investment to further expand infrastructure service to strengthen the foundation for long term and sustained growth and development.

3. Competitive price of shipment: The explanatory variable easy of arranging competitive shipment price in rail way has positive relationship with logistics performance cost. The coefficient showed that one percent increase in shipment price will increase cost of rail transport and logistics performance by 10.5 percent. However, it is statistically insignificant (t-ratio 0.457). The World Bank study showed that higher inland transport cost adds more than a 2% production cost penalty and a 10 day delay, due to longer distance, in adequate transport infrastructure and luck of competition in the tracking industry.

4. Quality and competence: The explanatory variable rail way quality and competency of logistics service in railways transport has positive relationship with rail way transport and logistics performance cost. The coefficient showed that one percent increase in quality and competency of logistics service will increase cost of rail transport and logistics performance by 54.6 percent.it is evident that at 99% confidence levels that statistically significant (t-ratio 0.000). This imply that, improving railways transport service quality and competency

significantly reduce transport cost, increase safety and reliability, facilitate import and export trade and increase foreign direct investment.

5. Trucking and Tracing: The explanatory variable rail way tracking and tracing has negative relationship with rail way transport and logistics performance cost. The coefficient showed that one percent increase in tracking and tracing will decrease cost of rail transport and logistics performance by 36.2 percent. It is evident that at 99% confidence levels that statistically significant (t-ratio 0.001).

6. Timeliness: The explanatory variable rail way timeliness has positive relationship with rail way transport and logistics performance cost. The coefficient showed that one percent increase in timeliness will increase cost of rail transport and logistics performance by 57.3 percent. It is evident that at 99% confidence levels that statistically significant (t-ratio 0.001).

Table 4.21 Regression-2: When the dependent variable is Speed/Time

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806[a]	.650	.605	.30256

Source: SPSS output, 2020

a. Predictors: (Constant), Timeliness, Competitiveness, Customs, Track and Trace, Infrastructure, Quality and Competence

The research findings showed that there is a strong relationship (R2= 0.650) between rail transport service operation and the logistics performance speed at EDR.

The result of the study also indicates that the value of adjusted R-squared is 0.650 were this denotes that 65% of the alteration in EDR's logistics performance speed can be accounted for rail transportation service activities. The remaining 35 % can be explained by other variables which were not included in the model.

Table 4.22 ANOVA

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.995	6	1.332	14.556	.000[b]
	Residual	4.303	47	.092		
	Total	12.297	53			

Source: SPSS output, 2020

a. Dependent Variable: **Speed/Time**

b. Predictors: (Constant), Timeliness, Competitiveness, Customs, Track and Trace, Infrastructure, Quality and Competence

Based on the ANOVA statistics, the study proven that the regression model had a significance level of less than 0.001% which shows that its less than the value of significance (P-value) 0.05%; this indicating that the data was ideal for making a conclusion on the population parameters & showing that there is a high significance; which means that all railways transport service LPI's identified have a highly significant effect on the logistics performance speed of EDR. This statistics also shows that the result is very highly unlikely to have occurred by chance alone.

Table 4.23 standardized and unstandardized coefficients speed

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.908	.356		2.555	.014
	Customs	.304	.124	.311	2.455	.018
	Infrastructure	.173	.138	.187	1.253	.216

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	Competitiveness	-.076	.136	-.100	-.558	.579
	Quality and Competence	.674	.139	.844	4.839	.000
	Track and Trace	.029	.101	.039	.288	.775
	Timeliness	-.345	.161	-.376	-2.147	.037

Source: SPSS output, 2020

a. Dependent Variable: Speed/Time

Analysis of how the railways transportation service affecting logistics performance speed.

1. Customs: The sign of the coefficient of customs service has positive relationship with logistics performance speed and statistically significant (t-ratio of 2.455). The coefficient indicated that one percent increase in customs service will increase speed of logistics performance by 30.4%. It is evident that at 95% confidence levels that statistically significant (t-ratio 0.018).

2. Infrastructure: The explanatory variable rail way infrastructure has positive relationship with logistics performance speed (t-ratio of 1.253). The coefficient showed that one percent increase in infrastructure will increase speed of logistics performance by 17.3 percent. However, it is statistically insignificant (t-ratio 0.216).

3. Competitive price of shipment: The explanatory variable easy of arranging competitive shipment price in railways transport has negative relationship with logistics performance speed. The coefficient showed that one percent increase in shipment price will decrease speed of rail transport and logistics performance by 7.5 percent. However, it is statistically insignificant (t-ratio 0.579).

4. Quality and competence: The explanatory variable quality and competency of logistics service in railways transport has positive relationship with rail way transport and logistics performance speed (t-ratio of 4.839). The coefficient showed that one percent increase in quality and competency of logistics service will increase speed of logistics performance by 67.4 percent. It is evident that at 99% confidence levels that statistically significant (t-ratio 0.000).

5. Trucking and Tracing: The explanatory variable tracking and tracing in railways transport has positive relationship with rail way transport and logistics performance speed. The coefficient showed that one percent increase in tracking and tracing will increase speed of logistics performance by 2.9 percent. However, it is evident that statistically insignificant (t-ratio 0.775).

6. Timeliness: The explanatory variable timeliness railways transport has negative relationship with logistics performance speed. The coefficient showed that one percent increase in timeliness will decrease logistics performance by 34.5 percent. It is evident that statistically significant (t-ratio 0.037).

Chapter Five

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

As discussed in the previous chapters this study was conducted to assess factors affecting rail transportation service on logistics performance using six dimensions of the World Bank LPI. The six dimensions used are customs clearance, infrastructure, easy arranging competitive shipment price, quality and competency of logistics activity, tracking and tracing; and timeliness. The operations attributed to these logistics performances are cost and speed. The study adopted more the descriptive and explanatory research design in obtaining information about the study topic. The study's population comprised of EDR local staffs which were selected in stratified sampling techniques approach. The data was collected using questionnaire and interview using descriptive and inferential statics of explanatory analysis. The findings obtained are summarized below as per the study's specific objectives.

From the previous chapter, based on the statics the correlation analysis, it show that rail transport service have statistically significant effect on the logistics performance cost. It is evident that at 95% confidence level that the independent variables of customs; competence and quality of logistics service; Track and Trace & timeliness are highly significant. However, Infrastructure; and easy of arranging competitively priced shipment has negative effect on the logistics performance cost and is highly insignificant. The regression analysis further showed that that 64.2% of the alteration in EDR's rail transportation service affects logistics performance cost.

On the other hand, it is evident that at 95% confidence level that the independent variables of customs, quality and competency of logistics activities, trucking and tracing activities & timeliness activities have positive effect on the logistics performance speed and are highly significant .The insignificant effect was conveyed for infrastructure and easy arranging competitive shipment price activities. The regression analysis showed that65% of the alteration in EDR's rail transportation service activities affects logistics performance speed.

5.2 RECOMMENDATION

Based on the results of the study, the following recommendations are suggested for consideration

- It is therefore recommended that the EDR will improve customs activity to provide high quality services that will enable them achieve the desire objectives. As it is recommended by World Bank 2016, Customs and other border agencies, including improvements of transit regimes, represent areas where companies can adopt comprehensive reforms. They need the support of a modernized system from the customs authority. EDR should have to implement simplified and transparent customs procedure and also create awareness's of customs rules and procedure of the system in cooperation with ERCA
- As it was indicated on the World Bank study, improving human resources are a key factor when it comes to competence and quality of logistics services. In order to achieving logistics excellence in EDR, it requires continuous improvement in service quality and competency of logistics services.
- Even if EDR's applying the Chinese "freight Transport system" which is IT based Technology installed along the line, they need to implement further IT and EDI e-system in areas of tracking and tracing logistics activities. Logistics players were highly depending on the information technology (IT) and electronic data interchange (Ali et al., 2008). Raus et al (2009) highlight that the usage of IT and EDI could prevent criminal activities, informal payments and improve cost efficiency. Therefore, I strongly recommend EDR to implement new information system in e-payment and e-ticketing services
- With Timeliness of transport, the rail transportation service is still developing, there are positive changes in the past few years. As compared to road transport, the rail transport decreased waiting time at border crossing and lower the demurrage cost of transport. However, the time can be more reduced if the customs can be handled at the start of the route. On the other hand, increasing speed causes accidents because there is no sufficient level crossing and lack of social awareness. This causes a lot of animal accident along the route which causes additional cost for the company. Therefore, reducing the speed allows drivers to easily stop the train and which intern minimizes accident. EDR need to create social awareness in order to ensure timely delivery of shipment to designated destination.

By adopting these recommendations, EDR can improve rail transportation service delivery for its customers, becoming the efficient, reliable and effective rail transport service provider in Ethiopia and improve the logistics performance level of the country in the global economy scale.

5.3 Suggestion for future studies

Based on the experience gained in the research the researcher suggests further studies can be made using variables with large samples including the trainees of the management contract. Further analysis should be conducted using secondary data of railways transport cost and speed. The cost which includes labor cost idle time, inventory and warehouse cost and operating costs. Speed of passengers and freight cargo transport and reliability of the railways logistics service.

References

Ali, R., Jaafar, H. S., & Mohamad, S. (2008). Logistics and Supply Chain in Malaysia: Issues and Challenges. In *Malaysian Universities Transport Research Forum Conference (MUTRC08)* (Vol. 2008,). Johor

Arvis, J.- F.et al., 2014. Connecting to Compete 2014: Trade logistics in the global economy: the logistics performance index and its indicators. s.l.:The World Bank.

Arvis, J., Saslavsky, D., L.Ojala, Shepherd, B., Busch, C., & Raj, A. (2014). The Logistics Performance Index and Its Indicators. Washington; The World Bank.

Banomyong, R., &Supatn, N. (2011). Developing a supply chain performance tool for SMEs in Thailand. *Supply Chain Management: An International Journal*, *16*(1),

Batista, L. (2012). Translating trade and transport facilitation into strategic operations performance objectives. *Supply Chain Management: An International Journal*, *17*(2),

Bernard A, (2019), The Rail Freight Challenge for Emerging Economies How to Regain Modal Share International Development In Focus

Brooks, D. H. (2008). Linking Asia's Trade, Logistics, and Infrastructure. ADBI Working Paper 128. Tokyo: Asian Development Bank Institute. URL: http://www.adbi.org/working

Chow, G., Heaver, T. D., &Henriksson, L. E. (1993). Logistics Performance: Definition and Measurement. International Journal of Physical Distribution & Logistics Management, 24(1),

Debora A. (2017), "An Assessment of Logistics Performance of Ethiopian Electric Power", AAU

De Leeuw, S. and van den Berg, J. P. (2011) Improving operational performance by influencing shop floor behavior via performance management practices. Journal of Operations Management 29 (3),

DecisionTek and Economic Development Research Group (2012). The Comprehensive Costs of Highway-Rail At-Grade Crossing Crashes, NCHRP Project 8-85, National Cooperative Highway Research Program, Transportation Research Board.

EmebetZ. (2016) The effects of use of rental vihcles on logistics performance School of commerce Department of Logistics and Supply Chain Management

Ethiopian Railways Corporation, unpublished 2017/2018 report.

Ernest M. (2016), operations performance objective and customes retention of moter vehicles dealers in Kenya

Fadil H. (2017) Assessment of logistics management practice : in a case of public service transport. AAU

FasilT. (2014), Development of Service Quality indicator for Ethiopian freight railway

FetihaS, (2018) Assessment of the effect of third-party logistics service providers operation on their performance using logistics performance index, AAU

Fielding, N. G. (2012) Triangulation and Mixed Methods Designs: Data Integration with New Research Technologies. Journal of Mixed Methods Research 6 (2).

Foolchand, P. (2006). An Investigation into the Efficiency of the Port / Rail Interface at the Port of Durban. South Africa.

González-Benito, J. (2010) Supply strategy and business performance: An analysis based on the relative importance assigned to generic competitive objectives. International Journal of Operations and Production Management 30 (8).

Griffis, S.E., Cooper, M., Goldsby, T.J. and Closs, D.J., 2004. Performance measurement: measure selection based upon firm goals and information reporting needs. Journal of Business Logistics, 25(2), pp.95-118.

Habtamu G.(2017) Analyze factors influencing passengers satisfaction in Addis Ababa City Light Rail Transit service

He, Y., Sun, H., Ni, W. and Ng, S. C. H. (2017) Re-examining the effects of supplier integration on operations performance: a relational view. International Journal of Operations and Production Management 37 (12).

IJEDR (2018) International Journal of Engineering Development and Research (www.ijedr.org)

Koufteros, X., Verghese, A. and Lucianetti, L. (2014) The effect of performance measurement systems on firm performance: A cross-sectional and a longitudinal study. Journal of Operations Management 32 (6).

Kunadhamraks, P., & Hanaoka, S. (2008). Evaluating the logistics performance of intermodal transportation in Thailand. *Asia Pacific Journal of Marketing and Logistics*, *20*(3),

Ling, C. S., Goh, G. M., &Desouza, R. (2008). Trade Facilitation in Logistics Services: Some Evidence from an Express Delivery Service Provider. In International Conference on Service Systems and Service Management. Melbourne. doi:10.1109/ICSSSM.2008.

Mentzer, J. T., &Konrad, B. P. (1991). An efficiency/effectiveness approach to logistics performance analysis. Journal of Business Logistics, 12(1),

MohdAzlan Abu Bakar1, HarlinaSuzana J.Nasruddin F., Azlina M.Journal of Logistics Performance Measurement, Malaysia Institute of Transport, UniversityTeknologi MALAYSIA

Nathanael C. (2015) Assessment of Freight Transport and Transportation Infrastructures along International Trade Route the Case of China – Djibouti – Ethiopia, Addis Ababa University Institute Of Technology

Neely, A., Gregory, M., &Platts, K. (2005). Performance measurement system design: A literature review and research agenda. International Journal of Operations & Production Management, 25(12).

OECD and World Bank. (2015) Inclusive Global Value Chains: Policy options in trade and complementary areas for GVC Integration by small and medium enterprises and low-income developing countries. Paris and Washington, DC: OECD and World Bank

Ogendo, J. L. (2017) Emerging economy MNEs: exploring the integration of knowledge transfer and strategy for sustainable performance. Basingstoke, Palgrave Macmillan.

Otsuki, T., Honda, K., & Wilson, J. S. (2013). Trade facilitation in South Asia. South Asian Journal of Global Business Research, 2(2), 172–190. doi:10.1108/SAJGBR-12-2011-0052

Raus, M., Flügge, B., &Boutellier, R. (2009). Electronic customs innovation: An improvement of governmental infrastructures. *Government Information Quarterly*, *26*(2), 246–256. doi: 10.1016/j.giq.2008.11.008

Rail Transport Regulation*Javier CamposUniversity of Las Palmas (Spain)

SelamawitH. (2017) Assessment of the performance of Multimodal Transport Service in Ethiopian Shipping and Logistics Service Enterprise, Addis Ababa University School of Commerce

Shankar &venkatesh (2001) integrating demand and supply chain management, supply chain management review. 7/8/

Shirley, C., & Winston, C. (2004). Firm Inventory Behaviour and the Returns from Highway Infrastructure Investments. Journal of Urban Economics , 55, 398-415.

Slack, N., Brandon-Jones, A. and Johnston, R. (2016) Operations management. Eighth edition. Upper Saddle River: Pearson.

Temple, F.T. (2003), Reforms and Socio-Economic Performance in Bangladesh, in the seminar on Accelerating Growth & Poverty Reduction in Bangladesh Organized by Dhaka University and World Bank, Dhaka.

Tong, X., Lai, K.-h., Zhu, Q., Zhao, S., Chen, J. and Cheng, T. C. E. (2018) Multinational enterprise buyers' choices for extending corporate social responsibility practices to suppliers in emerging countries: A multi-method study. Journal of Operations Management.

Upadhaya, B., Munir, R. and Blount, Y. (2014) Association between performance measurement systems and organizational effectiveness. International Journal of Operations & Production Management 34 (7), 853-875.

Wen Long Yue on 14 July 2014., (2014) The role of railway transport in designing a pro ecological transport system

Weisbrod, Glen and Stephen Fitzroy (2011). Traffic Congestion Effects on Supply Chains: Accounting for Behavioral Elements in Planning and Economic Impact Models , in SandaRenko, ed, Supply Chain Management - New Perspectives", InTech Publishers.

Yu, K., Cadeaux, J. and Luo, B. N. (2015) Operational flexibility: Review and meta-analysis. International Journal of Production Economics 169, 190-202.

Annexes

Annex 1 questionnaire's

Appendix 1: Structured Questionnaire

Addis Ababa University
Master of logistics and supply chain management

Dear respondent,

This questionnaire is designed to collect information from Rail transport service providers and stakeholders and aimed to analyze ***"Effects of rail transport service on logistics performance"*** as a research subject for the partial fulfillment of the requirements of Master in logistics and supply chain management (LSCM). ***Your response would have been used only for academic purpose and kept confidential.***

General Instructions

- There is no need of writing your name
- Where answer options are available please circle in the appropriate number for part I and tick (√) for your response to each statements of part II.
- Please answer ALL the questions.

Thank you for taking your time to share the insight with me.

Yours faithfully,

Getu Regassa
Addis Ababa University School of Commerce
Tel: 0913038638 Email: geturagassa2000@yahoo.com

Part One: Respondent characteristics***:***

1. **Sex**: 1. Male ☐ 2. Female ☐
2. **Age**: 1. 20-30 ☐ 2. 31-40 ☐ 3. 41-50 ☐ 4. 51-60 ☐ 5. Above 60 ☐
3. **Educational status:**
   1. Certificate ☐ 2. Diploma/TVET ☐ 3. Degree ☐ 4. Master and above ☐
4. **Position:**
   1. Director/chief officer ☐ 2. Section manager ☐ 3. Team leader ☐ 4 .Expe ☐ 5.Others ☐
5. **Average monthly income level in Birr:**

1. Below2000 ☐ 2. 2001-3000 ☐ 3. 3001-4000 ☐ 4. 4001-5000 ☐ 5. Above5000 ☐

6. How long have you been working in the railways company?

1. 1-5 Years ☐ 2. 6-10 years ☐ 3. 11yearsand above ☐

Part two: Effect of rail transportation service on logistics performance

questions: In determining the extent to which your organization affect logistics performance, please indicate to what extent your organization practices the following on a scale of 1 – 5 (where**; 1=very small extent, 2= small extent, 3=Moderate, 4= great extent, 5= very great extant)**

7. SECTION B: How customs in rail transport service affectthe logistics performance in EDR

To what extent does a custom in your organization affect the logistics performance?	1	2	3	4	5
1. Customs in rail transport increased utilization of computerized and automated clearance systems "ASYCUDA++"					
2. The clearance team or functional unit is independently organized to Coordinate activities of customs to allow the customers to get efficient services					
3. Border customs department and functional unit is adequately staffed with skilled personnel & facilities to deliver fast and quality services					
4. Clearly articulated customs guideline is in place to secure all necessary documents from customer before starting clearance process					
5. Customs in rail transport service promote cross-border cooperation in monitoring and clearing cargo					
Any other (Please specify) ……					

8. SECTION C: How rail transport infrastructure affects the logistics performance in EDR

How rail transport infrastructure affects logistics performance?	1	2	3	4	5
1. Rail transport infrastructure improves import & export in the domestic freight yards.					
2. Rail transport improves sufficient hinterland connection for intermodal transports.					
3. Adequate number of rolling stocks are available to support the rail transport operation such as locomotives, wagons, etc					
4. Rail transport infrastructures are well equipped with the necessary equipment and facilities such as railway communication signaling, mechanical and electrical equipment, IT system and other.					

How rail transport infrastructure affects logistics performance?	1	2	3	4	5
5. Rail transport infrastructure is accessible to sufficient fright yards and dry ports.					
6. Rail transport has sufficient link roads to access train station.					
7. Rail transports are equipped with sufficient electric energy supply for the service.					
Any other (Please specify					

9. SECTION D: How the ease of arranging competitively priced shipments in rail transport affects the logistics performance?

How the ease of arranging competitively priced shipments in rail transport affects the logistics performance?	1	2	3	4	5
1. Rail transport easy shipment provides services at increasingly competitive prices &reduces service barriers in the logistics sector.					
2. Rail transport shipment reduced costs of passengers and cargo transport to support logistics activities as compared to other modes.					
3. Rail transport competitive shipment price facilitates the movement of passengers & cargos within the country.					
4. The less cost of loaded and empty container cargo as compared with other modes of transport.					
5. Rail transportation service price stimulates multi-modal (intermodal) transport activities.					
6. Rail transport shipment price is competitive in comparison with other modes of transport in the market (road & Air).					
Any other (Please specify					

10. SECTION E: How service quality &competences of logistics service in rail transport affect logistics performance in EDR?

How service quality &competences of logistics service in rail transport affect logistics performance in EDR?	1	2	3	4	5
1. There is enough skill and expertise in the company to operate Rail transport systems as transport operator.					
2. The company uses proper queue management system to serve customers at the reception to minimize waiting time.					
3. Rail transportation service quotations are delivered to customers in standard time.					
4. Customers are informed in time in case of any supplementary work related to any change on schedule.					
5. In the company employees respond to customer enquiries in time.					
6. The company ensures that maintenances and line check up are made in time to ensure safety and security.					

How service quality &competences of logistics service in rail transport affect logistics performance in EDR?	1	2	3	4	5
7. Competency of rail transport allows increased scale of logistics service providers.					
8. Rail transport logistics service competency encourages integration of logistics services for import & export trade.					
9. Rail transport logistics service introduces modern supply chain management techniques such as increasing the reliability in online ticketing system & Targeting a new market niche.					
Any other (Please specify)					

11. SECTION F: How tracking and tracing in a rail transport affect the logistic performance in EDR?

How tracking and tracing in a rail transport affect the logistic performance in EDR?	1	2	3	4	5
1. Rail transport improved information and communications technologies (ICT) to support logistics activities.					
2. Rail transportation service implemented utilization of tracking and monitoring systems.					
3. Rail transport introduces online systems (internet) for real time clearance monitoring.					
4. Rail transport introduces e-government services and e-signatures for government approvals.					
5. Rail transport service introduced public information platforms for sharing trade and logistics data.					
Any other (Please specify)					

12. SECTION G: How timeliness in rail transport service affect the logistics performance?

How timeliness of rail transport service affect the logistics performance?	1	2	3	4	5
1. Rail transport service simplify operations which cause delays in transportation;					
2. Rail transport service decrease variability of transport and handling times.					
3. Rail transport service decrease waiting times in border crossings.					
4. Rail transportation services shorten operations required for border crossings.					
5. Rail transportation services improve management of handling perishable goods operations in freight yards.					
6. Rail transport service increase efficiency of logistics performance by novel management practices.					
Any other (Please specify)					

13. SECTION H: How costs of rail transport service affect the logistics performance?

How costs of rail transport service affect the logistics performance?	1	2	3	4	5
1. Rail transport minimized the transportation cost per unit in import and export process					
2. Rail transport is cheaper than other modes of transport					
3. The capital investment into rail transport add more value to the logistics activities					
4. Rail transport Maintenance cost maximize the logistics service cost					
5. Rail transport minimize the overall total inventory cost like holding, ordering and stock out					
6. Rail transport reduced loading and unloading cost as well as loss and damage cost					
Any other (Please specify)					

14. SECTION I: How speed/time of rail transport service affect the logistics performance?

How speed/time of rail transport service affect the logistics performance?	1	2	3	4	5
1. EDR shorten time to deliver freight cargos and passengers					
2. Rail transport improve time of loading and unloading in freight yards					
3. rail transport reduced lead time (time between order and delivery) in import and export logistics activities					
4. Trains arrive in the stations at the needed time by the customer					
5. The train traveling time increased level of incidence of cargo damage occurrence					
6. Reducing Train travel time improves safety and security of cargos and passengers					
Any other (Please specify)					

END

THANK YOU FOR YOUR INPUT AND COOPERATION!!!

Appendix 2:

Key informant interview questions with the top managers of Ethio- Djibouti Railways

1. How do you evaluate your company's logistics performance in respect to customs; infrastructure; competitive shipment price; quality and competence of logistics activity; tracking and tracing and timeliness?
2. What are the major problems in the current logistics practices in EDR?
3. What is included in your total logistics costs?
4. What type of technology EDR apply recently to improve its logistics performance?
5. How do you measure rail transport service time as compared to the company's standard and as compared with other modes of transport?

Annex 2- Anti plagiarism report

Document: REVISED - FORMATED.docx [D73828722]

IMPORTANT!

The analysis contains 1 warning(s). About 20% of this document consists of text similar to text found in 70 sources. The largest marking is 264 words long and is 96% similar to its primary source. PLEASE NOTE that the above figures do not automatically mean that there is plagiarism in the document. There may be good reasons as to why parts of a text also appear in other sources. For a reasonable suspicion of academic dishonesty to present itself, the analysis, possibly found sources and the original document need to be examined closely.

Click here to open the analysis: https://secure.urkund.com/view/71263655-983136-167871

Click here to download the document: https://secure.urkund.com/archive/download/73828722-849209-364903