DETERMINANTS OF FREIGHT TRANSPORTATION PERFORMANCE: IN THE CASE OF ETHIO-DJIBOUTI RAILWAY TRANSPORT SHARE COMPANY (EDR)

By

Tewodrose Legesse

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, SCHOOL OF COMMERCE FOR PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTERS' OF ART IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Advisor: Busha Temesgen (PhD)

June 2022
Addis Ababa, Ethiopia

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APPROVED BY THE COMMITTEE OF EXAMINERS:

1. _____ _____

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   Internal Examiner Signature

4. _____ _____

   External Examiner Signature

DECLARATION

This thesis is to certify that Tewodrose Legesse Molla has carried out his research work on the topic entitled, ‘’Determinants of freight transportation performance in the case of Ethio-Djibouti railway transport share company (EDR)’’. I conducted this research on my own with the guidance and full support of my advisor Bush Temesgen (PhD). All sources of the materials utilized in this study have been appropriately acknowledged, and it has not been presented for consideration by any other university or program.

Tewodrose Legesse Molla

Signature ----------

Date ----------

CONFIRMATION

This is to certify that Tewodrose Legesse Molla has carried out this thesis on the topic entitled ‘’ Determinants of freight transportation performance in the case of Ethio-Djibouti railway transport share company (EDR)’’. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for partial fulfilment of the requirements for the award of the degree of Master in Logistics and Supply Chain Management.

Busha Temesgen (PhD)

Signature ----------

Date ----------

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I would like to be thankful to the Almighty God for giving me the patience, strength, and dedication to endure the challenges in life. Everything he has done for me is considerably more amazing, incomprehensible, and unthinkable. So, from the bottom of my heart, I'd like to express my gratitude. Thank you very much.

I want to express my sincere gratitude to my adviser, Busha Temesgen (PhD), for his patience, enthusiasm, motivation, encouragement, and enormous knowledge and expertise in a variety of fields. Without his consistent direction and committed engagement throughout the proposal, this paper would not have been completed. You have allowed me total freedom to do this research using my personal and professional experiences. Working with him is a great honour for me.

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LIST OF ABBREVIATION AND ACRONYMS

EDR	Ethio-Djibouti Railway Transport Share Company
ITT	In Transit Time
KPIs	Key Performance Indicators
NT	Network Perspective Theory
OET	Order Entry Time
OPT	Order Processing Time
POP	Perfect Order Percentage
RB	Resource Based View Theory
RBV	Resource Based View
ServQaul	Quality of Service
TCE	Transaction Cost Economics
TCT	Transaction Cost Analysis Theory
WOCT	Warehouse Order Cycle

ABSTRACT

This study was carried out to examine determinants of freight transportation performance in the case of Ethio-Djibouti railway transport share company (EDR). Explanatory and descriptive research design was adopted for this study and the population was 272 employees from the case organization in Addis Ababa. The study attained 81 % of response rate and stratified sampling technique was embraced, with a structured questionnaire and interview checklist for data collection. Validity and Reliability of research instruments tests were conducted. Thus, the findings revealed that the most effect way to improve railway transport performance will be continual improvement and cost management. In addition, the level of railway transport performance was high due to better scheduling. Moreover, this study found that it needs a call for quality and cycle time improvements in surveyed organization. Further, this study revealed that for higher railway freight transport performance, the main determinant factor included technology, human factors, economic, accommodation, capacity, continual improvement, cost management, resource planning and accessibility. This study concluded that there is high level of freight transportation performance through effective utilization of technology, human factors, economic, accommodation, capacity, continual improvement, cost management, resource planning and accessibility. Thus, this study suggests that ERD provides high-quality information to serve Government, private and public industries, and the public in a manner that promotes public understanding. ERD periodically needs to review quality issues and adjusts its programs and processes to ensure continuous quality enhancement.

Keywords: Performance, Railway, Transport

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Performance is a wide-ranging concept which includes a number of aspects, such as availability, reliability and punctuality of fulfilling a given claim. It aims to produce objective, quantitative information of the performance of organisations that would support management, decision making and performance achievement (Menglei, 2016). In freight transport, performance is defined in different ways, for instance, traffic intensity, modal split, market diversity, operational efficiency, service quality and environmental impact to improve the performance of the freight transport system at all levels (Jaroslav, 2018). The key point here is that improved freight performance increases efficiency all along the supply chain and, therefore, increases the efficiency of manufacturers, distributors, and retailers. All the firms along the supply chain are constantly watching changing transport, labour, land, inventory, costs and other factors acting accordingly when they make business decisions (Laurence, Eric, and Daniel, 2015).

In railway freight, performance shows the capability of a railway system to fulfil their claim of transporting passengers and freight. Jaroslav (2018) demonstrated that benchmarking activities are important in assessing efficiency in rail systems because identify weaknesses and strengths. In addition, McKinnon (2015) distinguished that key parameters of freight transport that include spatial structure of the supply chain, freight model split, vehicle routing, and vehicle use, exposure to congestion, fuel efficiency and Co2 energy intensity. Corinne& Antje (2009) opined as the analysis of freight transport performance should be related to the industrial production system in which the transport service takes place. Freight transport performance indicators should encompass the global efficiency of flows of goods and information inside a production system. This helps to improve competitiveness and promote the expansion of businesses within their geographic region.

According to Laurence, et al., (2015), freight transportation performance can enhance productivity, quality, and cycle time as well as properly allocating transporters financial resources. Higher freight transportation performance that enables businesses to produce products with lower total

input costs will allow them to achieve a relative advantage against other firms who have higher costs. Reducing the total logistics costs associated with obtaining supplies and moving finished goods to market improves productivity by allowing businesses to produce more with fewer resources.

Thus, this study measured Ethio-Djibouti Railway (EDR) freight transport performance in terms of improving the efficiency of its businesses within a region provides a relative competitive advantage over firms located elsewhere. This is because improved freight transportation creates more competition for all businesses (across the supply chain) affected. Over the long run, this enhanced competition can also lead to greater efficiency as all market participants are compelled to innovate and lower costs in the presence of additional competitors. Alan (2015) claimed that railway systems are part of the social and economic system around the world, the railway freight transport performance of EDR. So, it specifically measured transportation performance in terms of productivity, quality, cycle time, user satisfaction, scheduling and finance requirements.

Since extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy, Ethio-Djibouti Railway (EDR) has been developed infrastructure to reduce the effect of distance between regions, integrating the national market and connecting it at low cost to markets in other countries and regions. EDR is a railway share company owned by Ethiopian and Djiboutian government. It established on December 2017 for operation and maintenance of railway line from Addis to Djibouti. Currently, it is under management contract with Chinese company for the operation and maintenance of the line.

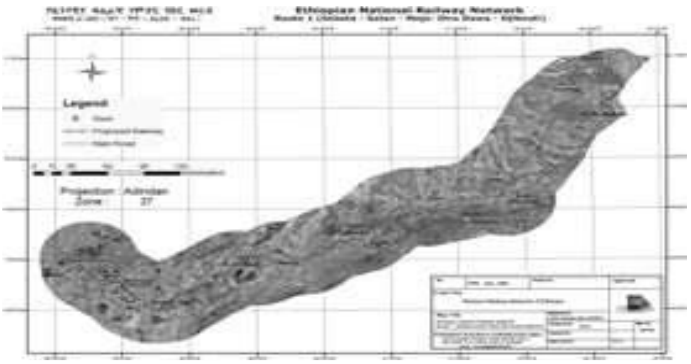


Figure 1 Addis Ababa – Djibouti Railway
(Source, EDR, Addis Ababa – Djibouti Railway, 2020)

1.2 Statement of the Problem

According to Gnap, Senko, Kostrzewski, Brídziková, Czo˝dörová and R˘íha (2021), global freight transport businesses have become sickening since over the last three years. On the contrary, it appears that the Ethio-Djibouti Railway is in the different boat. The Railway earned $26.3 million in the first half of 2020 by transporting 38,400 containers that contained 730,000tn of goods in 588 freight trains. 73,000tn of fertiliser was among the transported commodities (EDR, 2021).

According to World Bank railway transport practices (2020), EDR, thus far, has high fixed costs (particularly for infrastructure) and low variable costs. The Ethiopia-Djibouti railway line (with about 20 million tons travelling by road in the corridor) and the Nacala corridor in Mozambique and Malawi, which currently carries 12 million tons by rail, were designated as high-density traffic flows by the World Bank. This could be related to the fact that heavy traffic has a substantial impact on travel costs, transit time, mobility, accessibility, and productivity, as well as environmental impacts such as air pollution and global warming (Kontaxi and Riccia, 2012). Menglei (2016) also suggested that economic performance is usually analysed in terms of productivity, defined as the ratio between output (the volume of goods or services produced) and input (the volume of production factors).

Its logistics development project is least likely to wish to support to help overcome various logistical barriers because it has created rail transport delay chains, with far distance from train traffic on the Djibouti rail network side [network discrepancy mainly created by a 108 Km that far from the port of Djibouti to Ethiopian border, Dewale]. World Bank (2020) stated that the main negative impact of efficiency of railway corridor between Addis Ababa and Djibouti have remained as cost saving derived from short transit time and reduced uncertainty; infrastructure deficiency, road safety and lack of appropriate maintenance of infrastructure. However, EDR has focused solely on operational efficiency, particularly in respect to carrying capacity, capacity utilization, freight movement and freight volume (EDR, 2021). It leads to determined that supply chain and logistics concepts for measuring of railway transport performance evaluation that focused on efficiency and productivity measurements have been disregarded.

Karlygash, Serik, Madina and Alfonz (2018) argued that argued a simple procedure for estimating productivity growth based on an estimate of the cost function. They confirmed that the process of deregulation appeared to have a positive effect on the rate of productivity growth, as observed

through shifts in the estimated cost function. However, Laurence, et al., (2015) argued that the concept of the scale of the economy, human and technical changes are applicable only to the final boundary. In order to accept the possible existence of freight transport performance, the easy is way to include various factors including quality, cycle time, productivity, cost, scheduling and user satisfactions that affect the assessment of transport performance attainment, as they would be enthused in the presence of efficiency and effectiveness. It calls to combine different results of the transport performance, thus allowing them to take advantage of specialization for certain results. McKinnon (2015) illustrated that the various considerations of rail freight performance are influenced by key parameters of freight transport include longitudinal structure of the supply chain, quality, railway routing, railway usage, efficiency, customer satisfactions and cost.

Researches in respect to freight transportation performance of EDR have not been widely conducted. For example, Kalkidan (2017) evaluated freight transportation performance in relation to only delays. Going by the aforementioned facts, a good transporter cannot ignore the power and the role of effects of efficiency and competitiveness. As a result, it's critical to evaluate Ethiopia's railway freight transport performance, as well as the chances of enhancing freight transportation through productivity, quality, cycle time, user satisfaction, scheduling and finance. As a result, the goal of this research is to assess the determinants of freight transportation performance of the Ethio-Djibouti Railway Transport Share Company (EDR).

1.3 Objective of the Study

1.3.1 General Objective

- To find out the determinant factors that affect freight Transportation performance of Ethio-Djibouti Railway Transport Share Company/EDR/

1.3.2 Specific Objectives

- To investigate the level of effect productivity factors in terms of technology, human factors and economic have on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- To examine the level of effect quality factors in terms of accommodation has on affect freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

- To investigate the effect of cycle time factors cycle time embraces capacity and continual improvement on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- To examine the level of effect proper cost management in better financial actions has on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- To examine the effect of proper scheduling by better resource planning on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- To investigate the level of effect user satisfaction has on freight transport performance by accessibility has on of Ethio-Djibouti Railway Transport Share Company /EDR/

1.4 Hypothesis

- H_{1a} – Technology has a positive and significant effect on transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{1b} – Human Factors has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{1c}– Economic has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{2a} – Accommodation has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{3a} – Capacity has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{3b} – Continual improvement has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{4a} – Cost has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{5a} – Resource Planning has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- H_{6a} – Accessibility has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

1.5 Significant of the Study

Transport is critical for the economy. It creates opportunities for growth, generates jobs, and facilitates trade and realises economies of scale. Thus, this study signifies the theoretical as well as empirical studies which enhance the knowledge of railway freight transport performance that is a comprehensive concept which covers a number of aspects, such as availability, reliability and punctuality of fulfilling a given claim. Businesses and industry measure performance to assess and monitor their behaviour and to achive plans accordingly. A variety of performance measures have been applied in many management processes, such as strategic and operational management, human resources, organisational management, information systems, and marketing.

In addition, it will be beneficial for top management, employees, new researchers, policy makers, management contractors, importers and exporters, investors and all stakeholders of EDR. With an effective performance management system, the manager can maintain control over the organisation, and relevant parties can monitor and make sure the organisation produces the desired results. In general, it enhances Ethiopian and Djiboutian competitiveness by improving connectivity across local, regional and national areas. This study can provide information to EDR on how their freight transport is efficient and productive and can be of help to identify which transport performance will be appropriate to be effective. It can be beneficial for leaders to understand which transport performance and its impacts on competitiveness for a better performance and the determinants of freight transportation in terms of productivity factors in terms of technology, human factors and economic; quality factors in terms of accommodation; cycle time factors cycle time embraces capacity and continual improvement; cost management in better financial actions; proper scheduling by better resource planning and user satisfaction by accessibility. It helps as a reference to similar companies in improving railway freight transportation.

In addition, the customer or the public will have better or improved railway freight transportation and services facilities and their transport requirements will be improved. The public will get better information about leading railway freight transportation services and their voice will be hard at large. This study also helps development planners and policy makers in designing appropriate policies for railway freight transportation services particularly. Finally, this study will be a significant attempt in future researches that related to promoting and improving railway freight

transportation service, enhancing customer requirements and their relationship to improve service and organization environment in Ethiopia. The study can fill the existing gap of the stark scarcity and shallow of scientific studies in the area. The study is also significant in putting baseline information to the next work as a springboard for researchers who would like to conduct detailed and comprehensive studies. The study will contribute to a better theoretical understanding on the improved railway freight transportation to provide excellent customer services towards transport service sector.

1.6 Scope of the Study

The study's scope included a geographic scope, a conceptual scope, a methodology scope, and a time scope. This study was limited to activities such as railway freight transport performance, productivity, and competitiveness in the specified geographic location and was conducted in Addis Ababa. This research had a conceptual scope on evaluating railway freight transport travel activity, which is critical for determining the costs and benefits of a transportation performance. The causal factors that affect productivity includes technology, human factors and economic; quality factors comprises accommodation, journey time and connectivity while cycle time embraces capacity, schedule flexibility and continual improvement. Finally, financial factors contains proper cost management while schedule and user satisfaction was measured by better resource planning and accessibility of Ethio-Djibouti Railway Transport Share Company /EDR/.

This study also had a methodological scope that relied on data from a limited sample of female and male EDR employees and managers who heavily involved in the study areas' sector. Employees from the middle, lower, and top levels of the EDR hierarchy, as well as top management, were interviewed for this study. Due to financial and time limits, employees from Djibouti and other Ethiopian cities such as Adamma and Dire Dawa were excluded from this study. Besides, this study used both descriptive and explanatory survey design in the course of researching both primary and secondary data were used. The study mainly limited to assessing the employee perception where the sample were obtained at a head quarter of the surveyed organization. In order to achieve the research objectives, a well-designed five point Likert scale questionnaire, and close ended questions were adapted and modified for this study. Finally, the time scope was cross sectional and this was conducted from January to June, 2022.

1.7 Terms Definitions

1.7.1 Terms Definitions

- **Transportation –** refer to all physical entities that aim at the mobility of persons and the movement of freight between an origin and a destination (Nicolas, 2016).
- **Performance -** defined in six performance criteria including transport intensity, Modal split, Market diversity, Operational efficiency, Service quality and Environmental impact (Alan, 2015).

1.7.2 Operational Definitions

- **Productivity**: as the ratio of outputs (such as tonne-kms or vehicle-kms) to inputs (such as fuel, vehicles or labour) in terms of customer response, logistics workforce, transportation capacity and supply productivity (Alan, 2015).
- **Quality –** the acceptable limits of deviation from the standard for an integrated set of activities as broad as logistics are complex tasks or railway transport improvement in terms of Perfect Order Percentage (POP) (Menglei, 2016).
- **Cycle Time –** related to quicker transit, loading, and unloading times translate into greater asset utilization, which translates into greater leveraging of the corporation's capital included railway transport improvement based on order entry time (OET), order processing time (OPT), warehouse order cycle time (WOCT), and in transit time (ITT) (Jaroslav, 2018).
- **Finance –** represents the receiving, the paying, and the management of transport wealth and railway transport enhancement in terms of value creation, revenue enhancement, capital consumption, and expense control (Menglei, 2016).
- **User Satisfaction** - is defined as and assumed to entail cognitive evaluation and an emotional reaction to the structure, process, and outcome of services
- **Scheduling -** is the process of planning a feasible timetable for each train path based on the available infrastructure.

1.8 Organization of the Study

The study may comprise five main chapters. Chapter one is dedicated to the general introduction covering the background of the study, the statement of the problem, the objectives, significance,

scope, limitations and how the research are organized. Chapter two is mainly concerned with the review of related literatures and gives a detailed explanation on railway performance, competitiveness and productivity. Chapter three provides the methodology that will be applied to achieve the research objectives including primary data and method of analysis. Chapter four covers the analysis and presentation of data. This chapter discusses the result obtained in accordance with the research questions.

CHAPTER TWO

RELATED LITERATURE REVIEW

2.1 Introduction

In accordance to the aim of the paper, this chapter is dedicated to present literatures found on the online web system and also some preliminary books as well. This chapter reviews literatures which are related to the subject matter of the study. From related literatures and other sources, important ideas related to railway transport, its performance, competitiveness and productivity and associated factors are amalgamated. Under these chapter characteristics of railway transport, its competitiveness, and productivity, related theories and transport performance will be discussed and presented in detail. Encompassing empirical reviews and results of some findings will be presented. Overall, this chapter provides a wider understanding of the concepts and variables of this study from previous research. Finally, conceptual framework of the study will be offered at the end of the chapter.

2.2 Theoretical Review

2.2.1 Definition and Concepts about Performance of Freight Transportation

Nicolas (2016) indicated that performance measurement wishes to produce objective, quantitative information of the performance of organisations that would support management, decision making and higher performance. People measure performance for a variety of reasons. The common purposes of performance measurement included evaluate how well the organisation works, control the behaviour of subordinates, manage budget, motivate staff, collaborators and stakeholders, promote the organisation, celebrate the accomplishments, learn the strength and weaknesses; and improve performance.

Menglei (2016) listed and mentioned several studies (Lan and Lin, 2005, Lan and Lin, 2006, Azadeh et al., 2008, Yu and Lin, 2008, Yu, 2008, Lundberg et al., 2009, Chiou et al., 2010) that have dealt with railway performance evaluation using system level. These researchers have involved in the evaluation of railway performance by assessing effectiveness and efficiency in the industry. The effectiveness and efficiency measure is one of the most popular performance

measurement strategies. Effectiveness is the system's ability to meet certain goals, while efficiency measures the relationship of the produced outputs to the resource inputs.

On other hand, Yiik, Vinh and Kum (2019) identified a number of effectiveness and efficiency definitions are used in the literature to assess performance. Among these, technical efficiency and technical effectiveness are the most recognised. Technical efficiency measures the transformation of inputs (lines, vehicle, labour, etc.) into outputs (passenger train kms, freight train kms), and technical effectiveness measures the relationship between inputs and consumed services (passenger kms, freight kms). Another definition showed about cost efficiency, service effectiveness, and cost effectiveness. Cost efficiency as the ratio of service outputs (vehicle hours, vehicle miles, capacity miles, service reliability) to service inputs (labour, capital, fuel), cost effectiveness as the ratio of service consumption (passengers, passenger miles, operating revenue) to inputs, and service effectiveness as the ratio of service consumption to service outputs. To recapitulate, in effectiveness and efficiency measures, the main objects include inputs: lines, vehicles, labour, energy, capital; outputs: passenger train kms, freight train kms, vehicle journeys, service reliability and consumptions: passenger kms, freight kms, passengers, revenue (Menglei, 2016).

Seo, Lee and Moon (2016) exclusively stated that performance is a wide-ranging concept which covers a number of aspects, such as availability, reliability and punctuality of fulfilling a given claim. Performance is applied to evaluate achievement plans by industry and businesses. A variety of performance measures have been applied in many management processes, such as strategic and operational management, human resources, organisational management, information systems, and marketing. With an effective performance management system, the manager can maintain control over the organisation, and relevant parties can monitor and make sure the organisation produces the desired results.

Performance achivement in logistics productivity were achieved by logisticians' real-time and broad access to demand, supply, inventory, and shipment information. Access to that information allowed logisticians to take advantage of powerful optimization tools for forecast optimization in inventory management, network and routing optimization in transportation, slotting optimization in warehouses, and so on (Yiik, et al. 2019). Optimized forecasts, transportation networks, routes, and warehouse layouts in turn yield lower inventory levels and less material handling throughout

the supply chain. Logistics activity describing is the first step in logistics master planning because it is in the initial stages of considering better performance to any activity that logisticians have the greatest opportunity for higher achievement and the lowest costs of making design changes (Seo, et al., 2016).

2.2.2 Performance Evaluation in Railway Industry

Performance in railway transport shows the capability of a railway system to fulfil their claim of transporting passengers and freight. Because of the complexity of railway systems, a lot of capacity and resources are not used efficiently. At the same time, many of the existing mainline railways are congested. There is a high demand for more train paths and services. For example, European railway companies face the challenge of accommodating the expected growth of transport demand while improving train punctuality (Kontaxi and Riccia, 2012). In general, performance management involves monitoring and in-depth examination of performance towards pre-established goals.

The objects have covered a great part of railway performance, yet there are still a lot of elements within the system that have not been considered. Menglei (2016) discussed as stakeholders often have high expectations towards many other elements, requiring less delays, more resilient timetables, connectivity, passenger comfort, etc. In particular, none of these effectiveness and efficiency measures has put enough attention on the requirements and demands from the market. This is due to the fact that performance measures are oriented from the position of infrastructure managers or government agencies. A method that takes in the demands of service providers and customers would become helpful to implement these performance measures.

2.2.3 Theories Related to the Study

2.2.3.1 Transaction Cost Analysis Theory (TCT)

Freema, (2015) noted that the TCT believes that any transaction between two partners creates specific costs; these costs are so-called transaction costs. They comprise research provider fees (or information costs); negotiating costs and concluding contracts, control costs of the management and the monitoring of the signed contract. Bonet (2012) states companies are perpetually questioning whether to "make or buy", i.e. choose to either manufacture themselves or buy from the market and they are looking for the most satisfactory organizational form. Several theoretical

frameworks tried to inform the decision of outsourcing. Among all theoretical corpus mobilized to justify logistics outsourcing, transaction cost theory (denoted TCT) is the most used. This theory signifies this study as it is relevant in providing understanding freight transport activities because they can refer to it to make effective cost decisions and TCT provides relevant insights in choosing transport way as corporate clients' requirements including governance structure.

2.2.3.2 Institutional Theory

Organizations concerned with the processes by which structures, routines, rules and norms become established as the guidelines for acceptable behaviour. They have established reverse logistics practices because of internal and external pressures. Organizations act in a way that fulfils both customer and legal requirement. Organizations are forced to conform to be perceived as more legitimate due to normative pressures such as customer requirements. They stated that pressures from these two parties influence the adoption of environmentally responsible behaviour (Laosirihongthong, Adebanjo, and Tan, 2013). Thus, this theory is helps to institutionalize transport practices because of internal and external pressures customer and legal requirement. It may take managerial decisions to adopt environmental management initiatives maybe influenced by three institutional mechanisms: normative, coercive and mimetic.

2.2.3.3 Agency Theory (AT)

The contract between the principal and the agent governs the relationship between the two parties, and the aim of the theory is to design a contract that can mitigate potential agency problems. This theory is involved in the separation of ownership and control of economic activities between the agent and the principal (Freeman, 2015). Accordingly, firms can use the AT theory to mitigate on logistics risks and achieve the optimal value of their services. The "most efficient contract" includes the right mix of behavioural and outcome-based incentives to motivate the agent to act in the interests of the principal. Because theory provides a useful tool to respond to transaction cost dilemmas through contractual and non-contractual remedies in logistics.

2.2.3.4 Network Perspective Theory (NT)

The performance of a firm depends not only on how efficiently it cooperates with its direct partners, but also on how well these partners cooperate with their own business partners in cooperative relationships. The firm's continuous interaction with other players becomes an important factor in the development of new resources. The network theory (NT) contributes

profoundly to an understanding of the dynamics of inter-organisational relations by emphasizing the importance of "personal chemistry" between the parties, the build-up of trust through positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes (Peter and Kennedy, 2014). This theory is very relevant for this study as Network theory is descriptive in nature and has primarily been applied in logistics and SCM to map activities, actors, and resources in a supply chain. Relationships combine the resources of two organizations to achieve more advantages than through individual efforts.

2.2.3.5 Resource Based View Theory (RBV)

The RBV considers a firm's core competence to be its ability to react quickly to situational changes and build further competencies or dynamic capabilities. Thus, this theory helps a firm's competitiveness that is associated with the configuration of resources and capabilities as the markets evolve. Outsourcing decisions are based on the idea of focusing on core competencies and outsourcing complementary competencies to external partners as Temesgen (2020) cited (Bonet, 2012). It has been continuously raised two influential theories in the study of outsourcing have been transaction cost economics (TCE) and the resource based view (RBV) of the firm in supply chain and logistics literature. This theory is relevant as firms are comprised of bundles of resources that give them a competitive advantage.

2.2.3.6 ServQaul - Quality of Service Framework

The Quality of Service framework is involved in providing a comprehensive framework that covers the main attributes of the railway system, which supports performance evaluation and monitoring. The concept of "quality of service" is used to represent the expectations towards the performance of railway systems, covering the factors affecting the network performance from the perspectives of all stakeholders, such as operators, timetable planners, infrastructure managers, passengers and the government. The framework combines the traditional performance measure of effectiveness and efficiency with the service quality assessment from the train operator and customer's perspective (Menglei, 2016). Thus, with the Quality of Service (QoS) framework, it is possible to reveal the relationship between the system elements with the overall performance. This shows the basic service characteristics such as reliability, punctuality, travel time, frequency,

comfort and cleanliness, information, fare level, safety, customer service and integration with other modes of transport are found to be important in the evaluation of service quality.

2.2.4 Railway Freight Transport Performance Measurement

Jaroslav (2018) compared that the operational efficiency of logistics centres based on key performance indicators in the Rail Baltic Growth Corridor (RBGC) Russia project. It was argued that modern approaches that evaluate key logistics indicators are limited by benchmarking methods and quantify productivity and efficiency in rail transport. Bougna & Crozet (2016) examined rail transport through various statistical methods. First, authors applied a stochastic distance function that assesses productive effectiveness and changes through multiple outputs in the rail sector. Moreover, they analysed the overall productivity factor for European rail transport. The results show that the average productivity increased year on year. Then, they test how liberalization of rail transport has an impact on productive efficiency. They found that tender improves productive efficiency, but free entry has a different impact. In other words, competition and liberalization do not affect efficiency in rail transport.

Lavy, Garcia, Scinto & Dixit (2014) emphasizes that key performance indicators (KPIs) are significant performance approach. Moreover, they clarify that the selection of relevant KPIs is important in relation to the planned objectives. Performance assessment can be improved by simulations that create multiple scenarios to future.

2.2.4.1 Transport Performance - Productivity

Karlygash, et al., (2018) argued in depth from the literature on productivity and efficiency applied to the railway sector, an outstanding study made by Caves, Christensen and Swanson (1980), who designated a simple procedure for estimating productivity growth based on an estimate of the cost function. The main conclusion was that the process of deregulation (beginning from 1980 with the use of Staggers Act) appeared to have a positive effect on the rate of productivity growth, as observed through shifts in the estimated cost function. The estimated performance growth rates are very sensitive to the specification of the cost function. Though, from a theoretical point of view, the concept of the scale of the economy and technical changes are appropriate only to the final boundary.

2.2.4.1.1 Technology

Jaroslav (2018) mentioned Lakshmanan and Andersen (2002) who recognised the most significant complex indicators of the efficiency of the logistics system. The basis of this – is the duration of the complete logistics cycle – the time for the execution of the customer's order. The use of this indicator (or its individual components) is conditioned by the requirements of the corporate strategy, if time is chosen as the main factor of increasing the competitiveness of the firm. The complex indicator – the productivity (efficiency) of the logistics system – is determined by the volumes of logistic work (services) performed by technical means, technological equipment or personnel involved in the logistics system, per unit time, or unit costs of resources in the logistics system.

- ✓ H_{1a} – Technology has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.1.2 Human factors

Jaroslav (2018) stated that performance measurement is quite common in the rail sector. Benchmarking activities are significant in assessing efficiency in rail systems because identify weaknesses and strengths. The design and operations of a railway system is supported by people. It is essential to consider the capability and the demands of the individuals involved in the system. There are number of human factors in the system, such as planners, dispatchers, drivers, passengers and third parties. Their behaviour introduces uncertainties into the operations. The operational management deals with short-term operations plans to support traffic management. The main contents are resource allocation: making rolling stock, crew and other resource plans to support new train schedules; and incident management: the movement of resources when faults and break-downs occur in the operation.

- ✓ H_{1b} – Human Factors has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.1.3 Economic

Productivity can be viewed as a driver and an indicator of net national economic impact (affecting economic growth net of business relocation effects). Productivity and competitiveness are intrinsically related, for productivity may be viewed as the ratio of [output produced per unit of input cost] and cost competitiveness is measured through the ratio of [input cost per unit of output produced] for a given industry in a region (Laurence, *et al.,* 2015). Better productivity leads to a higher standard of living. Consequently to consider how transportation improves competitiveness, they focused on measuring the impacts of transportation on productivity. Improving the productivity of businesses within a region provides a relative competitive advantage over firms located elsewhere. The focus on productivity gives us more precise economic terminology and a broader view of the benefits of a more efficient economy. "Competitiveness," was mostly used to mean the ability to compete with manufacturers in other countries. It was never precisely defined in economic terms; however, it is important to define competitiveness in clear economic terms so tthat it becomes measurable. It is also the case that thinking of economic performance only in terms of international competition is too narrow a concept (Laurence, et al., 2015).

- ✓ H_{1c}– Economic has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.2 Quality Performance

As per Peter and Kennedy (2014), in the case of scheduled services it is conceivable to access publicly-available data on service frequency and transit times to produce composite measures of average speed of delivery and punctuality. Several studies have inspected the range of metrics that can be used to measure the quality of rail freight services either across a complete network or on particular corridors. Measures of the quality of freight transport services have to be associated with some norm or benchmarked against similar data for other countries. Service quality is after all a relative concept. Supply-side metrics used to assess the quality of a country's freight transport system need to be accompanied by surveys of the perceptions companies using it. Freight transport variables, such as timeliness, track-and-trace and infrastructure feature very blatantly in this survey as they obviously have a strong influence on managers' rating of a country's overall logistics capability.

2.2.4.2.1 Accommodation (AC)

According to Menglei (2016), this is the rolling stock's maximum capacity to carry freight, in terms of available passenger seats and standing room, and available freight container volume subject to a permitted maximum tonnage. This KPI shows the capability of the services to provide train paths to customers. The Key Measures for this KPI included freight volume - the available freight container volume that can be moved in the defined area. For each individual service, its freight volume is calculated as the available freight container volume multiplied by the distance travelled. Accommodation is closely linked to the passenger km and tonne km which are used in the traditional effectiveness and efficiency measure. The passenger km and tonne km measures only consider the design capacity of each vehicle, whereas accommodation also considers the extra space on each carriage that can be used in practice.

- ✓ H_{2a} – Accommodation has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.3 Cycle Time

This study is more involved in freight transportation performance can serve this goal through several avenues. Railway freight transportation performance can reduce freight transit times, improve the reliability of freight shipments, and reduce the cost of freight transportation. Reduced transit times can allow businesses to access suppliers in a larger market region or sell their products into a larger market area. Performance achievement in the reliability of transit times can allow businesses to reduce inventory levels and rely more on just-in-time shipments, reducing their total logistics cost of production (Karlygash, et al., 2018).

2.2.4.3.1 Capacity

Strategic planning is concerned with strategic, fundamental policy decisions regarding the capability of the railway network to meet future demand. In this phase major investments and long-term planning are engaged such as construction of new lines, hiring and training new staff and amending operational rules. The time horizon is often several years. Through management of capacity and resources, strategic planning aims at delivering the sufficient structure of train services to meet market requirements.

- ✓ H_{3a} – Capacity has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.3.2 Continual Improvement

It is the quest for cycle time superiority is a never-ending process in which people are continuously working to improve the performance, speed and number of features of the product or service. Continuous improvement means that small, incremental improvement that occurs on a regular basis will eventually add up to vast improvement in quality. Enterprise must improve the quality of product and service continually and reduce the cost to make customer satisfactory. In supply chain circumstance, the pressure of continual improvement is more and more pressing because the market competition is more and more hard. Therefore, the continual, stable and harmonious ability of quality assurance can be established (Karlygash, et al., 2018).

- ✓ H_{3b} – Continual improvement has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.4 Finance

2.2.4.4.1 Cost

According to Laurence, *et al*., (2015), freight transportation performance that enable businesses to produce products with lower total input costs will allow them to achieve a relative advantage against other firms who have higher costs. Reducing the total logistics costs associated with obtaining supplies and moving finished goods to market improves productivity by allowing businesses to produce more with fewer resources. Access to low-cost suppliers can also reduce input costs. Businesses may either pass these savings on to consumers or retain them as profits, or some combination of these. If the savings are passed on to consumers through reduced prices, this may allow businesses to increase demand for their products, capture market share and expand production.

- ✓ H_{4a} – Cost has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.5 Schedule

Timetabling is the process of planning a feasible schedule for each train path based on the available infrastructure, with consideration of track, junctions, platforms, and the signalling system. Passengers, the government, infrastructure managers, timetable planners and train operation companies all require that the current operations be improved. Competition from other transportation modes is also urging the railways to adopt more effective strategies to improve their performance. A more efficient use of existing infrastructure is necessary. It is expected that better performance can be achieved with improved performance management strategies. Measuring and improving the performance of railway networks has thus become a main theme in railway planning and management (Bougna and Crozet, 2016).

Journey time is considered as the total practical consumed time for trains to complete their trips, without connections with other services. It is the actual time trains consume rather than the planned time in the timetable. With different traffic and driving conditions, the journey time of individual trains may vary a lot from the timetable. When assessing journey time, the total journey time of all services is not always helpful. It is worthwhile counting the sectional journey time (i.e. the total journey time of services when passing a defined section) or the journey time of specific services (e.g. fast trains). For example, when assessing the journey time of trains running on a large network, some busy sections can be picked out to be examined (Menglei, 2016).

- ✓ H_{5a} – Resource Planning has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.2.4.6 User Satisfaction

Connectivity shows the cargo interchange time between any two services at a given interchange. It is related to both the number of possible connections and connection times at the interchange station. Connection time is the timetabled time in seconds between a passenger/cargo arriving on the first service and departing on the second service. In practice, a minimum interchange time is defined to make the connection feasible for passenger/ cargo movement (Laurence, *et al.*, 2015). They stated that productivity and economic efficiency are the terms related with the total value of goods and services produced in relation to the resources required to produce them. Most of us are concerned with the quantity and the quality of goods produced with available resources. It is not

just the quantity of widgets being made; it is also about the satisfaction people get from using those widgets. A more productive economy doesn't just produce more widgets, it produces better widgets. A freight train is composed of a collection of wagons hauled by one or several locomotives, depending on the motive power required. Freight trains throughout the world are most often diesel-powered either because electrified networks are not available or in order to offer more operational flexibility by allowing trains to run on any part of the network, including non-electrified sidings. A railway timetable should perform the functions including plan the train paths for optimum use of infrastructure; ensure sufficient train separations and avoid train traffic conflicts; provide traffic information to passengers; and s Support traffic control, locomotive and rolling stock usage and crew scheduling (Menglei, 2016).

- ✓ H_{6a} – Accessibility has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

2.3 Empirical Literature Review

2.3.1 Global Studies

2.3.1 Perspective from Several Countries Study

Transport is significant for our economy and society, as good transport infrastructure helps to improve the mobility of citizens and the flow of goods. Gnap, et al., (2021) examined the performance of public transport networks by using public transport criteria matrix analytic hierarchy process models. This study applied correlation analysis to compare selected parameters of the road and railway infrastructure of Japan and selected EU countries. The significance of the correlations between various parameters characterizing the transport infrastructure of Japan and selected EU countries was tested. The results of the study of the correlation between the length of road infrastructure and transport performance in road freight transport show a statistically significant linear relationship in the case of Germany, Bulgaria, Poland, Hungary, Lithuania, Denmark, Slovakia, and the Czech Republic. The strength of a relationship ranges from strong to moderate direct dependence. It follows that the length of the infrastructure in the countries concerned affects the performance of road transport. It should be noted that these are transit countries through which main routes pass from east to west and from north to south of Europe.

Karlygash *et al.,* (2018) aimed to analyse the evolution of productivity in rail transport among several countries from 1997 to 2016. They applied a non-parametric approach that allows us to change the performance and efficiency of the transport infrastructure. The main indicators of rail transport should be divided into variations of efficiency and technical changes. The results indicate that productivity growth is concentrated in the last period (1997-2016), when most countries conducted reform processes. This increase in productivity occurred mainly due to technical progress. They also analysed the correlation analysis to determine the factors most influencing the effectiveness. They justified that the higher the autonomy and financial independence, the higher the level of efficiency and technical change in the infrastructure of the railway transport in contrast to related articles.

Lin, Wang, Lin, Bu and Xu (2021) used a public transport criteria matrix AHP model to assess the performance of public transport networks. The established model selects appropriate evaluation criteria based on existing performance standards. They found that the public transport network ratio and public transport coverage ratio are the most important criteria for the basic public transport infrastructure level, whereas for the public transport service level, the public transport on-time rate has the highest weighting. It also found that compared to Stonnington, both Bayswater and Cockburn achieve higher levels for the public transport on-time rate, public transport driving accident rate, public transport land area per capita, and public transport energy intensity. Bayswater has the lowest level of public transport coverage ratio and intersection blocking rate during peak hours. The results display that Stonnington has the highest level in terms of the public transport network ratio, public transport coverage ratio, public transportation priority lane setting ratio, intersection blocking rate during peak hours, and coverage rate.

Brooks (2008) identified 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 performance for both; in general efficient transportation infrastructures lower transaction costs, raise value added, and increase potential profitability.

2.3.2 Perspective from Single Country Study

Jaroslav (2018) assessed the financial performance of Slovak enterprises based on Data Envelopment Analysis (DEA). The sample consists of 28 Slovak companies which operate in the

rail freight sector. They applied relevant key indicators which describe specific area of rail freight transport in the Slovak Republic. These indicators are calculated based financial statements from financial database Finstat. The results show that majority of transport companies are not efficient in freight rail transport sector. The reason listed as linked with strong competition in context with road freight transport. It has impact on low sale revenues, added value and effectiveness. Besides, results indicate that transport companies with dominant position on the market do not have better effectiveness than others.

Marchetti & Wanke (2016) evaluated the efficiency of Brazilian rail concessionaires by data envelopment analysis (DEA) between 2010 and 2014. In addition, authors test the significance of exogenous factors for the concessionaire performance through bootstrap truncated regression. These factors include main type of cargo, track gauge, type of rail operation and secondary data from National Land Transport Agency. The results show that the Brazilian railroad has a surplus of wagons in 2017.

2.3.2 Evidences from African Studies

The efficiency of operations determines the adequacy of infrastructure that is provided. Its successful demand the technological advancement and use 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 Factors Affecting Rail Transportation Service in the Logistics Performance rail and road terminal facilities in the vicinity of the quayside are required to facilitate the efficient transfer of goods to and from ships (Foolchand, 201).

Ambwene (2015) investigated the role of rail transport in improving the port performance with particular reference to Dar es Salaam port. This study used exploratory research methodology and survey techniques to collect data related to the topic understudy. The findings of the study revealed that rail transport plays a great role in the port performance. Among them include reduction of port congestion, improve cargo handling system and increases the port and government revenues. It increases the average of cargo traffic, lowering the cost of logistic and improves customer satisfaction. Therefore, rail transport is one among the major factors which can accelerate the

growth in economies. Despite of this contribution to port performance, the situation of railway transport is in a poor state. It is noted that, the government have invested mainly in road infrastructure performance, while neglecting railways. The responsible factors for this decline includes lack of efficient rail system, low capacity of rail transport, poor emphasis in rail/port intermodal and limited financial resources. This implies that there are strong and positive relationship between rail transport and the operation performance of the port.

2.3.3 Review of Related Ethiopian Studies

Getu (2020) examined factors affecting rail transportation service in logistics performance in case of Ethio – Djibouti railways transport service in terms of World Bank logistics performance index. The study assessed the effects of customs clearance, Rail infrastructure, easy arranging shipment price, service quality and competency of logistics service, tracking and tracing as well as timeliness of rail transport. 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, customs, quality and competency of logistics activities, trucking and tracing activities and 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.

Kalkidan (2017) designed to estimating the actual time it takes for freight to be transported and delivered to the customers, identify the major factors affecting the logistics service quality in terms of delay, identify the constraints that the delay of freight transports has caused to the country, customer, and service provider and finally to develop recommendations based on the analysis made to improve the delivery system by minimizing delays. This study found that as an on average it takes 37.4 days for transporter companies to transport goods and deliver to customers. The causes of delay are factors related to Djibouti port management problems, Poor condition of Djibouti-Addis Ababa road, bureaucracy, long clearance time at dry ports and check points, poor information flow and lack of integration between supply chain actors. At last, the study identifies

the impact of freight delay to different bodies and realizes that delay can affect driving behaviour, motivation and performance of truck drivers.

Habtamu (2017) identified factors influencing railway transport services 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 behaviour, accessibility and availability with passengers' satisfaction.

2.4 Summary and Research Gap

Previous studies overlooked the evaluation of railway freight transport in terms of competitiveness and productivity. For example, Karlygash *et al.,* (2018) aimed to analyse the evolution of productivity in rail transport among several countries; Jaroslav (2018) assessed the financial performance of Slovak enterprises; Marchetti & Wanke (2016) evaluated the efficiency of Brazilian rail concessionaires; Getu (2020) examined factors affecting rail transportation service in logistics performance and Kalkidan (2017) identified the major factors affecting the logistics service quality in terms of delay. Even if there is conventional measures for performance evaluation in railway transportation are discussed. The performance of a railway system can be evaluated with a number of technical and operational parameters, as described in the effectiveness and efficiency measures, and the service quality measures. However, the use of either class of measures individually cannot cover the performance requirements of all customers including infrastructure managers, train operators, government and passengers.

Regarding research methodology, Gnap, *et al.,* (2021) argued that several studies focused on passenger transport and correlations concerning the behaviour of the customers of this mode of transport. Correlation analysis is not typical in the freight transport research published to date. Relative indicators comparing only the length of transport infrastructure and performance relative to the area of the state and the population are inaccurate and can lead to distorted results. Therefore, they recommended using correlation analysis to examine the correlation between the performance of rail and road freight transport and infrastructure and the necessary infrastructure investments. They advised it is also necessary to examine the transport infrastructure for these modes of transport and their performance within the examined states, with especial consideration of aspects

of ecology. Thus, it is timely and necessary to apply explanatory research design or cause and effect analysis or correlation and regressions in transport performance indicator analysis.

2.5 Conceptual Framework

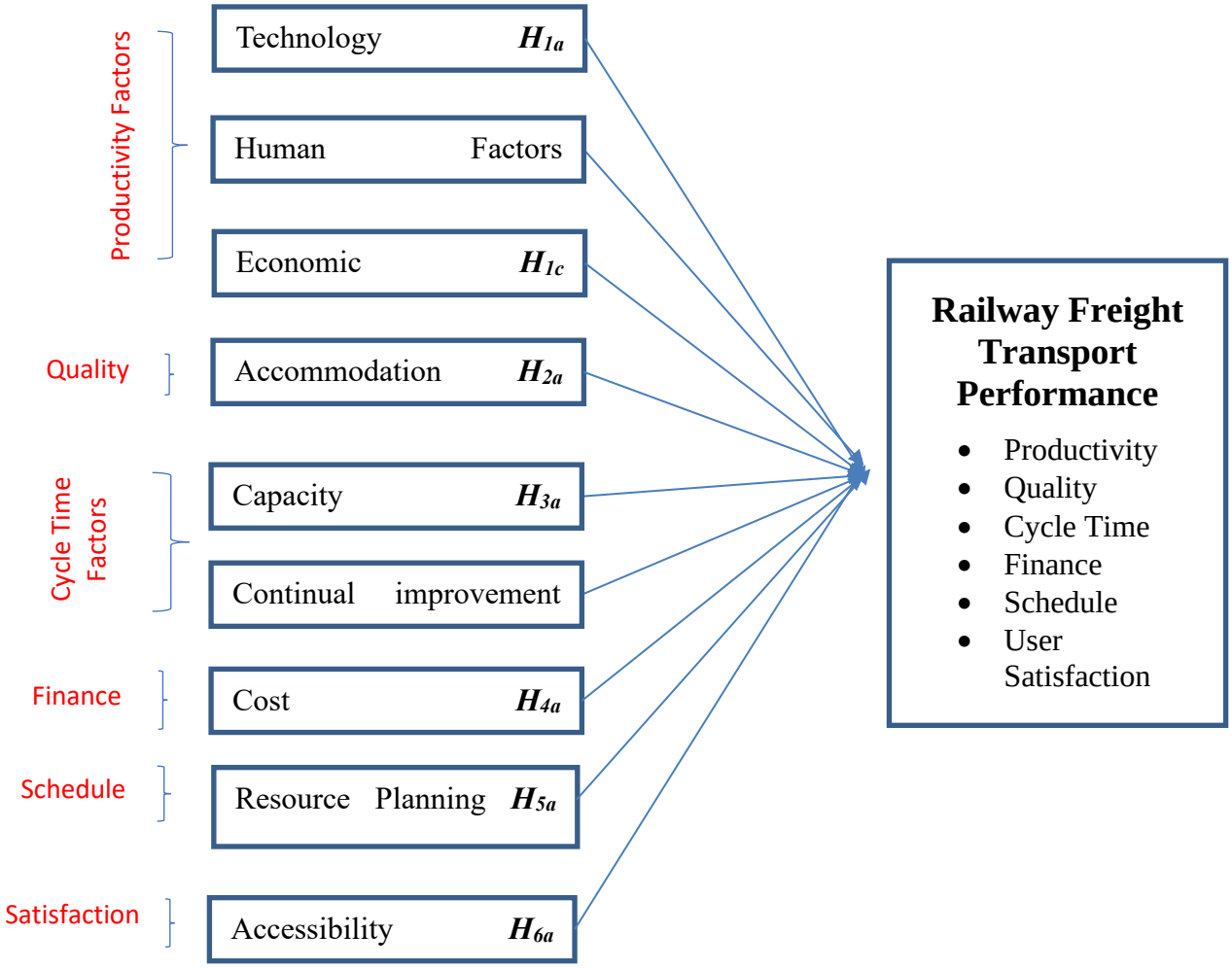


Figure 2 Conceptual Framework

Source : Adapted Laurence, *et al.*, (2015).

The above conceptual framework of this study shows freight transportation based on logistics performance measurements in terms of productivity in terms of customer response, logistics workforce, transportation capacity and supply productivity; quality in terms of Perfect Order Percentage (POP); cycle time includes order entry time (OET), order processing time (OPT), warehouse order cycle time (WOCT), and in transit time (ITT) and financial measures productivity in terms of value creation, revenue enhancement, capital consumption, and expense control. The

causal factors that affect productivity includes technology, human factors and economic; quality factors comprises accommodation, journey time and connectivity while cycle time embraces capacity, schedule flexibility and continual improvement. Finally, financial factors contains reducing costs, Cashflow and user services.

Laurence, et al., (2015) stated that freight transportation performance can serve this goal through several avenues. Performance in freight transportation can reduce freight transit times, improve the reliability of freight shipments, and reduce the cost of freight transportation. The causal factors that affect productivity includes technology, human factors and economic; quality factors comprises accommodation, journey time and connectivity while cycle time embraces capacity, schedule flexibility and continual improvement. Finally, financial factors contains proper cost management while schedule and user satisfaction was measured by better resource planning and accessibility of Ethio-Djibouti Railway Transport Share Company /EDR/. As per Poliak, Šimurková and Cheu (2019) it is also important to address tariffs in order to be competitive, particularly against road freight in order to increase rail freight performance. The prices in international road freight transport can be significantly affected by the harmonization of social regulations, especially in the area of minimum wages for drivers.

Transport performance of road and rail freight transport is related to economic activity in the given state's respective region, especially with industrial production (Gnap, *et al.*, 2021). The efficiency of the policies and strategies needs to be evaluated to improve the performance of public transportation networks. To assess the performance of a public transport network, it is first necessary to select evaluation criteria. The major components of logistics financial measures in terms of revenue, capital and expenses that are transportation, interest rates (on inventory), and costs of obtaining and operating distribution centres. To understand why this is the case, we need to understand how firms— manufacturers, distributors, and retailers—think about inventory. Thus, finance requirements are necessary along with freight transportation performance that can enhance capital requirements and reduce unnecessary costs. Reduced transit times can allow businesses to access suppliers in a larger market region or sell their products into a larger market area. A higher railway transport performance can be enhanced productivity and quality of the transport services and allow businesses to reduce inventory levels and rely more on just-in-time shipments, reducing their total logistics cost of production (Lin et al, 2021, Kalkidan, 2017 and Menglei, 2016).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter clearly identifies the knowledge gap which together with the problem statement shown in chapter one necessitates the conduct of this research. This chapter provides the details of the research methodology. The research design and methodology section clearly defined the research design, approaches of the study, population and sampling design, Data type and sources, data collection, data analysis methods finally data validity and reliability method are intensively presented.

3.2 Research Approach

Research can be approached as qualitative and quantitative or mixed when approach to research has been considered as the criterion of classification. Qualitative research is extremely subjective in nature than quantitative research, involves examining, and reflecting on the less tangible aspects of a research subject, e.g. values, attitudes, perceptions (Creswell, 2014).

This study concentrated on measuring the determinants of railway freight transport performance. On other hand, this study relied on careful definition of the meaning of freight transport performance and its associated factors like productivity factors in terms of technology, human factors and economic; quality factors in terms of accommodation; cycle time factors cycle time embraces capacity and continual improvement; cost management in better financial actions; proper scheduling by better resource planning and user satisfaction by accessibility. It also properly developed the concepts and variables of logistics performance in freight transport, and the plotting of interrelationships between determinant factors and railway freight performance (case and effect relationships). Therefore, this study applied qualitative research approach.

3.3 Research Design

From different types of research designs explanatory type of research design was employed as a main research design for this study to evaluate the performance of freight Transportation of Ethio-

Djibouti Railway Transport Share Company /EDR/. The explanatory design was employed for predicting the relationship between variables. In this study, this study investigates the relationship between all variables and it used independent which was applied as the predictor or casual inputs and dependent which was used as response variables in experimental studies. By taking cross-section of the population relevant data was collected at one point in time. In addition, descriptive design was employed to explaining, and understanding the nature of these variables. Then the study determines to what extent various logistical factors affect freight transport performance of Ethio-Djibouti Railway Transport Share Company /EDR/.

3.4 Population Design and Sampling

3.4.1 Target Population of the Study

In statistics the term "population" has a slightly different meaning from the one given to it in ordinary speech. The population is defined as a group of individuals or items that share one or more characteristics from which data can be gathered and analyzed (Yiik et al., 2019). According to the surveyed organization, there are 857 employees in Addis Ababa. The target populace of this research was staff working in a surveyed organization. They were divided into strata to cater for the different groups ‘that are ordinary staff, middle-level managers and department heads in a surveyed organization. The surveyed organization human resource for November 2021 detailed that its staffs was 857 in number in Addis Ababa.

3.4.2 Sample Unit

The sample unit of the study was individual employees of the surveyed organization.

3.4.3 Sample Frame

The sample frame is the list of elements from which proportional sample size is selected. For the study, recent employees’ payroll list was used to take lists of employees.

3.4.4 Sample size and Sampling Techniques

In this study, the sample size was calculated based on the known sampling formula called Yamane’s formula for calculating sample size. Yamane (1967) suggested simplified formula for

calculation of sample size from a population which is an alternative to Cochran's formula. The formula to be used to calculate the sample size of the study is the statistical formula given by Yamane (1967) formula. Sample size for ±5% precision levels where confidence level is 95% and P=.5. For 857 size of population, the sample size (n) for precision (e) of 5% was 272. The formula is presented below:

$$n = \frac{N}{1+N(e)^2} \text{— \{Equ-1\}}$$

$$n = \frac{857}{1 + 857(0.05)^2}$$

$$= 272$$

Where n = number of sample size and N = Total number of study population e= level of confidence to have in the data or degree of freedom which is 95% apply for this study with 5% error. Therefore, the sample size of the study was 272 respondents of the surveyed organized in Addis Ababa.

Table 1 Target Population Strata Target Population

Type (Strata)	**Target Population**	**Proportion**	**Sample**
Logistician, Transporters, Technician and Engineers	556	0.31738623	176
Senior Managers	101	0.31738623	32
Middle level Managers	200	0.31738623	63
Total	**857**		**272**

Source: ERC, 2022

This study applied both probability and non-probability sampling methods. Among probability sampling techniques, stratified random sampling technique was served as the basis for selecting samples from the target population. This sampling technique is important to select from senior, middle level and other staffs equally based on their proportion as compared to others. All targeted employees have got the chance to include in the survey. Use proportional allocation of the total sample size was carried out to get the required sample size from each current job position. And then, it used simple random sampling technique based on the stratified current job position to recruit employee for participation in the study. On the other hand, for non-probability sampling technique, purposive sampling method was used to select interview session participants. The

reason to select purposive sampling was to incorporate those who were better in knowledge, experience on the issue, and rich in information in the study area.

3.5 Data Sources, Data Collection Procedures and Tools

3.5.1 Data Source

Both primary and secondary sources were used to generate data for the study. Employees and managers of the surveyed organization was the source of primary data. Primary data was collected through questionnaires and semi structured interviews from employees of the corporation. Moreover, different journals, books, published & unpublished materials that contain data related to the subject in the study were used. Secondary data was obtained from the corporation online resources, websites, annual book, policies and strategy documents, annual report and publications.

3.5.2 Data Collection Tools

Primary data was collected using a structured questionnaire. This method covered some employees of the respected firm. A questionnaire is a type of survey was respondent's writes answers to questions posed by the researcher on a question form. The questionnaire was prepared to be inclusive of the constructs measured in the study. The questionnaire had two sections. The first section covered the demographic profile of the participants like age, sex, educational level and other background data. The second section had structured on a likert scale of 1-5 to show their degree of agreement or disagreement to the sentences about the constructs under study. Further, interviews are more suitable for questions that require probing to obtain adequate information. They are particularly useful when qualitative data are required. The data relevant for finding out the determinants of railway transport performance, an interview checklist was prepared and it was attached in the appendix part of this study next to questionnaire. Further, the study employed structured interview with ten logistician, transporters, technician and engineers, transporter coordinators and supervisors from the surveyed organization.

3.5.3 Data Collection Procedures

In this study, data that was collected by open and close-ended questions prepared in English and Amharic languages. Data was collected in March 2022 in Addis Ababa. Data collectors and

supervisors were undergraduate students specialized in logistics, transport, management and economics who had experience in data collection. A total of four data collectors and one supervisor were trained for half day on ethics, interview techniques, and data quality. During visits to each transport infrastructure and facility, data collectors explained the purpose of the study to the finance, transport, technical and logistics manager and experts, asked for a list of all surveyed employees at that office, and randomly employees for face-to-face interviews.

3.6 Data Analysis Methods

Data was checked for consistency and completeness by supervisors, double-checked by the principal investigator. Data was entered by the principal investigator using SPSS V.23 for cleaning and analysis. Accuracy of data entry was checked by running frequency analysis and making range checks every time. Hard copies of the data will be stored in a locked cabinet and consent forms will be separated from

The demographic facts obtained from the respondents were summarized using frequency distribution. Scale typed questionnaires were analysed by using descriptive statistics (mean, frequency and standard deviation test result) and particularly multiple logistics regression was used to test the research hypotheses and answering the research questions. The data was analysed using SPSS. This provided the generalization of the findings on of the data concerned and the standard deviation provides a dispersion of the data according to the variability of the data.Multivariable multiple regression analysis was done to identify the factors associated with railway freight transport performance. A statistical significance level was declared at a P-value of less than 0.05.

3.6.1 Variables and Expected Sign

Data obtained from primary sources were analyzed using descriptive statistics where mean and standard deviation used. In addition, inferential statistics was used using multiple logistics regression analyses which are instrumental in indicating whether the independent variables- factors significantly predict the dependent variable.

Table 2 Variables and Expected Sign

Objectives	Data Analysis	Measurements	Expected Sign
H_{1a} – Technology has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{1b} – Human Factors has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	multiple logistics regression	Likert Scale	+
H_{1c}– Economic has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{2a} – Accommodation has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{3a} – Capacity has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{3b} – Continual improvement has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{4a} – Cost has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{5a} – Resource Planning has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+
H_{6a} – Accessibility has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company	multiple logistics regression	Likert Scale	+

Source: Its own Survey, 2022

3.7 Reliability and Validity

3.7.1 Validity Analysis

Validity, often called construct validity, refers to the degree in which the test is truly measuring what it is supposed to measure. It states how good a test is for a particular situation. If a test has poor validity then it does not measure the content and competencies it ought to. According to Kothari (2019) content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study. Its determination is primarily judgmental and intuitive. It can also be determined using a panel of persons who shall judge how well the measuring instrument meets the standards, but there is numerical way to express it.

Based on this definition the content validity was verified by the advisor of the research, who look into the appropriateness of the questions and the scale of measurement. In addition discussions with Fellow researchers as well as feedback from the pilot survey were another way of checking the appropriateness of the questions. In case of secondary data, only relevant articles and literature from academic, scientific and marketing databases was used for this study.

3.7.2 Reliability Analysis

Reliability refers to the degree of the results consistency under the same conditions. It should remain the same if research has to be repeated.

Table 3 Cranach's Alpha Results For Reliability Analysis

Variables	Cronbach's Alpha	N of Items
Technology	0.896	3
Human Factors	0.770	3
Economic	0.793	3
Accommodation	0.862	3
Capacity	0.836	3
Continual improvement	0.819	3
Cost management	0.850	3
Resource Planning	0.806	4
Accessibility	0.827	4
Railway Transport Performance	0.946	21

Source: Its own Survey, 2022

To sustain a high level of reliability for primary data, after compiling questionnaires filled by respondents, those answers was transferred to SPSS and values in Cronbach's alpha. Afterward the results were double checked, in order to avoid any mistakes. To obtain more reliable answers and personal opinions of the respondents 'questionnaires was filled on the spot. The purpose of deriving a scale score by having multiple items is to obtain a more reliable measure of the construct than is possible from a single item. Therefore, Cronbach's alpha test for reliabilities were checked and found high to analyze the association between the variables under study. The findings of Cronbach alpha of the scales used in this study was rated as excellent. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct (Croswell, 2014). Consequently, it indicates the reliability of the scales was very high depicting a very strong internal consistency among the measurement items and the selected instrument accurately measures the variables selected. In this regard, values of 0.750 or greater were considered the data collection instrument is reliable.

3.8 Ethical Considerations

It is imperative that ethical issues are considered during the formulation of the evaluation and data collection plan. Ethical approval was obtained from Addis Ababa University, School of Commerce, Post Graduate Studies Program in Logistics and Supply Chain Management. Ethical letter was aslo obtained from Ethio-Djibouti Railway Transport Share Company (EDR) in Addis Ababa. Then after, the objectives and benefits of the research were discussed in detailed with the selected offices and departments. Then, a similar discussion was held with offices and departments officials and technical and professional staffs. As a result, permission/consent secured to data collectors and supervisor and appropriate discussions with individual respected respondents were conducted about the purpose, nature, objectives and benefits of the study in the local language (Amharic).

Participation in the study is voluntary and confidentiality of the information was assured during as well as after data collection. The participants were informed about their right not to participate, privacy, risk and no direct benefits of the study and not to answer any question or all of the questions. Data collectors obtained verbal consent from the respective supervisors and employees after informing them about the nature of the study and that their participation was voluntary. Then, they scheduled individual interviews to avoid disruption of usual health and COVID-19 practices.

Data collectors conducted interviews in a vacant offices room to maintain confidentiality responses and protect their identity. Confidentiality of the respected respondents was maintained by establishing secured safeguards using codes during data collection rather than asking names and the original data shall not be accessed except for the researcher and supervisor for data checking, cleaning and data entry purpose. The information sought will not be used for any other purpose than that to which participants consented and will not be passed to a third party. After the successful thesis defence and approval by School of Commerce, Academic Commission and Addis Ababa University, School of Commerce Senate, the questionnaire will be incinerated in a secure manner.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1Introduction

This chapter presents results and discussion of the study. It demonstrates how data are presented, analyse and interpreted including a response rate and demographic profile of respondents, the result presentation and analysis of responses of respondents on the selected railway organization.

4.2Response Rate

As indicated in the chapter three, the target population of the study was 219 sampled respondents from the surveyed organization, EDR.

Table 4 Response Rate

Type (Strata)	**Distributed Questionnaire**	**Returned**	**Rate**
Logistician, Transporters, Technician and Engineers	176	144	82%
Senior Managers	32	27	84%
Middle level Managers	63	48	76%
Total	**272**	**219**	**81 %**

Source: ERC, 2022

Out of distributed 272 questionnaires, a total of 219 questionnaires were returned which displayed 81 % response rate. According to Punch (2003), a low response rate can raise questions according to whether the responses received were representative of the sample. A researcher should therefore strive for at least 60 percent response rate. Within extraordinary efforts, this study attained 81 percent response rate that was therefore taken to be acceptable. Employees responded to the questionnaire from their respective departments and current positions including logistician, transporters, technician and engineers, senior managers and middle level managers. This study attempted to distribute 176 questionnaires to logistician, transporters, technician and engineers. As result, Table 4 above presents the highest number of questionnaires administered and (144) retrieved from logistics related departments and positions.

4.3Demographic Profile of Respondents

The questionnaire incorporated demographic information which assessed respondents' gender, age, educational background and work experience and job level. Table 5 below displays the demographic results.

Table 5 Demographic Profile of Respondents

Variables and their Category		Count	Column N %
Gender	Male	121	55.3%
	Female	98	44.7%
Age	Young adults (ages 18-35 years)	76	34.7%
	Middle-aged adults (ages 36-55 years)	108	49.3%
	Older adults (aged older than 55 years)	35	16.0%
Education Level	Diploma and below	35	16.0%
	First Degree	119	54.3%
	Masters and above	65	29.7%
Work experience	Less than 1 year	43	19.6%
	2 - 3 years	59	26.9%
	4 - 5 years	117	53.4%
Job level	Low	52	23.7%
	Middle	139	63.5%
	Top Management	28	12.8%

Source: Survey result, 2022

Table 5 above shows gender distribution of respondents. From the table, it is revealed that majority of the respondents' were males, about 55.3 percent representing a bigger part of the sample group. However, about 44.7 percent were females. It implies that the two genders were ineffectually represented in the study. As a result, it entails the number of men engaging in railway freight transport job engagements. This could be attributed to further efforts to women through various programs hence empowering more women to engage in more railway freight transport activities.

The above table displays that, among 219 sampled respondents, 76 (34.7 %) of the total respondents were of age below 35 and above 18 years or there were young adults, 108 (49.3 %) of them were of age 36 to 55 years or middle-aged adults, and only 35 (16 %) of the respondents were older adults or aged older than 55 years. This could be considered the study gathered information from well experienced and aged people who acquired knowledge in railway transport organization. With regards to the age distribution of the respondents as presented in Table 5 above, majority are falling in the age group of 36-55 years representing about 49.3 percent followed by age group 18-35 years also representing about 34.7percent.

For the educational background of the respondents as revealed in Table 5 above, about 35 (16 percent) had diploma in various field while 119 (54.3 percent) representing the majority of the respondents also had first degree in various fields of study. However, 65 (29.7 percent) of the respondents had Masters' degree or PhD. Similarly, the above table also shows that, among the selected respondents, 43 (19.6 %) of the sampled respondents worked in their respect organization for fewer 1 years; 59 (26.9 %) worked for 2 to 3 years and 157 (53.4 %) of them worked for more than four years. This depicts that majority had worked for more than three years. The study results shows that majority of the respondents had worked in railway freight transport for a period of four years and above. For the job level of the respondents as revealed in Table 5 above, 152 (23.7 %) of the sampled respondents were worked in lower position, and 139 (63.5 %) representing the majority of the of them worked in medium and the remaining 28 (12.8 %) of them worked in top position. In this case, top position includes professionals, senior staff and managerial position; medium level experts, junior position including associate officers and low position meant store keepers, maintenance and logistics assistance.

Overall, response on the gender of the participants across the railway freight transport indicated it continues to be a male dominated sector. This is not purely for company's reasons, such as stereotypes but women participation in the railway freight transport industry has been discouraged through culture. In addition, the above finding implies that the young adults are energetic and with a little effort, they can perform very well in terms of productivity as indicated by one of the interviewees. Based on that, the young adults are granted the opportunity to work in the railway freight transport as compared with the old age. All the level of education was featured in order to get a holistic response and eliminate bias. Thus, it was assumed that the sampled staffs' members would provide appropriate responses for higher railway freight transport performance effectively.

4.4 The Status of Determinants of Freight Transportation Performance

This response analysis presents respondents' opinion regarding their level of agreement on nine individual independent variables and one dependent variable dimensions with various questions about railway freight transport performance. Descriptive statistics was used to run the basic statistical measures such as the mean, percentage, and standard deviation. The mean is a measure of central tendency which provides an arithmetic average for the distribution of scores. The results were interpreted based on the following measurement scale intervals or range; 4.51-5.00 excellent, 3.51-4.50 very good, 2.51-3.50 average or moderate, 1.51-2.50 fair and 1.00-1.50 poor (Habtamu, 2017).

4.4.1 Level of Internal Factors of Freight Transportation Performance

EDR as across country railway operator is arranging to develop regional standard for the main tenancy and operation of its railway line. Thus, this study requested respondents about various factors of freight Transportation performance.

Table 6 Internal Factors improving the performance of freight Transportation of Ethio-Djibouti Railway Transport Share Company (EDR)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
EDR has Web-based solutions for customer response	1	1%	17	8%	42	19%	82	37%	77	35%	3.99	95%
EDR has improved equipment that helps to increases its efficiency.	4	2%	4	2%	42	19%	92	42%	77	35%	4.07	88%
EDR accumulates railway freight transport knowledge.	7	3%	14	6%	60	27%	90	41%	48	22%	3.72	98%
Grand Mean												3.92
Sufficient workforces are employed in EDR.	13	6%	9	4%	64	29%	55	25%	78	36%	3.80	115%
Teamwork was practiced in EDR to improve its transport performance.	19	9%	23	11%	34	16%	57	26%	86	39%	3.77	131%
EDR community developed social interactions.	13	6%	33	15%	35	16%	53	24%	85	39%	3.75	128%
Grand Mean												3.77

EDR identifies the appropriate service process for improvement.	23	11%	10	5%	47	22%	48	22%	91	42%	3.79	131%
EDR verifies the root cause(s) of poor service performance.	0	0%	19	9%	45	21%	47	22%	108	49%	4.11	102%
EDR has well organized Action Plan that correct the root cause(s) of poor service performance.	8	4%	9	4%	25	11%	80	37%	97	44%	4.14	102%
Grand Mean												4.01
sufficient working capital	0	0%	28	13%	32	15%	77	35%	82	37%	3.97	102%
good at cash management.	3	1%	17	8%	39	18%	74	34%	86	39%	4.02	100%
Executives of EDR realize the impact of cash flow on operations.	0	0%	11	5%	20	9%	126	58%	62	28%	4.09	76%
Grand Mean												4.02
Freight transport planning	0	0%	1	1%	28	13%	158	72%	32	15%	4.01	54%
Properly estimate timetable.	0	0%	1	1%	28	13%	157	72%	33	15%	4.01	55%
EDR secures high-class technology for a better scheduling.	0	0%	1	1%	21	10%	164	75%	33	15%	4.05	51%
Scheduling facilities are strengthened at EDR.	0	0%	1	1%	23	11%	158	72%	37	17%	4.05	54%
										Grand Mean		4.03

Source: Survey result, 2022

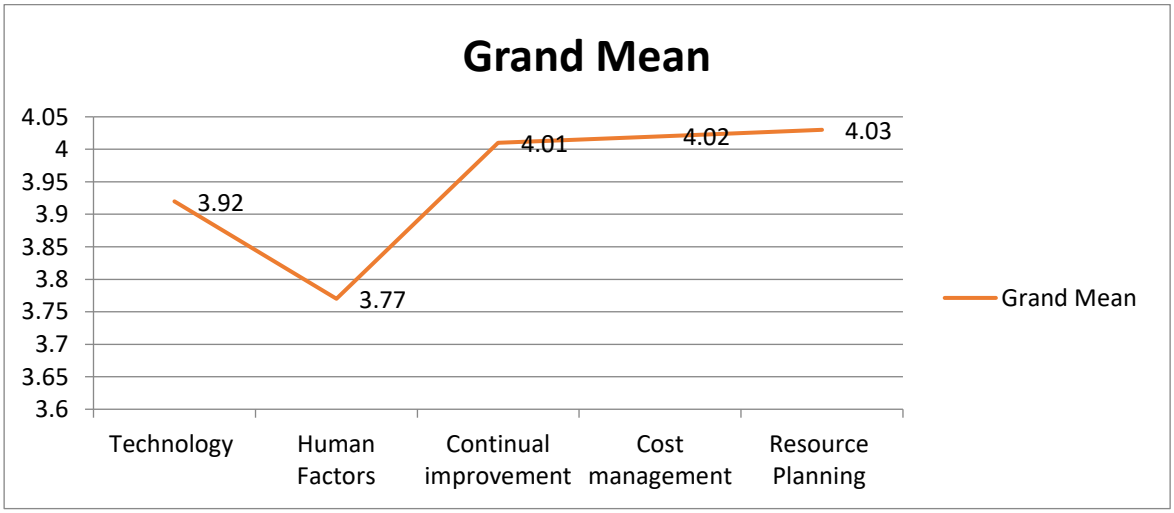


Figure 3 Grand Mean Internal Factor

Source: Survey result, 2022

From the above table, railway freight transport performance factors were assessed as internal factors using technology, human factors, continual improvement, cost management and resource planning. Table 6 and Figure 2 display that the highest mean scores were found for continual improvement, cost management and resource planning. This implies that there were better transport performance were disclosed in continual improvement, cost management and resource planning. Particularly, EDR has well organized Action Plan that corrects the root cause(s) of poor service performance. In addition, EDR verifies the root cause(s) of poor service performance and executives of EDR realize the impact of cash flow on operations. Further, EDR secures high-class technology for a better scheduling and scheduling facilities are strengthened at EDR.

On other hand, the freight transportation performance was weakening in human development factors (lowest mean among others). It implies that EDR has slightly satisfactory system to handle shipments. EDR has slightly satisfactory ability to handle large shipments. This shows that staff members have small salary, discouraging reward system and poor human resource management. Laurence et al., (2015) stated that railway travel time performance create most of the benefits associated with a transportation investment. Travel time progresses are typically monetized using data on the average salary and overhead costs of workers. By means of direct and indirect impacts, there are wages being paid to new workers, and these workers spend their incomes on foodstuff, housing, new equipment, trips to restaurants or anything else. These expenses affect output and jobs. Indirect and induced influences are iterated throughout the economy, creating a multiplier effect that distributes economic activity.

This study carefully detected the standard deviation values, it can be said that there is no the same variability of data points on each variables as the majority of the variables had below zero standard deviations. The magnitude of technology for developments of railway freight transport was also assessed in this study. The grand mean (3.92) was found and rated as very good. Among the given three questions, the highest mean was related to teamwork (4.07). It shows teamwork was practiced in EDR to improve its transport performance. This implies railway working team vary depending on the technology of the industry in which spending occurs. Karlygash et al., (2018) quoted Fare R, Grifell-Tatjé E, Grosskopf S & Lovellcak (1997) who considered that the ultimate significant efficiency factor is technical changes. The results of this mentioned study showed that the greatest increase in productivity was due to developments in technology, and not due to more effective behaviour of companies, especially in the period of 1997-2016. Foolchand (2016) also stated that

it needs to offer an ever-expanding range of services, such as final assembly of products, inventory management, product and package labelling, product tracking and tracing along the supply chain, order planning and processing, and reverse logistics systems (which tackle the collection and recovery of end-of-life products and used packaging in the supply chain). Proper planning and coat management according to Karlygash et al., (2018), helps companies to ensure safe, reliable and on-time delivery, and allows for improved planning. Such systems are also of great importance in locating products that have gone missing route.

4.4.2 Level of External Factors on the Freight Transportation Performance

This study also requested respondents about various external factors for freight transportation the performance and others.

Table 7 External Factors improving the performance of freight Transportation of Ethio-Djibouti Railway Transport Share Company (EDR)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
produce more output	4	2%	16	7%	64	29%	100	46%	35	16%	3.67	0.895
effectively utilize its capital	0	0%	12	6%	107	49%	69	32%	31	14%	3.54	0.802
smarter research funding	0	0%	19	9%	59	27%	83	38%	58	27%	3.82	0.924
										Grand Mean		3.68
EDR has sufficient freight container volume subject to a permitted maximum tonnage.	9	4%	20	9%	48	22%	103	47%	39	18%	3.65	1.008
EDR has the capability of the services to provide train paths to customers.	0	0%	29	13%	51	23%	89	41%	50	23%	3.73	0.96
EDR has extra space on each carriage that can be used in practice.	3	1%	24	11%	52	24%	84	38%	56	26%	3.76	1
										Grand Mean		3.71
EDR has sufficient cargo capacity.	13	6%	9	4%	64	29%	55	25%	78	36%	3.80	1.147

EDR has adequate system to handle shipments.	19	9%	23	11%	34	16%	57	26%	86	39%	3.77	1.305
EDR has an ability to handle large shipments.	13	6%	33	15%	35	16%	53	24%	85	39%	3.75	1.276
										Grand Mean	3.77	
EDR railway freight transport service is user-friendliness.	0	0%	5	2%	33	15%	136	62%	45	21%	4.01	0.67
EDR railway freight transport service is convenient.	0	0%	5	2%	36	16%	131	60%	47	22%	4.00	0.687
EDR railway freight transport service	1	1%	12	6%	45	21%	89	41%	72	33%	4.00	0.893
Ease of access railway freight transport is an appearance of EDR.	4	2%	11	5%	33	15%	106	48%	65	30%	3.99	0.904
										Grand Mean		4.00

Source: Survey result, 2022

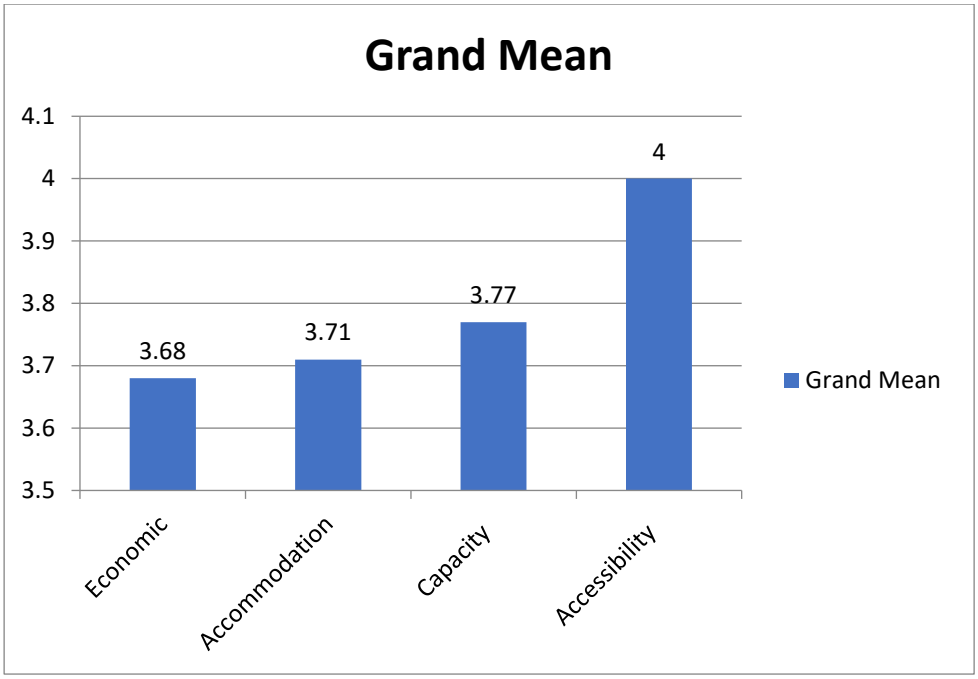


Figure 4 Grand Mean External Factor

Source: Survey result, 2022

Railway freight transport performance improvement factors were assessed as external factors using economic, accommodation, capacity and accessibility. This study carefully observed the standard deviation values, it can be said that there is no the same variability of data points on each variables as the majority of the variables had below zero standard deviations. From the above Table 7 and Figure 3 display that the highest mean scores were found for accessibility (4.00) other mean scores were below 4.00 for other three factors. This implies that EDR railway freight transport service is user-friendliness. In addition, EDR railway freight transport service is convenient. It is also found that EDR railway freight transport service and ease of access railway freight transport is an appearance of EDR. Laurence et al., (2015) definitely stated access to low-cost suppliers can also lessen input costs. Companies may either pass these savings on to consumers or maintain them as profits, or some combination of these. If the savings are passed on to consumers through reduced prices, this may permit companies to increase demand for their products, capture market share and expand production. Freight transportation enhancements consequently support competitiveness by improving productivity. It is also stated that increased competitiveness generates opportunities for business growth and expansion.

The lowest mean among these indicated items was 3.54; that implies EDR ineffectively utilize its capital to enhance its services. The Table 7 shows the results of descriptive statistics in the rail freight sector. This study found that doing business in railway sector is capital intensive. On the other hand, results show that among factors is extreme difference, because range is from 3.68 to 4.00, the highest mean. Next, lowest mean score was 3.65 that implied EDR has does not sufficient freight container volume subject to a permitted maximum tonnage. This issue may call for further improvements. Foolchand (2016) stated that containerization and other improvements in freight transportation have continued to lower obstructions to trade globally. It has opened new supply and consumer markets for businesses across the world. Overall, each advance in transportation technology has created new markets for businesses, spurring economic opportunities, competition, job creation and economic growth. McKinnon (2015) stated that one of the most relevant aspects to take into consideration when planning a new railway project is to ensure economic sustainability during the main lifespan phases: the construction phase and the operations phase. This section provides the reader with a review of the economics of both phases, starting with the railway assets investments to be conducted during the construction phase and following with the income, costs and cash flows derived from the operations phase.

4.4.3 Level of Railway Transport Performance Improvements

This study also requested respondents about railway transport performance improvements on the survey organization.

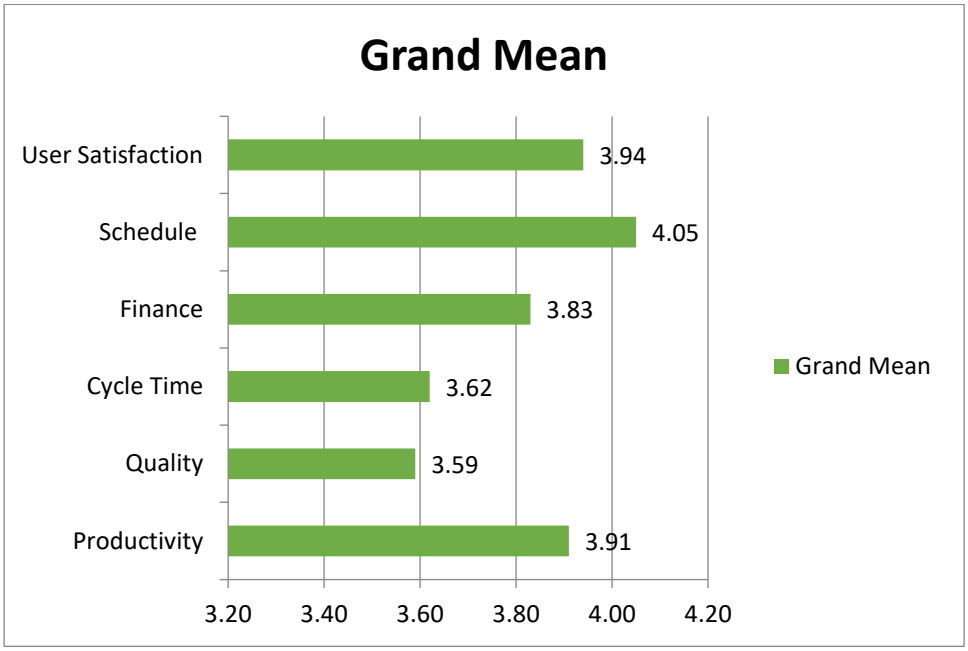


Figure 5 Grand Mean of Freight Transportation Performance

Source: Survey result, 2022

In this study, generally, using the mean scores the staff ranked the railway freight transport performance Schedule had the highest mean score, ranked user satisfaction- second with 3.94 mean score, productivity - third and finance fourth. This study carefully observed the standard deviation values, it can be said that there is no the same variability of data points on each variables as the majority of the variables had below zero standard deviations.

The highest mean score schedule (4.05) was rated as very good. This shows that ERD has a better timetabling or it has achieved better freight transportation performance through planning a feasible schedule for each train path based on the available infrastructure, with consideration of track, junctions, platforms, and the signalling system. This implies that it has a more efficient use of existing infrastructure. It is expected that better performance can be achieved with improved performance management strategies. In railway planning and management, effectively improving the performance of railway networks is essential (Bougna and Crozet, 2016). But the majority of

the interview responses indicated that ERD may have a free access to the infrastructure and other operators. As the delivery time by rail is much less than by sea transport, it seems it has improved its scheduling. They believed that it does not mean that ERD has effective analytical precision. They said it needs extremely detailed studies that are performed to satisfy legal mandates to less precise sketch planning analyses whose purpose is simply to develop an initial estimate of the benefits. User satisfaction and productivity were the next highest mean scores and were rated as very good. Of course, analysing the productivity benefits of transportation investments often involves the use of sophisticated modeling tools and may require more time and resources than policymakers have available. But the respondents' perception showed that ERD has used resources efficiently in producing transport services. If resources are used with greater efficiency, the ratio of output to cost rises and the standard of living rises. These are thus two distinct types of impacts, and they are measured differently. Direct customer benefits are the instantaneous effects on users of a facility—speed, safety, and others. Laurence et al., (2015) stated that productivity of freight transportation performance may take place for numerous explanations. For one, increases in supply-chain efficiency reduce costs; that is an immediate productivity gain. There may be scale economies leading to further productivity gains as economic development brings rising output. Away from that, increasing scale could change production technologies with additional gains (McKinnon, 2015).

The lowest grand mean was scored as 3.59 for quality. In railway transport, quality may be highly related to tow components: transit time and reliability. This result shows that ERD cannot effectively create transit time; it may have a problem on loading and unloading intermodal trains. More importantly, there will be some time lag from the time a container or trailer is dropped at the intermodal yard and the loaded train ultimately departs. Laurence et al., (2015) assured that freight transportation performance in intermodal service are reducing transit times in some lanes, but it will be almost always slower than truck.

4.5Inferential Analysis (Regression Analysis)

In this study, inferential analysis was conducted to test hypothesis. This study employed explanatory designs to reach at aforementioned objectives. This analysis was used to measure the freight transportation performance on the performance of freight Transportation of Ethio-Djibouti Railway Transport Share Company/EDR/. Hypotheses are tested by using this analysis. The researcher identified both general and specific objects by using regression method. Multivariate linear regression method is used to run the regression analysis. All decisions are made at significance level of 0.05. Model is summarized by using adjusted R squared. ANOVA analysis is conducted by F-statistics. Significance of independent variables in explaining the dependent variable is decided by using both p-value and t-statistics. Before running the regression analysis, classical model assumptions were established.

4.5.1 Assumptions and Diagnostic Test Result

Assumptions and diagnostic test are offered at this part of the study. It includes average value of the error term is zero (E (ut) = 0); normality, multicollinearity and autocorrelation tests. All were tested and found all the linear regression assumptions were maintained.

I. **Test for average value of the error term is zero** (E (ut) = 0); the first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. For that reason, since the constant term (i.e. α) was included in the regression equation, the average value of the error term in this study is expected to be zero.

II. **Normality Test**

One of the classical linear regression models assumptions is the error term should be normally distributed or anticipated value of the error term should be normally distributed or expected value of the errors terms should be zero (E(UT))=0). The researcher applied Skewness and Kurtosis to identify normal distribution of residuals and the result indicates that standard residuals are a little bit far away from the curve. The below table shows the descriptive statistic of Kurtosis and Skewness statics calculation and demonstrates from -2 to 2 that show the distribution is normal, thus data is normally distributed and had a reasonable variance to use

subsequent analysis. This implies that the majority of scores lie around the centre of the distribution. Therefore, this indicates that the residuals are normally distributed.

Table 8 Normality Test Result (N=219)

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Technology	219	-.667	.164	.208	.327
Human Factors	219	-1.103	.164	.855	.327
Economic	219	-.473	.164	-.442	.327
Accommodation	219	-.875	.164	.362	.327
Capacity	219	-.668	.164	-.433	.327
Continual improvement	219	-.390	.164	-.532	.327
Cost management	219	-.848	.164	.506	.327
Resource Planning	219	-.928	.164	.684	.327
Accessibility	219	-1.180	.164	.997	.327
Railway Transport Performance	219	-.511	.164	-.665	.327

Source: Survey result, 2022

III. **Test for multicollinearity**

Multicollinearity refers to a situation in which there is exact (or nearly exact) linear relation among two or more of the input variables. The VIF (Variance Inflation Factor) for each term in the model measures the combined effect of dependence among the regressors on the variance of that term. One or more large VIF specify multicollinearity. Practical understanding designates that if any of the VIF results exceed 5 or 10, it is an indication that the associated regression coefficients are poorly estimated because of multicollinearity. Conferring to the result found from the analysis, there is no strong multi collinearity and degree of association between variables. The above table shows that the VIF value of nine factors was found less than 5 or 10. It can be concluded that no collinearity was observed on this data.

Table 9 Multicollinearity Test Result

Model	Collinearity Statistics	
	Tolerance	VIF
Technology	.739	1.354
Human Factors	.702	1.424
Economic	.534	1.873
Accommodation	.536	1.865
Capacity	.495	2.019
Continual improvement	.682	1.467
Cost management	.545	1.836
Resource Planning	.404	2.473
Accessibility	.507	1.972

Source: Survey result, 2022

IV. Test for Autocorrelation

Assumption that is made of the multiple linear regressions disturbance terms is that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero.

Table 10 Autocorrelation Test: Durbin Watson

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.837[a]	.701	.688	.485	1.394

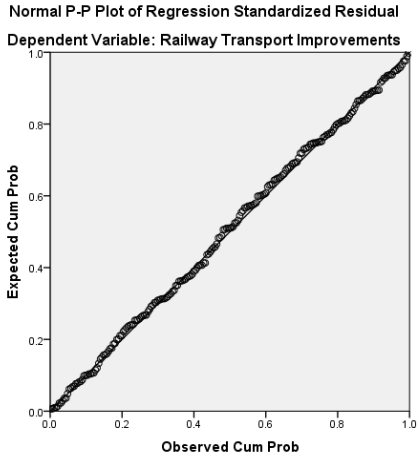
a. Predictors: (Constant), Accessibility , Human Factors, Continual improvement, Technology , Economic, Cost management, Accommodation, Capacity , Resource Planning
b. Dependent Variable: Railway Transport Performance

Source: Survey result, 2022

To test the presence of autocorrelation, the popular Durbin-Watson Test (found as 1.394) was employed in this study. In other words, it is assumed that the errors are uncorrelated with one

another. If the errors are not uncorrelated with one another, it would be stated that they are “auto correlated” or that they are “serially correlated”. A test of this assumption is therefore required.

V. **Linearity**



Source: Survey result, 2022

Figure 6 Normal P-P Plot

It was applied in this subsection to identify the predictor and its contribution towards the criterion. It aims to determine the prediction of a single dependent variable from a group of independent variables. The nature of the underlying relationship between the variables was established by checking the Normal Probability Plot (P-P) of the Regression Standard Residual, Furthermore, as shown in Figure 5, the sample of normality is further demonstrated in a Normal P-P of the Regression Standard Residual, below: The mean value of response variable (Y) is a straight line function of the independent variables, X’ A violation of this assumption may indicate that there is a non-linear relationship between the response and explanatory variables. Accordingly, the linear regression model may not be appropriate or tailored to the data under consideration. Consequently, the graph above shows that the regression can run.

4.5.1.1 Regression Test Result

This measurement is made by inferring the value of R^2 to explain the magnitude of the effect of the independent variable on the dependent variable. Here below depicted and explained are the linear regression of nine independent variables and dependent variable.

Table 11 Regression Test Results Model Summary (N-219)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.837[a]	.701	.688	.485

a. Predictors: (Constant), Accessibility , Human Factors, Continual improvement, Technology , Economic, Cost management, Accommodation, Capacity , Resource Planning

Source: Survey result, 2022

As shown in the above table, the overall bundle of determinant factors of the nine independent variables were 70.1 % (R^2 = .701) explained the dependent variable (railway freight transport performance). This suggests that 70.1 % of railway freight transport performance on the independent variables while the remaining 29.9 % is determined by other unaccounted factors in this study.

Table 12 Regression Test Results ANOVA (N-219)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.262	9	12.807	54.519	.000[b]
	Residual	49.095	209	.235		
	Total	164.358	218			

a. Dependent Variable: Railway Transport Performance
b. Predictors: (Constant), Accessibility , Human Factors, Continual improvement, Technology , Economic, Cost management, Accommodation, Capacity , Resource Planning

Source: Survey result, 2022

As the second table shows the result F= 54.519, it can be concluded that the combination of determinant factor have positive effect on railway freight transport performance which is statistically significant. Consequently, this study rejects the null hypothesis. F-test is used to determine whether any one of the predictor variable is related to explanatory variable in model equation. From the above Table 14, it is evident that F significance value is less than .05 thus; at least one independent variable is linearly related to dependent variably thereby proving the validity of model equation.

Table 13 Regression Test Results (N-219)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.417	.209		-1.991	.048
	Technology	.213	.051	.183	4.162	***.000***
	Human Factors	.217	.040	.244	5.417	***.000***
	Economic	.101	.045	.115	2.219	***.028***
	Accommodation	.033	.044	.038	.743	***.004***
	Capacity	.086	.045	.102	1.896	***.005***
	Continual improvement	.107	.043	.114	2.482	***.014***
	Cost management	.094	.048	.100	1.952	***.002***
	Resource Planning	.207	.062	.197	3.310	***.001***
	Accessibility	.113	.051	.118	2.224	***.027***

a. Dependent Variable: Railway Transport Performance

Source: Survey result, 2022

The regression equation provides us two unstandardized slopes, both of which are partial statistics. OLS unstandardized coefficients can be understood as a one unit increase in X is associated with a coefficient sized increase (decrease) in Y. Standardized coefficients are the estimates resulting from an analysis carried out on variables that have been standardized so that their variance is 1. This means that they are in "standard deviation" terms or units and can be compared to each other. Whereas unstandardized coefficients literally tell us the change in Y for every 1 unit change in X. He also stated that the model summary table reports the strength of the relationship between the independent and the dependent variable.

For higher railway freight transport performance, among the productivity factors; there is a positive and significant effect of technology (.0001) on railway freight transport performance; also a positive effect of Human Factors on the railway freight transport performance (***Sig = .0001***) and there is a positive and significant effect of economic (.028) on railway freight transport performance. In line with study, Karlygash, et al., (2018) who stated a strong increase in productivity over this period seems to reflect the effectiveness of these measures. The results of

this study show that the greatest increase in productivity was due to improvements in technology, human and economic.

To examine the level of effect quality factors, the result indicated that there is also a positive effect of accommodation on the railway freight transport performance (***Sig = .004***). In line with this study, Getu (2020) found that 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.

There is also a positive effect of cycle time factors, this study found that there is a positive and significant effect of capacity (.005) on railway freight transport performance and there is also a positive effect of Continual improvement on the railway freight transport performance (***Sig = .014***). Similarly, Peter and Kennedy (2014) identified the most important complex indicators of the efficiency of the logistics system. The basis of this – is the duration of the complete logistics cycle – the time for the execution of the customer's order.

There is a positive and significant effect of proper cost management in better financial actions [Cost management (***Sig* =.002**)] on railway freight transport performance. In line with this study, Getu (2020) found that 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.

There is also a positive effect of proper scheduling by better Resource Planning on the railway freight transport performance (***Sig = .001***). In the transport sector, the planned activities in the long term focus on planning infrastructure development, modal redistribution of traffic and renewal of rolling stock (Karlygash, et al., 2018).

There is a positive and significant effect of user satisfaction by accessibility (.001) on railway freight transport performance. Similarly, Menglei (2016) outlined in major for standardization include: availability, accessibility, information, time, customer care, comfort, security, environmental impact, reliability, asset utilisation, technical performance, customer satisfaction, safety and security, and external influences on the operator.

4.6 Discussion

This study aimed to find out determinates of freight transportation performance of Ethio-Djibouti Railway Transport Share Company/EDR/. Therefore, the results of this study are discussed below based on the hypothesis and objects raised in Chapter two.

4.6.1 Technology

This study tested the most determinant factor that affects freight transport performance and to make sure that its influences on railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is a positive and significant effect of technology (.0001) on railway freight transport performance. The finding agrees with results of previous researches. The result of this study is consistent with the similar study done by Jaroslav (2018) revealed that it is a basis for the execution of the customer's order effectively. This is a best determinant for perform technical means, technological equipment and personnel involved in its system. Thus, this study concluded that technology has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

4.6.2 Human Factors

This study tested the most determinant factor that affects freight transport performance along and it made sure that it actually influences railway freight transport performance (Sig, 0.0001) through multiple regression analysis. And the result of the regression analysis shows that there is also a positive effect of Human Factors on the railway freight transport performance (***Sig = .0001***). The finding agrees with results of previous researches. The result of this study is consistent with the similar study done by Menglie (2016) human factors are significant factors for improving transport performance through operations plans to support traffic management. Dependability determine the performance of the system given the static components, such as, traffic management strategies, operational management, human factors, maintenance strategies and environmental factors. Dynamic components can be adapted over a relatively short term with moderately low cost. Thus, this study stated that human Factors has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

4.6.3 Economic

This study verified the most determinant factor that affects freight transport performance using multiple regression analysis. And the result of the regression analysis shows that there is a positive and significant effect of economic (.028) on railway freight transport performance. The finding agrees with results of previous researches. The result of this study is consistent with the similar study done by Laurence, et al., (2015). They confirmed that productivity and competitiveness are intrinsically related and competitiveness was frequently used to mean the ability to compete with manufacturers in other countries. It was never precisely defined in economic terms; however, it is important to define competitiveness in clear economic terms so that it becomes measurable. Thus, this study concluded that economic has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/.

4.6.4 Accommodation (AC)

This study attempted to find out most factors that improves railway freight transport performance; and to make sure that accommodation actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is also a positive effect of Accommodation on the railway freight transport performance (***Sig = .004***). The finding agrees with results of preceding researches. The result of this study is consistent with the similar study done by Menglei (2016), shows the capability of the services to provide train paths to customers. Accommodation is thoroughly related to effectiveness and efficiency measure. Thus, this study concluded that accommodation has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/ .

4.6.5 Capacity

This study established the most factor that affect railway freight transport performance; and to make sure that it actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is a positive and significant effect of capacity (.005) on railway freight transport performance. The finding agrees with results of preceding researches. The result of this study is consistent with the

similar study done by Karlygash, et al., (2018) who stated that railway freight transportation performance in the reliability of transit times can allow to increase transport performance. From side to side management of capacity and resources, intentional development aims at delivering the sufficient structure of train services to meet market requirements. Thus, this study established to capacity has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

4.6.6 Continual Improvement

This study verified the most factor that increases railway freight transport performance; and to make sure that it actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that is also a positive effect of Continual improvement on the railway freight transport performance (***Sig = .014***). The result approves with results of preceding researches. The result of this study is consistent with the similar study done by Karlygash, et al., (2018) that small, incremental improvement that occurs on a regular basis will eventually add up transport performance. Thus, this study concluded that continual improvement has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/ .

4.6.7 Cost

This study recognized the most factor that influences railway freight transport performance; and to make sure that it actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is a positive and significant effect of Cost management (.002) on railway freight transport performance. The result of this study is consistent with the similar study done by Laurence, *et al*., (2015) who stated that reducing the total logistics costs associated with obtaining supplies and moving finished goods to market improves productivity by allowing businesses to produce more with fewer resources. Access to low-cost suppliers can also reduce input costs. Thus, this study concluded that effective cost management has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

4.6.8 Resource Planning

This study tested the factor that influences railway freight transport performance; and to make sure that it actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is also a positive effect of Resource Planning on the railway freight transport performance (***Sig = .001).*** The result of this study is consistent with the similar study done by Bougna and Crozet (2016) that found for a better performance, it is to improve performance management strategies or railway planning and management. Journey time is considered as the total applied consumed time for trains to complete their trips, without connections with other services (Menglei, 2016). Thus, this study concluded that resource Planning has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/

4.6.8.1 Accessibility

This study investigated the most factor that influences railway freight transport performance; and to make sure that it actually influences railway freight transport performance (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that there is a positive and significant effect of Accessibility (.001) on railway freight transport performance. The result of this study is consistent with the similar study done by Bougna and Crozet (2016) and Menglei, 2016 who found that accessibility can lead to improve that railway freight transport performance. Convenience via a good railway connectivity shows the cargo interchange time between any two services at a given interchange. It is associated to both the number of possible connections and connection times at the interchange station (Laurence, *et al.*, 2015). A railway timetable should ensure sufficient train separations and avoid train traffic conflicts and provide traffic information to passengers (Menglei, 2016). Thus, this study established to accessibility has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/.

Table 14 Summary of Hypothesis

Objectives/ Hypothesis	Sig.	Expected Sign and Found	Decision
H_{1a} – Technology has a positive and significant effect on transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.000***	+	Supported
H_{1b} – Human Factors has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.000***	+	Supported
H_{1c}– Economic has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.028***	+	Supported
H_{2a} – Accommodation has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.004***	+	Supported
H_{3a} – Capacity has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.005***	+	Supported
H_{3b} – Continual improvement has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.014***	+	Supported
H_{4a} – Cost managment has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.002***	+	Supported
H_{5a} – Resource Planning has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.001***	+	Supported
H_{6a} – Accessibility has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/	***.027***	+	Supported

Source: Survey result, 2022

CHAPTER FIVE

SUMMARY OF KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented the discussion of key data findings, conclusion drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn were focused on addressing the objective of the study.

5.2 Summary of Key Findings

This study found that the most effect way to improve railway transport performance will be continual improvement and cost management. In addition, the level of railway transport performance was high due to better scheduling. Moreover, this study found that it calls a quality and cycle time improvements in surveyed organization. Further, this study revealed that

- For higher railway freight transport performance, the main productivity factors were technology (Sig., ***.0001***), Human Factors (***Sig = .0001***) and economic (***Sig =.028***)
- In investigating the determinants of quality factors, accommodation (***Sig = .004***) has a positive and significant effect on freight transportation performance of Ethio-Djibouti Railway Transport Share Company /EDR/
- In examining cycle time factors, this study found that capacity (***Sig =.005***) and continual improvement (***Sig = .014***) have a positive and significant effects on railway freight transport performance
- To addresses proper cost management in better financial actions, this study revealed that there is a positive and significant effect of cost management (***Sig* =.002**) on railway freight transport performance.
- In railway effective scheduling, this study revealed that there is also a positive and significant effect of resource planning on the railway freight transport performance (***Sig = .001***).

- Through investigating the determinant factors by the use of user satisfactions, this study found that accessibility (.001) has a positive and significant effect on freight transport performance of Ethio-Djibouti Railway Transport Share Company /EDR/.

5.3 Conclusions

This study concluded that there is high level of improvements on performance of freight transportation in the case of Ethio-Djibouti railway transport share company (EDR). In railway transport, installation of modern ICT based systems including trains control, wagon management, cargo tracking, costing model, materials management, financial management, human resources management, performance/productivity evaluation and track and rolling stock maintenance management systems. Thus, for developed railway freight transport performance, the main productivity factors included technology, human factors and economic.

The dimensions of quality of service can be demarcated and are even quite well known including just-in time delivery, reliability, safety, sufficient production capacity but that the problem of evaluation is related to the restriction of the evaluation framework to a single quantified indicator (such as the ton-km). Thus, the study concluded that accommodation has a positive and significant effect on factor of freight transportation.

Railway transport performance attainment helps to reduce inventory levels and rely more on just-in-time shipments, reducing their total logistics cost of production. This is because insufficient capacity on some corridors and the poor quality of infrastructure add to the cost and time of road transport. These freight flows by road are likely to increase in the coming years as a result of continues improvements, including improvements to roads, freight terminals and customs facilities. Thus, this study concluded that there is also a positive effect of cycle time including capacity and continual improvement factors on the railway freight transport performance.

The basic infrastructure for railway road transport is available, but “missing links” constrain route choice. To be effective, the use of effective cost management can help to improve customer service, planning time, reduce journey times and distances and thereby reduce fuel costs. Thus, this study comes to conclude that there is a positive and significant effect of proper cost management in better financial actions (cost management including working capital governments) on railway freight transport performance.

It is also necessary to have a better feasible schedule for each train path based on the available infrastructure, with consideration of track, junctions, platforms, and the signalling system. Drivers can be alerted of changes in their schedules and warned of problems in advance. In addition, drivers can contact supply chain partners, vehicle recovery services, and the police in case of emergency. Thus, this study concluded that proper scheduling by better Resource Planning is a determinate factor for railway freight transport performance.

With the liberalisation of access to provide services over rail networks in different parts of the world, formerly domestic rail freight operators have started to become more international in nature. The infrastructure used by these modes is easily accessible and often lacks surveillance (such as major roads, bridges and tunnels). In addition, road goods vehicles are readily available and difficult to monitor for such use. It is therefore important that efforts are made at an international level to harmonise national security standards across borders to help prevent the risk of terrorist-related activity using road and rail. Thus, accessibility is determinate factor for effective railway freight transportation performance.

5.4 Recommendations

- This study suggests that ERD provides high-quality information to serve Government, private and public industries, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information.
- ERD periodically needs to review quality issues and adjusts its programs and processes to ensure continuous quality improvement.
- This study suggests that ERD needs more foreseeable transit times for a more efficient scheduling and improved utilization of its railway cargos. Also, it creates a higher probability of on-time delivery and reduces the cost of reliable service.
- ERD should strengthen the planning, performance monitoring and evaluation departments and furnish them well. This would help in recognizing the role of transport management in railway freight transport operations hence enable this organization to properly plan in advance with greater stakeholders involvement on how to deal with various railway freight transport operations activities and reduce the impact of railway freight transport operations management challenges facing them.

- The railway freight transport operations in Ethiopian should also confirm that they gather proper information in order for them to deliver right products to disaster areas.
- In the same way, railway freight transport operations should collaborate with other entities such as the government to develop infrastructures countrywide especially in disaster prone and high business activity areas. This will facilitate easy accessibility of the railway freight transport operations and enable delivery of services at the right time.
- ERD executives should take measure to fulfil on time stock replenishment and provide distribution plan head of time since this action would increase efficiency of the supply chain and its operations. Therefore, ERD would outsource some of non-core services like warehousing, transport, and inventory to 3PL providers in order for them to break-even and increase overall performance of the company.

5.5 Implications for Stakeholders

In the present study, this survey was designed to assessing the railway freight transport performance improvements. Essentially, the findings of this survey will be beneficial to all transport organizations that have presently executing transport services in particular and other organizations implementing their business and production operations. Stakeholders' participation, coordination, collaboration and competency play a significant role in the overall railway freight transport performance enhancement and the relationship between them cannot be overlooked. Organizational performance incorporates three specific areas of firm outcomes of beneficiaries' satisfaction and interest, financial performance, shareholder return and the ability of an organization to fulfil its mission through sound management, solid governance and a determined rededication to achieving results and effectiveness.

5.6 Suggestions for Further Research

This same study can also be replicated in other areas like Road and air transport services after some time to find out whether the findings will still remain the same or there will be major shifts in the observations that have been made in this study. A comparative study can also be conducted to establish similarities and differences between Ethiopian transport organisations performance as well as Ethiopian and another country. This will bring more understanding on quality,

coordination, information technology, human engagement and employee performances and their associated challenges.

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APPENDIX

Annex I - Questionnaire

DETERMINANTS OF FREIGHT TRANSPORTATION PERFORMANCE IN THE CASE OF ETHIO-DJIBOUTI RAILWAY TRANSPORT SHARE COMPANY (EDR)
(Employees Survey)

Greetings, Dear

I am Tewodrose Legesse Molla, a post graduate student of Master of Logistics and Supply Chain management, School of Commerce, Addis Ababa University. I am carrying out a study on ***Determinants of freight transportation performance in the case of Ethio-Djibouti Railway Transport Share Company (EDR).*** It will be of great value if you can share your wealth of knowledge by completing the attached questionnaire. Your answers will be handled with highest anonymity and confidentiality; this will be achieved by no indication of names.

Please kindly return the completed questionnaire to me. Your participation will be highly appreciated.

Yours Sincerely

Tewodrose Legesse Molla,
Email Address: tlegesse100@gmail.com and
Tell No. +251930440994)

Part A: Personal Profile

Instruction – please tick appropriate answer you choose.

Age (in years)	Young adults (ages 18-35 years)	[ ]
	Middle-aged adults (ages 36-55 years)	[ ]
	Older adults (aged older than 55 years)	[ ]
Sex:	Male	[ ]
Education level:	Female	[ ]
	Diploma and below	[ ]
	First Degree	[ ]
	Master and above	[ ]
Your work experience in EDR	Below 5 years	[ ]
	6 to 10 years	[ ]
	11 to 15 years	[ ]
	Above 16 years	[ ]
Which management level do you work	Low	[ ]
	Medium	[ ]
	Top	[ ]

B: Railway Transport Performance (Factors Affecting Railway Transport Improvements)

Direction- Please indicate the extent to which you agree or disagree with each statement on the probability of improvements in freight transportation the railway freight Transportation performanceand tick (√) in a box to the correspondent number. Note : - 5= Strongly Agree, 4= Agree, 3= Disagree, 2= Strongly Disagree, 1= Neutral

Variables	Dimensions	Measurements				
		1	2	3	4	5
Technology	EDR has Web-based solutions for customer response					
	EDR has improved equipment that helps to increases its efficiency.					
	EDR accumulates railway freight transport knowledge.					
Human Factors	Sufficient workforces are employed in EDR.					
	Teamwork was practiced in EDR to improve its transport performance.					
	EDR community developed social interactions.					
Economic	EDR's workers can able to produce more output due to their productivity.					
	EDR effectively utilize its capital to enhance its services.					
	EDR has smarter research and development funding scheme.					
Accommodation	EDR has sufficient freight container volume subject to a permitted maximum tonnage.					
	EDR has the capability of the services to provide train paths to customers.					
	EDR has extra space on each carriage that can be used in practice.					
Capacity	EDR has sufficient cargo capacity.					
	EDR has adequate system to handle shipments.					

	EDR has an ability to handle large shipments.					
Continual improvement	EDR identifies the appropriate service process for improvement.					
	EDR verifies the root cause(s) of poor service performance.					
	EDR has well organized Action Plan that correct the root cause(s) of poor service performance.					
Cost management	EDR has sufficient working capital					
	EDR is good at cash management.					
	Executives of EDR realize the impact of cash flow on operations.					
Resource Planning	EDR railway freight transport is well planned.					
	EDR properly estimate its railway freight transport timetable.					
	EDR secures high-class technology for a better scheduling.					
	Scheduling facilities are strengthened at EDR.					
Accessibility	EDR railway freight transport service is user-friendliness.					
	EDR railway freight transport service is convenient.					
	EDR railway freight transport service					
	Ease of access railway freight transport is an appearance of EDR.					

Section C: Railway Transport Performance (Railway Transport Improvements)

Direction- Please indicate the extent to which you agree or disagree with each statement on the probability of improvements in freight transportation the railway freight Transportation performanceand tick (√) in a box to the correspondent number. Note : - 5= Strongly Agree, 4= Agree, 3= Disagree, 2= Strongly Disagree, 1= Neutral

Variables	Dimensions	Measurements				
		1	2	3	4	5
Productivity	EDR has improved the ability to cope with the increased uncertainty.					
	EDR replies quickly for the most of its customer needs.					
	Number of transport orders launched per person-hour has been increased in EDR.					
Quality	EDR perfectly fillable with the exact quantity of each item available for delivery.					
	EDR perfectly packaged with the customer-designated packaging and labelling					
	EDR perfectly communicated with order status reports available 24 hours a day					
Cycle Time	EDR has simple procedure to order.					
	Order time is short in EDR.					
	Order processing time (OPT) is achieved as promised.					
	EDR tries to minimize the transportation cost per unit in import and export process					
Finance	EDR has been seen as a valuable resource by the clients.					
	EDR services provisions have been enhanced by meeting stakeholder's expectation.					
	EDR has improved its revenue for the last three years.					
	EDR has been able to reduce its operational costs.					
Schedule	EDR improves the delivery performance via scheduling.					
	EDR reduces service time and cost due to its better scheduling.					
	EDR has achieved minimum interchange time.					
User Satisfaction	EDR's fares are economical.					
	EDR provides convenience services.					
	Customers of EDR are satisfied with travel time.					
	EDR has comfortable services.					

1. How do you evaluate EDR's railway freight transport performance in respect to productivity, quality, cycle time and finance?

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2. What are the major improvements in freight transportation of Ethio-Djibouti Railway Transport Share Company /EDR

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3. What do you perceive or observe the competitiveness [improvements in freight transportation] and Productivity of Ethio-Djibouti Railway Transport Share Company /EDR?

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Thank you for your cooperation!

Annex II - Interview Checklist

I am Tewodrose Legesse, a postgraduate study of Addis Ababa university department of logistics and supply chain Management. I am conducting a study on railway transport performance with the following questions.

Can I continue to my questions? Thank you!

1 What are railwayfreight Transportation performance *standards? Please indicate the actual performances of EDR in terms of* productivity, quality, cycle time and finance?

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2 Do you believe EDR improves freight transportation through productivity, quality, cycle time and finance?

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3 Do you believe EDR is productive, user satisfaction, scheduling, maintained quality, improved cycle time and managed effectively its financial activities?

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Thank you for your cooperation!