FACTORS INFULENCEING CONTAINER TERMINAL EFFICENCY: A CASE STUDY ON MODJO DRY PORT

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DECLARATION

I, the under signed, declare that this thesis entitled “Factors Influencing Container Terminal Efficiency: A case study on Modjo Dry Port”, is my original work and to the best of my knowledge has not been presented for a degree by any other person, and that all the sources of material used for the thesis have been duly acknowledged.

Declared by:

Hailemariam Abera Bekele

_____

Date& Signature

STATEMENT OF CERTIFICATION

This is to certify that the thesis carried out by **Hailemariam Abera Bekele** on the topic entitled "Analysis of Factors Influencing Container Terminal Efficiency: A case study on Modjo Dry Port" is his original work and is suitable for submission for the award of Masters of Art Degree in Logistics and Supply Chain Management.

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ADDIS ABABA UNIVERSITY

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DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

This is to certify that, the thesis prepared by Mr. Hailemariam Abera Bekele entitled. "Analysis of Factors Influencing Container Terminal Efficiency: A case study on Modjo Dry Port". a thesis submitted to Addis Ababa University, school of commerce, department of logistics and supply chain management in partial fulfillment of the requirements for the award of the degree of master of art in logistics and supply chain management is complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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JUNE 2020

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LIST OF ACRONMYS AND ABREVATIONS

ESLSE: Ethiopian Shipping and Logistics Services Enterprises

DEA: Data Envelopment Analysis

COLS: Corrected Original Least Squares

VEM: Vector Error Model

ICD: Clearance Depot

IMF: International Monetary Fund

LLDC: Landlocked Developing Countries

LPI: Logistics Performance Index

C& F: Clearing & Forwarding

CFS: Custom Freight Station

DOD: Delivery Order

SPSS: Statistical Package for Social Sciences

TEUT: Twenty Equivalent Units

UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

UN-OHRLLS: United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States

UNCTAD: United Nations Conference on Trade and Development

ABSTRACT

Since the logistics industry involves many stakeholders in locally and globally it is exposing for many challenges the challenge is worth and different especially for those countries that have no their own direct port access. Since the independency of Eritrea in 1991, Ethiopia became landlocked. As a result, the country has been compelled to use neighbor countries for its imports and exports. In order to reduce some of the problems related with transit, Ethiopia has been constructed the first dry port in Modjo. To reap the maximum benefit from Modjo dry port, the efficiency of the dry ports is very crucial and to do that it is important to identify factors that influence the efficiency of dry ports. Currently, many factor influences Modjo dry ports container terminal efficiency. This study revealed that factors such as port machineries, container holding trucks, warehouse operation, custom operation, and size of the dry port directly influencing container terminal efficiency. The research findings thoroughly explained these factors and discussed how they influence container terminal efficiency of Modjo dry port container terminal. The primary objective of this study was to analyze factors influencing container terminals efficiency with a case study of the Modjo dry port container terminal. The target population of the study was approximately 500 people, which included terminal operators, Modjo dry port staff, freight forwarders, and transporters. Questionnaire was the major instrument used to obtain primary data from the respondents, while the secondary data obtained from existing empirical literature relevant to the study. The study employed an exploratory approach using a descriptive survey design. The questionnaire was designed using Likert scale type. Samples of 80 respondents obtained through a stratified sampling technique of which 56 of the respondents participated in the survey. The data analyzed using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel 2013. The result of the analysis indicated that, port machineries, container holding truck, warehouse operation, customs operations, size of dry port, found to be influential factors in determining the efficiency of Modjo dry port. Recommendation has been produced on investment in port machineries and heavy trucks, improvement in efficiency of warehouse operation, customs operations, expansion of port area, arranging local and international training for machinery operators and workshop maintenance technicians and improvement of poor management and overall working environment are recommended to get due attention by Ethiopian Shipping and Logistics Service Enterprise (ELSE).

Key Words: Container Terminal Efficiency Modjo Dry Port Container Terminal

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The dry port container terminals are the backbone in defining the efficiencies of global logistics and supply chains (Ng and Liu, 2014). In most cases, dry port container terminals has been treated and categorized as service industry. In addition, their main task was to ensure an efficient continuity of goods in transport and logistics chain in order to create an infrastructure harmony for imported and exported goods, services and information and communication systems by providing a multi-model transport ensuring a benefit in "door-to-door" services (SPO, 2003)

Specifically, dry port container terminals engage in various activities loading/discharging cargo onto/from trucks; providing value- added services such as labeling, packaging, cross docking, and others; and acting as warehouse and distribution centers (World Bank, 2007).

Dry Port container terminals have been consistently adapted to the evolving changing environment to sustain themselves in tough competitive environments (Woo et al., 2011a).

Now a day, dry port container terminal experienced a number of challenges and reorganized to survive in an uncertain logistics environment because of intension of different port stakeholders like port authorities, port users, service providers, and related communities, in economic, social, and environmental issues are sometimes in conflict. (Notteboom and Winkelmans, 2003)

As different studies shows the challenge is worse in a country that are landlocked like Ethiopia.

Landlocked refers to the geographical situation of a country without direct access to the sea According to the definition there are 44 landlocked countries in the world and of these, the United Nations lists 32 as landlocked developing countries (LLDCs) that are low and middle-income countries based on the World Bank country classification with a population of nearly 440 million. Ethiopia, as one of a landlocked country, has established its trade route along the Ethio-Djibouti corridor. (Arvis, et al. 2014)

The Ethio-Djibouti corridor is a main outlet to the sea and 925 Kilometers from Addis Ababa. It is the main route for Ethiopia's import and export trade that dominated by freight transport.

The Ethiopian economic growth has resulted in the growing demand of container cargo that was a standardized package for faster handling of cargo and reduces risk of damage to the subject cargo. However, the growth of containerization has created many challenges like higher requirements on terminals, cities, and communities. Solutions to increase capacity either through

physical expansion or through better utilization of resources employed to alleviate congestion and bottleneck problems that constrain the terminal's efficiency. In response to the steadily growing volume of cross boundary trade, as a result, Ethiopia has moved to establish various inland dry ports in different part of the country. The first of these dry ports in Ethiopia has been start operations in the first half of 2009. It is located at Modjo, nearly 75 km East of Addis Ababa. (ESLSE, magazine October 2019)

The dry port container terminals found in Ethiopian presented as an opportunity to strength intermodal solutions as part of an integrated and more sustainable transport chain for transporting goods by truck and rail. Moreover, due to economic deregulation enacted in many sectors including freight transit and a program of privatization, state assets in combination with a rapidly growing economy powered by the Ethio-Djibouti corridor resulted in the growth of the transport industry. (ESLSE, magazine October 2019)

The purpose of the enterprise establishment was to operate in dry ports, ships, and transports. and the main service provided by the enterprise are to provide the services of loading and unloading and storage of imported and exported goods, to provide the services of stowing and unpacking (stuffing and unsnuffing) of containerized export and imported goods, to provide container depot services and to engage in other related activities for the achievement of its purposes.

The efficient utilization of scarce resources is an ongoing trend in dry port container terminals. The trend not only attract more research, but also caused the researcher to use their talents and innovations to investigate the influential factors and difficulties that contributed to the inefficiencies that currently dry port container terminals operation facing.

The influential factors in the efficiency of container terminals leads to identification of gaps and shortcomings, as well as inefficiencies in utilization of scarce resources that, in turn, help to improve efficiency. (IAME, 2015)

Most of the studies on dry port container terminal, were related to efficiency measurement traditionally focus on the factors that influence its performance and productivity. In such studies, various research scopes and approaches used for efficiency analysis and economic optimum utilization of resource.

This study was focus on factors influencing container terminals efficiency in Modjo dry port container terminal, which is one of the first and the biggest dry port container terminal of the country.

1.2. Statement of the Problem

Ethiopia, like many countries in Sub-Saharan Africa, is enjoying a period of rapid growth in the past decade and within this period, the country international trade has grown rapidly. However, like other land locked developing countries lack of direct sea access imposes growing challenges to global integration and growth (Fekadu, 2013).

This in turn exposed the country for high transit transportation costs, limitation of technical and technological capacity, imported inflation, limited investable resources, and low mobilization of domestic financial resources to finance the massive investment requirement for rapid growth. Further to these, the country poor logistics raise costs for local industries and hamper the country's competitiveness in the global market (IMF, 2014).

According to IMF Country Report (2014), inefficient logistics not only impede Ethiopia's exports potential, they also increase the costs for consumers for imported goods. Improving trade logistics are thus very important for making Ethiopia's export sector globally competitive.

In order to counter those challenges associated with land connectedness (landlocked) (ESLSE ANNUAL MAGAZINE, 2017) established several dry ports in different part of the country to take the advantage of inland port.

The Modjo container terminals dry port in its first operation accommodating only 700 containers at once but now a days the capacity of accommodating container reaches 14,000 containers at a time, with 1000 containers in and out per day and the terminal has a share of about 76 percent import-export destination of Ethiopia. (ESLSE ANNUAL MAGAZINE, 2017)

As per ESLSE data containers transported from Djibouti port and unloaded & got service on inland ports have been increasing from 19,629 in 2004 to 170,833 in 2011 E.C. Accordingly in 2004, 19,629 in 2005, 60,799 in 2006, 84,869 in 2007, 114,396 in 2008, 159,051 in 2009, 169,241 in 2010, 165,502 and in 2011 170,833.

However, the number of container handling increase from year to year the efficiency of the terminal in providing the service is unsatisfactory in the eyes of different stakeholder and terminal operators.

There has been complaints from employee of the port and different customer on congestions due to inefficient performance trend on container delivering processes in port machineries, container holding trucks, long custom clearance process, terminal warehouse operation, size of the port and other delays are said to be the causes of slow operations processes and hence congestions at the terminals. As mentioned earlier, the influential factors for the inefficiency of the terminal

thought to be many however, for the consumption of this study limited influential factors were considered as independent variable as, container handling equipment (Port Machineries), heavy truck, machinery and heavy truck maintenance workshop, long custom clearance process, terminal warehouse operation and size of the dry port. (ESLSE ANNUAL MAGAZINE, 2017)

Thus, this research will focus on factors that influencing container terminals efficiency and calls for other options in addressing the problems that affects container terminal efficiency thereby to enhance the efficiency of the container terminals.

1.3 Research Questions

This research will try to address the following research questions:

- ✓ How the effects of port machineries on Modjo dry container terminal efficiency?
- ✓ How the effects of heavy trucks on Modjo dry port terminal efficiency?
- ✓ How the effects of customs operations on Modjo dry container terminal efficiency?
- ✓ How the effects of warehouse operations on Modjo dry container terminal efficiency?
- ✓ How the effects of dry port size on Modjo container terminal efficiency?

1.4. Objective of the Study

1.4.1 General Objectives of the Study

The general objective of the study is to explain the effects of different factors on Modjo container terminal efficiency.

1.4.2 Specific objectives

- To explain the effects of port machineries on Modjo dry port container terminal efficiency
- To explain the effects of container holding trucks on Modjo dry container terminal efficiency.
- To elaborate the effects warehouse operations on Modjo dry container terminal efficiency.
- To elaborate the effects of customs operations on Modjo dry container terminal efficiency.
- To explain the effects of dry port size on Modjo dry container terminal efficiency

1.5. Significance of the Study

This study was indeed significant because the dry port container terminal plays a major role toward the economic growth and development of the country. Modjo dry port container terminal has a strategic importance far beyond the borders of Ethiopia. As the largest dry port of the country, it is the main gateway for the import and export of goods not only for Ethiopia but also to countries of the East African Community (EAC, 2017)

The findings from this research primarily benefited Modjo dry port container terminal, Ethiopian shipping, and logistics service enterprise (ESLSE) by providing an in-depth knowledge on practical implications on factors influencing container terminal efficiency.

Moreover, the study seeks to benefit all stakeholders and players within the logistics industry especially, container terminal operators, decision and policy makers.

Finally, the research would be great benefit to government of Ethiopia, its neighboring countries and other African countries who have similar problems with terminal inefficiencies. as the findings and recommendations from the study were well utilized and taken into consideration by the appropriate authority and stakeholders, then the issues of container terminal inefficiencies can be adequately addressed thus enhancing the capacity and productivity of their ports which onward will boost economic growth and development.

1.6. Scope of the Study

The study focuses on the factors influencing the efficiency of container terminal at Modjo dry port. The research conducted within the dry port container terminal of Modjo and specifically looked at how some factors contributed to the efficiency of container terminal in Modjo.

The independent variables were container handling equipment (Port Machineries), customs operations, container holding trucks, terminal warehouse operation, and size of the dry port while the dependent variable is the efficiency of the dry port container terminal.

The questionnaires will distributed to stakeholders who make use of the facility in container terminal dry port operation like container terminal operator, Modjo dry port staff, freight forwarders, and transporters.

1.7. Limitations of the Study

It is obvious that every study encounters challenges and difficulties of which this study is no exception. Because of the current COVD 19 epidemic and other reason of the respondents, there has been challenges in collecting the distributed questionnaires on time and on required quantity, as a result some of the questionnaires were not collected. This perhaps would be deducing that a few numbers of the respondents were not willing to participate in the survey. Because of this, the expected sample size affected to some extent.

Due to time and budget, constraint the study focused on Modjo container terminal dry port only.

1.8 Definition of Terms

Dry port

A dry port is an inland intermodal terminal directly connected by road or rail to a seaport and operating as a center for the transshipment of sea cargo to inland destinations.

Close dry ports /Satellite Container Terminal

Dry ports to relieve the seaports from the burden of space shortage, congestion, and environmental issues

Mid-range dry port/ Freight Distribution Clusters (Load Centers)

Functions as a consolidation center for diverse rail services, denoting technical and administrative equipment define for sea transport. (Roso et al. 2009)

The distant dry port/ Transshipment Facilities:

Is situating near the market might be the consuming area in import-based supply chains, or a core production location in export-based supply chains. (Roso et al. 2009)

Data Envelopment Analysis (DEA)

DEA is a mathematical programming approach to estimate productive efficiency.

Vector Error Model (VEM)

The earliest models employed stochastic frontier analysis (SFA) and data envelope analysis (DEA). (Cullinane and Wang 2006)

Corrected Original Least Squares (COLS):a parametric approach to evaluate efficiency. (Greene, 1993)

Original Least Squares (OLS)

Estimation method is a regression method that fits an average line through the data. (Wang, 2006)

Port Efficiency

Often means speed and reliability of port services. Cited ‘on-time delivery’ as a major concern by most shippers, in fast-paced industries where products must be moved to the markets on time. (UNCTAD, 1992)

Multimodal

It as a means the carriage of goods by at least two different modes of transport based on a multimodal transport contract from a place in one country at which the multimodal transport operator takes the goods in charge to a place designated for delivery situated in a different country. (United Nation, 1980)

Container

Containers are steel box built to standardized dimensions as cargo carrier, can be loaded and unloaded, stacked, transported efficiently over long distances and transferred from one mode of transport to another-container ships, rail and semitrailer trucks-without being opened. (Huynh, 2009)

Container Terminal

Container terminal is where a number of container vessels often berthed alongside, and each vessel served by multiple quay cranes that supported by large number of yard cranes in the yard. (Huynh, 2009)

Operational Efficiency

The operational efficiency of a port generally measured in terms of the speed with which the cargo delivered from the ship, yard up to out gates. (Tongzon, 2002)

1.9. Organization of the Research Report

The research report consisted of five chapters and it organized as follows.

The first chapter would be an introductory part in which background of the study, statement of the problem, basic research questions, objectives of the study, significance of the study, scope of the study, limitation of the study, definition of terms and organization of the study would be presented. In chapter, two of these report review of both theoretical and empirical literature on different factors that influence the efficiency of container terminal dry port presented. Subsequently, methods of the study would present in chapter three. Then, chapter four would summarize and discuss the finding of the study.

Finally, on Chapter 5, the main findings of the study would summarize and conclusions would draw based on the results of the study and the paper would forward appropriate recommendations and policy implications.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents the literature reviewed in areas related to the objectives of the study. It focuses on the theoretical and empirical literature review by defining of container terminal and their functions. It then presents the extant literature on how container handling equipment (port machineries), customs operations, container holding trucks, warehouse management, and size of port could influence the efficiency of container terminal. The study also looked at the conceptual framework, critique of existing literature, summary and research gap.

2.1. Theoretical Literature Review

The ability of countries to deliver and/or receive goods and services on time and at the lowest possible cost is a key factor of integration into the world economy today. Logistics services which include activities required for the transportation, storage and handling of production inputs and finished products from producers to consumers or intermediary producer), play a critical role in international trade. (Caldeirinhaet al. (2011)

Consequently, the efficient supply of logistics services helps to facilitate international trade. Hence, the more timely, reliable, and efficient the logistics supply chain, the more efficiently and reliably goods can deliver from the point of production to the point of consumption. (Tilahun, 2014)

2.1.1 Drivers behind the Emergence of Dry Ports Container Terminal

Major drivers behind the development of dry ports include; sustainable access to hinterland locations, constraints at the seaports and a means to facilitating economic zones that are considered nodes in the supply chain. (Veenstra et al. 2012)

Several gateway ports currently confronted with development limitations such as diseconomies of scales, environmental issues, and land availability. (Roso 2005)

Considering these restrictions, most seaports have delved into the development of dry ports as a solution to relieve burdens while improving in the operations through a modal slip. Additionally, another reason for developing dry ports is to gain a competitive position through the expansion of hinterland connectivity. (Caballing and Gattorna, 2009)

2.1.2 Dry Port Container Terminal Definition

There is no universal definition provided for dry port, and different authors have adopted different definitions.

Dry port is a common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods including containers. Here the work is do through customs transit by any applicable mode of transport placed under customs control and with customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export. (UNCTAD, 1991)

Dry port as an inland intermodal terminal directly connected to one or more seaports, with a high capacity transport option, most likely rail, where customers can collect or drop off their containers as if they are in a seaport. (Roso et al. 2009)

In 1991, the council of Europe gave a simple definition stating dry port as a landlocked station that connected to the seaport directly and geographically. (Zou, 2009)

A dry port can understood as an inland setting with cargo-handling facilities to allow several functions to carry out different functions for example, cargo consolidation and distribution, temporary storage of containers, custom clearance, connection between different transport modes, allowing agglomeration of institutions both private and public which facilitates the interactions between different stakeholders along the supply chain. (Ng and Gujar, 2009)

In general, a dry port conducts functions very similar to contemporary seaports, especially its role as the distributional nodal points along intermodal supply chains. (Meersman, et al. 2005)

In this research, dry port defined as a terminal located in land locked country directly connected to the seaport with traffic modes, which offers services for handling and temporary storage of any kind of goods placed under customs where customers can collect their shipments after getting a clearance.

2.1.3 Concept of Dry Port Container Terminal

The concept of dry ports became global in conjunction with containerization.

Dry Port or Inland Clearance Depot (ICD) defined as a common user facility with public authority status that equipped with fixed installations and offering services for handling and temporary storage of any kind of goods including containers. The job is done through carried under customs transit by any applicable mode of transport, placed under customs control and with customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export. (UNESCAP, 2012)

2.1.4 Benefit of Dry Port Container Terminal

As per study conducted by (UNCTAD, 1991), the potential benefits of dry port container terminals summarized as follow:

Improved communications: Simple, rapid transfer of documentation and information, fundamental to efficient cargo transit, may be achieved by linking the introduction of computerized freight tracking or customs clearance to the provision of a dry port. UNCTAD, 1991)

Benefits to seaports: apart from lowering congestion, the establishment of dry ports also results in reduced handling of goods at related maritime ports. There is a reduction in demand for storage space owing to faster onward transit, saving in both capital costs of providing handling equipment and warehousing as well as in equipment maintenance costs. With greater containerization of transit cargos, maritime ports also gain the advantage of higher berth throughputs, thus reducing the cost per unit of cargo handled. (UNCTAD, 1991)

Lower customs staff costs: As dry ports allow customs clearance to be concentrated at a few sites, it may be possible to affect the same volume of clearance with reduced customs involvement, especially where a dry port accessed by two or more gateway ports. UNCTAD, 1991)

Greater use of containers: the establishment of a dry port with container-handling facilities can encourage greater use of containers. Containerization of cargo carried in boxes of standard dimensions that allow the containers to handle mechanically, transferred from one mode of transport to another. Efficiently and without disturbing the actual cargo inside, owing to high unit volume and weight handled per move, the productivity of handling equipment and throughputs is many times greater than if the same volumes of cargo were handle in break-bulk fashion. (UNCTAD, 1991)

Better utilization of capacity: A dry port can reduce empty rail wagon or truck movements by acting as a consolidation center for return loads of export cargo. The consignment increase in load factor may enable some savings to make in overall transport costs. (UNCTAD, 1991)

Avoidance of storage, demurrage, and late documentation fees:

In traditional transit systems, goods frequently held up at maritime ports or at land borders. And owing to the absence of documentation (such as ocean bills of lading or commercial invoices), minor irregularities in existing documentation, prepayment of handling charges in foreign currency, lapse of a bond, non-availability of onward transport, etc. in all such circumstances,

storage charges beyond the permitted free periods allowed may accrue, or demurrage charges and late documentation fees may arise. With a dry port and combined transport bills of lading, customs inspection at the maritime ports and at the borders of transit countries should be unnecessary or at least greatly minimized and many of the usual causes of delay at maritime ports would be removing. Storage costs, demurrage and late documentation fees will thus not occur. (UNCTAD, 1991)

Avoidance of clearing and forwarding agents' fees at seaports: These fees may completely avoid where a dry port allows the use of combined transport bills of lading or multi-modal transport documents. This is so when a shipping line issues such documents because the shipping line takes responsibility for the passage of goods through the maritime port. Hence, the importer or exporter does not need to employ a clearing and forwarding agent. (UNCTAD, 1991)

Increased trade flows: beneficial to a region or to the country as a whole.

Lower door-to-door freight rates: the consolidation of consignments and the greater use of containerization can contribute significantly to the introduction of lower through rates. Containerization offers numerous advantages. (UNCTAD, 1991)

2.1.5 Dry Port Container Terminal Classification

As per study conducted by (Roso et al. 2009), the classification of dry port container terminals summarized as follows:

Close dry ports /Satellite Container Terminal are to relieve the seaports from the burden of space shortage, congestion, and environmental issues. With abundant land, available, all high space-consuming activities, such as warehousing or sorting, shifted from seaports to dry ports. The customs clearance procedures could be carry out in these close dry ports. (Roso et al. 2009)

Mid-range dry port/ Freight Distribution Clusters (Load Centers) functions as a consolidation center for diverse rail services, denoting technical and administrative equipment define for sea transport. It works as inter-modal centers to consolidate or deconsolidate cargo from shippers. It can also function as a trans-modal/trans-loading terminal before cargoes are being transport to their designated markets. These types of dry ports are more beneficial to the seaports because it increases the hinterland access in getting close to customers. Pollution and congestions also tackled by the implementation of modal shift from trucks to barges/trains. (Roso et al. 2009)

The distant dry port/ Transshipment Facilities: Situate near to the market, which might be the consuming area in import-based supply chains, or a core production location in export-based supply chains.

This type of dry port plays an imperative role in the logistics system of landlocked countries to connect to international markets. In this case, the seaport will benefit from the connection to this type of dry port by gaining access to the inland market. (Roso et al. 2009)

2.1.6 Critical Review of Supporting Theories or Theoretical Analysis

Widely used approaches to measure/analyze the factors influencing container terminal efficiency/productivity include, stochastic frontier analysis (SFA), Data Envelopment analysis (DEA), Vector error model (VEM), Corrected original least squares (COLS), Original least Squares (OLS). (Roso et al. 2009)

Stochastic Frontier Analysis (SFA): measuring efficiency of container terminals by means of Bayesian Stochastic Frontier Analysis is a parametric and stochastic approach to estimate productive efficiency. A terminal is efficient if it produces a maximum output (container traffic in TEU) for given inputs (terminal superstructure). Traditional studies on container terminal efficiency tend to focus on partial productivity measures such as TEU per crane. (Culliname & Song, 2003)

Data Envelopment Analysis (DEA): DEA is a mathematical programming approach to estimate productive efficiency. The approach maps out a production frontier based on information on inputs and outputs. The degrees of efficiency were assesses by the distance between the observation and the frontier. The scholars claim that the efficiency of a container port is an important factor for the international competitiveness of the country. For this reason, intensive studies have carried out in order to determine port performance across all the regions of the world. (Cullinane and Wang, 2006)

Vector Error Model (VEM): The earliest models employed stochastic frontier analysis (SFA) and data envelope analysis (DEA). The model employed here is a Vector Error Correction Model (VECM), which takes into account the long run and short-run relationships among several variables: monthly container moves, gross labor hours, crane and straddle carrier operating hours and containers yard storage capacity. (Cullinane and Wang, 2006)

Corrected Original Least Squares (COLS) is a parametric approach to evaluate productive efficiency. It belongs to the regime of regression methods but differs from the original least squares estimation methods, in this approach one calculate an ‘average line’ that cuts through the

observations, and then shifts (corrects) the line to a position such that it encloses all the data. The corrected line can measured against this frontier. (Greene, 1993)

Original Least Squares (OLS): Estimation method is a regression method that fits an average line through the data. This average line calculated by the production or cost function, which represents the production technique of the considered industry and indicates information such as the degree of returns to scale of the industry and individual firms in the industry. (Cullinane and Wang, 2006)

2.2. Empirical Literature Review

The efficiency of container terminal can be influence by several factors in a competitive environment. Such as the market of the region where it is located, the physical and organizational capacity, the integration in the logistic networks, the level of competition, maritime and inland accessibilities, the type of handling equipment used at the quay and parking areas, the liner shipping services and inland networks to which they are connected. (Tongzon&Heng, 2005)

Port efficiency measurement is a challenging issue for most ports. The increased use of containerization and supply chains, the development of new production-distribution consumption systems and increased specialization of the different port markets have all affected port organization management and operation (Notteboom and Rodrigue, 2005)

Logistics Performance Index" is broader than a study of ports alone, and measures logistics instead. Yet the study is interesting as it includes port users' evaluations on specific factors dealing with logistics performance, as well as a framework on how to measure them. (World Bank's, 2012)

The Logistics Performance Index measures the ground trade of logistics performance based on six dimensions: timeliness, international shipments, tracking and tracing, customs, infrastructures and services quality. In doing so, six key areas of logistics performance indicators are identified Specifically, efficiency of the clearance process, quality of trade-and transport-related infrastructure, ease of arranging competitively priced shipments, competence and quality of logistics services, ability to track and trace consignments and frequency with which shipments reach the consignee within the scheduled or expected delivery time. (World Bank's, 2012)

2.2.1 Container

Containers are steel box built to standardized dimensions as cargo carrier, can be loaded and unloaded, stacked, transported efficiently over long distances and transferred from one mode of

transport to another-container ships, rail and semitrailer trucks-without being opened. There are five common standard sizes of containers, 20-ft (6.1m) length x 8ft (width), 40-ft (12.2m), 45-ft (13.7m), 48-ft (14.6m) and 53-ft (16.2m). The common use sizes are 20ft, 40ft and 45ft, while 48ft and 53ft are commonly United States domestic standards. A container capacity often expresses in twenty-foot equivalent units. (Mclean, 2012)

Container Types

General Purpose: It is suitable for the carriage of most types of dry goods. The size of this type of containers is 20' GP, 40' GP, 40' HC, and 45' HC. HC stands for high cube container that is one foot higher than general-purpose container (GP).

Refrigerated: Capable of transporting cargo from -13 °F (-25 °C) to 77 °F (25 °C). 5

Open Top: For carrying heavy and bulky finished products.

Ventilated: Prevent condensation inside the container.

Tank used for carrying hazardous and non-hazardous liquids.

Bin-liner: used for carrying garbage from cities to recycling and dumpsites.

2.2.2 Container Terminal

Container terminal is where a number of container vessels often berthed alongside, and each vessel served by multiple quay cranes, which supported by large number of yard cranes in the yard. When a vessel arrives at the terminal, containers normally discharged from the vessel, mounted onto trucks by quay crane, and then unloaded by yard cranes at various locations in the yard for storage. In the loading operation, export containers loaded onto trucks by yard cranes at the yard are off loaded at the quay and loaded onto a vessel by quay cranes. (Mark, 2005)

2.2.3 Container Terminal Operations

Container terminal operations are activities for transferring containers between modes of transport and provide a package of activities/services to handle and control container flows from vessel to landside and vice versa. (Koh and Ng, 1994)

2.2.4 Dry Port Container Terminal Efficiency Measures

Container terminal productivity/performance measures deals with the efficiency use of Labor, Equipment, and Land. Terminal performance measurement is a means to quantify the efficiency of the use of these three resources. (Dowd and Leschine, 2001)

2.2.5 Operational Efficiency

The operational efficiency of a port generally measured in terms of the speed with which the cargo delivered from the ship, yard up to out gates. The rate at which cargo handled and the

duration that cargo stays in port prior to shipment or post discharge and other delivering processes. However, Indicators to measure this efficiency are determined generally in relation to the tonnage of shipping calling at the port and of the volume of cargo handled since port services in the main rendered to ships and cargo. (Tongzon, 2002)

Productivity in ports generally measured in terms of the tonnage of cargo handled per unit of workstation per hour. In the case of general cargo, the workstation is the gang, with containers; it is the crane (or hook). Thus, productivity measured in terms of (a) tons per gang hour for general cargo and (b) TEUs/per crane or hook hour for container cargo. (Chung, 1993)

2.2.6 Port Efficiency

Often means speed and reliability of port services. Cited 'on-time delivery' as a major concern by most shippers, in fast-paced industries where products must be moved to the markets on time. Terminal operators as vital nodes in the logistics chain must be in a position to guarantee shippers a very reliable and quick service, Port efficiency reflect the turnaround time of ships and cargo dwelling time, (Tongzon, 2002)

2.2.7 Factors influencing container terminal efficiency

Very' few studies have empirically investigated the direct relationship between various factors and the efficiency of container terminal. However, a study of the literature allowed a reconstruction of the possible factors that could influence the efficiency of container terminal.

Since the environment in which ports operate has changed dramatically, ports are affected by various new forces driving global competition, including the far reaching unitization of general cargo, the rise of mega-carriers, the market entry of logistics integrators, the creation of network linkages among port operators, the development of inland transport networks, and so on. (Notteboom and Winkelmans, 2001)

In this context, different key factors that influence container terminal efficiency proposed based on the existing literature. These factors include container handling equipment or dry port machineries, container holding trucks, customs operation, warehouse terminal operation, and size of dry port.

2.2.7.1 Container Handling Dry Port Machineries

To move containers from trucks/rail to container yards and back will require the possession of specialized equipment by the dry port facility. The equipment/machineries required will include a number of loading/discharge appliances such as stevedoring pallets, hand trucks, hydraulic hand lift trucks, pallet trucks, and forklift trucks. (Brinkmann, 2011)

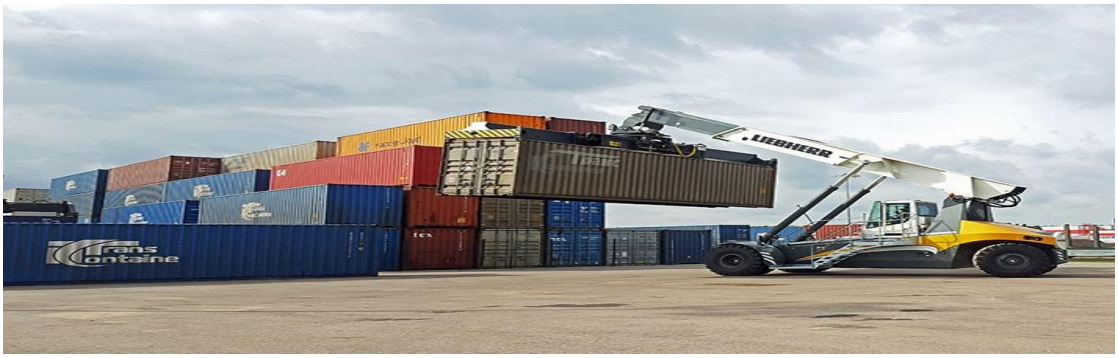
Similar to seaports, container-handling equipment used in dry ports, which include rubber tired gantry cranes, mobile cranes, top handlers, side handlers, reach stackers, forklifts, and so forth. Usually container handling equipment are viewed as the main machines for dry ports as well as seaports, and they can greatly influence both the container handling capacities and, in turn, the performance of the dry port. (Gujar, 2011)

Others will consist of tractors and trailers for horizontal transport over long distances, conventional hoists and gantry cranes for hoisting (UNCTAD, 1991). It will expect those container terminals that are well equipped expected to have a shorter container dwell time and will handle more cargo by volume. (Nathan Associates Report, 2011)

Similar container handling equipment is used in dry ports, which include rubber tired gantry cranes, mobile cranes, top handlers, side handlers, reach stackers, forklifts, and so forth. Usually container handling equipment are viewed as the main machines for dry ports as well as seaports, and they can greatly influence both the container handling capacities and, in turn, the efficiency of the dry port (Gujar, 2011)

2.2.7.1.1 Types of Container Handling Dry Port Machineries

Container Cranes: Container cranes are used to lift containers on and off ships/trucks by using a long horizontal arm called a 'boom' that is part of the crane which can reach over the container ship/ trucks. The crane has a specialized operator who sits in a glass cabin, which connected under a device called a 'trolley' near the top of the crane. The operator can move the cabin and trolley along the boom to get above the container that it wants to pick up.



Picture1. Container Cranes

Straddle Carriers: Straddle carriers are unregistered vehicles used to move containers within a container terminal. At Port, straddles work with container cranes to move the containers either to or away from the dock. The straddles also used to load or unload trucks that bring export containers into the port or the import containers that go by road to businesses in Victoria. The straddles operated by a driver who sits in a glass cabin at the top of the vehicle facing the middle

so that they can see all around them. Unlike most vehicles, the driver sits at right angles to the direction they are heading. The driver uses computers to tell them which containers they need to pick up.

Picture2. Straddle Carriers

Reach Stackers: Reach stackers are off-road vehicles used to transport containers that are waiting to move from one mode of transport to another such as from a rail wagon onto a truck. They are faster and more flexible than forklifts. Reach stackers are operated by a driver who sits in a cabin at the front of the vehicle which has a long arm that reaches over the top of the driver from behind. Reach stackers can pick up containers by using a device called a 'spreader' at the end of its long arm. The spreader placed on top of the container and it locks onto the container using devices called 'twist locks'. Reach stackers are able to place containers straight onto the back of trains or trucks or stack containers on top of each other for storage. They can use their long and flexible arm to stack containers up to four rows deep.

Picture3. Reach Stackers

Empty Container Handler: Empty container handlers are off-road vehicles used for handling empty containers that are to be stored in container yards. They are able to transport containers and stack them in rows up to seven containers high. Specialized drivers who sit in a cubicle in the middle of the vehicle operate empty container handlers. They pick up containers using a device called a 'spreader', which connects into the corners of the containers using specialized 'twist locks'. The container lifted up the long vertical arm of the handler, which can be about 20

m high. These machines are very important for storing containers in areas that have a limited area.

Picture 4. Empty Container Handler

2.2.7.2 Container Holding Heavy Truck

A **truck** defined as an automobile that designed to carry cargo most trucks and large have a "body-on-frame" construction, with the backbone of the truck consisting of what is widely known as a ladder frame. Container truck transportation is common throughout Africa as a means of moving goods from one place to another, where one truck vehicle is capable of moving one to two containers at a time. (Huynh, 2009)

Container trucks are commonly used freight transport vehicles in the form of a standardized and reusable steel container loaded on a truck. These boxes will travel on ships and then hauled by a truck, trailer, or other transport without having to unload or reload the cargo it contains. Trucks are the main workhorses of the international supply chain. Alongside railways, they are the main way to move goods across land in an efficient way. They are often fitted with chassis that can hold standardized shipping containers. (Hutson, 2008)

Container truck transportation is common throughout Africa as a means of moving goods from one place to another, where one truck vehicle is capable of moving one to two containers at a time. Container truck vehicles stuck in the traffic jam along Ethiopian road as they depart from Djibouti port. In the past, the East African region greatly relied on the container truck vehicles to transport goods from Ethiopia across to regional markets. This is about to change with the introduction of Standard Gauge Railway in Ethiopia, goods will be transported by double stack trains. Double stack trains are modern cargo trains that carry two layers of containers on top of the other and are capable of moving more than one hundred containers at a time.

Trucks in the Supply Chain: Trucks can get to places that other transportation methods cannot.

Railways do not travel to all destinations, and airfreight is expensive and limited by weight and available airports. This makes trucks the default choice for moving large quantities of goods. Trucks move more goods domestically in the U.S. than railway, water, airfreight, and pipelines combined. When pulling a chassis, a truck can move shipping containers quickly and efficiently.

Some disadvantages of container truck service: It is greatly affect by traffic jam due to congestion and narrow roads; it is more expensive for long hauls than some competing modes of transit. It is too expensive for many low-grade and bulk commodities in intercity service. It is limited somewhat as to what it can carry by the size of the vehicles used and by size and weight restrictions imposed by states. It is affect by weather and road conditions

While Ethiopia is seeking to reduce its dependence on a single corridor, the immediate focus for logistics improvements is the corridor to Djibouti. The corridor now handles more than 95 percent of Ethiopia's trade, and more than 850,000 tons per month. For the port itself, traffic originating from, or destined to, Ethiopia accounts for more than 80 percent of all port traffic. The key link is to Addis Ababa and the surrounding area where about 90 percent of inbound containers processed at the Modjo Dry Port. Low load factor of freight vehicles contribute to the frequent entry of freight vehicles to the city, which increase transport cost for the operation and congestion in the city. (ESLSE, MAGAZINE, 2018)

ESLSE has heavy trucks that speed up transportation of freight from Djibouti to inland ports or other designated destinations. In this regard, ESLSE originally had 60 heavy duty trucks with a total lifting capacity of 2400 tons of dry cargo and at a time Comet Transport SC join to the enterprise, 205 heavy duty trucks are added up, In addition 215 new Renault Trucks bought that raised the land fleet capacity of the enterprise to 480 trucks. Apart from its own trucks, ESLSE sub-contracts trucks for direct or consolidated cargo delivery from private and public transport operators. (ESLSE, MAGAZINE, 2018)

Picture5.Container Holding Heavy Truck

2.2.7.3 Warehouse Operation

Warehouse is an automated, unmanned, and paperless warehouse when conducting the operations of pickup, delivery, and bookkeeping. (Liu et al., 2018, p.1 Liu et al. 2018)

Warehousing has been a foremost element of modern supply chains as a competitive strategy to improve organizational performance. The role of warehouse has been changing over recent years since the prominence has placed on customer satisfaction and visibility of the supply chain. With the competitive market conditions and the dynamic customer demands, it has been difficult to meet the requirements with the traditional warehouse management approaches, due to their complexity and low efficiency. (Hettiarachchi & Ranwala, 2015)

Warehouses is one of the major obstacles for efficient freight transport and logistics system of the country in rural, regional and international freight movement and distribution system is lack of storage facilities, adequate loading and unloading equipment and efficient management of the system. At present, there is a total of about 0.8million metric ton capacity warehouses all over the country. Public institutions such as coffee marketing, Ethiopian grain trade enterprise, and World Food Program etc. own most of these. (ESLSE, 2018)

Most warehouses particularly the private ones not designed to handle heavy truck trailers and semi-trailers. Adequate doors and turning areas not provided. In short, there is no standard set for commercial warehouse building. There is a serious lack of cargo handling equipment all over the country, which normally is part of warehousing businesses. Cranes, forklifts and other equipment's are rented as and when cargo is already waiting to be loaded and unloaded at the warehouses. (Afro Consult & Trading PLC, 2010)

Warehousing is the segment of enterprise logistic functions responsible for the storage space and managing of the inventories beginning with suppliers receipt and ending with the consumption point. Warehouse operations cover a number of significant areas, from the receiving, organization, fulfillment, and supply processes and areas including Receiving of goods, integrating and maintaining tracking software. Goal of warehouse operations is to satisfy customer's desires and necessities whereas utilizing house, equipment, and labor effectively. (Hettiarachchi, 2015)

The current trends and pressures on provide chain and logistics-forever increasing client examine levels; inventory optimization, time solidity, and cost minimization have predictably changed the structure of supply chains and the location site and working of warehouses within the supply chains network. (Afro Consult & Trading PLC, 2010)

The role of Warehousing in Dry Ports

Warehousing is a critical importance to Port-Centric Logistics (PCL) because it allows businesses to store their goods at a port, as opposed to a separate distribution center. This cuts out unnecessary air miles, emissions and costs, and significantly streamline supply chain processes. The demands of the global economy have meant warehouses have changed and become increasingly important in the flow of goods. (Ranwala, 2015)

A decade later, they now utilized as strategic hubs of e-commerce within a multi-tiered supply chain. This change has brought about by the same trends that have made PCL such an extensively explored idea. Here are three of the biggest business trends driving its growth. (Afro Consult & Trading PLC, 2010)

Time-to-delivery: At the broadest level, the biggest driver of growth in the maritime sector is e-commerce and the increasing amount of goods shipped. This has rapidly increased customer expectations, which in turn has meant time-to-delivery has overtaken price as most important competitive differentiator. (Nyema, 2014)

This market phenomenon is often referred to as the 'Amazon Effect', due the e-commerce market leader's emphasis on ensuring goods arrive at customers' doors in the fastest and most cost-effective manner. The importance of time-to-delivery, or fulfillment responsiveness as it also called, will become more important, as is routinely shown in industry studies and surveys. (Ranwala 2015)

Drop shipping: Drop shipping is an increasingly popular supply chain trend, which sees retailers transfer orders to manufacturers or wholesalers, who then transfer goods directly to customers. This allows retailers to increase their profit margins and cut costs, and increases the burden on warehouses, which now have to ship goods themselves. (Ranwala, 2015)

Automation: For all warehouses to operate efficiently while housing greater amounts of goods, they must invest in automation technology. A particularly popular innovation is Warehouse Management Systems (WMS) or Automated Storage Systems. These help ensure that warehouse utilize space, consume less energy, and run smoothly, and that automation is implemented efficiently. Warehouse automation includes traditional technology, such as forklift trucks, sorters, conveyors etc., as well as collaborative robotics. (Afro Consult & Trading PLC, 2010)

Warehouses are of critical importance to the supply chain, as has been demonstrated by the 'Amazon Effect'. Providers such as Siemens Logistics Westphalia and Knapp have adapted to supply solutions that meet export, import and transshipment needs. This not only shows the

nuanced nature of port operations but also that if PCL is going to realized, the journey will begin in the warehouse. (Afro Consult & Trading PLC, 2010)

Warehousing is the glue for supply chain coordination. This function has become more important in dry port management in landlocked countries. Ethiopia is one of the landlocked countries use dry ports to mitigate related challenges. Modjo dry port is one of the largest and currently more than 95% of freights flow and first dry port. The flows of unstuffed containers in terminal increase the influences the warehouse operation, the existing dedicated volume of warehouse becomes beyond the dedicated capacity of the warehouse. (Afro Consult & Trading PLC, 2010)

2.2.7.4 Customs Clearance Process

World customs organization indicated that the effectiveness of the operational procedures of customs have a great influence in the movement of border crossing goods across the globe. Therefore, that customs have to be in position to revise their operational procedures to optimize trade facilitation and control. (WCO, 2011)

Excessive delay is a serious challenge for business that significantly depresses them because of the inefficient coordination and cooperation among customs within and between themselves. and other governmental agencies that inspect the same goods more than three and above as a result the shipment wait for a longer time to clear the customs and these delays are associated with attendant cost that can significantly affect the competitive position of the trading community. (WCO, 2015)

Widdowson (2007) identified that the following determinants that are the severe causes of delays for international border crossing goods to clear them from customs. These are excessive document requirements by the border regulating agencies. insignificant use of information technology along with less automation consumption; unclear and unspecified requirements for imports and exports by the regulatory bodies of border management; inefficient of customs procedure accompanied by excessive physical and documentary control and lack of cooperation and modernization amongst customs and other governmental agencies involved in the regulation of international goods. (WCO, 2015)

For some operations, shipper, clearing, and forwarding agents efficiently manage customs clearance, and transactional dwell time is not a major contributor to total dwell time. For other however the time lost in the clearance process because of missing documents, errors in the declaration or simply lack of anticipation is so important that it explains an important proportion of long delays. Moreover, customs administration are just one player among others players who

manage official formalities. Nevertheless, in terms of dwell time, customs processes still usually "mark" the beginning and the end of most of the processes (UNCTAD, 2003)

Security and custom regulation can impose substantial delays in the operation of the terminal and it is therefore essential that coordination with the agencies responsible for these activities negotiated and security practices embedded in terminal management. The provision of custom clearance and quarantine services imposes high security procedures for accessing the dry port, similarly to seaports, and depending on the country may include high fencing, cameras, and guards (Roso and Lumsden, 2010). The impact on operations of custom clearance procedures at ports and in transportation is well established. (Dollar and Micco (2004) one of the main advantages of dry port is the possibility of concentrating custom inspections outside of the seaport terminals. (Woxenius and Lumsden, 2009b)

The efficiency of customs at the port of Modjo closely monitored with a focus mostly on revenue collection performance However; there is a growing awareness of the significance of customs clearance processing time efficiency to facilitate international trade. In theory, the time to perform import clearance formalities starts much before containership arrival and not strictly related to cargo dwell time. However, in fact the bulk of formalities still performed after ship arrival in most developing countries ports despite trade facilitation initiatives of which Djibouti port is no exception (UNCTAD, 2003)

Dry port can play a supportive role as it is a logistics center which can provide services such as handling, storage, stuffing/un-stuffing, consolidation, customs clearance and container maintenance. As customs practice involved in the premise of the dry port the customs procedure in the clearance of the goods, have impact on the efficiency of the port. (UNCTAD, 2003)

2.2.7.5 Size of the Dry Port Container Terminal

A number of research articles consider the size of the dry ports as another factor that influences their efficiency. Since the land, size determines the total storage capacity of a dry port. It is especially important in the peak season. (Gujar, 2011; and Calderinhaet al, 2011)

The size of dry port can take as one of the factors when we consider the dry port efficiency.

Modjo dry port is set to be link with industrial parks through rail and road infrastructure to boost the country's exports, said Ethiopian shipping and logistics services enterprise The government of Ethiopia has given due attention to the expansion of the Modjo dry port by preparing a new expansion plan to support Ethiopia is manufacturing export. (ESLSE ANNUAL REPORT, 2019) Two years ago, the World Bank has approved 150 million USD for the project.

With an additional budget, the dry port will be interlinked with the railways and expressways in the country to delivery effective logistics services to the industrial parks and boost export. The project will also increase the size of the dry port from 158 to 188 hectares. (ESLSE SIX-MONTH REPORT 2020)

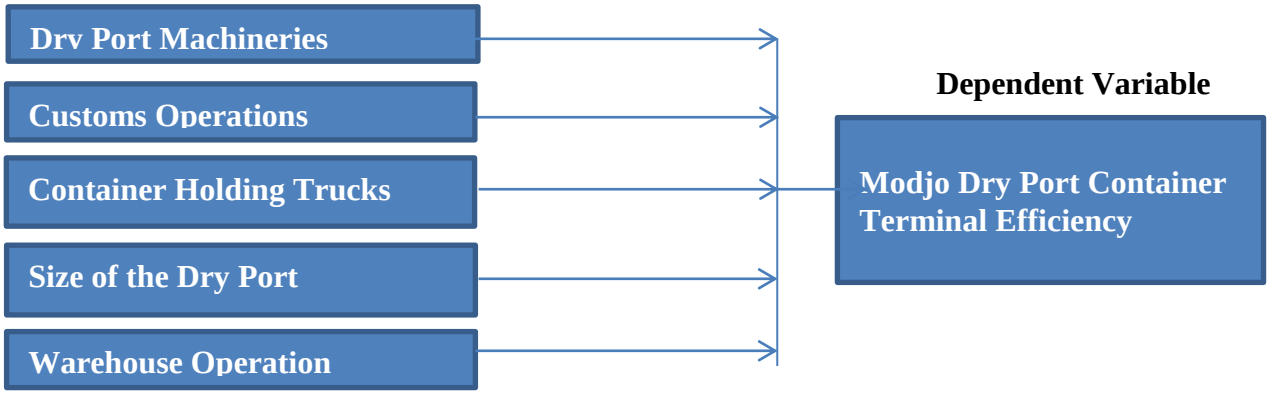
Modjo is becoming a hub of dry port services in Ethiopia as it meets international standards and largest of all, hosts almost 74 percent of the country's imports. (ESLSE ANNUAL REPORT, 2019) Currently, while the annual throughput of Modjo dry port reaches 600,000 containers with the total area coverage of 180 hectares, but there is still ongoing expansion that will take the service of the port to the advanced and standardized level by. (ESLSE SIX-MONTH REPORT 2020)

2.3. Conceptual framework

Enhancing logistics efficiency is at the base of the economic growth and competitiveness issues (Arviset al. 2014). Inefficient logistics raises the costs of trading and reduces the potential for global integration. Identifying those factors that influence the efficiency of ports is crucial. For the consumption of this study, the conceptual framework developed based on the research works. (Ng 2006, Vaggelas, and Pallis, 2015)

The variables in the left sides that are; container handling equipment, container holding trucks, customs operations, warehouse operation and size of dry port are the dependent variable of port efficiency which are identified from the literature. The dependent variable believed to influence the efficiency of the dry port either directly or indirectly and the arrow showed that the activities and interaction of those variables affect port efficiency

Independent Variable



Source survey 2020

Figure 1- Conceptual Framework, Adopted from the research works of (Ng, 2006), and Vaggelas and Pallis, 2015)

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the research design and research methodology that employed in this study. It has been set out under the sub-headings containing research study site, research design, target population, data collection instruments and procedure, and finally, the data analysis and presentation methods would be used in the study.

3.1 Area of the Study

The study conducted in Modjo dry port container terminals, as it is the largest dry port providing logistics services for the country of Ethiopia. The choice of this research area as a case study was because of the following reasons: First, as the port is the largest, first more transaction expected to be available, and the required data and information would get for the research. Second, the port has large number of staffs, freight forwarders (clearing and forwarding agents), transporters (drivers and other customers) that most data could be collected and compiled easily. Third, the areas are easily accessible by roads. Lastly, most of the information needed by the research is available at this port and it is easier to attach targeted respondents of different categories since their daily activities dealt at that port.

3.2 Research Design

A research design is a plan, structure, and strategy conceived in order to obtain answers to research questions and control variables. It helps to control the error variables of a particular research problem investigated. The study employed an explanatory approach using a descriptive survey design to assess factors influencing container Terminals efficiency; a case study of the Modjo dry port container terminal. A descriptive research design presents and reports the way things are (Mugenda and Mugenda, 2003). In addition, descriptive research design used when data collected to describe persons, organizations, settings or phenomena (Creswell, 2003). (Kothari, 2008) mentions that descriptive design has enough provision for protection against bias and ensure reliability. The study adopted a quantitative survey as a major method. Quantitative surveys designed to fit a questionnaire schedule. This is most commonly used technique in research (Veal, 2006).

3.3 Type of the Research

As the study is to assess and analyze factors that influence the efficiency of modjo dry port container terminal, the study invite to use descriptive study. Moreover, Explanation research is

required to set logical relationship among different factors of the existing problem. The objective of the study was assessing and analyzing of factors variables that influence container terminal efficiency. To do so first, the research identifies influential variables and sub variables that contributed for the inefficiency of the container terminal.

3.4 Population of Study

Sekaran (2010) refers to population as the entire group of people or things of interest that the researcher aims to assess. Population as defined by (Mugenda, 2003) is an entire group of individual or objects having common observable characteristic. The target population included terminal operators, Modjo dry port staff (MDP staffs), freight forwarders (clearing and forwarding agents), and transporters (drivers and other customers). The number of these people when put together is approximately 500. Therefore, the study targeted 500 people.

Table 3.4.1 Summary of Target Population

Section/Unit	Target Population	Percentage
Terminal operators	150	30
Modjo Dry Port Staff	100	20
freight forwarders	150	30
Transporters	100	20
Total	500	100

3.5 Sampling Frame

The sampling frame describes the list of all population units from which the sample will selected (Cooper & Schindler, 2003). It is a physical representation of the target population and comprises all the units that are potential members of a sample (Kothari, 2008). Kerlinger (1986) states that, a sample size of 10% of the target population is large enough Therefore, a proportionate sample size (500x0.1=50 of appropriately 50 respondents which is 10% of the population will selected using a stratified sampling technique from the identified sample as shown in Table 3.5.1

Table 3.5.1: Sampling Frame

Section/Unit	Target Population	Frequency	Percentage
Terminal operators	150	15	10%
Modjo Dry Port Staff	100	10	10%
Freight forwarders	150	15	10%
Transporters	100	10	10%
Total	500	50	100%

Keller (2009) indicates that a sample is a set drawn from the entire population. A stratified sampling technique is employed to stratify four (4) units at the Port of Modjo dry port container terminal, , freight forwarders (clearing and forwarding agents), Transporters (drivers and other customers). With 150, terminal operators with 100, Modjo Dry Port Staff (MDP staffs), with 150, Freight forwarders and with (clearing and forwarding agents),) expresses, a sample size between 10% and 15% is considered adequate for in-depth studies. Therefore, the sample size for this study is 10% of the total population which is (500x0.1=50

3.6 Data Collection Methods

The data collection process made through a systematic sequence of events. The process began by first seeking permission from the respondent in order to avoid any possible stop that might have arisen from lack of response to conduct the research. This followed by sample selection based on the strata as explained in the sampling technique above. However, the researcher made a self-introduction and requested for consent of the respondents in taking part in the exercise. Subsequently, questionnaires administered to the respondents. On the other hand, the secondary data were collected from existing literature relating to the study topic and data was collected from records available at Modjo container terminal dry port and by the use of record review from journals, booklets, policy documents, reports of weekly, monthly and annually performance on container operation. The main instrument employed for data collection in this research was questionnaire. A 1 – 3, 1 – 4, and 5-point Likert scale questionnaire administered to the respondents.

3.7 Data Processing and Analysis

Data analysis defined as a way of analyzing information gathered on focusing on various questions posed in the study (Kothari, 2004). Data for this study was quantitative in nature. Quantitative analysis done for the numerical data obtained from the field. This done using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS) and Microsoft Excel 2013. The responses in the questionnaire coded into common themes to facilitate analysis. Data presented in descriptive form supported by tables, frequency distributions, and percentages. The researcher used Likert scale as parameter to measure the variables.

3.8 Reliability and Validity of Data

Reliability refers to the extent to which data collection technique or analysis procedures will yield consistent findings (Mark et al., 2007). “It is important that all surveys are tested before the

actual survey is conducted. This is to ensure that the questionnaire is clear to respondents and can be complete in the way the researcher wishes (John Adams et al., 2007).

Pilot testing is an activity that helps the study in determining whether there are errors, limitations, or other weaknesses within the design and allows the researcher to make necessary adjustments and corrections before embarking on the survey. For the consumption of this research, a pilot study was taken on nearly 10 terminal operators, Modjo dry port staff, freight forwarders and transporter since they are directly involved with container operations to test the reliability and validity of the questionnaire.

3.8.1 Reliability

Reliability of the questionnaires was test by using the statistical tool Cronbach's coefficient alpha score of 0.70, which is the cutoff acceptable limit. As Pallant (2011) indicated, it provides an indication of the average correlation among all of the items that make up the scale. Values range from 0 to 1, with higher values indicating greater reliability. Items with a Cronbach's Alpha value of 0.7 and above will be acceptable as recommended by (Nunn ally, 1978). This study used Cronbach's coefficient alpha in order to measure the reliability of the scales used by using SPSS (Statistical Package for the Social Sciences) version 21.0.

Table 3.8.1
Summary of Measures

No.	Study Variables	Source of Items (scale or Instrument source)	No. of Items in the Scale	Chronbach's Alpha Results
1	Dry port machineries	SPSS 21 Result	8	.970
2	Container holding trucks	SPSS 21 Result	8	.971
3	Warehouse operation	SPSS 21 Result	2	.849
4	Custom operation	SPSS 21 Result	2	.802
5	Dry port size	SPSS 21 Result	2	.942

As depicted in the above **Table 3.8.1** the overall Cronbach's alpha scored by the five variables that incorporated by the five points Likert scale, result shows above is 0.7, which is above the cutoff acceptable limit of 0.70.

3.8.2 Validity

Validity is concerned with whether the findings are really about what they appear to be about (Mark et al., 2007). Also in conformity to (Babbie, 1990), validity refers to the extent to which an empirical measure adequately reflects real meaning of the concept under consideration. For guaranteeing the validity of this study, all the concepts and theories which are used here are referred to relative literature and certain authorities documents in that correlative area.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND DISCUSSIONS

The study represents the empirical findings and results of the research. The data presented here includes response rate, background information of the respondents and the presentation of research findings against each individual. Descriptive statistics also employed in analyzing the findings.

4.1. RESPONSE RATE AND DEMOGRAPHIC CHARACTERSTICS OF RESPONDENT

4.1.1. RESPONSE RATE

From the data gathered, out of **80** questionnaires distributed, **56 (70%)** were filled and returned and the rest **24 (30%)** not properly filled and returned. According to (Mugenda, 2003) **70%** response rate considered very well, **60%** good and **50%** response rate is adequate. Therefore, the response rate in this case **70%** was very good representation of the entire targeted population.

4.1.2. DEMOGRAPHIC CHARACTERSTICS OF RESPONDENT

The study required to establish the background information of the respondents by using the following parameters: gender, age, level of education, type of organization, position held by the respondents and number of year's respondents has been working with the department.

Table 4.1.2: Demographic Characteristics of Sample Respondents

No	Items	Response	
		Frequency	Percent
1	Gender		
	a) Male	42	75
	b) Female	14	25
	Total	56	100
2	Age		
	a) Less than 24 years	10	17.9
	b) 25 – 29 years	30	53.6
	c) 30 – 45 year	8	14.3
	d) 46 – 50+ years	8	14.3
	Total	56	100
3	Educational level		
	a) Diploma	5	8.9
	b) First Degree	30	53.6
	c) Post Graduate Degree	21	37.5
	Total	56	100

4	Type of Organization		
	a) Container Terminal Operator	14	25.0
	b) Modjo Dry Port Staff	20	35.7
	c) Freight Forwarders	12	21.4
	d) Transporters	10	17.9
	Total	100	100
5	Organization type		
	a) Director	4	7.1
	b) Division Manager	9	16.1
	c) Coordinator	13	23.2
	d) Senior officer	7	12.5
	e) Officer	5	8.9
	f) Operator	8	14.3
	g) Mechanics	6	10.7
	h) Driver	4	7.1
	Total	56	100
6	Service Year		
	a) Over 10 years	16	28.6
	b) 6 – 9 years	28	50.0
	c) 3 – 5 years	12	21.4
	Total	56	100

Source own survey, 2020

The descriptive statistics of demographic characteristics of sample respondents as shown in the above **Table 4.1.2** presented as follow:

42 (75%) of the respondents were male, while the remaining **14 (25%)** were female**.**

The finding here indicates that **10 (17.9%)** of the respondents were aged less than 24 years, **30 (53.6%)** of the respondents were aged between 25 –29 years, **8 (14.3%)** of the respondents were aged between 30 – 45 years, and **8 (14.3%)** of the respondents were aged between 46 –50+ years.

5 (8.9%) of the respondents were found to be diploma holders, **30 (53.6%)** of the respondents were first-degree holders and **21 (37.5%)** of the respondents were postgraduate degree holders.

14 (25%) of the respondents came from container terminal operations, **20 (35.7%)** of the respondents came from Modjo dry port staff, **12 (21.4%)** of the respondents came from freight forwarders and **10 (17.9%)** of the respondents came from transporters. This implies that majority of the responses came from the Modjo dry port staff. **4 (7.1%), 9 (16.1%), 13 (23.2%), 7 (12.5%), 5 (8.9%), 8 (14.3%), 6 (10.7%)** and **4 (7.1%)** of the respondents hold the position of

directors, division manager, coordinators, senior officer, officer, operator, mechanics, and driver respectively.

16 (28.6%) of the respondents have worked over 10 years, **28 (50%)** of the respondents have worked 6 – 9 years, **12 (21.4%)** of the respondents have worked 3 – 5 years.

4.2. DRY PORT MACHINERIES

Table 4.2.1 Dry port machineries influence on terminal efficiency

Item	Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant	Mean	Std. D
dry port machineries	2 (3.6)	4 (7.1)	2 (3.6)	12 (21.4)	36 (64.3)	4.3571	1.08592
Item	**machinery quality**	**machinery quantity**	**operator inefficiency**	**maintenance workshop**	**-**	**Mean**	**Std. D**
machineries inefficiency	20 (35.7%)	10 (17.9%)	15 (26.8%)	11 (19.6%)	-	2.3036	1.15868
Item	**Out dated or aged**	**Lack of maintenance**	**Lack of spare parts**	**failures due to over use**	**-**	**Mean**	**Std. D**
machineries poor quality	18 (32.1%)	12 (21.4%)	11 (19.6%)	11 (26.8%)	-	2.4107	1.20268
Item	**Container per machineries**	**Machineries in kind**	**Machineries in capacity**	**Machineries in speed**	**-**	**Mean**	**Std. D**
machineries quantity	22 (39.3%)	16 (28.6%)	8 (14.3%)	10 (17.9%)	-	2.1071	1.12296
Item	**Not Significant**	**Slightly Significant**	**Moderately Significant**	**Significant**	**Very Significant**	**Mean**	**Std. D**
dry port machineries operator	1 (1.8%)	3 (5.4%)	5 (8.9%)	13 (23.2%)	34 (60.7%)	4.3571	0.98033
Item	**Lack of technical skill**	**Poor management**	**Lack of motivation**	**Negligence**			
machineries operators inefficiency	32 (57.1%)	12 (21.4%)	15 (26.8%)	11 (19.6%)	19 (33.9%)	1.7143	0.96699
Item	**Not Significant**	**Slightly Significant**	**Moderately Significant**	**Significant**	**Very Significant**	**Mean**	**Std. D**
machineries maintenance workshop	4 (7.1%)	8 (14.3%)	10 (17.9%)	12 (21.4%)	22 (39.3%)	3.7143	1.31722
Item	**Lack of skilled**	**Poor management**	**Lack of workshop**	**Disorganized**			
machineries maintenance workshop	20 (35.7%)	8 (14.3%)	10 (17.9%)	18 (32.1%)		2.4643	1.2787

Source own survey, 2020

The descriptive statistics of the study as shown in the above **Table 4.2.1** presented as follow:

2 (3.6%), 4 (7.1%),2 (3.6%), 12 (21.4%) and **36 (64.3%)** of the respondents responds show that the significance influence level of port machineries in loading and unloading of container at Modjo dry port container terminal was not significant, slightly significant, moderately significant, significant and very significant respectively.

36 (64.3%) and **12 (21.4%)** of the respondents respond the dry port machineries level of influence was very significant and significant respectively.

20 (35.7%), 10 (17.9%) 15 (26.8%) and **11 (19.6%)** of the respondents thought poor quality of the machineries, imbalance quantity of the machineries, inefficiency of machineries operator inefficiency and machinery maintenance workshop contributed for the inefficiency of the machineries.

18 (32.1%), 12 (21.4%), 11 (19.6%) and **15 (26.8%) of** the respondents thought availability of out dated or aged machineries, lack of timely service maintenance, lack of adequate spare parts and technical failures due to over use machinery respectively.

22 (39.3%), 16 (28.6%), 8 (14.3%) and **10 (17.9%)** of the respondents measuring the influence in terms of container against machineries, machineries in kind, machineries in capacity and machineries in speed respectively.

1 (1.8%), 3 (5.4%), 5 (8.9%), 13 (22.2%) and **34 (60.7%)** of the respondents responds shows significance influence level of port machineries operator in loading and unloading of container at Modjo dry port container terminal was not significant, slightly significant, moderately significant, significant and very significant respectively.

34 (60.7%) and **13 (22.2%)** of the respondents respond, the dry port machineries operator level of influence was very significant and significant respectively.

4 (7.1%), 8 (14.3%), 12 (21.4%) and **32(57.1%)** of the respondents thought inefficiency of the machinery operators generated from negligence, lack of motivation, poor management, lack of technical skill was the reason for the inefficiency of the machinery operators respectively.

4 (7.1%), 8 (14.3%), 10 (17.9%), 12 (21.4%) and **22 (39.3%)** of the respondents said port machineries maintenance workshop influence in machinery efficiency was not significant, slightly significant, moderately significant, significant, very significant respectively.

22 (39.3%) and **12 (21.4%)** of the respondents respond, the dry port machineries maintenance workshop level of influence was very significant and significant respectively.

20 (35.7%), 8 (14.3%),10 (17.9%) and **18(32.1%)** of the respondents thought inefficiency of the machinery maintenance workshop generated from lack of skilled technician, poor management, lack of workshop equipment and disorganized workshop structure was the reason for the inefficiency of the machinery maintenance workshop.

4.3. CONTAINER HOLDING HEAVEY TRAUCKS

Table 4.3.1 Container holding trucks influence

No.	Item	Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant	Mean	Std. D
1	container holding trucks	1 (1.8%)	2 (3.6)	3 (5.4%)	13 (23.2)	37 (66.1)	4.4821	0.89425
No.	**Item**	**Truck quality**	**Truck quantity**	**Driver inefficiency**	**maintenance workshop**	**-**	**Mean**	**Std. D**
2	container holding trucks inefficiency	18 (32.1%)	12 (21.4%)	17 (30.4%)	9 (16.1%)	-	2.3036	1.09411
No.	**Item**	**Out dated or aged**	**Lack of maintenance**	**Lack of spare parts**	**failures due to over use**	**-**	**Mean**	**Std. D**
3	container holding trucks poor quality	22 (39.3%)	10 (17.9%)	9 (16.1%)	15 (26.8%)	-	2.3036	1.24929
No.	**Item**	**Container per trucks**	**Trucks in kind**	**Trucks in capacity**	**Trucksin speed**	**-**	**Mean**	**Std. D**
4	container holding trucks quantity	32 (57.1%)	8 (14.3%)	9 (16.1%)	7 (12.5%)	-	1.8393	1.10826
No.	**Item**	**Not Significant**	**Slightly Significant**	**Moderately Significant**	**Significant**	**Very Significant**	**Mean**	**Std. D**
5	trucks driver	1 (1.8)	3 (5.4%)	5 (8.9%)	13 (23.2)	34 (60.7%)	4.3571	0.98033
No.	**Item**	**Traffic jam**	**Lack of motivation**	**Long documentation**	**Old Vehicles**	**Poor management**	**Mean**	**Std. D**
6	trucks driver inefficency	11 (19.6%)	5 (8.9%)	14 (25%)	18 (32.1%)	8 (14.3%)	3.125	1.3357
No.	**Item**	**Not Significant**	**Slightly Significant**	**Moderately Significant**	**Significant**	**Very Significant**	**Mean**	**Std. D**
7	trucks maintenance workshop	4 (7.1%)	8 (14.3%)	10 (17.9%)	12 (21.4%)	22 (39.3%)	3.7143	1.31722
No.	**Item**	**Lack of skilled technician**	**Poor management**	**Lack of workshop equipment**	**Disorganized workshop**		**Mean**	**Std. D**
8	trucks maintenance workshop	20 (35.7%)	9 (16.1%)	10 (17.9%)	17 (30.4%)		2.4286	1.26286

Source own survey, 2020

The descriptive statistics of the study as shown in the above **Table 4.3.1** presented as follow:

1 (1.8%), 2 (3.6%), 3 (5.4%), 13 (23.2%) and **37 (66.1%** of the respondents responds show that the significance influence level of contain of container holding trucks at Modjo dry port container terminal was not significant, slightly significant, moderately significant, significant very significant respectively.

37 (66.1%) and **13 (23.2%)** of the respondents respond, the container holding trucks level of influence was very significant and significant respectively.

18 (32.1%), 12 (21.4%), 17 (30.4%) and **9 (16.1%)** of the respondents thought poor quality of the container holding trucks, imbalance quantity of the container holding trucks, inefficiency of the container holding trucks drivers and inefficiency container holding trucks maintenance workshop contributed for the inefficiency of the container holding trucks.

22 (39.3%), 10 (17.9%), 9 (16.1%) and **15 (26.8%)** of the respondents thought availability of out dated or aged machineries, lack of timely service maintenance, lack of adequate spare parts for the machineries and technical failures due to over use machinery.

32 (57.1%), 8 (14.3%) 7 (12.5%) and **9 (16.1%)** of the respondents measuring the influence in terms of container against container holding trucks, availability of container holding trucks in kind, availability of container holding trucks in capacity and availability of container holding trucks in speed which was related with loading ton per hours.

1 (1.8%), 3 (5.4%) 5 (8.9%) 13 (23.2%) and **34 (60.7%)** of the respondents responds show the significance influence level of truck's driver in loading and unloading of container at Modjo dry port container terminal was not significant, slightly significant, moderately significant, significant and very significant respectively.

34 (60.7%) and **13 (23.2%)** of the respondents respond, the truck's driver level of influence was very significant and significant respectively.

5 (8.9%), 18 (14.3%) 11 (19.6%)4(25%)and **18(32.1%)** of the respondents thought inefficiency of the truck drivers generated from lack of motivation, poor management, traffic jam, long documentation process and presence of old trucks.

4 (7.1%), 8 (14.3%) 10 (17.9%) 12 (21.4%) and **22 (39.3%)** of the respondents said the trucks maintenance workshop influence in trucks efficiency was not significant, slightly significant, moderately significant, significant and very significant.

22 (39.3%) and **12 (21.4%)** of the respondents respond, the heavy trucks maintenance workshop level of influence was very significant and significant respectively.

20 (35.7%), 8 (14.3%) 10 (17.9%) and **18 (32.1%)** of the respondents thought inefficiency of the heavy trucks maintenance workshop generated from lack of skilled technician, poor management lack of workshop equipment and disorganized workshop structure was the reason for the inefficiency of the heavy trucks maintenance workshop.

4.4. WERAHOUSE OPERATION

Table 4.4.1: Warehouse operation influence at Modjo dry port terminals

No.	Item	Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant	Mean	Std. D
1	warehouse operation	2 (3.6%)	4 (7.1)	2 (3.6%)	47 (83.9)	1 (1.8)	3.7321	0.77439
No.	**Item**	**Unsuitable construction for proper storage and handling of commodities**	**Outside premises are not well drained**	**Terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities**	**Unclean and improper housekeeping practices**	**-**	**Mean**	**Std. D**
2	warehouse operation inefficency	6 (10.7%)	8 (14.3%)	4 (7.1%)	38 (67.9%)	-	3.3214	1.08052

Source own survey, 2020

The descriptive statistics of the study as shown in the above **Table 4.4.1** presented as follow:

2 (3.6%), 4 (7.1%) 2 (3.6%) 47 (83.9%) and **1 (1.8%)** of the respondents responds show that the significance influence level of warehouse operation at Modjo dry port container terminal was not significant, slightly significant, moderately significant, very significant. **36 (64.3%)** and**12 (21.4%)** of the respondents respond the warehouse operation level of influence was very significant and significant respectively.

6 (10.7%), 8 (14.3%) 4 (7.1%) and **38 (67.9%)** of the respondents thought unsuitable construction for proper storage, handling of commodities, unwell drained outside premises of the warehouse unclean and improper housekeeping practices and terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities.

4.5: CUSTOM OPERATION

Table 4.5.1: Custom operation influence at Modjo dry port terminals

No.	Item	Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant	Mean	Std. D
1	custom operation	6 (10.7%)	2 (3.6%)	2 (21.4%)	36 (64.3)	1 (1.8)	4.3929	0.98495
No.	**Item**	**Lack of Integrated ICT System**	**Interrupted & insufficient internet network**	**Unethical behavior of the employee**	**Poor management**	-	**Mean**	**Std. D**
2	custom operation inefficency	16 (28.6%)	22 (39.3%)	12 (21.1%)	6 (10.7%)	-	2.1429	0.9616

Source own survey, 2020

The descriptive statistics of the study as shown in the above **Table 4.5.1** presented as follow:

6 (10.7%), 2 (3.6%) 12 (21.4%) and **36 (64.3%)** of the respondents responds show the influence level of custom clearance operation at Modjo dry port container terminal was slightly significant, moderately significant, significant and very significant respectively.

36 (64.3%) and **12 (21.4%)** of the respondents respond the custom clearance operation level of influence was very significant and significant respectively.

6 (10.7%), 12 (21.4%) 22 (39.3%) 16(28.6%) of the respondents thought inefficiency of the custom clearance operation was because of poor management, unethical behavior of the employee, interrupted and insufficient internet network and lack of integrated ICT system was the reason for the inefficiency of the custom clearance operation.

4.6: SIZE OF THE DRY PORT

Table 4.6.1: Size of dry port influence at Modjo dry port terminals

No.	Item	Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant	Mean	Std. D
1	size of dry port	2 (5.4%)	4 (7.1)	2 (30.4%)	-	47 (57.1)	3.9643	1.29284
No.	**Item**	**Availability of enough parking for trucks and port machineries**	**Availability of enough space for the incoming container**	**Organized office arrangement**	**Facilities like cafeteria and internet café**	**Other service provide like bank, insurance and customs**	**Mean**	**Std. D**
2	dry port size inefficencey	9 (16.1%)	8 (14.3%)	10 (17.9%)	8 (14.3%)	21 (37.5%)	3.4286	1.51186

Source own survey, 2020

The descriptive statistics of the study as shown in the above **Table 4.6.1** presented as follow:

4.27 indicates, **32 (57.1%), 17 (30.4%), 3 (5.4%)** and **4 (7.1%)** of the respondents responds shows the influence level of dry port size was very significant, significant, slightly significant, moderately significant. **32 (57.1%)** and **17 (30.4%)** of the respondents respond the size of dry port level of influence was very significant and significant respectively.

21 (35%), 8 (14.29%) 9 (16.07%) and,**10 (17.86%)** of the respondents responds shows the presences of service like bank, insurance customs, facilities like cafeteria and internet café and availability of enough space for the incoming container availability of enough parking for trucks and port machineries and Organized office arrangement respectively.

4.7. DISCUSSION OF FINDINGS

The efficiency of Modjo dry port container terminal is important for the smooth logistics function of the country import and export. These studies try to analyze the factors by categorized in five variables.

4.7.1 DISCUSSION ON DRY PORT MACHINERIES

4.7.1.1. Confidence interval Estimate

In order to ensure the acceptability of the mean value of the survey data a 95% confidence interval test on mean difference have conducted for the criterion variable and its predictors. The result of this test is present in table 4.7.1.1 below.

Table 4.7.1.1: Confidence interval estimate for differentiation on dry port machineries

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
machineries	30.026	55	.000	4.35714	4.0663	4.6480
machineries inefficency factors	14.878	55	.000	2.30357	1.9933	2.6139
machineries quality	15.000	55	.000	2.41071	2.0886	2.7328
machineries quantity	14.042	55	.000	2.10714	1.8064	2.4079
machineries operator	33.260	55	.000	4.35714	4.0946	4.6197
machineries operator inefficency factors	13.266	55	.000	1.71429	1.4553	1.9732
machineries maintenance workshop	21.101	55	.000	3.71429	3.3615	4.0670
machineries maintenance workshop inefficency factors	14.422	55	.000	2.46429	2.1218	2.8067

The mean difference for the effect of machineries (4.35714) lies between the lower (4.0663) and the upper (4.6480) limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance.

Therefore, it is possible to draw conclusion about the differentiation of effect of machineries based on the sample mean of the survey for differentiation. On the other hand, the mean differentiations of the rest 8-predictor sub factor lie within their respective 95% confidence interval of the mean difference as a significance level 0.000. This means the sample mean for each of the sub factor are acceptable to represent their respective population mean. Thus, it is also possible to draw conclusion about the population of the individual predictor variable based on their respective sample mean. Based on the results of the one-sample test presented above in table **4.7.1.1,** the following section deals with the interpretation of the mean score values of the effect of machineries factors.

4.7.1.2 Mean Score Values of Machineries

Table 4.7.1.2: Mean Score Values of machineries

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
machineries	56	4.3571	1.08592	.14511
machineries inefficency factors	56	2.3036	1.15868	.15483
machineries quality	56	2.4107	1.20268	.16071
machineries quantity	56	2.1071	1.12296	.15006
machineries operator	56	4.3571	.98033	.13100
machineries operator inefficency factors	56	1.7143	.96699	.12922
machineries maintenance workshop	56	3.7143	1.31722	.17602
machineries maintenance workshop inefficency	56	2.4643	1.27870	.17087

Table 4.7.1.2 shows the effect of machineries with mean value of 4.3571 and a standard deviation of 1.08592. As per (Pihie, 2009), the mean value 4.3571 lies within the high-level range. This high-level effect can interpret as the machineries have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the machineries as it depicted on the above table.

4.7.1.3. Correlation Analysis for Machineries & its sub factors

Correlation procedures vary depending on data type. This study used an interval data. Therefore, Pearson's Product Moment Coefficient (r) is the appropriate statistical procedure to measure the degree of association between two interval variables. Table 4.7.1.3 below displays the bivariate correlation results for the data collected on the criterion variable on machineries and its sub factors. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to

0.29 may regarded as indicating a low degree of correlation, r ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and r ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the machineries with each of the sub factors as shown below:

Table 4.7.1.3: Pearson's bivariate correlation for machineries and its sub factors

Correlation

		machineries	machineries inefficency factors	machineries quality	machineries quantity	machineries operator	machineries operator inefficency factors	machineries maintenance workshop	maintenance workshop inefficency
machineries	Pearson Correlation	1	.678**	.679**	.594**	.954**	.445**	.861**	.690**
	Sig. (2-tailed)		.000	.000	.000	.000	.001	.000	.000
machineries inefficency	Pearson Correlation	.678**	1	.966**	.939**	.719**	.874**	.880**	.959**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
machineries quality	Pearson Correlation	.679**	.966**	1	.923**	.721**	.853**	.890**	.961**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
machineries quantity	Pearson Correlation	.594**	.939**	.923**	1	.658**	.899**	.832**	.927**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
machineries operator	Pearson Correlation	.954**	.719**	.721**	.658**	1	.493**	.911**	.736**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
machineries operator	Pearson Correlation	.445**	.874**	.853**	.899**	.493**	1	.706**	.815**
	Sig. (2-tailed)	.001	.000	.000	.000	.000		.000	.000
machineries maintenance workshop	Pearson Correlation	.861**	.880**	.890**	.832**	.911**	.706**	1	.901**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
maintenance workshop inefficency	Pearson Correlation	.690**	.959**	.961**	.927**	.736**	.815**	.901**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Considering the relationship of the criterion variable machineries with each of the sub factors shows that machineries is positively and significantly related with seven of its sub factors; machineries inefficiency, machineries quality, machineries quantity, machineries operator, machineries operator inefficiency, machineries maintenance workshop and maintenance

workshop inefficiency at 0.01 level of significance. This means there is high degree of positive relationship between the machineries and its sub factors in influencing the container terminal efficiency on the dry port. From this, one can concluded that, the effect of machineries and its sub factors on dry port container terminal is high the effect on the efficiency also high as their relationship is positive.

Objective One: To explain the effects of port machineries on Modjo dry port terminal efficiency

As it discussed above, confidence interval estimate for differentiation on machineries indicated that the mean difference for each of the factors lies between the lower and the upper limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion on how machineries and its sub factors have impact on efficiency of the terminal.

To describe the mean score of the participants, mean score measurement used by Pihie (2009) was applied where mean score: ≥4.5 = Very High, 3.51-4.51= High, 2.51-3.5= Moderate, 1.51-2.5= Low; < 1.5= Very Low (Crewel, 2012).

The effects of machineries with mean value 4.3571 have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the machineries as it depicted on the above table.

Therefore, the machineries and its sub factors found to be high in affecting the efficiency of the terminal as their mean value fall under high level of standard.

4.8.1 DISCUSSION ON CONTAINER HOLDING TRUCKS

4.8.1.1. Confidence interval Estimate

In order to ensure the acceptability of the mean value of the survey data a 95% confidence interval test on mean difference have conducted for the criterion variable and its predictors. The result of this test is present in table 4.8.1.1 below.

Table 4.8.1.1: Confidence interval estimate for differentiation on container holding trucks

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
container holding trucks	37.508	55	.000	4.48214	4.2427	4.7216
trucks inefficency factors	15.756	55	.000	2.30357	2.0106	2.5966
trucks quality	13.799	55	.000	2.30357	1.9690	2.6381
trucks quantity	12.419	55	.000	1.83929	1.5425	2.1361
truck's driver	33.260	55	.000	4.35714	4.0946	4.6197
truck's driver inefficency factors	17.508	55	.000	3.12500	2.7673	3.4827
trucks maintenance workshop	21.101	55	.000	3.71429	3.3615	4.0670
truck's maintenance workshop inefficency factors	14.391	55	.000	2.42857	2.0904	2.7668

The mean difference for the effect of container holding (4.4821) lies between the lower (4.2427) and the upper (4.7216) limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion about the differentiation of effect of container holding trucks based on the sample mean of the survey for differentiation. On the other hand, the mean differentiations of the rest seven-sub factor lie within their respective 95% confidence interval of the mean difference as a significance level 0.000. This means the sample mean for each of the sub factor are acceptable to represent their respective population mean. Thus, it is also possible to draw conclusion about the population of the individual predictor variable based on their respective sample mean. Based on the results of the one-sample test presented above in table **4.8.1.1,** the following section deals with the interpretation of the mean score values of the effect of container holding factors.

4.8.1.2 Mean Score Values of Container Holding Trucks

Table 4.8.1.2: Mean Score Values of Container Holding Trucks

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
container holding trucks	56	4.4821	.89425	.11950
trucks inefficency factors	56	2.3036	1.09411	.14621
trucks quality	56	2.3036	1.24929	.16694
trucks quantity	56	1.8393	1.10826	.14810
truck's driver	56	4.3571	.98033	.13100
truck's driver inefficency factors	56	3.1250	1.33570	.17849
trucks maintenance workshop	56	3.7143	1.31722	.17602
truck's maintenance workshop inefficency factors	56	2.4286	1.26286	.16876

Table 4.8.1.2 shows the effect of container holding trucks with mean value of 4.4821 and a standard deviation of 0.89425. As per (Pihie, 2009), the mean value 4.4821 lies within the high-level range. This high-level effect can interpret as the container holding trucks have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the container holding trucks as it depicted on the above table.

4.8.1.3. Correlation Analysis for Container Holding Trucks & its Sub Factors

Correlation procedures vary depending on data type. This study used an interval data. Therefore, Pearson's Product Moment Coefficient (r) is the appropriate statistical procedure to measure the degree of association between two interval variables. Table 4.8.1.3 below displays the bivariate correlation results for the data collected on the criterion variable on container holding trucks and its sub factors. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to 0.29 may regarded as indicating a low degree of correlation, r ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and r ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the container holding trucks with each of the predictor factors as shown below:

Table 4.8.1.3: Pearson's bivariate correlation for container holding trucks and its sub factors

Correlations									
		container holding trucks	trucks inefficency factors	trucks quality	trucks quantity	truck's driver	truck's driver inefficency factors	trucks maintenance workshop	truck's maintenance workshop inefficency factors
container holding trucks	Pearson Correlation	1	.684**	.615**	.447**	.941**	.771**	.845**	.667**
	Sig. (2-tailed)		.000	.000	.001	.000	.000	.000	.000
trucks inefficency factors	Pearson Correlation	.684**	1	.929**	.866**	.728**	.944**	.881**	.944**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
trucks quality	Pearson Correlation	.615**	.929**	1	.916**	.697**	.870**	.882**	.965**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
trucks quantity	Pearson Correlation	.447**	.866**	.916**	1	.506**	.788**	.728**	.869**
	Sig. (2-tailed)	.001	.000	.000		.000	.000	.000	.000
truck's driver	Pearson Correlation	.941**	.728**	.697**	.506**	1	.826**	.911**	.726**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
truck's driver inefficency factors	Pearson Correlation	.771**	.944**	.870**	.788**	.826**	1	.930**	.895**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
trucksmaintenance workshop	Pearson Correlation	.845**	.881**	.882**	.728**	.911**	.930**	1	.895**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
truck's maintenance workshop inefficency factors	Pearson Correlation	.667**	.944**	.965**	.869**	.726**	.895**	.895**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Considering the relationship of the criterion variable, container holding trucks with each of the sub factors shows that container holding trucks is positively and significantly related with seven of its sub factors. Container holding trucks inefficiency, container holding trucks quality, container holding trucks quantity, container holding trucks operator, container holding trucks operator inefficiency, container holding trucks maintenance workshop and maintenance workshop inefficiency at 0.000, level of significance.

This means there is high degree of positive relationship between the container holding trucks and its sub factors in influencing the container terminal efficiency on the dry port. From this, one can concluded that, the effect of container holding trucks and its sub factors on dry port container terminal is high the effect on the efficiency also high as their relationship is positive.

Objective Two: To explain the effects of container holding trucks on Modjo dry container terminal efficiency.

As it discussed above, confidence interval estimate for differentiation on container holding trucks indicated that the mean difference for each of the factors lies between the lower and the upper limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion on how container holding trucks and its sub factors have impact on efficiency of the terminal.

To describe the mean score of the participants, mean score measurement used by Pihie (2009) was applied where mean score: ≥4.5 = Very High, 3.51-4.51= High, 2.51-3.5= Moderate, 1.51-2.5= Low; < 1.5= Very Low (Crewel, 2012).

The effects of container holding trucks with mean value 4.3571 have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the container holding trucks as it depicted on the above table.

Therefore, the container holding trucks and its sub factors found to be high in affecting the efficiency of the terminal as their mean value fall under high level of standard.

4.9.1 DISCUSSION ON WAREHOUSE OPERATION

4.9.1.1. Confidence interval Estimate

In order to ensure the acceptability of the mean value of the survey data a 95% confidence interval test on mean difference have conducted for the criterion variable and its predictors. The result of this test is present in table 4.9.1.1 below.

Table 4.9.1.1: Confidence interval estimate for differentiation on warehouse operation

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
warehouse operation	36.066	55	.000	3.73214	3.5248	3.9395
warehouse operation inefficency factors	23.003	55	.000	3.32143	3.0321	3.6108

The mean difference for the effect of warehouse operation (3.73214) lies between the lower (3.5248) and the upper (3.9395) limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000,

significance. Therefore, it is possible to draw conclusion about the differentiation of effect of warehouse operation based on the sample mean of the survey for differentiation. On the other hand, the mean differentiations of the rest one-sub factor lie within their respective 95% confidence interval of the mean difference as a significance level 0.000. This means the sample mean for each of the sub factor are acceptable to represent their respective population mean. Thus, it is also possible to draw conclusion about the population of the individual predictor variable based on their respective sample mean. Based on the results of the one-sample test presented above in table **4.9.1.1,** the following section deals with the interpretation of the mean score values of the effect of warehouse operation factors.

4.9.1.2 Mean Score Values of warehouse operation

Table 4.9.1.2: Mean Score Values of warehouse operation

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
warehouse operation	56	3.7321	.77439	.10348
warehouse operation inefficency factors	56	3.3214	1.08052	.14439

Table 4.6.1.2 shows the effect of warehouse operation with mean value of 3.7321 and a standard deviation of 0.77439. As per (Pihie, 2009), the mean value 3.7321 lies within the high-level range. This high-level effect can interpret as the warehouse operations have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the warehouse operation as it depicted on the above table.

4.9.1.3. Correlation Analysis for warehouse operation & its Sub Factors

Correlation procedures vary depending on data type. This study used an interval data. Therefore, Pearson's Product Moment Coefficient (r) is the appropriate statistical procedure to measure the degree of association between two interval variables. Table 4.6.1.3 below displays the bivariate correlation results for the data collected on the criterion variable on container holding trucks and its sub factors. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to 0.29 may regarded as indicating a low degree of correlation, r ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and r ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the warehouse operation with each of the predictor factors as shown below:

Table 4.9.1.3: Pearson's bivariate correlation for warehouse operation and its sub factors

Correlations			
		warehouse operation	warehouse operation inefficency factors
warehouse operation	Pearson Correlation	1	.778**
	Sig. (2-tailed)		.000
warehouse operation inefficency factors	Pearson Correlation	.778**	1
	Sig. (2-tailed)	.000	

****. Correlation is significant at the 0.01 level (2-tailed).**

Considering the relationship of the criterion variable, warehouse operation with its sub factors shows that there is positively and significantly related with its sub factors at 0.000, level of significance. This means there is high degree of positive relationship between the warehouse operation and its sub factors in influencing the container terminal efficiency on the dry port. From this, one can concluded that, the effect of warehouse operations and its sub factors on dry port container terminal is high the effect on the efficiency also high as their relationship is positive.

Objective Three: To elaborate the effects warehouse operations on Modjo dry container terminal efficiency.

As it discussed above, confidence interval estimate for differentiation on warehouse operation indicated that the mean difference for each of the factors lies between the lower and the upper limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion on how warehouse operation and its sub factors have impact on efficiency of the terminal.

To describe the mean score of the participants, mean score measurement used by Pihie (2009) was applied where mean score: ≥4.5 = Very High, 3.51-4.51= High, 2.51-3.5= Moderate, 1.51-2.5= Low; < 1.5= Very Low (Crewel, 2012).

The effects of warehouse operation with mean value 4.3571 have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the warehouse operation as it depicted on the above table.

Therefore, the warehouse operation and its sub factors found to be high in affecting the efficiency of the terminal as their mean value fall under high level of standard.

4.10.1 DISCUSSION ON CUSTOM OPERATION

4.10.1.1. Confidence interval Estimate

In order to ensure the acceptability of the mean value of the survey data a 95% confidence interval test on mean difference have conducted for the criterion variable and its predictors. The result of this test is present in table 4.10.1.1 below.

Table 4.10.1.1: Confidence interval estimate for differentiation on custom operation

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
custom clearance	33.375	55	.000	4.39286	4.1291	4.6566
custom clearance inefficency	16.676	55	.000	2.14286	1.8853	2.4004

The mean difference for the effect of custom operation (4.39286) lies between the lower (4.1291) and the upper (4.6566) limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion about the differentiation of effect of custom operation based on the sample mean of the survey for differentiation. On the other hand, the mean differentiations of the rest one-sub factor lie within their respective 95% confidence interval of the mean difference as a significance level 0.000. This means the sample mean for each of the sub factor are acceptable to represent their respective population mean. Thus, it is also possible to draw conclusion about the population of the individual predictor variable based on their respective sample mean. Based on the results of the one-sample test presented above in table **4.10.1.1,** the following section deals with the interpretation of the mean score values of the effect of custom operation factors.

4.10.1.2 Mean Score Values of custom operation

Table 4.10.1.2: Mean Score Values of custom operation

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
custom clearance	56	4.3929	.98495	.13162
custom clearance inefficency	56	2.1429	.96160	.12850

Table 4.10.1.2 shows the effect of custom operation with mean value of 4.3929 and a standard deviation of 0.98495. As per (Pihie, 2009), the mean value 4.3929 lies within the high-level range. This high-level effect can interpret as the custom operations have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the custom operation as it depicted on the above table.

4.10.1.3. Correlation Analysis for custom operation & its Sub Factors

Correlation procedures vary depending on data type. This study used an interval data. Therefore, Pearson's Product Moment Coefficient (r) is the appropriate statistical procedure to measure the degree of association between two interval variables. Table 4.6.1.3 below displays the bivariate correlation results for the data collected on the criterion variable on custom operation and its sub factors. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to 0.29 may regarded as indicating a low degree of correlation, r ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and r ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the custom operation with each of the predictor factors as shown below:

Table 4.10.1.3: Pearson's bivariate correlation for custom operation and its sub factors

Correlations			
		warehouse operation	warehouse operation inefficency factors
warehouse operation	Pearson Correlation	1	.778**
	Sig. (2-tailed)		.000
warehouse operation inefficency factors	Pearson Correlation	.778**	1
	Sig. (2-tailed)	.000	

****. Correlation is significant at the 0.01 level (2-tailed).**

Considering the relationship of the criterion variable, custom operation with its sub factors shows that there is positively and significantly related with its sub factors at 0.000, level of significance. This means there is high degree of positive relationship between the custom operation and its sub factors in influencing the container terminal efficiency on the dry port. From this, one can concluded that, the effect of custom operation and its sub factors on dry port container terminal is high the effect on the efficiency also high as their relationship is positive.

Objective Four: To elaborate the effects of customs operations on Modjo dry container terminal efficiency.

As it discussed above, confidence interval estimate for differentiation on custom operation indicated that the mean difference for each of the factors lies between the lower and the upper limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion on how custom operation and its sub factors have impact on efficiency of the terminal.

To describe the mean score of the participants, mean score measurement used by Pihie (2009) was applied where mean score: ≥4.5 = Very High, 3.51-4.51= High, 2.51-3.5= Moderate, 1.51-2.5= Low; < 1.5= Very Low (Crewel, 2012).

The effects of custom operation with mean value 4.3929 have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the custom operation as it depicted on the above table.

Therefore, the custom operation and its sub factors found to be high in affecting the efficiency of the terminal as their mean value fall under high level of standard.

4.11.1 DISCUSSION ON SIZE OF THE DRY PORT

4.11.1.1. Confidence interval Estimate

In order to ensure the acceptability of the mean value of the survey data a 95% confidence interval test on mean difference have conducted for the criterion variable and its predictors. The result of this test is present in table 4.11.1.1 below.

Table 4.11.1.1: Confidence interval estimate for differentiation on size of dry port

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
dry port size	22.946	55	.000	3.96429	3.6181	4.3105
size of dry port inefficency factors	16.971	55	.000	3.42857	3.0237	3.8334

The mean difference for the effect of size of dry port (3.96429) lies between the lower (3.6181) and the upper (4.3105) limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion about the differentiation of effect of size of dry port based on the sample mean of the survey for differentiation. On the other hand, the mean differentiations of the rest one-sub factor lie within their respective 95% confidence interval of

the mean difference as a significance level 0.000. This means the sample mean for each of the sub factor are acceptable to represent their respective population mean. Thus, it is also possible to draw conclusion about the population of the individual predictor variable based on their respective sample mean. Based on the results of the one-sample test presented above in table **4.11.1.1,** the following section deals with the interpretation of the mean score values of the effect of size of dry port factors.

4.11.1.2 Mean Score Values of size of dry port

Table 4.11.1.2: Mean Score Values of dry port

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
dry port size	56	3.9643	1.29284	.17276
size of dry port inefficency factors	56	3.4286	1.51186	.20203

Table 4.11.1.2 shows the effect of dry port size with mean value of 3.9643 and a standard deviation of 1.29284. As per (Pihie, 2009), the mean value 3.9643 lies within the high-level range. This high-level effect can interpret as the dry port sizes have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the dry port sizes as it depicted on the above table.

4.11.1.3. Correlation Analysis for dry port sizes & its Sub Factors

Correlation procedures vary depending on data type. This study used an interval data. Therefore, Pearson's Product Moment Coefficient (r) is the appropriate statistical procedure to measure the degree of association between two interval variables. Table 4.11.1.3 below displays the bivariate correlation results for the data collected on the criterion variable on dry port sizes and its sub factors. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to 0.29 may regarded as indicating a low degree of correlation, r ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and r ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the dry port sizes with each of the predictor factors as shown below:

Table 4.11.1.3: Pearson's bivariate correlation for dry port sizes and its sub factors

Correlations			
		dry port size	size of dry port inefficency factors
dry port size	Pearson Correlation	1	.901**
	Sig. (2-tailed)		.000
size of dry port inefficency factors	Pearson Correlation	.901**	1
	Sig. (2-tailed)	.000	

****. Correlation is significant at the 0.01 level (2-tailed).**

Considering the relationship of the criterion variable, dry port sizes with its sub factors shows that there is positively and significantly related with its sub factors at 0.000, level of significance. This means there is high degree of positive relationship between the dry port sizes and its sub factors in influencing the container terminal efficiency on the dry port. From this, one can concluded that, the effect of dry port sizes and its sub factors on dry port container terminal is high the effect on the efficiency also high as their relationship is positive.

Objective Five: To explain the effects of dry port size on Modjo dry container terminal efficiency

As it discussed above, confidence interval estimate for differentiation on dry port size indicated that the mean difference for each of the factors lies between the lower and the upper limits of the 95% confidence interval of the difference. This indicates the sample mean of the survey represents the population of mean at a level of 0.000, significance. Therefore, it is possible to draw conclusion on how dry port size and its sub factors have impact on efficiency of the terminal.

To describe the mean score of the participants, mean score measurement used by Pihie (2009) was applied where mean score: ≥4.5 = Very High, 3.51-4.51= High, 2.51-3.5= Moderate, 1.51-2.5= Low; < 1.5= Very Low (Crewel, 2012).

The effects of dry port size with mean value 3.9643 have high impact on the terminal efficiency of the dry port. Moreover, the different sub factors are there for the inefficiency of the dry port size as it depicted on the above table.

Therefore, the dry port size and its sub factors found to be high in affecting the efficiency of the terminal as their mean value fall under high level of standard.

The first variable to be assessed and analyzed here the dry port machineries influence. Dry port machineries are major tools of dry port operation in loading and unloading of containers. Here the result implies some sort of truth as the problem currently existed in the dry port and the majority of the respondent believes. The presence of inefficient machineries at the modjo dry

port terminal is hindering the smooth function of the port and the effect is not limited their impact also on overall function of the logistics system. The inefficiency of machineries resulted for the inefficiency of the dry port. Moreover, there are factors for the inefficiency of machineries and those factors were poor quality of the machineries, which was the result of availability of out dated or aged machineries, lack of timely service maintenance, lack of adequate spare parts for the machineries and technical failures due to over use machineries.

The second factors that contributed for the inefficiency of the dry port machineries were the imbalance of the machineries that expressed in terms of container against machineries, availability of machineries in kind, availability of machineries in capacity, and availability of machineries in speed, which related with loading and unloading ton per hours respectively.

The third factors that contributed for the inefficiency of the dry port machineries were inefficiency of the machineries operators that is resulted from negligence, lack of motivation poor management, lack of technical skill was the reason for the inefficiency of the machinery operators respectively.

The fourth factors that contributed for the inefficiency of the **dry port machineries** was inefficiency of the machineries maintenance workshops it discussed above. Here the result implies majority of the respondent believes the dry port machineries operators were influencing the efficiencies of Modjo dry port container terminals, its inefficiency was the result of lack of skilled technician, poor management, lack of workshop equipment, and disorganized workshop structure was the reason for the inefficiency of the machinery maintenance workshop respectively.

The second variable to be assessed and analyzed here the **containers holding heavy trucks** influence on Modjo dry port container terminal efficiency. Among the different mode of transport in the logistics, industry the containers holding heavy trucks function is great. The efficiency of this truck has impact in overall function of Modjo dry port container terminal.

The first factors that contributed for the inefficiency of the container holding truck was the quality of the truck as it discussed above resulted from availability of out dated or aged truck, lack of timely service maintenance, lack of adequate spare parts and technical failures due to over use truck contributed for the inefficiency of the container holding truck respectively.

The second factors that contributed for the inefficiency of the container holding trucks was the imbalance of the container holding trucks quantity which expressed in terms of container against

trucks, availability of container holding trucks in kind, availability of trucks in capacity, and availability of trucks in speed which was related with loading and unloading ton per hours.

The third factors that contributed for the inefficiency of the container holding trucks was inefficiency of the truck's driver that generated from lack of motivation, poor management, traffic jam long documentation process and presence old vehicles respectively.

The fourth factors that contributed for the inefficiency of the container holding truck was inefficiency of the truck maintenance workshop resulted from lack of skilled technician, poor management, lack of workshop equipment, disorganized workshop structure was the reason for the inefficiency of the truck maintenance workshop.

The third variable to be assessed and analyzed here the **customs operations influence** on Modjo dry port container terminal efficiency. Like the previous variable the custom operation also influencing the logistics industry by its daily operations. The poor efficiency of the customs operations was because of poor management, unethical behavior of the employee, interrupted, and insufficient internet network, and lack of integrated ICT system was the reason for the inefficiency of the custom clearance operation.

The fourth variable to be assessed and analyzed here the **warehouse operations influence** on Modjo dry port container terminal efficiency. The poor efficiency of the warehouse operations resulted from unsuitable construction for proper storage and handling of commodities, unwell drained outside premises, unclean, and improper housekeeping practices, terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities.

The fifth variable to be assessed and analyzed here the size of the **dry port influence** on Modjo dry port container terminal efficiency. The inefficiency was resulted from unavailability of enough parking for trucks and port machineries, availability of enough space for the incoming container, organized office arrangement, facilities like cafeteria and internet café and other service provide like bank, insurance, and customs

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. SUMMARY

The objective of the study was to analyze factors Influencing Container Terminals Efficiency; a case study of the Modjo container terminal dry port.

the variable were container handling equipment (Port Machineries), container holding trucks, warehouse operation, customs operations and size of the dry port. The study thoroughly assessed these factors and discussed the extent to which they influence container terminal efficiency within the logistics industry. **Summary of findings were presented on below table**

Variable 1 Dry port machineries inefficiency at Modj dry port terminal				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Not Significant	2	3.6	3.6	3.6
Slightly Significant	4	7.1	7.1	10.7
Moderately Significant	2	3.6	3.6	14.3
Significant	12	21.4	21.4	35.7
Very Significant	36	64.3	64.3	100
Total	**56**	**100**	**100**	
Factors for the inefficiency of port machineries				
Poor quality of the machinery	20	35.7	35.7	35.7
Imbalance quantity of the machinery	10	17.9	17.9	53.6
Inefficiency of the machinery operator	15	26.8	26.8	80.4
Lack of efficient maintenance workshop	11	19.6	19.6	100
Out dated or aged	**18**	**32.1**	**32.1**	**32.1**
Total	**56**	**100**	**100**	
Factors for the poor efficiency port machineries				
Out dated or aged	18	32.1	32.1	32.1
Lack of timely service maintenance	12	21.4	21.4	53.6
Lack of adequate spare parts	11	19.6	19.6	73.2
Technical failures due to over use	15	26.8	26.8	100
Total	**56**	**100**	**100**	
Factors for the imbalance quantity of the machinery				
Container against machineries	22	39.3	39.3	39.3
Machineries in kind	16	28.6	28.6	67.9
Machineries in capacity	8	14.3	14.3	82.1
Machineries in speed	10	17.9	17.9	100
Total	**56**	**100**	**100**	
Factors for the inefficiency of the machinery operator				
Lack of technical skill	32	57.1	57.1	57.1
Poor management	12	21.4	21.4	78.6
Lack of motivation	8	14.3	14.3	92.9
Negligence	4	7.1	7.1	100
Total	**56**	**100**	**100**	

Factors for the inefficient maintenance workshop				
Lack of skilled technician	20	35.7	35.7	35.7
Poor management	8	14.3	14.3	50
Lack of workshop equipment	10	17.9	17.9	67.9
Disorganized structure of the workshop	18	32.1	32.1	100
Total	**56**	**100**	**100**	
Variable 2 Container Holding Truck inefficiency at Modj dry port terminal				
Not Significant	1	1.8	1.8	1.8
Slightly Significant	2	3.6	3.6	5.4
Moderately Significant	3	5.4	5.4	10.7
Significant	13	23.2	23.2	33.9
Very Significant	37	66.1	66.1	100
Total	**56**	**100**	**100**	
Factors for the inefficiency of Container Holding Truck				
Poor quality of the container holding trucks	18	32.1	32.1	32.1
Imbalance quantity of the container holding trucks	12	21.4	21.4	53.6
Inefficiency of the container holding truck's driver	17	30.4	30.4	83.9
Lack of efficient maintenance workshop	9	16.1	16.1	100
Total	**56**	**100**	**100**	
Factors for the poor efficiency Container Holding Truck				
Out dated or aged	22	39.3	39.3	39.3
Lack of timely service maintenance	10	17.9	17.9	57.1
Lack of adequate spare parts	9	16.1	16.1	73.2
Technical failures due to over use	15	26.8	26.8	100
Total	**56**	**100**	**100**	
Factors for the imbalance quantity of the Container Holding Truck				
Container against container holding trucks	32	57.1	57.1	57.1
Container holding trucks in kind	8	14.3	14.3	71.4
Container holding trucks in capacity	9	16.1	16.1	87.5
Container holding trucks in speed	7	12.5	12.5	100
Total	**56**	**100**	**100**	
Factors for the inefficiency of the Container Holding Truck drivers				
Traffic jam	11		19.6	19.6
Lack of motivation	5		8.9	28.6
Long documentation process	14		25	53.6
Old Vehicles	18		32.1	85.7
Poor management	8		14.3	100
Total	**56**		**100**	
Factors for the inefficient maintenance workshop				
Lack of skilled technician	20	35.7	35.7	35.7
Poor management	9	16.1	16.1	51.8
Lack of workshop equipment	10	17.9	17.9	69.6
Disorganized structure of the workshop	17	30.4	30.4	100
Total	**56**	**100**	**100**	
Variable 3 Warehouse operation inefficiency at Modj dry port terminal				
Not Significant	2	3.6	3.6	3.6
Slightly Significant	4	7.1	7.1	10.7
Moderately Significant	2	3.6	3.6	14.3
Significant	47	83.9	83.9	98.2

Very Significant	1	1.8	1.8	100
Total	**56**	**100**	**100**	
Factors for the inefficient of Warehouse operation				
Unsuitable construction for proper storage and handling of commodities	6	10.7	10.7	10.7
Outside premises are not well drained	8	14.3	14.3	25
Terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities	4	7.1	7.1	32.1
Unclean and improper housekeeping practices	38	67.9	67.9	100
Total	**56**	**100**	**100**	
Variable 4 Custom operation inefficiency at Modj dry port terminal				
Slightly Significant	6	10.7	10.7	10.7
Moderately Significant	2	3.6	3.6	14.3
Significant	12	21.4	21.4	35.7
Very Significant	36	64.3	64.3	100
Total	**56**	**100**	**100**	
Factors for the inefficient of custom operation				
Lack of Integrated ICT System	16	28.6	28.6	28.6
Interrupted and insufficient internet network	22	39.3	39.3	67.9
Unethical behavior of the employee	12	21.4	21.4	89.3
Poor management	6	10.7	10.7	100
Total	**56**	**100**	**100**	
Variable 5 Dry port size inefficiency at Modj dry port terminal				
Not Significant	3	5.4	5.4	5.4
Slightly Significant	4	7.1	7.1	12.5
Moderately Significant	17	30.4	30.4	42.9
Very Significant	32	57.1	57.1	100
Total	**56**	**100**	**100**	
Factors for the inefficient of the dry port				
Availability of enough parking for trucks and port machineries	9	16.1	16.1	16.1
Availability of enough space for the incoming container	8	14.3	14.3	30.4
Organized office arrangement	10	17.9	17.9	48.2
Facilities like cafeteria and internet cafe	8	14.3	14.3	62.5
Other service provide like bank, insurance and customs	21	37.5	37.5	100
Total	**56**	**100**	**100**	

The study also looked at two major theories: Data Envelopment Analysis (DEA) and DEA Window Analysis as well other empirical studies relating to the topic. The study targeted population included terminal operators, Modjo dry port staff (MDP staffs), freight forwarders (clearing and forwarding agents), and transporters (drivers and other customers). Questionnaire used as a major instrument to obtain primary data. The questionnaire was designed using Likert scale ranging from 1-3, 1-4 and 1-5 respectively. 80 questionnaires distributed for the data gathering of which 56 of the respondents participated in the survey. The data analyzed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel 2013.

Findings indicated that, the cause and effect relationship among variables and sub variables. Poor efficiency of the terminal generated from inefficiency of the machineries, inefficiency of container holding trucks, inefficiency of warehouse operation, and inefficiency of customs operations and size of the dry port. Inefficiencies of the entire five variables generated from inefficiencies of many sub variable factors as it discussed on the findings and discussion part of this paper.

5.2 CONCLUSIONS

The first variable to be analyzed here the dry port machineries influence and its influence expressed in terms of its poor quality of the machineries, imbalance machineries quantity, inefficiency of the machineries operator, and inefficiency of the machineries maintenance workshop. Poor quality of the machineries resulted from the presence of out dated or aged machineries, lack of timely machineries service maintenance, lack of adequate spare parts and technical failures due to over use of the machineries. The influence of imbalance machineries quantity was measured in terms of container against machineries, machineries in kind machineries in capacity and machineries in speed. The influence of the machineries operator generated from lack of technical skill, presence of poor management, lack of motivation and negligence of the operator. Inefficiency of the machineries maintenance workshop was the result of lack of skilled technician, poor management, lack of workshop equipment and disorganized structure of the workshop. The second variable to be analyzed here container holding trucks influence and its influence expressed in its poor quality of the trucks, imbalance trucks quantity, inefficiency of the truck's driver, and inefficiency of the trucks maintenance workshop. Poor quality of the trucks resulted from the presence of out dated or aged trucks, lack of timely trucks service maintenance, lack of adequate spare parts and technical failures due to over use of the trucks. Imbalance trucks quantity measured in terms of container against trucks, trucks in kind, trucks in capacity and trucks in speed. The influence of the trucks drivers generated from lack of motivation, presence of poor management, presence of long documentation process, traffic jam, and having old vehicles. Inefficiency of the trucks maintenance workshop was the result of lack of skilled technician, poor management, lack of workshop equipment and disorganized structure of the workshop. The third variable to be analyzed here warehouse operation influence and its influence was the result of unsuitable construction for proper storage and handling of commodities, outside premises are not well drained, terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities and unclean and

improper housekeeping practices. The fourth variable to be analyzed here custom operation influence and its influence was the result of lack of integrated ICT system, interrupted and insufficient internet network, unethical behavior of the employee and poor management and the fifth variable to be analyzed here size of dry port influence.

5.3 RECOMMENDATION

Based on the findings of the study, the following recommendations forwarded:

- Ethiopian Shipping and Logistics Service Enterprise (ESLSE) have to invested more on the purchase of new and modern machineries to alleviate the port machineries and container holding trucks quality and quantity problem.
- In order to efficiently and effectively use the available port machineries and container holding trucks ESLSE has to invest in both the port machineries and container holding trucks maintenance workshop. The workshop has to be equipped with skilled labor, workshop maintenance equipment, spare part and the overall working environment including the poor management of the workshop has to give due attention.
- In order to improving the existing efficiency related problem and to boost the future efficiency of the port machinery operators, container trucks drivers and the port machineries and container trucks maintenance workshop technicians ESLSE has to give due attention by making the working environment smooth. To do this the existing poor management has to be improved, the negligence of employee has to be managed properly, the skilled gap related to machineries operator and workshop technicians has to be immediately solved by arranging local and international training in order to upgrade the operator and technicians technical skill and thereby boosting the efficiency of the terminal.
- Ethiopian Shipping and Logistics Service Enterprise (ESLSE) have to invest more on building and management of warehouse. To improve the operation of warehouse due attention has to be given for those influential factors.
- ESLSE need to building suitable construction for proper storage and handling of commodities, make improvement on outside premises to be well drained, make the working area more attractive and suitable for work by avoiding unnecessary clutter, trash, unused equipment, or spilled commodities and unclean and improper housekeeping practices.
- In order to improve the efficiency related with custom operation ESLSE has to closely work with the customs and other stakeholders who have role in the overall efficiency of the terminals

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APPENDIX 1:

Introductory Letter to Respondents

Dear Respondent,

I am a postgraduate student in the department of logistics and supply chain management in Addis Ababa University School of Commerce. Currently, I am undertaking a research study on, **"FACTORS INFULENCEING CONTAINER TERMINAL EFFICENCY: A CASE STUDY ON MODJO DRY PORT.**

The purpose of this questionnaire is to collect data for purely academic purposes and your opinions, responses and views are very important to this study and treated with the utmost confidentiality. Kindly spare a few minutes and complete this questionnaire. I would highly appreciate if you assist me by responding to all questions as completely, correctly and honestly as possible.

Thank you very much for your participation, cooperation, and understanding.

If you need further explanation or questions, please do not hesitate to contact me by below cell phone.

Yours faithfully,

Hailemariam Abera Bekele

Mobile, 0913565968

May 2020

APPENDIX 2: QUESTIONNAIRE

Answer all questions as indicated by either filling in the blank or ticking the options that apply.

SECTION A: BACKGROUND INFORMATION OF RESPONDENTS

1. **Sex of Respondent:**

   1. Male { } 2. Female { }

1. **Age of Respondent:**

   1. Less than 24 years { } 2. 25 – 29 years { } 3.30 – 45 year { } 4. 46 – 50+ years { }

3. Level of Education Acquired:

   1. Diploma { } 2. First Degree { } 3. Post Graduate Degree { } 4. Other (Specify) _____

4. Type of Organization:

   1. Container Terminal Operator { } 2. Modjo Dry Port Staff { } 3. Freight Forwarders { }

   4. Transporters { } 5. Other (Specify)_____

5. What is your position/status in the organization?

   1. Director { } 2. Division Manager { } 3.Coordinator { } 4.Senior officer { }

   5. Other (Specify) _____

6. How many years have you worked in this organization?

   1. Over 10 years { } 2. 6 – 9 years { } 3.3 – 5 years { } 4. Less than 2 years { }

SECTION C: DRY PORT MACHINERIES

1. **How do you rate the influence of dry port machineries in loading and unloading of container at Modjo dry port container terminal?**

   1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }

   4. Significant { } 5. Very Significant { }

2. **What do you think the factors would be for the inefficiency of the machineries?**

   1. Poor quality of the machinery { } 2. Imbalance quantity of the machinery { }

   3. Inefficiency of the machinery operator { } 4. Lack of efficient maintenance workshop { }

   4. If any, other than the above please specify here: _____

3. **What do you think the reason for the poor quality of the port machineries would be?**

   1. Out dated or aged { } 2. Lack of timely service maintenance { }

   3. Lack of adequate spare parts { } 4. Technical failures due to over use { }

   If any other than the above please specify here: _____

4. **In terms of what do you measure the quantity of machineries influence at Modjo dry port container terminal?**

   1. Container against machineries { } 2. Machineries in kind { }
   2. Machineries in capacity { } 4. Machineries in speed { }
   5. If any other than the above please specify here: _____

5. **How do you rate the influence of dry port machineries operator in loading and unloading of container at Modjo dry port container terminal?**

   1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }
   4. Significant { } 5. Very Significant { }

6. **What do you think the reason for the inefficiency of the port machineries operator would be?**

   1. Lack of technical skill { } 2. Poor management { } 3. Lack of motivation { }
   4. Negligence { } 5. If any other than the above please specify here: _____

7. **How do you rate the significance influence level of dry port machineries maintenance workshop in machineries efficiency at Modjo dry port container terminal?**

   1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }
   4. Significant { } 5. Very Significant { }

8. **What do you think the reason for the inefficiency of the port machineries maintenance workshop would be?**

   1. Lack of skilled technician { } 2. Poor management { }
   3. Lack of workshop equipment { } 4. Disorganized structure of the workshop { }
   5. If any other than the above please specify here: _____

SECTION D: CONTAINER HOLDING HEAVEY TRAUCKS

9. **How do you rate the significance influence level of container holding trucks at Modjo dry port container terminal?**

   1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }
   4. Significant { } 5. Very Significant { }

10. **What do you think the factors would be for the inefficiency of the container holding trucks?**

    1. Poor quality of the container holding trucks { } 2. Imbalance quantity of the container holding trucks { } 3. Inefficiency of the container holding truck's driver { }
    4. Lack of efficient maintenance workshop { } If any,_____

11. What do you think the reason for the poor quality of the container holding trucks would be?

1. Out dated or aged { } 2. Lack of timely service maintenance { }

3. Lack of adequate spare parts { } 4. Technical failures due to over use { }

5. If any other than the above please specify here: _____

12. In terms of what do you measure the quantity of container holding trucks influence at Modjo dry port container terminal?

1. Container against container holding trucks { } 2. Container holding trucks in kind { }

3. Container holding trucks in capacity { } 4. Container holding trucks in speed { }

5. If any other than the above please specify here: _____

13. How do you rate the influence of container-holding truck's driver at Modjo dry port container terminal?

1. Not Significant { } 2 Significant { } 3. Moderately Significant { }

4. Significant { } 5. Very Significant { }

14. What do you think the reason for the inefficiency of the container holding truck's driver would be?

1. Traffic jam { } 2. Lack of motivation { } 3. Long documentation process { }

4. Old Vehicles { } 5. Poor management { }

15. How do you rate the significance influence level of heavy trucks maintenance workshop in trucks efficiency at Modjo dry port container terminal?

1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }

4. Significant { } 5. Very Significant { }

16. What do you think the reason for the inefficiency of the container holding truck's maintenance workshop would be?

1. Lack of skilled technician { } 2. Poor management { }

2. Lack of workshop equipment { } 4. Disorganized structure of the workshop { }

5. If any other than the above please specify here: _____

SECTION E: TERMINAL WAREHOUSE

17. **How do you rate the significance influence level of warehouse operation at Modjo dry port container terminal?**

1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }

4. Significant { } E. Very Significant { }

18. What do you think the factors would be for the inefficiency of the warehouse operation?

1. Unsuitable construction for proper storage and handling of commodities { }
2. Outside premises are not well drained { }
3. Terminal warehouse premises and grounds are full of weeds, clutter, trash, unused equipment, or spilled commodities { }
4. Unclean and improper housekeeping practices { } 5. If any, other than the above please specify here: _____

SECTION F: CUSTOM CLEARANCE

19. **How do you rate the significance influence level of custom clearance at Modjo dry port container terminal?**

1. Not Significant { } 2. Slightly Significant { } 3. Moderately Significant { }
4. Significant { } E. Very Significant { }

20. What do you think the factors would be for the inefficiency of the custom clearance?

1. Lack of Integrated ICT System { } 2. Interrupted and insufficient internet network { }
2. Unethical behavior of the employee { } 4. Poor management { }
5. If any, other than the above please specify here: _____

SECTION G: SIZE OF THE DRY PORT

21. **How do you rate the significance influence level of dry port size at Modjo dry port container terminal?**

1. Not Significant { } 2.Slightly Significant { } 3. Moderately Significant { }
4. Significant { } 5. Very Significant { }

22. In terms of what do you measure the size of dry port influence at Modjo dry port container terminal?

1. Availability of enough parking for trucks and port machineries { } 2. Availability of enough space for the incoming container { } 3. Organized office arrangement { } 4. Facilities like cafeteria and internet cafe 5. Other service provide like bank, insurance and customs

END OF QUESTIONNAIRE

Thanks for your time and participation!