ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES

ASSESSMENT OF DRY PORT PERFORMANCE MANAGEMENT PRACTICES IN ETHIOPIA: A CASE STUDY OF MODJO DRY PPORT

BY

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ADDIS ABABA, ETHIOPIA

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STATEMENT OF DECLARATION

I the undersigned declared that this thesis of MBA in general management at St. Mary's University, which was done independently with the advice and suggestions of my advisor, Worku Mekonnen (PhD), is my original work submitted for examination and that all reference materials contained therein have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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St. Mary's University, Addis Ababa June, 2019

ENDORSMENT

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

Worku Mekonnen (PhD) _____

Name Signature

St. Mary's University, Addis Ababa June, 2019

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ACRONYMS/ABREVATIONS

ASEAN	Associations of Southeast Asian Nations
DPSE	Dry Port Service Enterprise
E.C	Ethiopian Calendar
EIR	Equipment Interchange Receipt
ESLSE	Ethiopian Shipping and Logistics Service Enterprise
HR	Human Resource
IT	Information Technology
ICD	Inland Clearance Depot
ICT	Information Communication Technology
JIT	Just in Time
KPI	Key Performance Index
LLC	Land Locked Countries
LPIs	Logistics Performance Index
MTS	Multimodal Transport Service
MDP	Modjo Dry Port
PORTOPIA	Ports Observatory for Performance Indicators Analysis
TEU	Twenty-foot Equivalent Unit
UNDP	United Nations Development Program
UNCTAD	United Nations Conference and Development

Abstract

Dry ports promote regional development and which are especially useful in land-locked countries whose shipments come through a neighboring sea port. Ethiopia has started constructing dry ports in its hinterland along the transit corridors. And this move has helped the country to save the foreign currency and increased its efficiency in import and export operation. Among the constructed dry ports, Modjo has been identified by the government as the key node for the emerging Ethiopian intermodal trade logistics system. Thus, the efficiency of the whole logistics supply chain largely depends on dry ports as they act as the integrating and coordinating mechanism between different components. To reap the maximum benefit from those dry ports, the efficient and effective performance of the dry ports is very crucial and to do that it is important to assess the performance of dry ports. Hence the objective of this research was to assess the performance of dry port operation management practices based on port performance indicators and ranking factors based on their level of importance. In order to achieve this objective, the researcher has used quantitative and qualitative research methods, Data was collected from 129 employees out of 192 sample frame and 50 customers. The data was collected using questionnaire and interview, and data was analyzed using descriptive statistics and interpretation with the support of secondary data. The result of the study was indicated that backward of custom clearance process, poor Infrastructure and equipment management practice, discontented service provided situation, poor cargo handling efficiency in terms of container throughput, and incidents, delay and waiting time was recorded, and these were factors of the overall dry port performance whereas showed poor performance regarding the management practices, according to the study result recommended severely that the need to improvement of the dry port operational management practices.

Key Words: *custom clearance, infrastructure and equipment, service, handling efficiency, incidents, delay and waiting time*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Ports play a key role in international trade with the most of the world's goods being transported by ships and through ports thanks for the cost benefit relationship of this transport mode. Since the ports have this surgical role in the economy it is imperative that they follow the technological development of other industries by creating tools that analyse and evaluate their performance in a continuous way.

Dry port operations play a differentiating role in the development of world trade and their competitiveness. The logistics process also depends on the port operation efficiency, by improving the efficiency of dry port operations. Assuming vitality in the creation of new markets and distribution of goods across the geographical borders such are the gains or losses that the logistics operations can induce in the system (Ringsberg and Lumsden, 2015). Firstly, logistics makes an important contribution to the economy as a whole. Secondly, logistics supports the movement and flow of many economic transactions; it is an important activity in facilitating the sale of virtually all goods and services, for instance, if goods do not arrive or are delivered on time, in proper place or condition, no sale can be made. With the development of global multimodal supply chains, dry ports have been assumed increasing importance to suit the need for market development, seamless integration and closer collaboration between the different participants of the supply chain and transport network (Lee and Kim, 2003).

Thus as inland logistics centers, dry ports are playing an increasingly pivotal role in the multimodal transport network that sustains economic activity by delivering key inputs to local enterprises and facilitating their exports of raw materials, semi-manufactured products, and finished goods (Gujar Girish,2011). Another major reason for the rising importance of dry ports is due to their roles in the coordination of materials and information flows; minimization of costs; as well as reliable cargo handling which is becoming crucial as a functional part of the global logistics and supply chain management. The increasingly demanding customers push service providers hard to provide speedy, just-in-time services at low/reasonable prices. This may require shipping lines to carry cargo further inland with a much more flexible schedule and it will need dry ports to cope with it. Thus, the efficiency of

the whole logistics supply chain largely depends on dry ports as they act as the integrating and coordinating mechanism between different components, e.g., shipping lines, inland transportation and warehousing (Bichou and Gray, 2004; Miyashita, 2004).

Due to the lack of direct access to the sea, Landlocked Developing Countries (LLDCs) are marginalized from major transportation and services (logistics, information technology) networks (World Bank-United Nations, 2014). Their international trade depends on transit through other countries. In addition, long distance to world markets, cumbersome transit procedures and inadequate infrastructure contribute to high transport and trade costs thereby reducing external trade and subsequent economic growth. Access to major markets is one of the biggest constraints to poverty reduction and economic integration of landlocked developing countries (Faye et.al. 2004). Companies in landlocked developing countries are struggling to get the goods to their destination without major delays and increases in cost (Faye et.al. 2004).

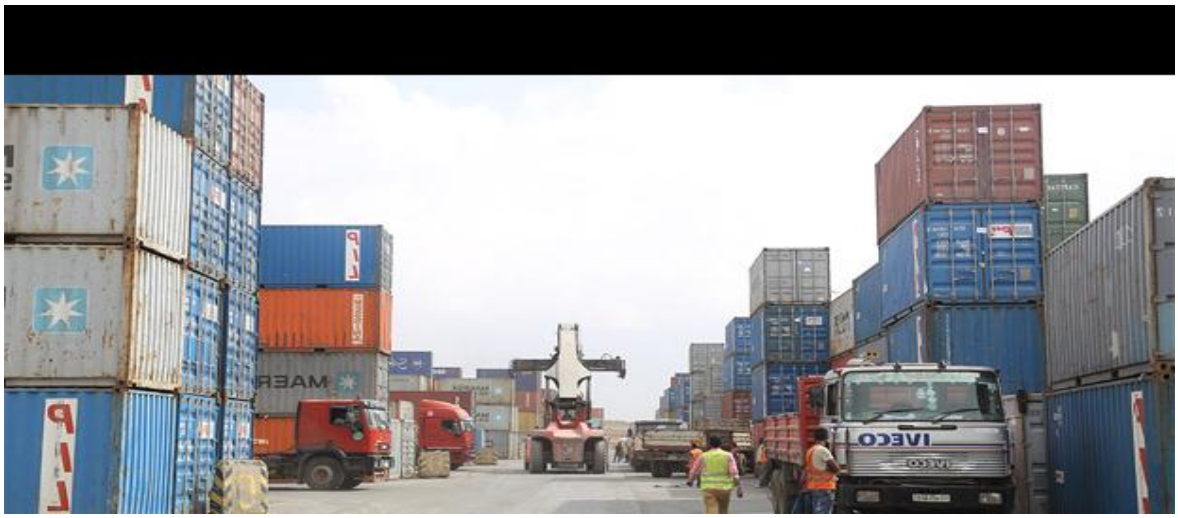
Dry ports promote regional development and which are especially useful in land-locked countries whose shipments come through a neighboring sea port. These dry ports provide warehousing, customs control and clearance, forwarding, container handling, stuffing & unstuffing, and security services. Therefore, proper management of these dry ports will enhance its service performance and minimizing the high cost of ports. A port manager will continuously have challenges of improving, satisfying, and maintaining the required standards. It is difficult to make effective international comparisons of port performance, standardization of port performance measures and metrics.

Managers and authorities at ports have increasingly been under pressure to improve port performance by ensuring that the port provides services on an internationally competitive basis (Simoes and Marques, 2010). They are responsible for selecting warehousing locations and capacities, determining the number of cranes, derricks, winches, forklifts and any other cargo handling equipment required for loading and discharging cargoes and controlling daily port operations. Also, managers are responsible for using information systems for demand forecasting, strategic planning, port control, and customer satisfaction (Panayides and Song, 2008).

Ethiopia is a landlocked country and thus lacking any sea ports. For the import and export of cargo it is depending on its neighboring countries. The government of Ethiopia has established the institution, DPSE for the development of dry ports in Ethiopia .Under the

Regulation No. 136/2007 or 136/1999EC establishment and purpose of DPSE, Dry Ports has established 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 destuffing) of containerized export and imported goods, to provide container depot services and, To engage in other related activities conducive to the achievement of its purposes. Dry ports will improve the logistic network of Ethiopia. To reap the maximum benefit from those dry ports, the efficient and effective performance of the dry ports is very crucial and to do that it is important to assess the performance of dry ports.

The first dry port in Ethiopia was established at Modjo, nearly 75 km East of Addis Ababa, and started operations in the first half of 2009.The port has a capacity to handle 6,000 containers, measuring 20-ft (six meters), on 2012. Modjo dry port is connect to Djibouti and were built with the Purposes of providing, receiving and delivering cargoes, loading and unloading, stuffing and unstuffing of container goods, temporary storage for import and export cargoes, container cleaning and maintaining, weight bridge, customs control and clearance, banking and insurance, container depot service and engage in other related activities conducive to the achievement of its purposes. And this move has helped the country to save the foreign currency and increased its efficiency in import and export operation. Modjo has been identified by the Government as the key node for the emerging Ethiopian intermodal trade logistics system.



Picture: Modjo dry port

Now the port has reached the capacity of accommodating more than 14,000 containers at a time, with 1000 containers in and out per day ESLSE annual report 2018. The port has a share of about 76 percent import-export destination of Ethiopia formerly, which was

established in 2009 with the capacity of accommodating only 700 containers at once. As a land locked country, Ethiopia is using mainly Djibouti's and other neighbouring countries' ports. In addition to the challenges with trade balance and the dearth of foreign currency, the payment for ports with additional cost of containers was a heavy burden for this developing country until recent time,

1.2. Statement of the problem

Ethiopia, as landlocked developing country, faces number of challenges. 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. To compensate this problem and to cope up with the world economic development and growth of commerce as well as to balance the import export scenario the dry ports are consider as the solution.

As the business environment becomes more competitive and global than ever before, service industries, such as ports, are placing greater emphasis on customer satisfaction through providing quality services efficiently (Song and Cullinane, 1999). Song and Cullinane (1999) further noted that, as a major trade facilitator and a component in the total logistics chain, a port and/or terminal should be managed and operated in a way which maximizes efficiency and performance of their operation.

Since its implementation, the intermodal system in Ethiopia has encountered several problems. In the beginning, there was heavy congestion at Djibouti port. The congestion then moved to dry ports. Containers were not picked up in time which severely hampered the effectiveness of the dry ports. Modjo dry port regularly reaches its terminal capacity very quickly and stays crowded thereafter. For Multimodal traffic - which currently accounts for more than 85% of containerized imports, 86% of the total transport time is spent at Modjo. According to the study of UNDP/Ethiopia, 2017 stated that there are significant operational constraints at the Modjo dry port, these problems lead to the question whether the dry ports in Ethiopia has been performing efficiently and has achieved the intended purpose.

According to world bank LPIs (2018) based on the aggregated logistics performance measurement variables including the dry port section, Ethiopia is ranked 131th amongst 167 countries. Which was indicate the poorest performance on the overall logistics operation.

According to the report of ESLSE May, 2018 Modjo operational performance, the organization (ESLSE) showing that the dry port problems broadly. For instance, utilization of resources, absence of control and procedures while delivering services, poor IT and communication system observed, as per the sample taken for the month of November 2017 up to January 2018, 992 customers were not informed timely, the port customers are strongly complain and led to decreasing customer satisfaction about the service delivery system. Ports successful cargo operations are dependent on the availability and use of mechanical equipment (reach stacker, forklift etc..) however, availability and productivity of the terminal machineries are under questioned due to their organization and effectiveness, The Enterprise planed for equipment to keep availability to 90%, and found that about 63% of the ports machineries were ready for work and the remaining 37% are not functional. In addition to availability and reliability of cargo handling equipment, Ports need planned maintenance system and management of cargo handling equipment, during audit time more than 367 damaged containers were found in the dry port which were discharged from 2012 to 2018.(ESLSE report, 2018) Dwell time/waiting time is an indicator of how efficient the ports are operating and how quickly the containers are flowing through the terminals. With longer dwell times, terminals are storing more containers, and truckers must wait for longer periods as containers must be moved to reach the older containers on the bottom of each stack, Modjo dwelling time of containers increases and the port makes busy, Port service payment and demurrage increase on customers. According to the report there are cargos in the port which stayed for 60 up to 2057 days. (ESLSE report, 2018).

In general, these all the above listed problems hinder the dry port performance of its efficiency and effectiveness. Based on these problems the researcher will assess the port performance management system with the following basic research questions to provide information for the port's operation and port management can assess the efficiency of their port's operation and can initiate action to improve performance and investigate any apparent problem areas so that they can be eliminate.

1.3. Basic Research Questions

- How is the performance of Modjo dry port management practice in terms of custom clearance, infrastructure and equipment, service providing system, handling efficiency and incidents, delay and waiting times?

- What would be the rank of indicators according to their degree of influence on the performance of Modjo dry port?
- What is the level of Modjo dry port performance in its operational activities and utilization of its capacity?
- What is the current state of the practice of dry port performance management?

1.4. Objectives of the Study

1.4.1. General Objective of the Study

The key objective of this study was to assess the performance of Modjo dry port management practices based on widely accepted performance indicators and parameters for dry ports.

1.4.2. Specific Objective of the Study

The specific objectives of the study are:

- ❖ To examine the performance of Modjo dry port management practice in terms of custom clearance, infrastructure and equipment, service providing system, handling efficiency and incidents of delay and waiting times.
- ❖ To evaluate the rank of indicators according to their degree of influence on the performance of Modjo dry port.
- ❖ To assess the existing state of practice of port performance management.
- ❖ To assess the level of Modjo dry port performance in terms of its operational activities and utilization capacity.

1.5. Significance of the Study

Performance measurements plays an essential role in evaluating productivity, because, it can define not only the current state of the system but also its future. Performance measurement helps to move the system in the desired direction through the effect. The common purposes of performance management are to reduce cost and to improve efficiency and effectiveness.

Despite the obvious significance of port efficiency and as dry port is a new phenomenon to the country there are few studies conducted in the area. Hence, in view of the important role those dry ports have to the whole supply chain and to entire economy of the country it is worthy to evaluate the performance of the dry ports. Therefore, this study will attempt to identify the major areas of the port performance management process that influence the

performance of Mojo dry port and can help the port operators and authorities and other stakeholders to identify areas which need improvement to enhance the performance of the ports.

The output of this research would contribute to betterment of Modjo dry port performance management practice in terms of the efficiency and effectiveness of the country's trade flow. It also informed policy makers, port operators and authorities and other stakeholders to identified areas which needed improvement to enhance the performance of the ports in the enterprise to have a glance of what was missing in the total picture of their logistics performance and take necessary directions towards improving it in the future. Moreover, it would be an initial input for those who wish to conduct further studies on this topic.

1.6. Scope of the Study

The scope of the study was focus on one of the dry ports out of nine, under Ethiopian Shipping and Logistics Service Enterprise management, which was found in Oromia region specifically in Modjo dry port. Mainly the study was focused on the operation of the port as it is a largest area of the port activities. Modjo is the aged one and experienced port to assess performance when compared to the other ports.

1.7. Limitations of the Study

In addition to the common limitation such as time and resource constraints, the research method used questionnaire and interview for collecting primary data and to support secondary data were important for the issue of the study and expected the limitation of well-organized information from the place hence respondents might reply base on their own perception and there will a level of subjectivity. To cover all the performance measurement variables which are frequently used by many countries, there was limitations of getting data from central server. No national institution exists to collect, scrub, and deploy such comprehensive data. At the enterprise level, the enterprise and its affiliates are not networked with modern logistics information systems which resulted in fragmentation of data and information. This was made difficulty to access data and information sooner. As a result, the researcher was used internal reports and pieces of information from different sector and depending on the availability of data and limitations of time, and the capability of respondents answering each question stated on the survey.

It is known that dry port operation is vast part and parcel of logistics activity. The activity is mainly performed on the import and export activity. Due to limitations of time and budget, the study only investigates some parts of indicators of dry port performance.

1.8. Operational definitions of the key terms

Dry Port: A common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage (UNCTAD, 1991).

Container Dwell Time: The amount of time a container waits to get picked up at a marine terminal after being unloaded from a vessel (PMSA, 2016).

Demurrage: are charges raised when the full container is not moved out of the port/terminal for unpacking within the allowed free days offered by the shipping line (Hariesh Manaadira, 2009).

loading/unloading: Loading and unloading means the services of loading or unloading cargo between any place or point of rest on a wharf or terminal, and railcars, trucks, or any other means of land transportation and barges (Rafal Burdzik, 2014).

Cargo in Transit: A cargo that is moved from an origin point across international borders to another country over land is termed as "Cargo in Transit" (Hariesh Manaadira, 2014).

Equipment: Crane, vehicles, reach stacker and others machines used in the terminal.

Gate: A point at an intermodal terminal where a clerk checks in and out all containers and trailer. All reservations and paperwork are checked at the gatehouse (UNCTAD, 1976).

Lead-time: is the speed at which activities are performed. This term gained more attention by the introduction of just-in-time production, where it is defined as the time that elapses between the start of a process and its completion (De Treville*et al*., 2004).

1.9. Organization of the Research Report

This research was organized in five chapters. Chapter one presents introduction which includes background of the study, statement of the problem, basic research questions, objectives of the study, definition of terms, significance of the study, and delimitation/scope of the study. Chapter two, the review of related literature was accessed basic concepts, measurement variables, and other related concepts critically essential to the study. The third chapter was presented methodology which comprised research design, data tools would employ; the procedures of data collection; and the methods of data analysis. Chapter four was analysed of the study according to collected data through questioner interview and second hand information using various statistical measurement tools depending on the characteristics of variables used on the study. The final part, chapter five provided conclusion and the actions required solving the problem arising from the finding of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

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

2.1. Theoretical Review of Dry Port system

The development worldwide concerning "dry ports" (in their various forms, functions and strategies) addresses many of the challenges facing contemporary logistics and ports. The concept of a dry port is more often used in practice while being given more scientific attention. In 1982, the UN first used the term to underline the integration of services with different traffic modes under one contract (Beresfordand Dubey 1990).

2.1.1. Definition of Dry Port

A "dry port" was defined as an inland terminal to and from which shipping lines could issue their bills of lading (UNCTAD 1982). The concept has evolved from merely focusing on the container segment to other market segments as well, so that it is now more focussed on the services originally offered at the port but moved Inland (Woxenius and Bergqvist 2011, Cullinane and Wilmsmeier2011).

Parallel to the development of the concept in practice and theory, numerous definitions have been developedaccording to UNCTAD (1991), dry port is "An inland terminal to which shipping companies issue their own import bills of lading for import cargos assuming full responsibility of costs and conditions and from which shipping companies issue their own bills of lading for export cargos."

Dry ports could be inland terminals within a country that has a gateway port or they could be located in adjacent land-locked countries in the hinterland of one or more sea ports. The concept came into wide spread use in conjunction with containerization and this is the context in which the term is used here.Dry Port or Inland Clearance Depot (ICD) also defined as: " 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) 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." (UNCTAD,2002)

Roso*et al*. (2009) define dry port as; "an inland intermodal terminal directly connected to seaport(s) with high capacity transport mean(s), where customers can leave/pick up their standardized units as if directly to a seaport." A dry port can be understood as an inland setting with cargo-handling facilities to allow several functions to carry out, 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,etc (Ng and Gujar, 2009).

Inland nodes are usually known by different terms depending on the shape, governance, functions, stakeholders and networks they have. These are dry ports, inland terminals, inland hubs, inland logistics centres, inland freight villages and inland ports PORTOPIA (2015).Rodrigue&Notteboom (2013) define inland ports as "A rail or a barge terminal that is linked to a maritime terminal with regular inland transport services". According to this definition, an inland port has a level of integration with the maritime terminal and supports a more efficient access to the inland market both for inbound and outbound traffic. This implies an array of related logistical activities linked to the terminal, such as distribution centres, depots for containers and chassis, warehouses and logistical service providers.

2.1.2. Role and Purpose of Dry Ports

Dry ports may be used whether a country has sea ports or is land-locked, but only surface modes of transport are involved in giving access to them. 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). As a crucial part of the international transportation systems, ports are not solely independent and natural area for the transfer of physical goods, but also a systematic element of (often multimodal) logistical supply chain (Gujar, 2011). Therefore, the role of a dry port within this system is becoming particularly important. Due to the roles of dry ports in the coordination of materials and information flows; minimization of costs; as well as reliable cargo handling which is becoming crucial as a functional part of the global logistics and supply chain management.

The benefits and potential benefits of dry ports are summarized by UNCTAD (1991) as follows:

- **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 throughrates. Containerization offers numerous advantages.
- **Avoidance of clearing and forwarding agents' fees at sea ports:** These fees may be completely avoided where a dry port allows the use of combined transport bills of lading or multi-modal transport documents. This is so when such documents are issued by as hipping line 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 clearing and forwarding agent.
- **Avoidance of storage, demurrage and late documentation fees:** In traditional transit systems, goods are frequently held up at maritime ports or at land borders 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 will be removed. Storage costs, demurrage and late documentation fees will thus not occur.
- **Better utilization of capacity:** A dry port can reduce empty rail wagon or truck movements by acting as a consolidation centre for return loads of export cargo. The consignment increase in load factor may enable some savings to be made in overall transport costs.
- **Greater use of containers:** the establishment of a dry port with container-handling facilities can encourage greater use of containers. In containerization cargo is carried inboxes of standard dimensions allows these containers to be handled 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 handled in break-bulk fashion. This advantage, coupled with standardization of the dimensions of containers, has revolutionized general cargo transport and handling methods.

- **Lower customs staff costs:** As dry ports allow customs clearance to be concentrated at a few sites, it may be possible to effect the same volume of clearance with reduced customs involvement, especially where a dry port is accessed by two or more gateway ports.
- **Benefits to sea ports:** 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.
- **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.

In addition, according to PORTOPIA, 2015 the following are supposedly put as advantages of the growth of inland ports:

- Increasing land value: inland ports transfer parts of the seaports activity to the hinterland to unburden the territory surrounding the seaports.
- Reducing costs: inland ports reduce the costs of the ports since the hinterland land value is normally lower than coastal one.
- Decreasing congestion: building inland ports is a proved strategy for decreasing the congestion generated in the big sea ports terminals due to the truck transport.
- Improving hinterland access: this kind of facilities certainly stimulates the transportation of the goods to hinterlands, as well as the exportation of key products from local markets.
- Managing the supply chain: the inland port is not only a strategy to improve the capacity and the accessibility of the hinterland transport it is also a location that plays a key role in the supply chain management. Nowadays, inland ports are considered logistical centres where a good can be stored or even transformed before reaching

other destinations. In addition, an inland port can also act as a buffer depot if necessary (capacity management).

2.2. Dry port facilities and operational configuration

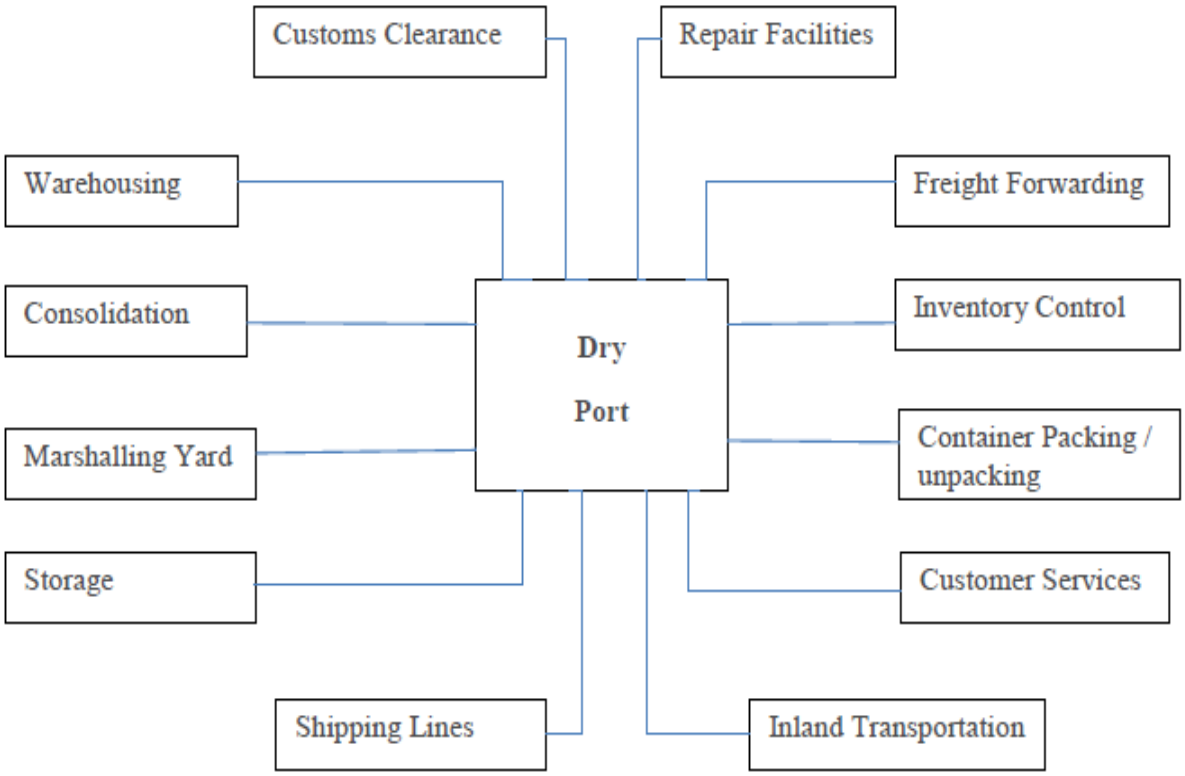
A dry port of international importance "refers to an inland location as a logistics centre connected to one or more modes of transport for the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs control and formalities" (Article 1 of Inter-Governmental Agreement on Dry Ports). (UNESCAP 2015)

Dry ports are intermodal facilities located inland connecting rail and road facilities with sea ports. They allow containers to be moved around from each mode and can help shift freight from road to rail and sea options. Furthermore, they can help relieve congestion from sea ports and provide them with support functions.

Dry ports operate 24 hours a day and assist with the transport of Twenty Foot Equivalent Units (TEUs). Essentially they can carry out all the functions and value added services of a sea port required for the shipping and forwarding of cargoes. These functions include customs clearance, storage, information exchange etc. These functions can save time and space at sea ports and reduce loading times (SEStran ,2012)

UNCTAD outlines the minimum dry port facilities. These may include customs and clearance services, warehousing and marshalling yards as highlighted in Figure 1. In addition, a reliable and efficient information and communication system is an integral part of the dry port infrastructure (UNCTAD, 1991).

Figure 2.1 Functional structures of dry ports.



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Source: (UNCTAD, 1991)

2.3. Performance measures

According to Marlow and Casaca (2003) generally defined performance as: "An investigation of effectiveness and efficiency in the accomplishment of a given activity and where the assessment is carried out in relation to how well the objectives have been met".

Performance has many definitions. Mentzer and Konrad (1991) have defined it as the ratio of actual output to standard output, which requires establishing a goal and a strategy to meet such standard output. This definition was based on differentiating between productivity, utilisation and performance. They discussed that productivity refers to the ratio of output to input, while utilisation is the ratio of used facilities to available facilities. In order to meet a standard output, a goal tends towards minimising operating costs and improving the service levels requiring a balance between efficiency and effectiveness. For both these dimensions, they measured efficiency in terms of how well the resources are utilised, while the effectiveness has been measured if a goal or a strategy has been accomplished.

Performance measurement plays a vital role in all organizations. The function of performance measurement is to investigate how well the given activities of an organization have effectively and efficiently achieved their goals (Mentzer and Konrad, 1991) and to give guidance on how the organization can make improvements (Woo *et al*., 2011a). In other words, the performance measurement is to observe and investigate what we did in the past and what we are doing at present and how we drive the situations for the future improvement. Performance indicators are very useful measures that quantify and simplify the critical success factors of a firm (Kaplan and Norton, 1992). Neely *et al*. (1997) argued that performance measures are a somewhat mechanistic view to represent a behavioural impact. De Langen*et al*. (2007) suggested the main functions of performance indicators (PIs) are as follows:

- *PIs provide management for organization.*

- *PIs serve to compare (the organization and other units, such as countries).*

- *PIs are used to communicate with relevant stake holders.*

It is a powerful tool for decision makers or other related stakeholders to measure and control the performance from a large amount of incomplete quantitative and qualitative data. According to Hon (2005), the performance measures in terms of their scope and dimension have differently evolved in different eras and organization.

However, it should be mentioned that performance indicators used for measuring, managing and comparing the performance of organizations, vary depending on the nature of the organization, its strategy and the industry considered. Thus, different authors (Leong et al. 1990; Maples and Szwejckewski, 1997) stated that each organization has to determine performance indicators and, subsequently, performance measures and figures that are strategically relevant to its respective situation.

2.4. Port Performance Measurements

Ports' managers, planners and authorities need a reliable performance measurement system to assess the efficiency and effectiveness of their actions. For this reason, optimisation of facilities and operations is the common goal in most current measurement systems. Analytical methods such as queuing models, stochastic frontier, data envelopment analysis and simulation models have been the most common measurement approaches used in measuring port performance.

In a competitive environment, the performance of a dry port is determined by several factors, 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).

The extant port literature mainly introduces lists of PPIs to measure the productive and allocate efficiency of port/terminal operations (i.e. operational efficiency), focusing more on terminal quayside operations via the application of DEA and stochastic frontier models (Tongzon, 1995; Cullinaneet *al*., 2002; Talley, 2006; González and Trujillo, 2009). Compared to port efficiencystudies, existing studies focusing on port effectiveness (i.e. Brooks, 2006; Brooks and Schellinck, 2013) are mostly restricted to the dimension of customer satisfaction using qualitative PPIs (i.e. service effectiveness). In this regard, port performance measurement should consider the different natures of PPIs.

Various metrics have been used over the years to determine the performance of ports. These include indicators that assess the utilization rates and productivity of cranes, berths, yards, gates and gangs: TEUs per year per crane, vessel per year per berth, TEUs per year per hectare and moves per crane-hour. For instance, average performance levels in a large port can reach 110,000 TEUs per year per crane, 25–40 crane moves per hour, a dwell time of 5–7 days for imported boxes and 3–5 days for exported boxes (OECD, 2013).

Regarding the use of performance indicators in ports and container terminals, it should be firstly mentioned the original performance indicators that were proposed by UNCTAD (1976) and classified in two groups: financial and operational indicators.

Table 2.1 Summary of performance indicators suggested by UNCTAD.

Financial indicators	Tonnage worked
	Berth occupancy revenue per ton of cargo
	Cargo handling revenue per ton of cargo
	Labor expenditure
	Capital equipment expenditure per ton of cargo
	Contribution per ton of cargo
	Total contribution
Operational indicators	Arrival late
	Waiting time
	Service time
	Turn-around time
	Tonnage per ship
	Fraction of time berthed ships worked
	Number of gangs employed per ship per shift
	Tons per ship-hour in port
	Tons per ship hour at berth
	Tons per gang hours
	Fraction of time gangs idle

Source: UNCTAD (1976).

Financial aspects measure a quantitative contribution on a port's economic activity, whereas operational aspects evaluate the effectiveness of port operations such as service time, arrival time and tons per ship-hour at berth. From the initial study by UNCTAD, many researchers used the indicators for the port performance measurement. Studies with regard to port performance measurement have been conducted for making comparisons at a single-port level (Talley, 1994, Sachish, 1996, Tongzon, 1995a) and at multi-ports level (Tongzon, 1995b, Talley, 2006). Port performance at the single-port level is generally evaluated by comparing ports' real throughputs with their optimum throughputs over time (Talley, 1988). In this scope, an engineering optimum approach is typically used to define the maximum throughputs that a port can handle under its capacity (Chadwin*et al*., 1990). Cruz *et al*. (2013) argued both operational performance indicators and physical capacity indicators are important measures for port performance measurement.

Thomas and Monie (2000) and suggested that the measures can be divided into four categories also. These are production, productivity, utilization and service measures.

Production Measures

These are the level of activity of the business. In the ports industry a number of different terms are used to represent this category such as 'trade', 'traffic', 'throughput' and 'output'

Traffic measures, which indicate in various ways the quantity of cargo passing through a port or terminal in unit time, and throughput measures, which indicate the effort involved in moving that cargo, in terms of tonnes handled or containers movements per unit of time.

Throughput measures include:

• *Ship throughput:* Measures the entire activity involved in loading and discharging vessels in a given time period (a shift, day, month or year).

• *Quay transfer throughput:* Measure of the number of tonnes or containers moved between the quay and the storage areas.

• *Container yard throughput:* This is the sum of the movements that take place in the storage areas.

• *Receipt/delivery throughput:* Measure of the activity relating to the delivery of outbound cargo or containers the port or terminal and collection of inbound cargo. Each of them is expressed as container moves/unit of time. The value of this measure is very important when estimating resource needs and the actual costs of handling the cargo.

Productivity Measures

Productivity Measures calculate the ratio of output to input. Productivity measures are particularly important to the terminal operator as they are directly related to the cost of operating the terminal. There are seven different productivity measures which terminal operators need to compute. These core productivity measures are:

• *Ship productivity*: The broadest measures of ship productivity relate container handling rates for a ship's call to the time taken to service the vessel.

• *Crane productivity:* Crane productivity is calculated per crane and can be expressed in gross and net values.

• *Quay productivity:* Defines the relation between production and quay resources. The latter can be measured by defining, for a given unit time, the length of a typical berth (which will then produce a 'berth productivity 'figure) or by working on the basis of a particular length of quay or per meter of quay.

• *Terminal area productivity:* Similar to the quay productivity indicator is the measure of 'terminal area productivity' which applies to the entire terminal and expresses the ratio between terminal production and total terminal area for a given unit time.

• *Equipment productivity:* The value that is of interest is the number of container moves made per working hour, either for an individual machine or for the stock of a particular type of machine. The number of moves can be deduced from data collected per

• *Labour productivity:* Even with a high level of mechanization, labour costs still form a large part of total terminal costs and it is important to monitor labour well and know what the productivity per man-hour is over a measured period.

• *Cost effectiveness:* This brings the all- important element of cost into the equation. Perhaps the simplest and most revealing measure of a terminal's efficiency is the cost of handling its container traffic or throughput over a specified period (typically a month or a year).

Utilization Measures

Utilization Measures allow management to determine how intensively the production resources are used. The most common and most relevant utilization measures are:

• *Quay utilization:* This measure reflects the amount of time that the berth was occupied out ofthe total time available.

• *Storage utilization:* It is calculated by comparing the number of storage slots occupied with the total number of available slots according to the yard's design capacity.

• *Gate utilization:* The smooth and rapid processing of incoming and outgoing road vehicles at the gate is a very important factor in efficient terminal operations. Thus, gate utilization is a valuable measure for container terminal operators.

• *Equipment utilization:* Because the terminal's investment in cargo-handling equipment is very costly, equipment utilization is an extremely important performance measure. The utilization of any item or type of equipment is defined as the proportion of time that it was effectively deployed over a specified period.

Services Measures

These measures indicate the satisfaction of the customers with the services offered to them in terms of reliability, regularity and rapidity. The principal external service measures include:

• *Ship turnaround time:* One of the most significant indicators of service to ship operators is ship turnaround time. This is the total time, spent by the vessel in port, during a given call. It is the sum of waiting time, plus berthing time, plus service time (i.e. ship's time at berth),

plus sailing delay. Ideally, ship turnaround should be only marginally longer than ship' s time at berth and thus waiting time in particular should be as near to zero as possible.

• *Road vehicle turnaround time:* For shippers/receivers (and trucking companies) the most important measure of a terminal's service quality is the time required to collect a container from the terminal or deliver one.

Ports are located geographically in strategic locations to enable connection with the broader global supply chain. Each port differs in terms of cargo handling capacity (throughput), available infrastructure, ship size that can be handled, etc., although it is a ports' cargo handling capacity that is used to classify port size. Common to any port is infrastructure that provides maritime access and connection to land-based transportation networks. A port is regarded as an infrastructure serving the international and domestic trade as well as the entire economy of the country.

Port performance assessment is an important 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 and it is also challenging issue measuring the performance of ports supported by Notteboom and Rodrigue, 2005. Understanding the levels of performance achieved is at the core of the strategy of port authorities and operators, in order to deploy strategies that address the needs of port users, increase competitiveness, and thus market shares.

Most port authorities and operators have made significant infrastructure investments in order to reduce operational costs and improve service quality, which are important factors that influence terminal performance (Cullinane and Wang, 2009). Furthermore, investments in inland accesses are very important to expand the hinterland and contribute to improve port performance. Inland accessibility and terminal hinterland are driven by transport costs, alternative modes, capacity and quality of inland connections and transport service quality, as well as integration on the main land transport networks or at the crossroads of inland trade routes. Productivity gains and improved efficiency and operational performance are becoming even more important, given recent developments affecting the liner shipping market. Adapting to the new paradigm means that ports will need to upgrade their performance, including in terms of turnaround time (time in port of ships), dwell time (time

in port of cargo), gate operations, hinterland connections and intermodal connectivity UNCTAD (2017).

2.5. Port performance measurement approach

The previous studies on port performance measurement can be summarized in terms of their research scopes, methods, and layer of study areas. The early era of the port performance studies mostly focused on investigating port/terminal efficiency and productivity for internal and external benchmarking, particularly at a single-port level (Talley, 1988, Talley, 1994, Talley, 2006), at a country level (Liu, 1995, Sachish, 1996, Barros, 2003, Park and De, 2004) and international level (Roll and Hayuth, 1993, Tongzon and Ganesalingam, 1994, Tongzon, 1995b, Barros and Athanassiou, 2004, Cullinane and Wang, 2006a).

Wiegmans et al. (2004) presented an operational approach for the measurement of the quality of container terminal services to identify the critical performance conditions in terms of quality for container terminals. SonerEsmer (2008) has covered a wide range of performance dimensions (production, productivity, utilization and service Measures) using the container terminals that reviewed in existing literature. Jing Lu et al. (2010) evaluated container terminal service attributes through statistical methods such as Internal-Consistency Reliability, Factor Analysis and cluster analysis. The study identified five most important container terminal service attributes (Custom declaration efficiency, Loading and discharging efficiency Reliability of the agreed vessel sailing time, Berth availability and Port tariff). Dong-jin KIM (2012) evaluated port efficiencies with four productivity criteria (TEUs/year/crane, TEUs/year/length, TEUs/year/area and TEUs/year/hour) and ranked nineteen European container ports using PROMETHEE methodology. Longjia et al. (2013) performed regression analysis with throughput (TEU) as independent variable and ten dependent variables (Total berth length, Port draft, total terminal area, total container yard area, total number of quay cranes, total number of yard cranes, total number of straddle carriers, total number of prime mover tractors, total number of trailers and total number of lifters/stackers) using data on the forty ports in East and Southeast Asia.

The comparison studies to measure port efficiency at an inter-port level have frequently used by many people as frontier models such as linear programming techniques (i.e. non-parametric approach, data envelopment analysis (DEA)) (Roll and Hayuth, 1993, Tongzon, 2001, Barros and Athanassiou, 2004, Cullinane and Wang, 2006a) and parametric (econometric) approach (i.e. stochastic frontier analysis (SFA)) (Cullinane*et al.*, 2002,

Cullinane*et al*., 2006). The techniques use quantitative data input (i.e. technical or physical container terminal/port specification) to yield port/terminal efficiency and productivity as well as port's economic and social contributions. The DEA approach in the port industry has firstly been attempted by Roll and Hayuth (1993). The study used three input factors (manpower, capital, cargo uniformity) of the cross-sectional data (1993) and four output factors (cargo throughput, level of service, users' satisfaction, ship calls) to measure port efficiency of 20 ports in two regions.

2.6. Dry port Performance Measurement Indicators selection

However, previous literature on port performance measurement tends to focus on limited dimensions of port performance measurement or specific areas of ports. There are no single and standardize existing or established measurement systems in the area of inland ports, The indicators selection was based in the different and potential literature review and in some studies with port and terminal researches that help this study with their empirical knowledge.

PORTOPIA(2015) Under the aim in the development of a performance measurement system for inland ports. This model was based in part on the World Bank Logistics Performance Index (LPI) seeking to transpose their criteria into the port context.

Though several indicators are just measurement indicators they are considered the same because they have influence in the port performance. The indicators selection was based in the different and potential literature review and in some studies with port and terminal researches that help this study with their empirical knowledge.

2.6.1. Customs Clearance of dry port

In the port environment, customs are public domain offices that control the movement of goods into and out so they have to consider the relationship between the requirements of control and facilitation of processes. While, customs reforms and automation can support faster cargo clearance and reduce dwell time. It is perceived that customs clearance plays a relevant role both in port exercise and in logistics chains port integration due to the impacts it causes in times and costs of the system.

In this field indicators are chosen. First the time that the container takes to exit the port after the client request. The remaining are lead-time to obtain a gate out authorization with and without physical inspection, this means the period of time that elapses since the withdrawal requisition until the exit authorization is guaranteed.

2.6.2. Infrastructures and Equipment of dry port

Bassan (2007), Notteboom and Rodrigue (2009) and De Langen (2008) are some of the authors who argue that port infrastructure is a good representation of the performance, the capacity and the competitiveness of the port since every product produced by the port is dependent on them.

The infrastructure and equipment characterization is considered a good representation of the port reality, capacity and size. The dry port area is one of the indicators because represents the areas where cargo operations occur. Other aspect to consider is the terminal storage capacity and warehouses. Thus as indicator considers the terminal size, the number of TEU slots available and the average time that container is parked in the terminal for import and for export. Finally, the indicators related with containers handling equipment. The goal is to measure the equipment performance (availability, reliability and operational productivity) in order to estimate the terminal's investment in cargo-handling, the throughput capacity installed in the terminal and units of land equipment.

2.6.3. Service Provided by dry port

Service (quality) is tightly linked with time measurements to complete the processes affecting the customer (Morales-Fusco et al., 2010). In that sense, the indicators that are directly affecting time related performance identified in the literature are: waiting time of the user in the system, reliability (no delays, no wrong delivery), flexibility (if a system can easily respond to changes in requirements), qualification (terminal's capability), terminal accessibility during the day which can be both identified as the opening and closing time of the terminal and in regard to physical access. Additionally, safety and security (% of lost or damaged cargo) should be considered as quality related indicators.

In addition to the good port operational performance in the perspective of the direct users the position of the client should be considered in order to be able to analyse what port offers based on their infrastructures and operating conditions. It is also essential to evaluate the service provided by the port with regard to the available services and the costs / tariffs. For this indicator also analyse in a summary way the port service, their rates and the tools used to provide it. About the rates the model analyses the price of load/unload operations, storage and storage days free of taxes. The number of workers in the terminal operations, the number of labour hours, the technological tools available, the number of maritime services offered by the port and the share of intercontinental maritime services are another service indicator.

2.6.4. Handling Efficiency of dry port

The absolute volume and cargo handling efficiency are the most used domains reviewed in the literature about port performance evaluation. The absolute volume of cargo handled is the most used indicator by port communities to represent the production and to classify ports (De Langen et al., 2007). The terminals handling process efficiency with particular attention to the equipment, facilities and labour is another point of attention because it represents utilization quality and performance of the actors that intervene in this crucial phase to port process.

This domain incorporates three aspects: containers and ships throughput, throughput efficiency and utilization share of the terminal. The first includes as indicators the total number of container ship port calls and the port TEU throughput. The second contains as indicators the number of TEU throughput by crane and the number of TEU throughput by worker. The third embrace in terms of terminal utilization the number of TEU by quay meter, the number of ships by quay meter and the quay utilization share. Focus the storage areas includes as indicators the number of TEU throughput by terminal square meter and the relationship between the average number of containers storage and the terminal storage capacity. In addition, Total cargo handled annually at the port area the aim is to analyse the total cargo handled annually at the port area and how this is evolving in time.

2.6.5. Incidents, delays and waiting times of dry port

Delays are mainly due to transaction and storage time associated with controlling agencies' performance and, more importantly, strategies of importers and customs brokers, which tend to use port facilities as storage. To improve port performance and competitiveness, it is therefore necessary to have a better understanding of the various components of cargo delays in ports and address the underlying causes (Raballand et al., 2012).

In the literature review is found some indicators connected with them and the decision to group the three is related with the fact of them expose the operations negative points. In order to quantify the elements of port operation that suffered any kind of physical damage were selected as indicators the share of TEU with incidents (TEU per thousand) and the share of ships with physical damages (ships percent). In the delays field the suggest to identify the delay responsibility Thus, there are four indicators that are the share of ships delayed with responsibilities to i) the port; ii) the quay; iii) the towing and iv) bureaucracy. The third aspect in this area is the waiting times were considered six indicators. The average ship

waiting time by terminal incapacity, the average time that a ship stays in the port, the average ship berth time, the average time that a ship waits for the operations beginning, the average time that a ship stays berthed without occur any operation and the average truck waiting time to get in the port.

2.7. Empirical Study

Researches about dry port have done by some academician's by different people at different times while they have their own limitations evaluated empirically. Accordingly, the researcher has evaluated the following research titles which were directly related the study under investigated.

2.7.1. Port Efficiency and productivity

Previous studies with regard to port performance assessment reviewed and examined by many scholars and industrial practitioners for the past three decades. The concept of port performance is notably associated with operational issues, i.e. the efficient use of infrastructure, superstructure, and all other resources used. The majority of the indicators, or relevant exercises, applied are constructs dealing with the operational productivity of the assets, equipment and productivity factors available (Brooks *et al*, 2011).

Suykens (1983) discussed the cargo-handling productivity in the Port of Antwerp and crucial indicators influencing the port productivity. The indicators that he highlighted are particularly focused on labour, physical lay-out of the port/terminal and type and extent of equipment.

Early Tongzon and Ganesalingam (1994) investigated ASEAN port performance and efficiency and identified two broad categories of port efficiency indicators: operational efficiency and customer-oriented indicators. The former includes containers per net crane hour, twenty foot equivalent units (TEUs) per crane and TEUs per berth meter. The latter includes reliability and ship's waiting time. Tongzon (1995a) attempted to identify determinants that influence the port's performance and efficiency. An empirical research was conducted to establish proper performance models and to define vital factors with regard to terminal operation aspects. The identified indicators are divided in two broad categories: cargo size (or throughput) and terminal efficiency.

Abdureazak (2016) conducted an empirical study on assessment of customer's perceived factors which determines performance of Modjo dry port. Dry ports have similar characteristics like sea ports adopt important characteristics from sea port researches seven

key determinants of port performance are proposed based on the existing literature. Including cargo handling equipment, port infrastructure, customs operation, size of dry port, quality of logistics service, port staff and reliability of port operations. These are factors which are identified as selection criterion by port users indirectly considered as indicators variable which influence ports performance.

2.7.2. Port Effectiveness and User Satisfaction

The study conducted by Roll and Hayuth (1993) was one of the first investigations in port performance measurement into effectiveness research which included effectiveness performance indicators such as users' satisfaction for their DEA output. Tongzon and Ganesalingam (1994) used service reliability and vessel waiting time to measure customer oriented services.

Brooks (2006) investigated suitable constructs and measures to assess port devolution program performance. She found that studies on port performance measurement have more narrowly focused on measuring port/terminal efficiency but have little studied on whether ports are effective or meet port stakeholders' needs. According to her contention, both internal measures (i.e. port/terminal financial and non-financial and operational measures) and external measures (i.e. customer perspectives) need to be used for port performance measurement. Especially, user satisfaction is one of the most important indicators to identify customers' needs. However, amongst the 42 ports in 10 countries only a few ports use the service quality indicators for performance measures.

According to Elshaday (2016), assessment of the performance of dry ports in Ethiopia using the Supply Chain Operation Reference (SCOR) model and Queuing method has been developed to describe the business activities associated with all phases of satisfying a customer's demand with performance attributes of reliability, responsiveness, agility, costs, and assets and she concluded that, since most of the existing dry ports are not fully utilized and developed, the main focus should be on improving the performances of the existing dry ports instead of increasing the number of dry ports.

These studies, however, are more focused on the sea side operations than the landside operations and failed to link quayside operations with landside systems (Bichou, 2006).Over time ports' activities and strategies have continuously been adapted to an evolutionary changing environment in order to survive themselves in a highly competitive environment as well as achieve competitive advantages.

2.8. Conceptual Framework

Various methods for measurement of performance of container terminals has been proposed and recognized in previous literatures. It is difficult to find and use one single dimension of port performance, there is no one general measurement or model to measure port/ terminal performance. The early era of the port performance studies used different measurement to investigating port/terminal performance and for internal and external. The following research framework was developed for this study based on the ideas and concepts reviewed in the literature and developed hybrid indicators of dry port performance measurement.

Figure 2.2 Conceptual Framework

Source: Adopted from PORTOPIA (2015) **KPIs** for inland ports, Filipe Alexandre (2017) designed model based on World Bank LPI attributes of ports and modified by the author

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter tries to highlight the overall methodological considerations of the thesis. This includes the research design, sample size and sampling technique, source and tools/instruments of data collection, procedure of data collection, methods of data analysis, and finally ethics issue.

3.1. Research Approach

There are three approaches to conduct any research: Qualitative, Quantitative and Mixed approaches (Creswell 2009). Quantitative research is a means for testing objective theories by examining the relationship among variables. On the other hand, qualitative research approach is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem with intent of developing a theory or pattern inductively. Finally, mixed methods approach is an approach in which the researchers emphasize the research problem and use all approaches available to understand it. A combination of qualitative and quantitative method is often the best way of handling research questions through triangulation (Russel, 2005 cited in Ahmed, 2005). Hence, endeavors were made to utilize the advantages of each method.

Thus, the study was used quantitative as well as qualitative research approach to describe the performance of Modjo dry port operational management practice with that widely used performance indicators that mentioned in the study of the subject problem. The qualitative approach by its very nature is needed for its advantage of describing and exploring of rich, detailed, and valid process of data on the perception of study, therefore in mixed approach, like mixed questionnaire and interview, document analysis, required amount of data can be collect in the qualitative part. The other major advantage of qualitative methods is flexibility which help researcher to collect data in depth and in detail. On the other hand, including quantitative data can help in controlling the extra flexibility to a manageable manner. The quantitative approach was also included to get the advantage of managing respondents.

3.2. Research Design

Accordingly, from different types of research designs explanatory and descriptive type of research design was employed for this study for the realization of intended objectives. Descriptive type of research, according to Creswell (1994), is a technique of gathering information about the existing condition. The descriptive research attempts to describe, explain and interpret conditions of the present i.e. "what is'. The purpose of a descriptive research is to examine a phenomenon that is occurring at a specific place(s) and time. A descriptive research is concerned with conditions, practices, structures, differences or relationships that exist, opinions held, processes that are going on or trends that are evident. So, this study used descriptive research design to measure the performance of the dry port operation.

On the other hand, explanatory research designs, emphasis on studies of the discovery of ideas and insights. According to C.R. Kothari (1990), As such the research design appropriate for such studies to be flexible enough to provide opportunity for considering different aspects of a problem under study. Inbuilt flexibility in research design is needed because the research problem, broadly defined initially, is transformed into one with more precise meaning in exploratory studies, which fact may necessitate changes in the research procedure for gathering relevant data. Generally, the following three methods in the context of research design for such studies are talked about the survey of concerning literature, the experience survey and the analysis of 'insight-stimulating' examples. A mixed methods study refers to "the collection or analysis of both quantitative and/or qualitative data in a single study" (Creswell *et al*., 2003, p. 212). According to Creswell and Clark (2007), triangulation that uses different methods, techniques and data sources in the same study can offset weaknesses in each.

Therefore, this study partially adopted a triangulation approach; more than one method to collect data, such as interviews, questionnaires, and documents, more than one data sources and more than one method or research design to analyse the data, descriptive and explanation.

3.3. Population of the study

According to Keller (2009), "*a population is the group of all items of interest to a statistics practitioner"*. Target population is a total group of people from whom the researcher may obtain information to meet the research objectives (McDaniel, 2001). So, the target population is users or (customers utilizing dry port service, employees on the

terminal/operation and managers) in Modjo dry port. According to the HR data for the month of January 2019 the total employees of the dry port are 481 (permanent employees). For this study the researcher believed that the target population of the study was employees of the dry port in the operation department (it is the core activity of the dry port) and calculated the sample from 192 employees in operation area.

3.4. Sampling Techniques and Sampling Procedures

Sample design*:* A sample design is a definite plan for obtaining a sample from the sampling frame. It refers to the technique or the procedure the researcher would adopt in selecting some sampling units from which inferences about the population is drawn. Sampling is the process of choosing smaller and more manageable number of study units from a defined study of population. To achieve the objectives of the study, primary data was collected from the respondents (management, employees and users of Modjo Dry port) select using convenience and purposive sampling technique.

Customers are the origination for the dry port operation and service, considering the importance of customer's satisfaction and desire to assess the performance of dry port with the side of customer, the researcher took a sample of 50 Modjo dry port customers with judgemental sampling method. Judgemental sampling, also referred to as authoritative sampling, is a non-probability sampling technique where the researcher selects units to be sampled based on his own judgement when the study is gathered in a process that does not give all of the individuals in the population equal chance of being selected and difficult to included.

To determine the sample size from the number of people (working at the operational field in MDP) used simple formula to include in the survey. The employees are considered to be homogenous in their nature and also influenced by the operation of the system. To calculate the sample size Yamane (1967) provides a simplified formula. Based on this formula confidence level is 95% and level of precision is 5%, and the marginal error e was limited to 0.05. Where e^2 is the marginal error.

$n = \frac{N}{1+N(e)^2}$ **Formula (Yamane, 1967)**

n - the sample size

N - the population size

e - the acceptable sampling error

** 95% confidence level and p = 0.5 are assumed*

Using this formula $n = \frac{192}{1+192(0.05)^2} = 129$

Therefore, based on the above analysis the sample size is determined by 129 respondents.

3.5. Method of Data Collection, Sources and Research Instruments

To achieve the objectives of this research, the researcher was collected both primary and secondary data. For the sake of collecting primary data the researcher was mainly used the method of questioner and interview. Throughout the study, the researcher was used both primary and secondary data sources. Primary data, directly related to the purpose, collected through an empirical study. The empirical study was done through conducting a questionnaire and interview regarding the port performance. Secondary data, indirectly relating to the purpose, collected through a theoretical study comprised of books, research thesis, articles, internet, manuals and annual reports.

3.6. Data Analysis and Presentation

After collecting the data through questionnaires and interview the researcher was organized and prepared the various data depending on the sources of information. Moreover, in order to ensure consistency of data, editing was carried out by the researcher. After data was collected and organized, data was analyse qualitatively and quantitatively. The quantitative data analysis was done by using of SPSS packages version 20. The techniques for quantitative data analysis were descriptive statistics such as mean and percentages, to interpret the information to measure the performance of the dry port with the relationship of port performance indicators dimensions. Finally, the analysis part was presented in the form of tables and figures form to ensure easily understanding of the analysis. Additional information from interview and other sources was analysed in narrative form.

3.7. Reliability and validity

Reliability is the degree to which an assessment tool produces stable and consistent results where validity refers to how well a test measures what it is supposed to measure. In this study the standardized questionnaire were adopted from related researches. However, taking the context of Modjo dry port, some adjustment was made on the questionnaire as a result pre testing of the questionnaire was made on some employees of MDP and customers, also discussion was made with some experts in the field then based on the response and comments

the questionnaire was amended. Furthermore, in order to insure the reliability of the questionnaire Cronbach Alpha was calculated and the score was grater than 0.7. The alpha value is ranges from a maximum of 1.0 for a perfect score to minimum of zero, good measure of the alpha should be 0.70 or higher Neuman (2007). According to Willima and Berry (2010) exhibiting a coefficient of alpha between 0.80 and 0.96 are considered to have very good reliability, between 0.70 and 0.80 are considered to have good reliability and alpha value between 0.60 and 0.70 indicated fair reliability and when the coefficient of alpha is below 0.60, the scale has poor reliability.

3.8. Ethical Consideration

As this study was required the participation of human respondents, specifically human resource professionals, certain ethical issues was addressed. The consideration of these ethical issues was necessary for the purpose of ensuring the privacy as well as the safety of the participants. In order to secure the consent of the selected participants, the researcher was communicated all important details of the study, including its aim and purpose. By explaining these important details, the respondents were able to understand the importance of their role in the completion of the study. With this, the participants were not forced to participate in the research. The confidentiality of the participants was also ensured by not disclosing their names or personal information in the research question and interview. Only relevant details that helped in answering the research questions was included. Generally, this study was avoided full of harm on the organization and kept the confidentiality of the participants in the study.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter deals with presentation, analysis and interpretation of the data obtained through survey questionnaire and secondary source of data together and interview. To collect primary data 129 questionnaires were distributed for employee of the dry port as sample size, and of the total number of 129 survey questioner112 respondents were returned but 11 of them were rejected as a result of missing data and 6 not returned questionnaires at time of collections which were resulted to arrive the overall of Modjo dry port performance management practices. The same 50 questionnaires were distributed for customers of the dry port and 46 were returned and the rest 4 were not collected from the site. The result of the responsiveness of the respondents is calculated as the number of returned questionnaires divided by the total sample who sent the survey initially Mitchell (1989). Applying this formula, the result of the response rate was presented as 86 percent of respondents were returned the questionnaire filling properly. Therefore, the result obtained from the response rate implies the rate is a best representative of the sample size.

4.1. Demographic Profile of Respondents

The study analyzed the background information of the respondents by using the following parameters: gender, Age of respondents, educational level, position in the organization, and work experience by the respondents.

Table 4.1 Demographic Profile of Respondents

Variables	Response Items	Frequency	Percent
Gender	Male	75	67
	Female	37	33
Age	20-29 years old	27	24
	30-39 years old	80	71
	40-49 years old	5	5
Educational Level	Diploma	9	8
	First Degree	95	85
	Master's Degree	8	7
Position	Middle Level Manager	5	5
	Lower Level Manager	73	65
	Other	34	30
Experience	1-5 years	40	35.7
	6-10 years	67	59.8
	> 10 Years	5	4.5
Total		**112**	**100**

Source: Own Survey, 2019

As shown on the above table 4.1, The respondents were 33 percent Female and 67 percent of Male. On the operation area the majority work load is in the storage area of the terminal and there is loading unloading of cargos, unstaff containers, inspection of goods, operating cargo handling equipment and moving from one place to the other place from container to store so through this process majority of cargo handler around the area was men than women. This was the reason majority of the respondent was female based on their information given. With regard to the respondent profile, age of Modjo dry port Employees and management shows that, 24% between age of 20-29 years old, 71% were between 30-39 years old, and 5% was from 40-49 years old.

Regarding the educational level, 8 percent diploma, 85 percent first degree, and 7 percent Masters. Based on this we can conclude that above 85 percent of employees of MDP in the operation field have first degree and above qualification. Furthermore, table 4. indicated the position of respondents in the organization, accordingly 5 percent of middle level management, 65 percent of respondents under lower level management and 30 percent of respondents were other position like clearance officer, operator of machines and security officers. Regarding work experience of MDP employees that, 35.7% worked from 1-5 years, 59.8% worked from 6-10 years, and 4.5% worked Over 10 years. Almost over 60 percent of employees have above 5 years' experience. The overall experience of respondents is represented in the above table 4.1.

4.2 Analysis of Descriptive Statistics Based on Employees Response

In orders to analyze, describe and summarize the characteristics of responses, mean and percentage were used. These research designs were used to point out the degree of variability and percentage share of responses that were answered questions stated in the questionnaire.

4.2.1 Custom Clearance in MDP

Checking cargo and release documents is the primary process of custom clearance operation. In order to measure the custom clearance management practices, the researcher has used intervening variables such as Lead-time, procedure simplified, Authorization with physical inspection and speed of time when container exit the port. Accordingly, questions with their responses for each type of questions were forwarded in the following table 4.2.

Table 4.2 Custom Clearance

	Lead-Time for gate out authorization and inspection of the port is low (Q1)	The procedure of authorization and inspection is simplified (Q2)	There is speed of time container exit the port after request by the customer (Q3)	Authorization is always with physical inspection of cargo (Q4)
N	112	112	112	112
Mean	2.68	2.44	2.6	3.3

Source: Own Survey, 2019

As observed from the above table 4.2, there was difference in responses for each of the questions. For Lead-Time for get out authorization and inspection of the port is low or not, the mean score of the respondents were 2.68 which confirms that respondents have doubt and show disagreement with the lead-time of the process mainly occur during get pass operation. The process of get pass operation place issue gate pass, check cargo and invoice and issue EIR out. The lead-time refers to the speed at which activities are performed. This term gained more attention by the introduction of just-in-time (JIT) production (De Treville *et al*., 2004), where it is defined as the time that elapses between the start of a process and its completion.

The response for the second question regarding whether or not the procedure of authorization and inspection is simplified, the mean score of the respondent was 2.44 under the range of disagreement. Therefore, respondents were disagreed with simplified procedure of authorization and inspection. Lack of synchronized clearance process, lack of integrated port system to accomplish all on single window basis to cut time and non-value adding procedures were factors that contributed to poor performance of custom clearance process and customers always dissatisfied when getting this service. Thus, each segment of the clearance activity should be taken with its own pace and time.

As of the question forwarded to measure speed of time container exit the port after request by the customer the port has the mean score of 2.6 which was needs improvement. The fact that, customers request their cargo to delivery within the shortest time however the port clearance procedure hinder the process of goods received on time and significant impact on container

circulation, container throughput, trucks round trip. From this figure, clearance process has the poorest management practices in the dry port

The other intervening variable related with custom clearance was authorization is always with physical inspection of cargo with the mean score of 3.30. According to this, it was observed that there was moderate performance in trucks circulation. The observed result has an implication that still there is a desire to improve the overall custom clearance system with the aggregate performance indicators. One of the focal issues in international trading is the performance of customs and their efficiency in clearing goods. In the modern business environment of just-in-time production and delivery, it has become ever more important that traders are guaranteed fast and predictable release of goods. Therefore, streamlining and simplifying clearance procedures are beneficial to importers, exporters and national economies.

4.2.2. Descriptive Analysis of Infrastructure and Equipment

Port infrastructure and equipment is one of the most important parts of economic infrastructure. The impact of infrastructure on economic growth and foreign trade is a very important phenomenon. Without infrastructures or the ability to offer services, a port could not be able to hand lean increasing number of cargo. To test the related literatures, the following survey questionnaires were forwarded to users of MDP. The indicators on the infrastructure and equipment component of Modjo dry port are important in assessing the dry port performance. For the first two question the researcher aims to know the suitability and sufficiency of port and terminal area/ size which is presented in the following

Table 4.3 Infrastructure and Equipment

Questions	Percent					Mean
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. Port area is suitable for operation	4.5	66.1	15.2	12.5	1.8	2.41
2.Terminal size is sufficient to load/unload cargos	7.1	53.6	26.8	11.6	0.9	2.45
3. There is storage capacity in the port	3.6	62.5	9.8	19.6	4.5	2.58
4. All over the port area there is exchange of real time information using sophisticated ICT tools	0.9	63.4	23.2	10.7	1.8	2.49
5.There is required number of handling equipment	0.9	56.3	18.8	21.4	2.7	2.68
6.There is required type of handling equipment	0.9	36.6	20.5	41.1	0.9	3.04
7.There is high capacity of handling equipment	1.8	37.5	36.6	20.5	3.6	2.86
8.There is availability and reliability of equipment	1.8	38.4	17.9	39.3	2.7	3.02

Source: Own Survey, 2019

As shown table 4.3, For the first question about the suitability of the port area for operation, 4.5 percent strongly disagree, 66.1 percent disagree, 15.2 percent neutral, 12.5 percent agree and the rest 1.8 percent strongly agree with a mean score 2.41 According to this response, 66 percent of Modjo dry port employees were not agreed with the suitability of the port and terminal. Port and terminal facilities have a tendency to impact the operational performance of dry port by smoothing the flow of cargo. ESLSE has taken measures to provide port and terminal facilities such as port handling machineries like forklifts, cranes, storage facilities and other facilities used to enhance port operation. But these efforts are not parallel to the growth of imported cargo which brings to achieve effective and efficient logistics service.

The second question was asked to confirm the first question and measure whether the terminal size is sufficient to load/unload cargo or not, 7.1 percent strongly disagree, 53.6

disagree, 26.8 neutral, 11.6 agree and only 0.9 percent strongly agree with a mean score 2.45 based on this result the largest proportion of response was disagree and indicate that the need of facility development of the port and terminal in order to make suitable and sufficient to handle cargo.

The third question was asked to assess the storage capacity in the port, 3.6 percent strongly disagree, 62.5 disagree, 9.8 neutral, 19.6 agree and only 4.5 percent strongly agree with a mean score 2.58 based on this result the largest proportion of response was disagree and indicate that still the need of improvement and development of the port to handle cargo.

The other major infrastructure element in the dry port is real time information exchange and ICT infrastructure, for the question raised about all over the port area there is real time exchange of information using sophisticated ICT tools, the response has a mean score of 2.49 which indicates the largest percentage of respondents were not agreed with the exchange of real time information using modern technology. For today's requirement, real time information and ICT infrastructure is vital and unconditional, and it is witness that organization are invested their capital to acquire ICT infrastructure to improve their communication and service providing. Infrastructure deficiencies currently result insubstantial time delays and high costs for goods moving both into and out of Modjo dry port and hinder the management performance.

Equipment is the asset of a dry port to render services and generate revenue this equipment are including container, port handling machineries like forklifts, cranes, reach stacker and other facilities used to enhance port operation. The last four questions were assessed about equipment performance of a dry port about the required number of handling equipment has a mean score of 2.7 and the response indicated a need of improvement and the respondent doubt about the required number of handling equipment. Besides that, the mean value of respondents on the required type of cargo handling equipment was 3.04 which mean moderate and need improvement on type of cargo handling equipment and need the effort of management also a factor of Modjo dry port performance. The mean value for capacity of cargo handling equipment is 2.86 and it indicates that respondent has doubt about the ability of equipment to handle cargo efficiently and it was a sign to the management to give attention in the dry port equipment.

The last question was raised to confirm and in order to get clear answer about the performance of MDP in handling equipment variable of availability and reliability of

handling equipment were the question, half of respondent disagree and half of agree. The mean value of the respondents was 3.02 which indicated that availability and reliability of cargo handling equipment is also need an improvement in the dry port.

4.2.3. Descriptive Analysis of Service provided

The other important indicator of dry port performance management is service provided. The increasingly demanding customers push service providers hard to provide speedy, just-in-time services at low/reasonable prices. This may require shipping lines to carry cargo further inland with a much more flexible schedule and it will need dry ports to cope with it. To assess the overall service provided performance the following intervenes variables were used by the researcher and presented as below in different ways of data presentation tools.

Table 4.4 Service Provided

Questions	Percent					Mean
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. Cargo Handling Charges are Reasonable	2.7	5.4	35.7	52.6	3.6	3.49
2. Storage Days Free of Payment	1.8	25.8	38.4	31.3	2.7	3.07
3. Availability of Workers in the Terminal	2.7	32.1	39.3	21.4	4.5	2.92
4. Labor hour Efficiently Used	0.9	59.8	23.2	15.2	0.9	2.55
5. Availability of Technological Tools	4	70	12	12	2	2.35
6. Service Quality Control System	4.5	73.2	9.8	12.5	_	2.3
7. Safety and Security of Cargo Handling	8	38.4	23.2	27.7	2.7	2.87
8. Service Reliability	4	66	20	8	2	2.38
9. Service Flexibility	2	53	33	12	_	2.56

Source: Own Survey, 2019

From table 4.4, the response over cargo handling charge is reasonable or not indicates that, 2.7 percent strongly disagree, 5.4 percent disagree, 35.7 percent neutral, 52.7 percent agree

and 3.6 percent strongly agree with the overall mean score of 3.49 which have an implication that respondents were agreed and confirmed that cargo handling charge is reasonable in the dry port. Similarly, the second question were about whether or not there is enough storage days free of payment, 1.8 percent strongly disagree, 25.9 percent disagree, 38.4 percent neutral, 31.3 percent agree and 2.7 percent strongly agree with the overall mean score of 3.07 which have an implication that majority of respondents were neutral about the issue and the others were agreed that there is enough storage days free of payment and only 25 percent of the respondent were disagree the mean value indicates that moderately the need of improvement of storage days free of payment.

For the question whether or not number of workers in the terminal is available 2.7 percent strongly disagree, 32.1 percent disagree, 39.3 percent neutral, 21.4 percent agree and 4.5 percent agree. Based on the assessment majority of the response balance to normality and disagree with a mean score of 2.92 which indicates that the availability of workers in the terminal is an indicator for the performance of the operation and there is doubt and could not give clear response to assure on the availability of number of workers. When there is a vast cargo in the terminal process which could not easily manage without the required number of workers will create delay and congestion in the port. The study report of Gujar (2011) and Rajasekar and Deo (2014) also indicated that number of employee and their quality are important factors which influence the performance of dry ports.

In addition, for the question whether or not number of labor hours is efficiently used 0.9 percent strongly disagree, 59.8 percent disagree, 23.2 percent neutral, 15.2 percent agree and 0.9 percent agree with a mean value of 2.55. Based on the result more than 55 percent of respondent were disagree about efficiently used of labor hour and this indicates that there was poor management of labor hour in the port particularly in the area of operation need the usage of working time efficiently because each time has a value for the customers and eliminate unnecessary delay and its costs.

Regarding table 4.4, 4 percent strongly disagree, 70 percent disagree, 12 percent neutral, 12 percent agree and 2 percent strongly agree. Based on the result more than 70 percent of respondent were disagree on availability of technological tools for operation with a mean value of 2.35 this indicates that the dry port need of improvement on availability of technological tools for operation and these efforts are not parallel to the growth of the technology in the world port industry and competition which brings to achieve effective and

efficient operational activity. For the question whether or not there is service quality system, 4.5 percent strongly disagree, 73.2 percent disagree, 9.8 percent neutral, and 12.5 percent agree. Based on the result more than 75 percent of respondent were disagree on service quality control system of the dry port with a mean value of 2.30 this indicated that the dry port need improvement on the quality of service when provide it. The customer comes to the service provider with a problem or need, and quality is determined by the solution to the customer's need or problem, quality in service is very subjective and sensitive. In services, the focus is on the external customer, and his satisfaction with both the result and the process. In addition to this even the customer's expectations towards particular services are also changing with respect to factors like time, increase in the number of encounters with a particular service, competitive environment etc, Thus, according to the result it needs efforts of management to control and change ways of processing the former operation process.

According to table 4.8, the result whether or not there is enough safety and security of cargo handling shows that, 8 percent strongly disagree, 38.4 percent disagree, 23.2 percent neutral, 27.7agree and 2.7 percent strongly agree with a mean value of 2.87 which indicated doubt of respondent on enough safety and security of cargo. In fact, more than 45 percent of respondents were disagreed about enough safety and security of cargo handling process.

Table 4.5 Value of damage incurred on the dry port and customers

Modjo Dry Port		
Cost of Damage in birr		
Value of damage on the dry port	Value of damage on customers	Total loss
1,106,000	3,365,000	4,471,000

Source: ESLSE (2018) Annual Report and modified by the researcher

ESLSE measure the dry ports safety and standard efficiency in the budgeted year 2018 and quantified the damage/ loss of assets on the side of the dry port and the customer's goods with absence of safety and security about total value measure in birr 4.4 million in the year of operational efficiency at Modjo terminal. Information was presented on the above table for clear understanding.

The dry port is as a temporary storage for the customer's good until they received their goods and transfer risk. On the handling process the need of safety and security is central for the

operator and cargo. Providing safety and security will make the environment free from hazards. At the same time, it maintains the safety of employees free from contamination of dangerous goods and protects cargo from damage. Each port facility should be responsible for undertaking its own port security assessment, using an approved recognized security organization PSAPTTEC (2007).

For the questions service reliability respondents result shown, 4 percent strongly disagree, 66 percent disagree, 20 percent neutral, 8 percent agree and 2 percent strongly disagree with a mean value of 2.38. This result also shows the performance of the service provided management practice. According to the result 70 percent of the respondent were disagree on service reliability of the dry port. Service reliability show the persistent of quality over time. And assess the performance of service delivery management as well. The same, to assess the performance of service provided in the dry port the question forwarded whether or not there is service flexibility, the result of the question shows, 2 percent strongly disagree, 53 percent disagree, 33 percent neutral, and 12 percent agree with a mean value of 2.56. Many of respondents were dissatisfied and indicated that the need of improvement on the service flexibility attribute as needed and respond for changes in requirement. In general, based on the result of the questions the performance indicator of service provided in the port is strongly need improvement by the management.

4.2.4. Descriptive Analysis of Handling Efficiency

The assessments on the handling of efficiency of the dry port were made on five indicators: total cargo handling as planned and efficient, average number of TEU throughput as per terminal size and efficient, number of TEU throughput per crane capacity, number of TEU throughput per worker and average number of containers store as per terminal storage capacity. The results on these indicators were presented on Table 4.6.

Table 4.6 Handling Efficiency

Variables	N	Mean
Total cargo handling of the port is as planned and efficient (Q1)	112	2.54
Average number of TEU throughput is as per the terminal size and is efficient (Q2)	112	2.80
Number of TEU throughput per crane capacity is efficient (Q3)	112	3.29
Number of TEU throughput per worker is efficient (Q4)	112	3.34
Average number of containers store as per terminal storage capacity(Q5)	112	2.61

Source: Own Survey, 2019

As observed from the above table 4.6, the first question to measure handling efficiency of the port was whether or not total cargo handling of the port is as planned efficient and the result was the mean value of the respondents were 2.54 which confirms that respondents have doubt and shown disagreement. The response for the second question regarding average number of TEU throughput per terminal size and is efficient, the mean value of the respondent was 2.80 under the range of disagreement and indicator of need of improvement.

Table 4.7 Container Throughput Efficiency of MDP in 2018 Budget Year

Container Throughput handling Efficiency Terminal Name: Modjo Dry Port						
Year= 2018 G.C						
			Plan	Actual	Difference	Efficiency in %
Annual	Full Container	Container in	137,880	130,747	7,133	93
		Container out	139,592	132,042	7,550	95
	Empty Container	Container in	139,100	128,682	10,418	93
		Container out	139,100	128,696	10,404	93
	Total Container Throughput		555,672	520,167	32,505	94

Source: ESLSE Annual Report (2018) and Modified by the researcher

The third question was forwarded to measure number of TEU throughput per crane capacity the result shown the mean score of 3.29 which was majority of the respondent were agreed and confirm that there is performance of using the capacity of crane with TEU throughput. The other intervening variable related with handling efficiency was, number of TEU

throughput per worker is efficient has a mean value of 3.34. This value indicates that agreement of the performance and worker's efficiency. The last question was whether or not the average number of containers store as per storage capacity has a mean score of 2.61 under the range of disagreement and indicates that the need of improvement according to storages equilibrium with the containers throughput.

Port congestion arises when port capacity is insufficient to cope with the traffic arriving at the port. It is not a new problem and can occur at any port if there is a sudden upsurge in demand or hold-up in the port such as a strike. Since the land size determines the total storage capacity of a dry port, it is especially important in the peak season.

4.2.5. Descriptive Analysis of Incidents, Delay and Waiting time

The assessments on incidents, delay and waiting time of the dry port were made on eight questions and the results and these indicators were presented on Table 4.8.

Table 4.8 Incidents, Delay and Waiting time

Questions	Percent					Mean
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1.Incedence of lost and damaged cargo is low	0.9	39.3	22.3	37.5	0	2.96
2.There is high incident of delay	0.9	20.5	25.9	51,8	0.9	3.31
3.There is incident of wrong delivery	2.7	44.6	26.9	24.1	1.8	2.77
4.There is high dwell time in the port	3.6	20.5	6.3	65.2	4.5	3.46
5.Truck turnaround time is low	1.8	39.3	25	33	0.9	2.91
6.The average waiting time of containers and trucks in the port is low	3.6	53.6	25	17	0.9	2.58
7.Port operation schedule is reliable to minimize delay and waiting time	1.8	20.5	21.4	55.4	0.9	3.33
8.The port bureaucracy led to cargo delay and waiting time	1.8	35.7	8.9	51.8	1.8	3.16

Source: Own Survey, 2019

As seen the above table 4.8, the result on the first question was, 0.9 percent strongly disagree, 39.9 percent disagree, 22.3 percent neutral, and 37.5 percent agree with a mean value of respondent of 2.96, which was majority of respondents disagreed and close percent of respondents were agreed on incident of lost and damaged cargo is low. The mean value also cascades under range of disagreement and doubtful on the performance. The second question was used to assess whether or not there is high incident of delay and the result shown, 0.9 percent strongly disagree, 20.5 percent disagree, 25.9 percent neutral, 51.8 percent agree, and 0.9 percent strongly agree with a mean value 3.31, which was majority of respondents were agreed and confirm that there is high incident of delay in the port.

Delays are mainly due to transaction and storage time associated with controlling agencies' performance and, more importantly, strategies of importers and customs brokers, which tend to use port facilities as storage. To improve port performance and competitiveness, it is therefore necessary to have a better understanding of the various components of cargo delays in ports and address the underlying causes (Raballand et al., 2012).

The question whether there is incident of wrong delivery, respondents answer show that, 2.7 percent strongly disagree, 44.6 percent disagree, 26.9 percent neutral, 24.1 percent agree, and 1.8 percent strongly agree with the mean score of 3.46. The answer indicates that majority of respondents were disagreed over the incident of wrong delivery.

The fourth question was forwarded to assess whether or not there is high dwell time in the port and the result shown, 3.6 percent strongly disagree, 20.5 percent disagree, 6.3 percent neutral, 62.5 percent agree, and 4.5 percent strongly agree with a mean value 3.46. which was majority of respondents were agreed and confirm that there is high dwell time in the port. Dwell time is an indicator of how efficient the ports are operating and how quickly the containers are flowing through the terminals. Every time a truck shows up to pick up a container, a stack of containers get shuffled around to get to the intended one; this is a time-consuming process which hinders the efficiency for both terminals and truckers. With longer dwell times, terminals are storing more containers, and truckers must wait for longer periods as containers must be moved to reach the older containers on the bottom of each stack.

Table 4.9 Container Dwell time in Dry ports

No	Type of ownership	<60		>60		TOTAL	
		No of cont(TEU)	W.Dwell Time	No of cont(TEU)	Dwell Time	No of cont(TEU)	W. Dwell Time
1	Private	8,194	18.8	1,172	275.8	9,366	50.93
2	Government	298	22.9	132	702.7	430	231.58
3	Enterprise	123	21.7	47	113.9	170	47.23
TOTAL		8,615	18.95	1,351	311.88	9,966	58.66

Source: ESLSE Annual Report (2018)

The other intervening variable related with incidents, delay and waiting time was trucks turnaround time with the mean score of 2.91. According to this, it was observed that there was moderate performance in trucks circulation. The observed result has an implication that still there is a desire to improve to the performance of truck turnaround time. Recently ESLSE has purchased 215 heavy Renault trucks in order to provide timely, cost effective, efficient and optimized logistics service. As published in Ethio-logistics annual magazine (2017), trucks turnaround time in the year 2017 was 3.14 and decreased to 2.75 in the preceding year ESLSE nine-month report (2018). Thus, newly purchased modern Renault trucks are not changed trucks roundtrip starting from Djibouti to dry port or vice versa. Maintenance down time was the leading factor which contributed to slow down trucks turnaround time.

The other questions forwarded to confirm again the performance of the port on delays and waiting time whether or not average waiting time of containers and trucks in the port is low and the result shown, 3.6 percent strongly disagree, 53.6 percent disagree, 25 percent neutral, 17 percent agree, and 0.9 percent strongly agree with a mean value 2.58. Still the digit shows the need of improvement on waiting time.

The last two questions were measure the dry port schedule and bureaucracy towards the reason of delay and waiting time as seen from table 4.8, the result shows that port operation schedule is reliable to minimize delay and waiting time with a mean value of 3.33 and majority of respondent were agreed on the reliability. About the question whether or not port bureaucracy led to cargo delay and waiting time has a mean value of 3.16 and agreement of respondents on the need of improvement of the port bureaucracy in order to minimize and

eliminate delay which bring unnecessary cost and non-adding value on the port operation as well as on customer's satisfaction.

4.3. Demographic Profile of Customers

The study analyzed the background information of the respondents by using the following parameters: gender, age of customers, educational level, type of organization, and business type engaged by customers.

Table 4.10 Demographic Profile of Respondents

Variables	Response Items	Frequency	Percent
Gender	Male	35	76
	Female	11	24
Age	20-29 years old	19	41.3
	30-39 years old	18	39.1
	40-49 years old	9	19.6
Type of Organization	PLC	34	73.9
	Share Company	5	10.9
	Partnership	2	4.3
	Governmental	5	10.9
Business Type	Importer	19	41.3
	Exporter	1	2.2
	Import-Export	16	34.8
	Freight Forwarder	10	21.7
Educational level	High School	2	4.3
	Diploma	8	17.4
	First Degree	36	78.3
Total		**46**	**100**

Source: Own Survey, 2019

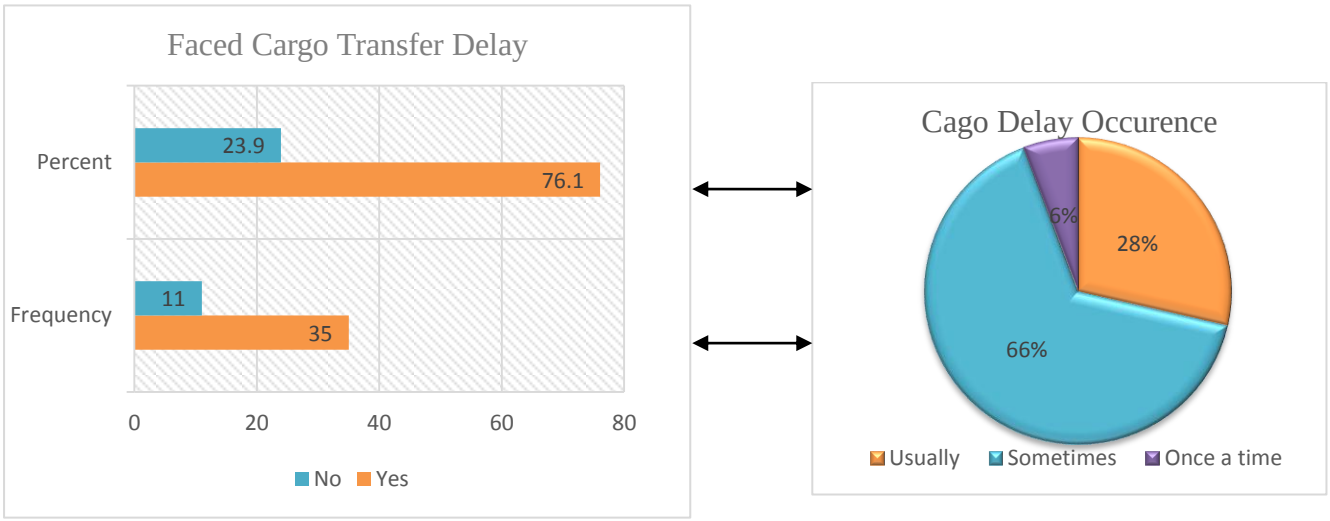
As Table 4.10 indicated 76% of the respondents are male and the remaining 24% were female. Based on the information collected, age of respondents was 41.3% between age of 20-29 years old, 39.1% were between 30-39 years old, and 19.6% were from 40-49 years old. Furthermore, Table-2 indicated the types of organizations where customers are working, accordingly 73.9% of respondents work in PLC, 10.9% Share Company, 4.3% Partnership

and 10.9% Governmental. Regarding type of business customers are engaged or run, the composed information shows, 41.3% importer, 2.2% exporter, 34.8% and 21.7% of respondents were Import-export and freight forwarder companies respectively. With regard to the educational level of customers, 78.3% respondents had first degree, 57.4% had diploma, and the remaining 4.3% of customers graduated level of high school.

4.3.6. Analysis of Cargo Transfer Delay and Occurrence

According to the respondents, 76.1% were faced cargo transfer delay and confirm by said" Yes" and 23.9% were said" No" and confirm that did not faced cargo transfer delay never. Based on the below diagram and as tried to show the relationship of delay and its occurrence or frequency of the delay when handling cargo, from the total respondent more than 75percent about 35 respondents faced delay of cargo and the occurrence of 66% were sometimes, 28% were faced usually, and 6% were once a time faced by delay of cargo. The number respondents, cargo transfer delay and its frequency and percentage share were listed in the following Figure 4.1

Figure 4.1 Cargo Transfer Delay and Occurrence



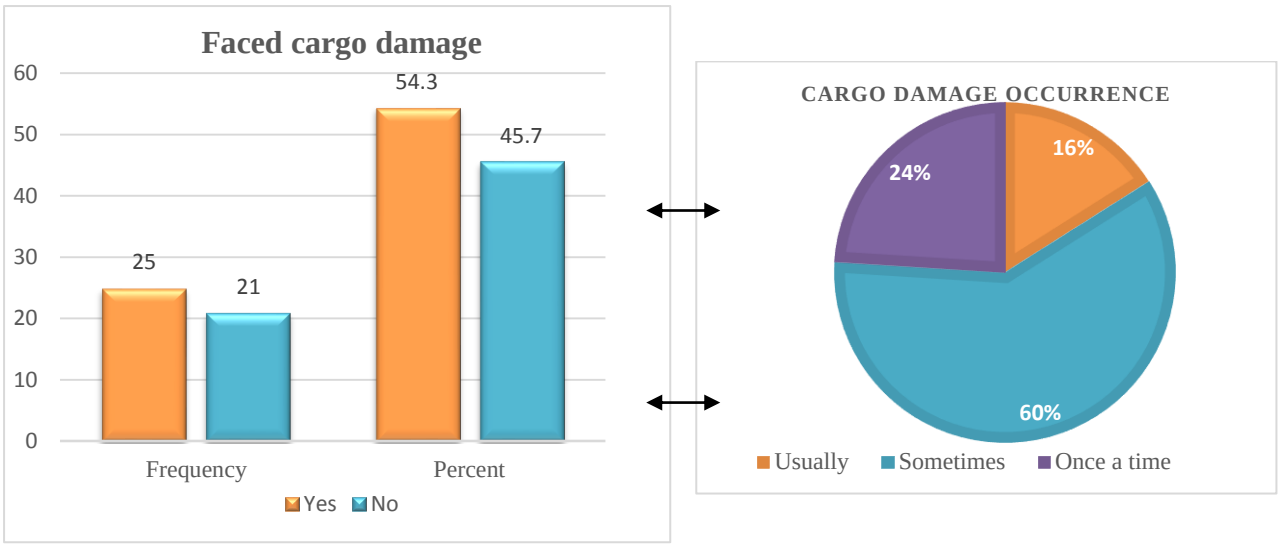
Source: Own Survey, 2019

4.3.7. Analysis of Cargo Damage and Occurrence

According to the respondents, 54.3% were faced cargo damage and confirm by said" Yes" and 45.7% were said" No" and confirm that did not face cargo damage. Based on the below diagram and as tried to show the relationship of damage and its occurrence or frequency of damage when handling cargo, from the total respondent more than 50 percent about 25

respondents faced delay of cargo and the occurrence of 66% were sometimes, 24% were faced once a time, and 16% were usually faced by damage of cargo. The number respondents, cargo damage and its frequency with percentage share were listed in the following Figure 4.2.

Figure 4.2 Cargo Damage and Occurrence



Source: Own Survey, 2019

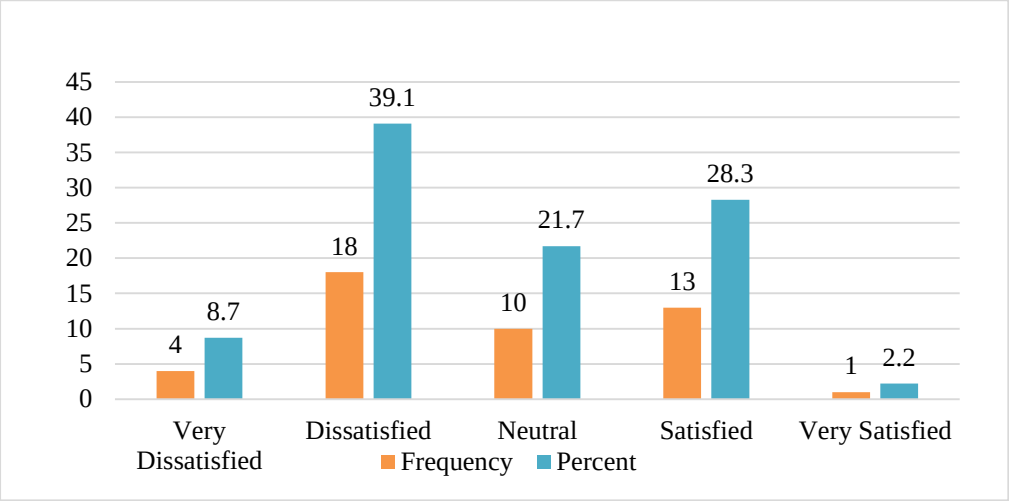
4.4. Descriptive Analysis of Customers Satisfaction

This descriptive analysis is used to support and confirm the general study of the dry port performance according to the eyes of customers to conclude and recommend the points to improve or excel the performance of the management practices. In orders to analyze, describe and summarize the characteristics of responses, mean and percentage were used. These research designs were used to point out the degree of variability and percentage share of responses that were answered questions stated in the questionnaire.

4.4.1 Cargo Handling Equipment

Here the study tried to measure customer's satisfaction on cargo handling efficiency in terms of the equipment availability and reliability as well as the equipment handling capacity in the dry port and shown with figure 4.15, 4 percent very dissatisfied, 39.1 percent dissatisfied, 21 percent neutral, 13 percent satisfied and 2.2 percent very satisfied. The result indicated that majority of respondents were dissatisfied with the mean score of 2.67.

Figure 4.3 Cargo Handling Equipment



Mean=2.67

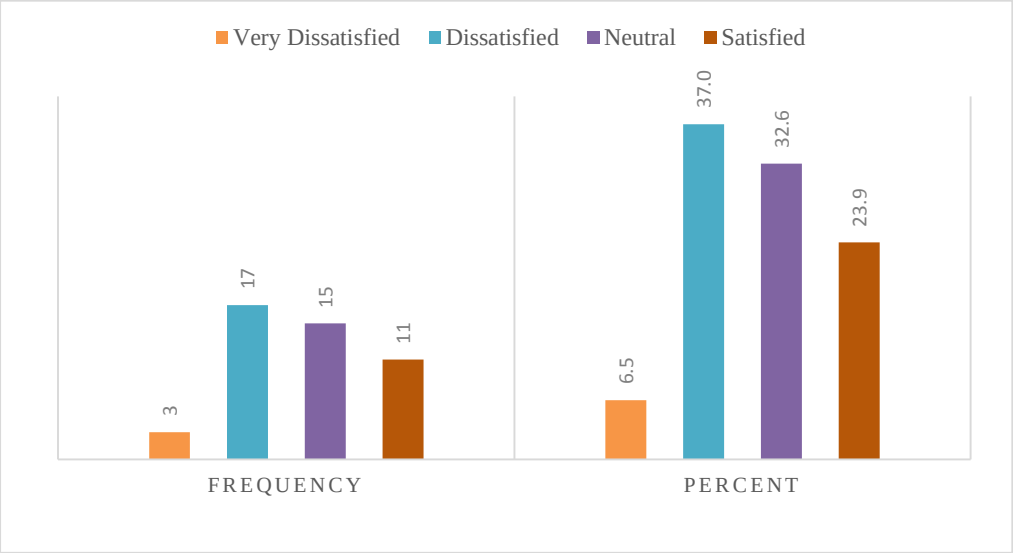
Source: Own Survey, 2019

According to the feedback provided by the managements, there is a shortage of handling equipment at MDP. Whatever equipment presently available is utilized for the overall operations, which is not sufficient during peak times, and results in congestions and long queues. This leads to incurring of extra costs, delays and ultimately unsatisfied customers, which is not good for business. Even though MDP has adequate equipment capacity, it lacks port handling equipment. For instance, there are only five functional Reach stacker around 21 forklifts and around 2 Empty container handler to serve the port for incoming volumes that exceed TEUs annually. It is also important to make sure that availability of equipment alone would not be sufficient, but to ensure that the equipment are maintained and serviced appropriately, to minimize downtime, and maximize on the availability of the equipment. This will most definitely improve the turnaround time of the vessels calling Djibouti, and also reduce the dwell time of the containers in the port, leading to improved capacity, and ultimately increase throughput. The warehouses were small in sizes and most of the time containers are stored outside. Customer's goods get spoiled due to improper storage conditions. In additions, the dust from the poorly constructed roads can make the items dirty when they are stored this way.

4.4.2 Descriptive Analysis of Infrastructure and Equipment level

Regarding equipment and infrastructure level as shown on figure 4., 6.5 percent very dissatisfied, 37 percent dissatisfied, 32.7 percent neutral and the rest 23.9 percent satisfied. According to this response, 43.5 percent users of Modjo dry port were not satisfied with the suitability of the terminal area, it's storage capacity and telecommunication infrastructure. It is known that telecommunication infrastructure through connection of internet accesses enhance online service of port. Port and terminal facilities have a tendency to impact the operational performance of smoothing the flow cargo handling process. ESLSE has taken measures to provide port and terminal facilities such as port handling machineries like forklifts, cranes, storage facilities and other facilities used to enhance port operation. But these efforts are not parallel to the growth of imported cargo which brings to achieve effective and efficient logistics service

Figure 4.4 Infrastructure and Equipment level



Mean=2.74

Source: Own Survey, 2019

According to the information given by the management during interview declared that, the dry port operates with equipment (machineries) like containers, loading unloading machines forklift and reach stacker but their productivity is low some are old and need continuous maintenance. The management believed that the terminal size and infrastructure expansions are unconditional when we see the growth of the demand and flow of import and export goods needs an effort to increase storage capacity and facilities of the port. About ICT infrastructure the management believed that with the current system could not bring

performance and satisfaction, in the future the market drive to use single window system that incorporates all stakeholders in the documentation and clearance process, making it a fast, seamless and efficient process. Hence most documentation is done manually, which is time-consuming and leads to delays in the documentation, and container handling.

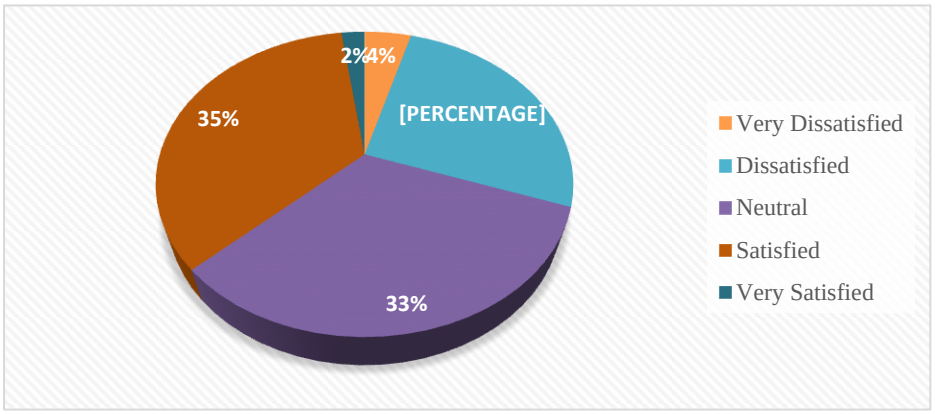
4.4.3 Descriptive Analysis of size of Modjo Dry Port

The assessments on the size of the dry port were made according to the availability of area to discharge cargos and storage capacity at the port and access to port premises for pick-up and delivery (gate congestion).

According to figure 4.15, 4 percent very dissatisfied, 26 percent dissatisfied, 33 percent neutral, 35 percent satisfied and 2 percent very satisfied regarding the size of MDP. Based on this response, directly highest percent of response shows satisfaction on the size of the dry port however the sum of neutral, dissatisfied and very dissatisfied response share the majority with mean score of 3.04 and indicated that the user were neither satisfied nor dissatisfied but normal. It is true that port congestion arises when port capacity is insufficient to cope with the traffic arriving at the port. It is not a new problem and can occur at any port if there is a sudden upsurge in demand or hold-up in the port such as a strike, it is especially important in the peak season.

According to the study by Gujar, 2011 suggested that the optimum size of a dry port is derived from projections of existing and future demand for dry port services.

Figure 4.5 Size of Modjo Dry Port



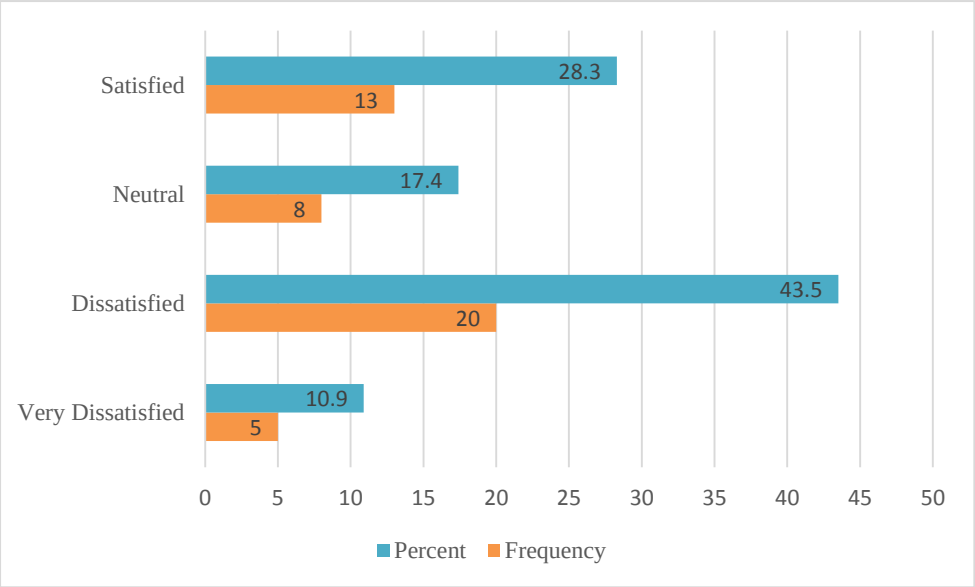
Mean=3.04

Source: Own Survey, 2019

4.4.4. Descriptive Analysis of Custom Practice

Customs operations are major part of Modjo dry port operation and under control and administration of the authority. Regarding efficiency of customs service, responds on speed of customs procedures, transparency of charges and customs clearance procedure and provision of adequate, on-time information was the operation of both the custom office and the dry port effort. Customs operations are undoubtedly a vital part of maintaining safety and making sure that anything illegal is instantly spotted. The problem is, however, that these operations can cause delays. Customs related issues that most commonly hamper portside operations include multiple clearance procedures, delays in the release of imported and exported cargo from the port, and in some cases, corrupt customs officials.

Table 4.6 Custom Practice



Mean=2.63

Source: Own Survey, 2019

Port operations remain adversely affected by customs delays and the study tried to assess the practice according to the speed of the custom clearing practice, it's simplicity and procedure of the process perform regarding to user's satisfaction as shown on figure 4.6, 11 percent of respondents very dissatisfied, 44 percent were dissatisfied, 17 percent neutral, and 28 percent were satisfied. According to this response, 55 percent users of MDP were not satisfied with speed, simplicity and procedure of custom practice with mean score of 2.63.

Although, the management of the dry port stated that the custom clearance procedure and inspection certainly cause delay and high lead-time on cargo transfer process and create

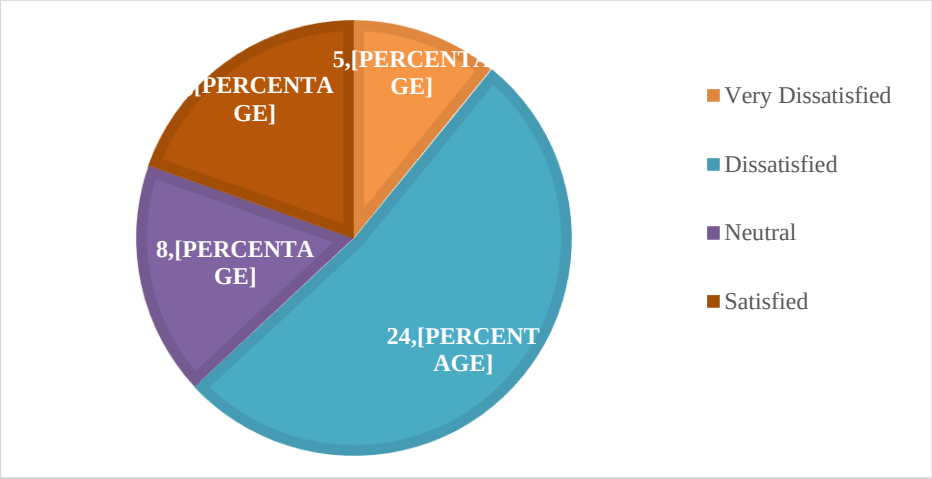
dissatisfaction at our customer. The management always try to make more harmonized and simplified the operation however the issue is not one side effort and decision.

4.4.5. Descriptive Analysis of Service Provided

It has been widely recognized that logistics quality is the foundation of logistics enterprises and the level of logistics service provided by those enterprises determines customers' satisfaction which leads to improve performance. One of the logistics performance center dry port service should be better to cope with the customer satisfaction. As shown figure 4.7, regarding service provided 11 percent very dissatisfied, 52 percent dissatisfied, 17 percent neutral, and 20 percent satisfied. According to this response, 63 percent users of MDP were not satisfied with charges, safety and security as well as service quality about the service provided by the dry port with a mean score of 2.45.

Figure 4.7 Services Provided

Mean=2.45



Source: Own Survey, 2019

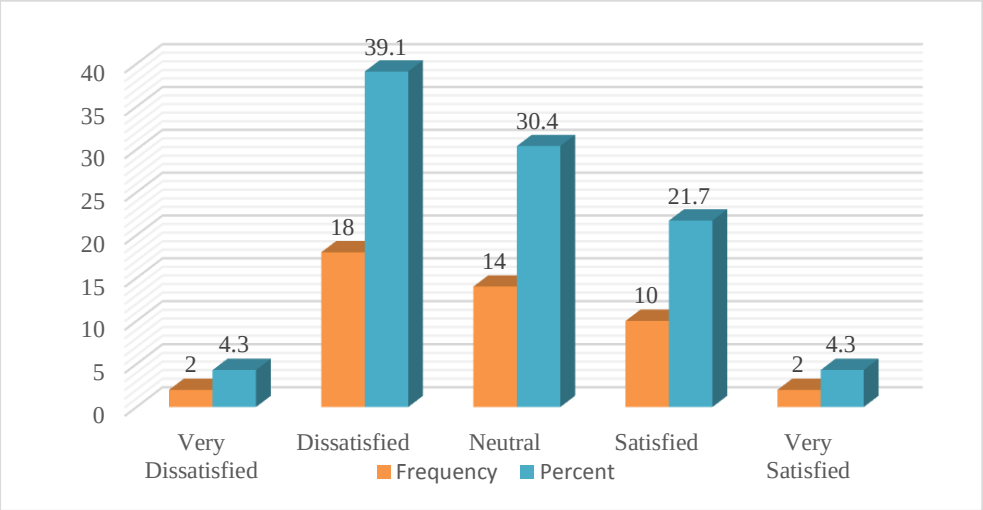
As the information collected from the management through interview and concluded that the competency and quality of service provided by the dry port is a desire for improvement and need of change, Therefore, improving service quality should be an ongoing focus for the dry port management and they should never refrain from becoming more proactive with customers' satisfaction by providing better dry port operation. However, the overall cargo handling charges are reasonable and cheap and most of the time customers does not use the provided storage days free of payment properly and incurred demurrage. Customers are first

and the management respond as they are required and use our effort to safety and security of their cargo and for our employees from risky operation.

4.4.6. Descriptive Analysis of Operation Performance

According to figure 4.8, 4 percent very dissatisfied, 39 percent dissatisfied, 30 percent neutral, 22 percent satisfied and 4 percent very satisfied about the port operation performance in terms of incident of damage or lost, wrong delivery, delay of cargo and waiting time aggregated with a mean score of 2.82. indicated that the need of improvement of operation performance.

Figure 4.8 Operation Performance



Mean=2.82

Source: Own Survey, 2019

Customers satisfaction level on operation performance measure level of delay and waiting time on the basis. And to strength the study, cargo waiting times in the dry port until delivery take place information was collected from customers, the majority response falls from 4-7 days and shown there is waiting time more than 15 days, assuming the cargo type which is perishable or fashions obsolescent type goods which need immediate delivery for users, waiting more than 30 days means should almost consider as loss, number of respondents with its frequency and percentage share of waiting cargos in the dry port were listed in the following table 4.11.

Table 4.11 Days of Cargo Waiting Time at Dry Port

		Frequency	Percent	Valid Percent	Cumulative Percent
Waiting Times	1-3 Days	5	10.9	10.9	10.9
	4-7 Days	16	34.8	34.8	45.7
	8-11 Days	9	19.6	19.6	65.2
	12-15 Days	6	13.0	13.0	78.3
	Above 15 Days	10	21.7	21.7	100.0
	Total	46	100.0	100.0	

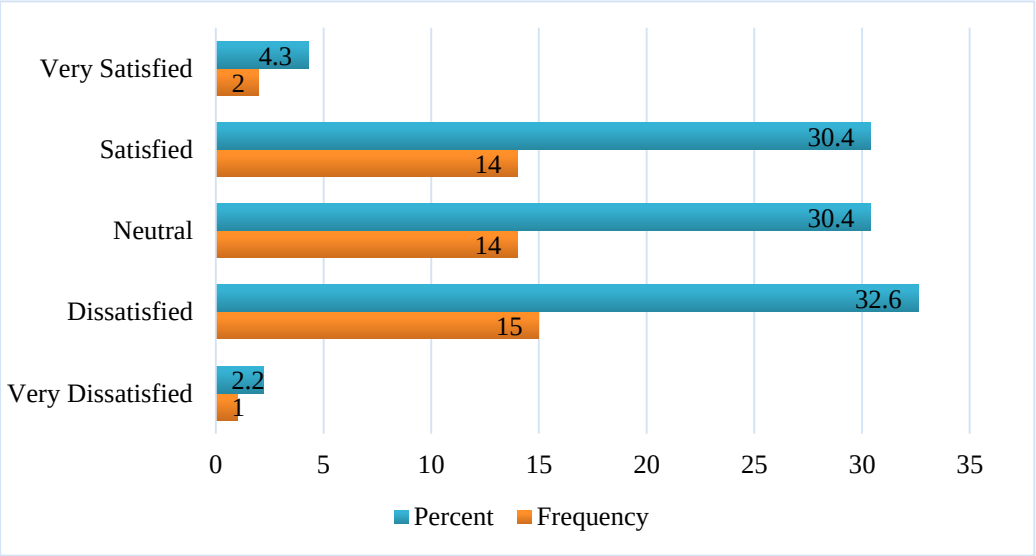
Source: Own Survey, 2019

4.4.7. Descriptive Analysis of Handling Efficiency

The terminals handling process efficiency with particular attention to the equipment, facilities and labour is another point of attention because it represents utilization quality and performance of the actors that intervene in this crucial phase to port process.

Figure 4.9 Cargo Handling Efficiency

Mean=3.02



Source: Own Survey, 2019

As seen in the above table 4.9, 2 percent very dissatisfied, 33 percent dissatisfied, 30 percent neutral, 30 percent satisfied and 4 percent very satisfied about cargo handling efficiency of MDP in terms of utilization of resources efficiently as labor hour, storage and machines with a mean score of 3.02.

According to the interview with the management concluded that the dry port total cargo handling was not as planned but show growth, however, based on the aggregate cargo handling efficiency it need improvement. The level of lost or damage of cargo were exhibits some costs in the year and take the necessary actions and provide the coverage cost for the incidents which already happened. There is delay and waiting time records still the management working and planned to manage the high dwell time of the dry port in order to minimize and eliminate delays with cooperation of users.

CHAPTER FIVE

SUMMERY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of major findings, conclusions, recommendations and areas for further research based on the analysis made in the previous chapter. Thus, the chapter is organized in to three sections as section 5.1 presents summery, section 5.2 conclusions and section 5.3 recommendations.

5.1 Summary of Findings

The following findings are derived from the analysis and interpretations made in the previous chapter.

- The result found from the descriptive analysis of responses from employees and customers of the dry port, among five Indicators of MDP performance measurement 'Infrastructure and Equipment' has a mean value of 2.69, the second 'Service Provided' has a mean value of 2.58, which is the lowest score 'custom clearance'' a mean value of 2.76, fourth indicator 'Handling Efficiency' with a mean value of 2.92, and the last indicator 'Incidents, Delay and Waiting time' has a mean value of 2.94. The mean values indicated above 50 percent of respondents disagree or dissatisfied and the remaining were under neutral state.
- The research finding indicated that the dry port operational performance is poor based on the indicators mean values, poor custom clearance and service provided, lack of infrastructure and equipment, high delays and waiting time to handle cargo are crucial performance indicators and influence on the operation performance which is need effort of management to improve the prior practices.
- For the dry port operation's performance evaluation seven questions were provided to the respondents (customers). As per the information from the respondents most of them were not satisfied with the level of dry port operational activities as far as the five measurement questions were concerned. And for the remaining two measurement questions they have shown their neutral position. The sum up result shows that most of the respondents tend to dissatisfied with the overall performance level of the port operation.
- The result founded regarding 'Service provided' and 'Custom Practice' indicated that the dry port poor operational performance and created user's dissatisfaction, which is strictly need improvement.

- In Tangibles dimension, with respect to fulfilling infrastructure, custom practice and service provided and storage areas and equipped by modern and up to date machineries and equipment facilities, the dry port has got worst results. However, cargo handling efficiency was neutral. MDP was not keeping customer's satisfaction, especially when giving services could not provide prompt service as expected by customer. The long dry port custom clearance process, poor port management, poor cargo handling and long line of trucks to load container are the sources of delay at dry ports. And the cargo operation process usually with delays and waiting time, which is sensitive part to the customer and usually carry unnecessary cost leads to poor dry port operation performance.
- MDP had record less anticipation with regard to the current management practice unable to excel its performance.

5.2 Conclusions

The function of the dry port performance assessment is to investigate how well the given operation of the dry port has effectively and efficiently achieved and to give guidance on how the dry port can make improvements. In other words, the performance measurement is to observe and investigate how the dry port did in the past and what are doing at present and how drive the situations for the future improvement.

The dry port implementation certainly is a straightforward solution for land locked countries like Ethiopia which incurred a huge amount of costs in order to access seaport terminal and the dry port used as the solution to minimize cost of depots. However, Modjo dry port exercised the slow pace goods and service delivered to users, which leads to a serious congestion problem in the dry port which has, in turn, resulted in substantial increment of costs to customers it also magnified operating cost of Modjo dry port and non-value added costs for the whole country's economy.

Furthermore, as the dry port is a key logistics channel to the country it contributes to overall poor logistics performance of the country due to delays. The poor infrastructural facility of the dry port has not helped the enterprise to succeed what it has planned to achieve. Most of the respondents did not agree with the dry port information technology performance level. The poor information communication technology system, unavailability of internal and external software based integrated and networked system were the major reasons explained by the managements for the problem prevailing.

Moreover, attention should be given to improve the level of service providing and procedures at customs authority and service should be simplified & computerized for the benefit of the country. Standing from the results of the research it is very likely to conclude that the compliance of rules and regulations of the dry port operation system has not been ensured so far and it might have created bad impression on customers. The customs operation has its own impact on the dry port operation system either by stretching or shrinking the cargo transfer, truck turnaround time, the dry port congestion and overall transit time. As per the findings of the research it is possible to conclude that the excessive procedures and too many clearing documents requirement and the manual system by customs offices generally has worsen the role of customs office to the success of dry port operation management practice so far.

In general, custom clearance with service provided, infrastructure and equipment are significant key derivers of overall performance of dry port management practices system in Ethiopia and the others indicators are dependent on the other improvement or impairment.

5.3 Recommendations

On the basis of the findings of the study, the researcher has forwarded the following recommendations:

- ✓ Modjo dry port should reform of customs and other control procedures as essential as reforms can result in the reduction of delays and waiting time to accelerate the **turnaro**und of containers or cargo flow.
- ✓ Efficient operational management is critical for eliminating avoidable delays and enhancing predictability in custom clearance. Coordination among government control agencies will remain essential in trade facilitation efforts.
- ✓ Dwell time is an instrument used to measure the handling efficiency of a terminal. This becomes more critical when the destination is a landlocked country (LLC) because, in general, half of the overall transit time is spent in the port of arrival. Dwelling time of cargo should be reduced at Dry Ports. To shorten the dwelling time at, the government of Ethiopia should reduce the transit permit process time at Ethiopian customs, customs clearance time, port clearance time, waiting time for gate pass and truck waybill, and time for assigning trucks and loading.
- ✓ Investment in port infrastructure including on cargo handling equipment will have significant impact in improving port performance. Therefore, in order to improve the

performance of Modjo dry port ESLSE should invest on port infrastructure and equipment.

- ✓ Expansion of Modjo dry port area and efficient utilization of port area and its premises (storages) is essential to reduce congestion problems at the port.
- ✓ The port operation is dependable on the effort of human power beside machinery should employ adequate staffs in all sections. Furthermore, it is important for the port to provide training to the port staffs so as to improve their skill and to update them with recent knowledge and technology in the port sector including the management knowledge.
- ✓ One of the key indicators of the success of dry ports is the extent to which they can contribute to the minimization of the total logistics cost between cargo origins/destinations and seaports, through managing delays, waiting time cut truck turnaround time will minimize costs and port congestion. Hence, it is important all stakeholders in the logistics service should coordinate their activity through better planned and coordinated activities.
- ✓ Initiate regular meetings of stakeholders in the port at the decision-making level. The intention would be to identify, discuss and decide on the implementation of key measures that should be implemented to reduce dwell time and improve port efficiency and effectiveness.
- ✓ Raising Awareness through a workshop/seminar for the port community and consumers of port services to providing better service could be useful in explaining the direct and indirect consequences of poor port operation performance on consumer prices, input prices, export costs, and economic competitiveness.
- ✓ Operational hours are important in managing congestion and in improving dwell times. For this, not only do government agencies need to function during these times, such as Customs, but economic operators need to adapt their hours of operation as well.

In general, Logistics performance is strongly associated with the reliability of supply chains and the predictability of service delivery for producers and exporters. Indeed, dry ports are the center inefficient logistics raises the costs of trading and reduces the potential for global integration. Hence, improving logistics performance is at the core of the economic growth and competitiveness agenda. To this end, the role of every stakeholder in the sector has to be further investigated and detail and planned work is required in terms of alleviating problems

identified in this study and also the role of research studies to identify knowledge gap and solutions to the problems are critical &timely issues. In this regard the following points are believed for further study:

Going forward there are many aspects of performance of dry port that still need to be investigated further when we see the concept of dry port. Given the above limitations, it would be beneficial to carry out research that improves the overall performance of the logistics system in Ethiopia from a broader perspective. Accordingly, researcher has forwarded the following research titles to be studied in the future.

- ✓ Measuring the performance of dry ports in Ethiopia
- ✓ Assessment of the practice and expansion planning of dry port system in Ethiopia
- ✓ Is it possible to think of privatization of the "Dry port" system in Ethiopia to improve the logistics performance of the port?

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Appendix I

St Mary's University

School of Post Graduate Studies

Department of General MBA

Questionnaire for the management and Employees of

Modjo Dry Port

Dear: Respondents,

I am Haimanot Webeshet, a graduate student at St Mary University, School of Management. Currently, I am conducting a research study on "Assessment of performance of Dry Port Management Practices, A case study of Modjo Dry Port." in partial fulfillment of Master of Arts Degree in Business Administration. I request your help to spend some minutes of your time by filing the provided questionnaire.

Please note that, the information provided will kept confidential and used only for academic purpose. Your cooperation in completing the survey questionnaire by providing reliable information is highly valuable and greatly appreciated. Thanking you in advance for giving your time and sharing experience. No need of write your name.

Haimanot Webeshet. Mobile: 0922836391

I. Questionnaire

This questionnaire is meant to collect data regarding ***Assessment of Dry Port Performance Management Practices*** *in Modjo dry port*.

Part I

I. Back ground information (**Make Circle**)

1. Sex A. Male B. Female
2. Age A. 20-29 B. 30-39 C. 40-49 D. 50-59 E. Above 59
3. Educational Background
   A. High school
   B. Diploma
   C. Degree

D. Masters

E. Doctorate (PHD)

4. Position/Status in the organization

   A. Senior Manager

   B. middle level manager

   C. lower level

   D. other (specify) ——————————

5. Work Experience

   A. 1-5 Years B. 6-10 Years C. Above 10 Years

Part II. Measure the Performance of the Dry Port as per the following Measurement Variables (Make tick Mark as √)

No	Dry Port Operation Performance Measurement Indicators	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I	**Custom Clearance**					
1	Lead-time for gate out authorization and inspection of the port is low					
2	The procedure of authorization and inspection is simplified					
3	There is speed of time container exit the port after requested by the customer					
4	Authorization is always with physical inspection of cargo					
		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
	II Infrastructure and equipment					
1	Port area is suitable for operation					
2	Terminal size is sufficient (to load/unload cargos)					
3	There is storage capacity in the port					
4	All over the port area there is exchange of real time information using sophisticated ICT tools					
5	There is required number of handling equipment					
6	There is the required type of handling equipment					
7	There is high capacity of handling equipment					
8	There is availability and reliability of equipment					

	Dry Port Operation Performance Measurement Indicators	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	III Service provided					
1	Cargo handling charges is reasonable					
2	There is enough storage days free of payment					
3	Number of workers in the terminal is available					
4	Number of labor hours is efficiently used					
5	There is availability of technological tools for operation					
6	There is service quality control system					
7	There is enough safety and security of cargo handling					
8	There is service reliability(no delay, no wrong delivery)					
9	There is service flexibility(system can easily respond to changes in requirements)					
IV	**Handling efficiency**					
1	Total cargo handling of the port is as planned and efficient					
2	Average number of TEU throughput is as per the terminal size and it is efficient					
3	Number of TEU throughput per crane capacity is efficient					
4	Number of TEU throughput per worker is efficient					
5	Average number of containers store as per terminal storage capacity					
V	**Incidents, delays and waiting time**					
1	Incidence of lost and damaged cargo is low					
2	There is high incident of delays					
3	There is incident of wrong delivery					
4	There is high dwell time in the port					
6	Truck turnaround time is low					
7	The average Waiting time of containers & Trucks in the port is low					
8	Port operation schedule is reliability to minimize delay and waiting time					
9	The port bureaucracy led to cargo delay and waiting time					
	VI Overall performance of Modjo dry port					
1	The Overall performance of Modjo dry port is excellent.					

Appendix II

St Mary's University

School of Post Graduate Studies

Department of General MBA

Survey questionnaire for customers

Dear: Respondents,

My name is Haimanot Webeshet and I am a graduate student at St Mary's University, School of Management.Currently, I am conducting a research study on "Assessment of performance of Dry Port management practices, A case study of Modjo Dry Port." in partial fulfillment of Master of Arts Degree in Business Administration. I request your help to spend some minutes of your time by filing the provided questionnaire.

The following questionnaire has two sections and will require approximately 10 to 15 minutes to complete. In order to ensure that all information will remain confidential and participation is strictly voluntary and you may refuse to participate at any time, please answer all questions as honestly as possible and return the completed questioner promptly. Thank you for taking the time to assist me in my educational endeavour. The data collected will provide useful information regarding customers' satisfaction in order to assess the performance of Modjo dry port operation. If you require any information, please contact me.

Sincerely,

Haimanot Webeshet

Phone number: +251922836391

SECTION I- GENERAL INFORMATION

1. Background Information (**Make tick Mark as √)**

1.1. What type of organization do you operate?

Private Limited Company☐Share Company☐Partnership☐Joint Venture☐Governmental☐

1.2. What type of business do you engaged?

Importer ☐ Exporter ☐ Import-Export ☐ Freight Forwarder ☐

1.3. Level of education:

High School ☐ Diploma ☐ First Degree ☐ Masters ☐ Doctorate (PhD) ☐

1.4. Have you faced Cargo transfer Delay? Yes ☐ No ☐

1.5. If your answer is yes, how often? Usually ☐ Sometimes ☐ Once a time ☐

1.6. Have you faced Cargo damage? Yes ☐ No ☐

1.7. If your answer is yes, how is its frequency? Usually ☐ Sometimes ☐ Once a time ☐

1.8. On average How many days your cargo wait at Modjo dry port _____ Days

SECTION II- PERFORMANCE EVALUATION

2. Customers Satisfaction (**Make tick Mark as √)**

In this section Please indicate how much you satisfied by the following operation or services of Modjo dry port.

2.1. How much do you satisfied from the service of cargo handling equipment at Modjo dry port? (E.g. availability & reliability, capacity, etc.)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.2. How much do you satisfied by the infrastructure and equipment level of Modjo dry port? (E.g. Suitability of terminal area, storage capacity, telecommunications infrastructure, etc.)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.3. How much do you satisfied by the size of Mojo dry port/ Terminal in handling cargo?

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.4. How much do you satisfied by the customs practice at Modjo dry port? (e.g. speed, Simplicity, and of procedures, etc)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.5. How much do you satisfied by the services provided at Modjo dry port? (e.g. overall charges/payments, safety and security, quality etc)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.6. How much do you satisfied by the operation /performance at Modjo dry port? (e.g. incidence of cargo damage/lost, wrong delivery, delay & waiting time, etc)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

2.7. How much do you satisfied by the cargo handling efficiency of Modjo dry port operations? (e.g. utilization of resources (storage, machines, labor hour) etc.)

Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied ☐

Appendix III

In-Depth Interview Guide for Management of

Modjo Dry port (operation)

Personal Information questions

- Please tell me a bit about yourself?
- Your position?
- Education?
- Work experience in the field?

Dry port custom clearance questions

- What arrangement does the dry port implement to comfort the procedure, inspection and to minimize lead- time (latency)?
- How simplified the authorization and inspection process?
- Does it try to make a quick decision on clearance process upon to the request of customer in order to fast delivery of cargo

Physical infrastructure and equipment related questions

- How do the physical infrastructure and equipment are helping the efficient cargo handling process?

Probe

- Availability of required number and type of equipment to handle all types of goods to
- Terminal size and road infrastructure
- Ware house availability and storage capacity
- ICT infrastructure and use

Service provided questions

- Do you think that there is reasonable cargo handling charge and arrange enough storage days free of payment?
- What factors would most improve the capacity to provide quality service to the dry port?

Probe

Please your idea on:

- ❖ Safety and security of cargo handling process
- ❖ Service reliability (about delay, wrong delivery of cargo)
- ❖ Service flexibility (can easily respond to changes in requirement)

Handling Efficiency questions

- ❖ Does the dry port total cargo handling is as planned and efficient?

Probe

- ❖ Number of TEU terminal size
- ❖ Crane capacity and utilization per TEU throughput
- ❖ Number of Containers as per terminal storage capacity

Incidents, delay and waiting time questions

- ❖ How the level of incidents of lost and damage of cargos? How manage?
- ❖ Dwell time and/or truck turnaround time are serious performance indicator of the port. How manage the high dwell-time of the port?
- ❖ How the port operation schedule helping to minimize delay and waiting time?

Overall performance of the dry port

What is your suggestion on the overall performance of Modjo dry port?

Concluding questions

- ❖ Are there any other issues we have not covered that you would like to discuss?