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SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

AN ASSESSEMENT ON DETERMINANTS OF DRY PORT PERFORMANCE: THE CASE OF MODJO DRY PORT

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN LOGISTICS AND SUPPLYCHAIN MANAGEMENT

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This is to certify that the thesis prepared by Mr. Abdurezak Mussema, entitled "An Assessment on Determinants of Dry Port Performance: The case of Modjo Dry Port", a thesis submitted to Addis Ababa University, school of commerce, department of logistics and supply chain management in partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply chain Management, complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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Declaration

I hereby declare that the work which is being presented in this thesis entitled An Assessment on Determinants of Dry Port Performance: The case of Modjo Dry Port is original work of my own, has not been presented for a degree of any other university and that all sources of material used for the thesis have been duly acknowledged.

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List of Acronyms and Abbreviation

DEA	Data Envelopment Analysis
ESLSE	Ethiopian Shipping and Logistics Services Enterprises
GRT	Gross Registered Tons
IMF	International Monetary Fund
LLDCs	Landlocked Developing Countries
LPI	Logistics Performance Index
NRT	Net Registered Tons
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UN-OHRLLS	United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States
UNCTAD	United Nations Conference on Trade and Development
SPSS	Statistical Package for Social Sciences
TEU	Twenty foot Equivalent Unit

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Abstract

Since the independency of Eritrea in 1991, Ethiopia became landlocked. As a result, the country has been compelled to use neighbor countries for its imports and exports. In order to ease some of the problems in the transit countries, Ethiopia has started constructing dry ports in its hinterland along the transit corridors. Among the planned dry ports, Modjo and Semera dry ports have become operational. 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 identify factors which influence the performance of dry ports. Therefore, this study tried to examine factors that influence the performance of dry ports from port users perceptions. This paper assess on determinants of dry port performance. Primary data was collected from 63 sample customers of the port which are selected based on convenience sampling technique. The data was collected using questionnaire and the data was analyzed using descriptive statistics. The result of the analysis indicated that, cargo handling equipment, customs operations, port infrastructure, size of dry port, port staff, reliability of port operations and quality of logistics service are found to be important factors in determining the performance of Modjo dry port. Based on the findings of the study it were recommended that investment in container handling equipment and other port infrastructure, improvement in efficiency of customs operations, expansion of port area, employing adequate skilled port staff and improving the reliability and quality of logistics service of the ports are important.

Key words: dry port, performance, determinants, customers

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Landlockedness refers to the geographical situation of a country without direct access to the sea (Arvis, *et al.* 2014). According to this definition, there are 44 landlocked countries in the world and of these, the United Nations lists 32 as landlocked developing countries (LLDCs) that are low and middle-income countries based on the World Bank country classification with a population of nearly 440 million.

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).

In today's competitive globalized economy the ability to transport goods quickly, safely, economically and reliably is witness to be vital for the success of businesses in particular, and to a nation's prosperity in general (Song and Cullinane, 1999). Shipping is the cheapest mode of transportation which carries a large volume of cargo and containerization facilitates this method of transferring goods and attracts huge amounts of cargo to shipping (Song and Cullinane, 1999). Containerization and global trade are conjoined twins indicating that one cannot live without the other and the ease with which containerization facilitates door to door delivery of cargo has facilitated the growth of global trade(Roso*et.al*. ,2009). The actual process of container transport is affected by simultaneous use of multimodal carriers combining sea/river going ships/barges and land based services such as trucks and trains (Song and Cullinane, 1999). In view of consistently rising expectations of shippers/consignees for faster, efficient and low cost services,

the logistics services providers had no alternative but innovate new concepts to improve their services while simultaneously endeavoring to lower costs (Gujar, 2011).

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, it is a natural outcome for the ports to extend the services to locations situated further hinterland by either patronizing, forming strategic alliances or buying out existing dry ports so as to optimize the supply chain (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,2011). Poorly-performing ports may reduce trade volumes, particularly for small, less-developed countries (Gujar, 2011; ci; Clark *et.al.*, 2004). As such, by relieving congestion at gateway sea ports and acting as a focal point of supply chains connecting different locations, dry ports promote regional development (UNESCAP, 2006).

Ethiopia is a landlocked country with a land area of about 1.13 million sq. km and a population of about 87.9 million in 2014 (Admit *et.al*, 2015). Since the independency of Eritrea in 1991, Ethiopia became landlocked. As a result, the country has been compelled to use neighbor countries for its imports and exports. In order to ease some of the problems in the transit countries, Ethiopia has started constructing dry ports in its hinterland along the transit corridors. Among the planned dry ports, Modjo and Semera dry ports have become operational. The activities of the dry ports are managed and supervised by a public enterprise called Ethiopian Shipping and Logistics Services Enterprises (ESLSE) under the Ministry of Trade and Industry.

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 identify factors which influence the performance of dry ports. Therefore, this study assessed on the determinants of port performance from port users perceptions.

1.2. Statement of the Problem

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.

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

The ability of countries to deliver goods and services on time and at the lowest possible cost is a key determinant of integration into the world economy today (UN-OHRLLS, 2013). The landlocked developing countries continue to face serious constraints and challenges in the areas of trade, transit, and overall socio-economic development. With no direct access to the sea and port charges at the monopolistic Djibouti port, landlocked Ethiopia appears to be at a disadvantage when it comes to competitiveness and efficiency of transportation of goods (Fekadu, 2013). 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,

However, dry ports could be a solution to this problem as it facilitates the international trade of the country with the rest of the world (IMF, 2013). With a dry port, goods being transported to a landlocked country, rather than undergoing customs procedures at the sea port, would instead be transported directly to the country's dry port, where customs clearance would take place (Gujar, 2011). Consequently, efficient dry ports could help reduce these transport costs and make them better able to compete commercially (Gujar, 2011).

The World Bank Logistics Performance Index (LPI) which is an overall LPI score measures the performance of a country's logistics based on efficiency of customs clearance process, quality of trade and transport-related infrastructure, ease of arranging competitive shipments in terms of

price, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time (Arvis,*et al.*2014).

According to this index Germany, Netherlands and Belgium are the most efficient and highest ranked LPI countries at positions 1, 2 and 3 in the 2014 LPI. In Africa, South Africa, Egypt and Malawi are the most consistent and highest ranked in logistics performance at positions 34, 62 and 73 respectively. East African countries have had mixed rankings with Kenya ranked the highest at position 74 while followed by Rwanda, Ethiopia, Burundi, Tanzania, and Djibouti at positions 80, 104, 107, 138 and 154, respectively.

Ethiopia's poor logistics raise costs for local industries and hamper the country's competitiveness in the global market (IMF, 2014). According to IMF Country Report (2014) inefficient logistics not only impede Ethiopia's exports potential, they also increase the costs for consumers for imported goods. Improving trade logistics are thus very important for making Ethiopia's export sector globally competitive. Based on the Arvis, *et al. (*2014) World Bank 2014 LPI report, all the six key dimensions of logistics performance measured suggest that Ethiopia's trade logistics are fundamentally weak and need to be improved.

Djibouti is the main port for sea transport in and out of Ethiopia, and situated 900 km from Addis Ababa, making the cost of in-land transportation an important factor. According to the World Bank's "Doing Business" study in 2015 it costs US$2,960 to import a container to Ethiopia (and US$2,380 to export), compared with US$800 to import and US$ 823 to export in China and US$600 and US$610to import and export respectively in Vietnam. Thus, poor trade logistics is a key contributing factor of Ethiopia's poor performance compared to the Asian countries. In order to solve this problem the Ethiopian government established Ethiopian Shipping and Logistics Enterprise (ELSE), which resulted from the merger of the three major state-owned enterprises, notably Ethiopian Shipping Lines, Ethiopian Maritime, and Transit Services and Ethiopian Dry Port Service Enterprise. Giving the mandate to one agent to take charge of transiting and transporting shipments until delivery to the importers was aimed to save time and cost for them (IMF, 2014).

Despite these initiatives, improvements in the logistics system did not materialize. As noted by IMF (2014) increased time for clearing imports worsening congestion at Djibouti port and Ethiopia's main dry port Modjo dry port. This highlighted the problem to overall economy of the

country by instigating substantial operating costs for ESLSE and import/export cost to the customers.

Over 90 percent of Ethiopia's total import-export trade is carried through the port of Djibouti. Studies show that the estimated total transit costs have been consuming over 16% of Ethiopia's foreign trade value which is about two million US$ per day. High cost of charges, reduced free time for imported cargos, the untimely availability of empty containers for export cargos and inadequacy of storage facilities remain the major factors that escalated Ethiopia's total logistic cost for its import and export trade there by affecting the country's competitiveness in the international trade. Poor trade logistics penalize importing and exporting firms and it can add about 10% to production cost. In addition to shipping cost, cost of transit of goods from port to the main land is still another burden for the trade competitiveness of the nation.

Thus, given the important role of dry ports to the entire economy of the country it is worthy to examine factors that influence the performance of dry ports. Although dry ports are important to the whole supply chain, as the concept of dry port is new to the country researches on the overall activities and performance of dry port is scarce.

Users are in the best position to determine if the port, and its partners, delivers the services required. If the delivery of services does not match expectations, the port does not deliver a value proposition to its customers, and is therefore seen as ineffective. According to Brooks and Pallis (2011) port users are able to see how ports perform on the various dimensions of port performance and are also able to identify factors which have impact on port performance. Hence, addressing users perception on performance determinants is important and the findings could assist ports in benchmarking their performance against others they see as competitors, and therefore guide them in improving the quality of their services, which will be a significant benefit to the port users in particular and to overall economy in general.

Kasypi and Muhammad (2006) noted that, the port performance is the lifeblood of ports which deserves maximum attention from port operators. Therefore, the study of factors which drive the performance of dry ports is important when considering building a new port or upgrading an existing one and for achieving higher levels of competitiveness.

Exporters, importers, ocean carriers, marine terminal operators, truckers, and railroads all experience additional costs when cargo and equipment does not move efficiently through the terminals and when there is congestion. Port congestion can arise from multiple causes, and those causes may vary by port or by marine terminal. These include; labor productivity issues, operators' schedule reliability, inefficiency of the transportation infrastructure connecting a marine terminal to rail and roadways, the amount of land that the port facility has to store containers and conduct operations and Shortages of various types of equipment. Those factors are hardly an exclusive or exhaustive list of reasons for port congestion, but it illustrates that the problem is not caused by a single or simple set of factors.

Modjo dry port users frequently complained about the slow pace goods and service delivered by Modjo dry port that leads to a serious congestion problem in the dry ports which has, in turn, resulted in substantial operating costs for the port and to the customers. As Modjo dry port is key logistics channel to the country it contributes to overall poor logistics performance of the country. Hence it is important to identify those factors which lead to congestion of Modjo dry port which has impact on the performance of the port. Therefore, as Modjo dry port is one of the biggest dry ports in Ethiopia where 80 percent of the national import is accommodated at this port and frequent complains of customers on congestion and delays in operations of Modjo dry port, the focus of this research is to identify port users perceived factors which influence the performance of Modjo dry port.

1.3. Research Questions

Although dry ports are important to the whole supply chain, related research is scarce. This research will try to answer the following research questions:

- How container handling equipment determine the performance of Modjo dry port?
- How customs operations determine the performance of Modjo Dry port?
- How the qualities of port infrastructure have impact on Modjo dry port performance?
- How qualities of logistics services determine the performance of Modjo dry port?
- How port staffs influence the performance of Modjo dry port?
- How size of Modjo dry port determines its performance?
- How the reliability of Modjo dry port operations determine performance of Modjo dry port?

1.4. Objectives of the Study

1.4.1. General Objective of the Study

The main objective of the study is to assess the determinants of Modjo dry port performance.

1.4.2. Specific Objective of the Study

The specific objectives of the study are:

- To assess the determinants of Modjo dry port performance in its container handling equipment, customs operations, quality of port infrastructure, quality of logistics services and port staffs.
- To assess customers perceptions on size of Modjo dry port.
- To examine on the reliability of Modjo dry port operations.

1.5. Significance of the Study

Following the independency of Eritrea in 1991, Ethiopia became landlocked. As a result, the country has been compelled to use transit countries for its imports and exports. In order to ease some of the problems in the transit countries, Ethiopia has started constructing dry ports in its hinterland along the transit corridors. Among the planned dry ports, Mojo and Semera dry ports have become operational.

Dry ports are a location actively integrated within supply chain management practices. This takes many forms such as the agglomeration of freight distribution centers, custom clearance, container depots and third party logistical services.

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 study factors that determine the performance of the dry ports. Therefore, this study will attempt to identify the major factors that influence the performance of Mojo dry port based on consumers perception. Hence, it will have practical importance to governments, port authorities and other Stakeholders by providing information and guidelines for the implementation of port policies and organizational reforms which enhance the performance of the dry ports. Moreover, it will narrow the existing knowledge gap in this area and could also serve as a reference for future studies in the area.

1.6. Scope of the Study

This study is conducted to identify users perceived factors which influence the performance of dry ports in Ethiopia. Currently Among the planned dry ports, Modjo and Semera dry ports have become operational but as Semera dry port is located far from Addis Ababa, this study will take the case of Mojo dry port only. Scarcity of funds as well as time constraints will not permit the study to cover all the dry ports in Ethiopia. Furthermore, the study would not include all important variables that have an impact on the performance of dry port.

1.7. Limitations of the Study

The limitations of this study are, the focus of the study was on customers of Modjo dry port and it excludes other stakeholders and since it was difficult to get list of all customers of Modjo dry port it was hard to apply appropriate sampling technique hence, the study employed a non-probability sampling technique called convenience sampling so it is difficult to generalize the findings to entire population. Furthermore, due to time and budget constraint the study focused on Modjo dry port only.

1.8. Organization of the Research Report

The research report will consist 5 chapters and it will be organized as follows. The first chapter will be an introductory part in which background of the study, statement of the problem, basic research questions, objectives of the study, hypothesis of the study, definition of terms, significance of the study, and scope of the study will be presented. Chapter 2 will present review of both theoretical and empirical literature on determinants of port performance. Subsequently, methods of the study will be presented in Chapter 3. Then, Chapter 4 will summarize and discuss the finding of the study. Finally, on Chapter 5, the main findings of the study will be summarized and conclusions will be drawn based on the results of the study and at last, the paper will forward appropriate recommendations and policy implications.

CHAPTER TWO

2. RELATED LITERATURE REVIEW

2.1. Definition, Role and Purpose of Dry Ports

There are different definitions of dry port, according 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).

Simply stated, dry ports are specific sites to which imports and exports can be consigned for inspection by customs and which can be specified as the origin or destination of goods in transit

accompanied by documentation such as the combined transport bill of lading or multi-modal transport document.

By definition, dry ports are located inland from sea ports but are linked directly to the sea port(s) or, in the case of international land movements, are in contact with the sources of imports and destinations of exports. 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 through-rates. 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 a shipping 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 a 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 center 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 in boxes 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.

2.2. Theoretical Literature Review

Ports have always had an important role in the development of national and international trade of countries, currently challenged by globalization, with implications for sustained economic development of their regions (Gaur, 2005). Globalization, emerged from trade growth between continents, regions and countries, has led to an expansion of global sea trade with huge impacts for ports. Increasing competition between transport modes and growing capacity per unit of transport demand for higher performance level in ports, which largely depend on their characteristics, such as infrastructure, equipment, governance structure and integration in logistic networks (Caldeirinha*et al*. 2011).

With the development of global multimodal supply chains, dry ports have been assumed increasing importance to suit the need for market development, smooth integration and closer collaboration between the different participants of the supply chain and transport network. Thus, it is a natural outcome for the ports to extend the services to locations situated further hinterland by either patronizing, forming strategic alliances or buying out existing dry ports so as to optimize the supply chain (Lee and Kim, 2003).

The ability of countries to deliver and/or receive goods and services on time and at the lowest possible cost is a key determinant of integration into the world economy today. Logistics services which include activities required for the transportation, storage and handling of production inputs and finished products from producers to consumers (or intermediary producer), play a critical role in international trade (Caldeirinha*et al*. 2011). Consequently, the efficient supply of logistics services helps to facilitate international trade. Hence, the more timely, reliable and efficient the logistics supply chain, the more efficiently and reliably goods can be delivered from the point of production to the point of consumption (Tilahun, 2014).

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 (Sanchez *et al*., 2003).

In a competitive environment, the performance of a container terminal 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).

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

According to Khalid & Richard (2004) measures of port efficiency or performance indicators use a diverse range of techniques for assessment and analysis. UNCTAD (1982) suggests two categories of port performance indicators: macro performance indicators quantifying aggregate port impacts on economic activity, and micro performance indicators evaluating input/output ratio measurements of port operations. According to Khalid and Richard (2004) there are many ways of measuring port efficiency or productivity, which could be categorized in to three broad categories which are: physical indicators, factor productivity indicators, and economic and financial indicators. Physical indicators generally refer to time measures and are mainly concerned with the ship (e.g. ship turnaround time, ship waiting time, berth occupancy rate, working time at berth). Sometimes, co-ordination with land modes of transport is measured, e.g. cargo dwell time or the time elapsed between cargo being unloaded from a ship until it leaves the port. Factor productivity indicators also tend to focus on the maritime side of the port, for example to measure both labor and capital required to load and unload goods from a ship. Similarly, economic and financial indicators are usually related to the sea access, for example, operating surplus or total income and expenditure related to gross registered tons (GRT) or net registered tons (NRT), or charge per twenty foot equivalent unit (TEU).

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.

Moreover, De Langen (2004) argued that coordination between the active players of both hinterland network and port is necessary. The port service quality depends on the performance of many players, including port operators, freight forwarders, container operators and port authority and that influences the overall port performance. Port terminals increasingly seek to improve service quality and hinterland connectivity in order to meet the logistic network demands (Notteboom and Winkelmans, 2004). Besides improving the service quality, ports and terminals should also contribute to improve competitiveness and performance of the supply chains in which they are integrated (Tongzon*et al*., 2009). Due to the intermodal nature of the container transport network, terminals must necessarily be an efficient and effective connection point between different transportation modes.

Robinson (2002) reported that port choice has become a decision made within the entire network and therefore the competition is no longer between ports but rather between supply chains, which calls for a wider approach beyond port and terminal selection criteria. This means that shippers tend to choose the logistic networks which fulfill their requirements in terms of costs, transit times, efficient handling, productivity and reliability, connectivity and interoperability (Tongzon*et al*., 2009).

The notion of port performance is notably associated with operational issues, i.e. the efficient use of infrastructure, superstructure, and all other resources used. This association has for long affected the structuring of port performance measurement frameworks. 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). Contrary to what is observable in other service industries, attention on the demand side reflections, i.e. the users point of view, has been a recent phenomenon (Brooks and Pallis, 2008; Brooks and Schelling, 2013).

Revising its strategy in 2007 the European Commission (CEU, 2007) mentioned that port users and their views are important elements in the whole process and deserve further attention – endorsing in essence that port performance is a construct of two components, namely efficiency and effectiveness (Brooks and Pallis, 2008; Brooks *et al*, 2011; Brooks and Schelinck, 2013).

The World Bank's study "Logistics Performance Index" is broader than a study of ports alone, and measures logistics instead. Yet the study is interesting as it includes port users' evaluations on specific factors dealing with logistics performance, as well as a framework on how to measure them. The Logistics Performance Index measures on-the ground trade logistics performance based on six dimensions: timeliness, international shipments, tracking and tracing, customs, infrastructures and services quality.

In doing so, World Bank (2012) developed two standardized questionnaires as a means to gather the data needed. The first one is the international questionnaire which request for an assessment of six key areas of logistics performance and more specifically:

- Efficiency of the clearance process by border control agencies (including customs).
- Quality of trade-and transport-related infrastructure
- Ease of arranging competitively priced shipments
- Competence and quality of logistics services
- Ability to track and trace consignments
- Frequency with which shipments reach the consignee within the scheduled or expected delivery time.

Apart from the international questionnaire there is also a domestic one, in which the respondents are requested to provide qualitative and quantitative data on the logistics environment in the countries they work. The respondent has to provide data for 5 major categories of factors related with quality, cost and efficiency. Each category has some sub-indicators.

The customer focus is a critical issue for container terminal performance, because terminals need to show flexibility/agility in adapting new requirements and market changes, making the necessary adjustments to meet increased customer demands. In addition, a well-organized terminal layout can improve the terminal productivity and capacity and, consequently, affect performance and service quality, particularly when large vessels call demanding for large space areas.

2.3. Empirical Literature Review

According to Sanchez et al. (2003) ports are a major determinant of shipping costs, proving the importance and the strong impact of efficiency on unit costs and competitiveness. Caldirinaha*et.al* (2011) on their study they focus on analyzing the impact of characterizing factors on the port performance, using operational, financial and efficiency indicators. Considering the multidimensional nature of port performance, the study aims to analyze which characterizing factors are relevant and what measure the relationships. The study employed Data Envelopment Analysis (DEA), statistics of factor analysis and linear regression methods based on a sample of 43 European ports and the results of this study indicate the existence of a relationship between performance and several variables that characterize the port. Additionally, they also confirm the impact of location, governance, size, infrastructure, specialization, logistic integration and maritime services in the ports operational and financial performance and efficiency.

Nyema (2014) assess factors influencing container terminals efficiency with a case study of the Mombasa Entry Port using a descriptive survey design. This study revealed that factors such as inadequate cargo handling equipment, reducing berth times and delays of container ships, dwell time, container cargo and truck turnaround time, custom clearance, limited storage capacity, poor multi-modal connections to hinterland and infrastructure directly influencing container terminal efficiency.

Balci*et.al.* (2014) studied determinants of dry bulk port selection and analyses factors considered by shippers and forwarders in selection of ports using exploratory survey method and the result indicates that physical and technical structure of port, cargo handling speed, handling cost, storage facilities, location, customer relations, port reliability and hinterland connection are found to be important factors in determining the performance of ports.

Ruto and Datche (2015) study logistical factors influencing port performance taking Kenya port Authority as a case study. The study use survey research design and employs descriptive statistics analysis and summaries the causes of poor performance in the port of Mombasa according to the findings are: lengthy customs clearing procedures, rapid growth of container trade, frequent break down of Kenya Revenue Authority (KRA) and Kenya Ports Authority (KPA), IT Systems, slow gate out process and slow container off-take to Container Freight

Station, inadequate yard capacity and lengthy KRA clearing procedures, poor yard planning and in adequate usage of IT in yard planning, poor working corporate culture by the corporate staff and poor hinterland connectivity.

Tongzon (1995) tried to specify some factors that could influence port efficiency. He focused on determinants of port throughput, including as key parameters the location of the port, the frequency of ship calls, port charges, the economic activity and the terminal efficiency (which is in turn affected by container mix, the work practices, the crane efficiency and the vessel size and cargo exchange). The study employed multiple regression model and the result showed that terminal efficiency, frequency of ship calls and economic activities are important factors in influencing port performance.

Yeo *et al.* (2008) in their study tried to identify and evaluate the competitiveness of major ports in Korea and China and their study identifies the components influencing their competitiveness and presents a structure for evaluating them. Based on the literature related to port selection and competition, a regional survey of shipping companies and owners employed factor analysis to reveal that port service, hinterland condition, availability, convenience, logistics cost, regional center and connectivity are the determining factors in these regions.

Rajasekar and Deo (2014) tried to identify the determinant factors for port performance of major ports in India during 1993 – 2011. For identifying the factors panel data models like pooled ordinary least square method, fixed effect model and random effect model are used. The results of the study indicated that berth throughput, operating expenses, number of employees, cargo equipment's and idle time showed significant effect on port performance.

Scholars experimented with several perceptions of performance, with users perception emerging as part of the relevant debate in the recent past. Ng (2006) asserted that, targeting the container ports in Northern Europe, shipping company considered the effectiveness of port, geographical location, and service quality more important than the cost of port. Also, Ng (2006) proposed that individual groups of port users showed different priority ranks for the importance of the select factors. Besides this, this study points out the fact that the select factors for port depend on the qualitative factors such as reliability, proximity, frequency, security, and reputation and cost factors.

Panayides and Song (2009) also identified information systems, communication and informal relations in the supply chain as essential to performance, productivity and competitiveness of supply chains and port networks. Information and communication systems can improve the efficiency of supply chain operations contributing to achieve its purposes (Cachon and Fisher, 2000). Furthermore, information sharing is regarded as an effective way to contribute to improve container terminal integration in the supply chains. It allows companies to improve safety, reliability in a faster synchronized process with impacts in terms of costs and service quality (Zhao *et al*., 2002) because information systems avoid duplication of documents, maintain data integrity along the transport chain and reduce costs.

Turner *et al*. (2004) examined the impact of hinterland and maritime accessibilities on performance and Gaur (2005) identified factors that affect the terminal performance, including maritime access and hinterland connectivity.

In general, the performance of a port has a multivariable behavior. According to Brooks and Pallis (2008) port performance research can be divided into effectiveness research and efficiency research. Efficiency has been noted as 'doing things right' while effectiveness is 'doing the right things'. The right things are those that are important to the customer. If a negative and significant gap exists between the importance of those right things and the performance of them, dissatisfaction is the byproduct. In combination, these two port performance components also provide government policy-makers with the essential feedback for assessing the governance structure of ports in meeting national strategic objectives.

2.4. Determinants of Port Performance

In order to study the determinants of port performance, we should first identify the indicators of port performances. Since the environment in which ports operate has changed dramatically, ports are affected by various new forces driving global competition, including the far reaching unitization of general cargo, the rise of mega-carriers, the market entry of logistics integrators, the creation of network linkages among port operators, the development of inland transport networks, and so on (Notteboom and Winkelmans, 2001). In this context, seven key determinants of port performance are proposed based on the existing literature. These determinants include: cargo handling equipment, port infrastructure, customs operation, size of dry port, quality of logistics service, port staff and reliability of port operations.

2.4.1. Cargo handling equipment

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

2.4.2. Size of the dry port

A number of research articles consider the size of the seaports as another factor that influences their performance (Gujar, 2011; Nyema, 2014 and Calderinha*et al*, 2011), since the land size determines the total storage capacity of a seaport. It is especially important in the peak season. Accordingly, the size of a dry port is taken as one of the factors when we consider its performance.

2.4.3. Infrastructure

According to Liu (1995) both investment in port infrastructure and the capital-intensity level are other factors that can explain the differences in performance and efficiency between ports, because without infrastructures or the ability to offer services, a port could not be able to handle an increasing number of vessels or cargo.

The quality of access to a dry port and the quality of the road/rail/waterway interface determines the quality of terminal performance therefore it is necessary to have scheduled, reliable, transport by high capacity means to and from seaport (Roso*et al*., 2008). Thus dry ports are used much more consciously than inland terminals with the aim to improve the situations caused by increased container flows, focus on security and control by use of information and communication systems.

2.4.4. Customs

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

2.4.5. Quality of Logistics Service

Freight forwarders are agents not moving freight themselves play a critical role in organizing supply chains and moving goods on transit corridors (World Bank-United Nations, 2014). The

role of freight forwarders is to organize international (or eventually domestic) logistics on behalf of shippers and consignee. This includes organizing transportations with railways or trucking companies, and customs representation activities at the border.

They make a key contribution to supply chains by linking with forwarding partners abroad, which essentially insures the continuity of the supply chain, and makes it possible to track shipments in transit (World Bank-United Nations, 2014). Hence, their interaction and collaboration with the port staffs and the activities of other logistics service providers is crucial in determining the performance of the dry port.

2.4.6. Number of staff

The numbers of staff or the labor costs are also considered as a potential factor that may influence the performance of dry port (Guar, 2011). The number of employees is usually taken as a critical factor influencing businesses of dry ports as more staffs can handle the inbound and outbound containers or bulk cargos more efficiently especially in peak hours. Dry ports should have sufficient middle-level and front line managers as well as workers to handle the businesses.

2.4.7. Reliability

According to Tongzon and Heng (2005) reliability means a steady and predictable performance adapted to shipping lines' schedules. If a port authority or port operator always makes delays during operation process due to strikes, equipment breakdown, weather etc, shipping companies and shippers will suffer huge losses due to this kind of unreliability. Supply chain reliability is a major concern for traders and logistics providers alike. In a global environment, consignees require more certainty about when and how deliveries will take place. This increases the demand for quality in logistics services, posing challenges for private agents and for governments, all of which face pressure to facilitate trade while safeguarding the public against criminal activity, health concerns, or terrorism threats.

2.5. Conceptual Framework

Improving logistics performance is at the core of the economic growth and competitiveness agenda (Arvis*et al.* 2014). Policymakers globally recognize the logistics sector as one of their key pillars for development. Indeed, inefficient logistics raises the costs of trading and reduces the potential for global integration. In international trade besides other factors the logistics performance of ports are very important for the competitiveness of countries. Hence, identifying

those factors which influence the performance of ports is crucial. For the purpose of this study, the conceptual framework is developed based on the research works of Ng (2006) and Vaggelas and Pallis (2015). Therefore, the research will be guided by the conceptual framework that is indicated in below diagram. The variables in the left sides that are; container handling equipment, port infrastructure, customs operations, size of dry port, quality of logistics service, port staff and reliability of port operation are determinants of port performance which are identified from the literature. The determinant variables are believed to influence the performance of the port either directly or indirectly and the arrow showed that the activities and interaction of those variables affect port performance.

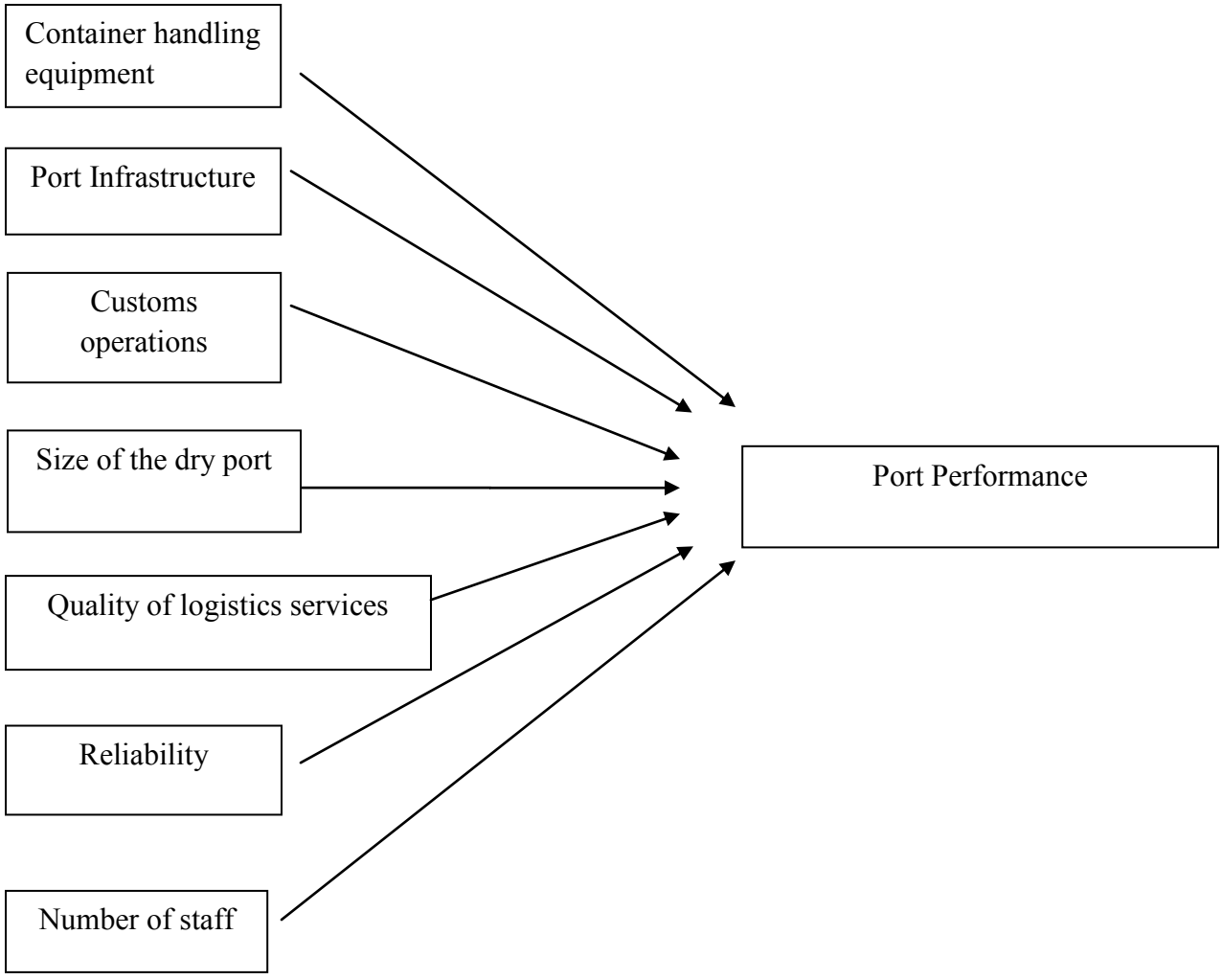

Figure 1- Conceptual Framework, Adopted from the research works of Ng (2006), and Vaggelas and Pallis (2015)

Ports need to be able to evaluate the effectiveness of the port system inmeeting the needs of their trading communities; supply chain participants also need toevaluate whether ports meet their needs. As a result, a program of regular performancemeasurement is recommended. In most port performance determinant assessments, measurement focuses on efficiency (Tongzon (1995), Caldirinaha*et.al.* (2011) and Guar (2011)) but fails to include the port's effectiveness in delivering its services to those who 'use' it. It is the belief of this paper that efficiency measurement mustbe accompanied by the measurement of effectiveness in order to improve the overall andspecific performance of the port system.

The purpose of this study is to assess port determinants based on users perceptions as it has not yet been adequately addressed in the scholarlyliterature.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

The methodology for empirically assessing customers perceived factors which determines the performance of Modjo dry port entails the development of a questionnaire for data collection, the selection of a sampling frame and sample to administer the survey, and data analysis.

Most performance related researches are conducted in sea port however; as dry ports have similar characteristics like sea ports this research adopt important characteristics from sea port researches. Furthermore most researches are on factors which influence the selection criteria of ports by users. Factors which are identified as selection criterion by port users indirectly considered as indicators variable which influence ports performance. Hence, for the purpose of this study we use those identified variables and collect the data on those variables.

In order to identify users perceived determinants of Modjo dry port performance, the study required to use a standardized survey questionnaire and collect primary data from a sample of key customers of Mojo dry port. The simplest thought is to define as port user anyone who uses a port. However for the purpose of this study Pallis and Vitsounis (2009) definition of port users is employed. According to Pallis and Vitsounis (2009) port user is an entity that uses port facilities and consumes port service. The study therefore took business entities which are involved in import and export business and use the dry port and logistics provider companies as a sampling frame from which the sample were selected.

In accordance with the methodology proposed in a research paper by Ng (2006) and Vaggelas and pallis (2015), the relevant users perceived factors which determine the performance of dry port was identified. In this study, customers or users of Modjo dry port was approached to indicate their feeling about each characteristics. The study then analyzes the information collected through a survey of a group of port users.

3.2. Study Design

The research design in this study is survey research design. Survey research design is a procedure in quantitative research in which researchers administer a survey to a sample or to the

entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population (Cresswel, 2012). In this procedure, data was collected using questionnaires and statistically analyzed the data to describe trends about responses to questions and to test research questions and then the meaning of the data was presented and interpreted. Accordingly, this study employed survey research design to assess determinants of Mojo dry port performance.

3.3. Study Area

This study was conducted on Modjo dry port. The study engaged in identifying users' perceived factors which influence the performance of Modjo dry port. To identify those factors data is collected from users or customers of Modjo dry port i.e. importers, exporters and freight forwarders. Hence the study area is customers of Modjo dry port.

3.4. Unit of Analysis

According to Brooks and Pallis (2011) port users are able to see how ports perform on the various dimensions of port performance and are also able to identify factors which have impact on port performance. Hence, addressing users perception on performance determinants is important and the findings could assist ports in benchmarking their performance against others they see as competitors, and therefore guide them in improving the quality of their services, which will be a significant benefit to the port users in particular and to overall economy in general. Therefore, the units of analysis in this study are customers of Modjo dry port i.e. exporters, importers and freight forwarders.

3.5. Population of the study

The population of this study includes all customers of Modjo dry port that includes importers, exporters and freight forwarders.

3.6. Sampling

In order to identify users' perceived determinants of port performance, the study required to develop a survey questionnaire and collect primary data from a sample of key customers of Mojo dry port. According to Pallis and Vitsounis (2009) port user is an entity that uses port facilities and consumes port service. The study therefore took business entities which are involved in import and export business and use the dry port and logistics provider companies as a sampling frame from which the sample will be selected.

The research uses non-probability sampling technique called convenience sampling. According to Cresswel (2012) in convenience sampling the researcher selects participants because they are willing and available to be studied.

The total numbers of Modjo dry port customers were not known because it has no registered customers list. Therefore, sampling formula was not applied. Instead, the data was collected from customers coming for service to Modjo Dry port. This is a relatively easy choice for researchers when a group of people cannot be found to survey or question. In this case convenience sampling includes going to Modjo dry port and questioning or surveying those people who are available and consent to being questioned. The main motive for using convenience sampling is to reduce the cost of the surveys and the time required to complete them by using a convenient sample of persons who are ready and willing to be interviewed the first time the interviewer calls.

In this case, the researcher cannot say with confidence that the individuals are representative of the population. However, the sample can provide useful information for answering questions and hypotheses (Cresswel, 2012). Amentae and Gebresenbet (2015) used similar sampling technique in their study to evaluate the performance of intermodal import-export freight transport system in Ethiopia and similarly Sakar (2012) used similar technique in his analysis of freight forwarders' perceptions about multimodal transport in Turkey. Furthermore, Khalid & Richard (2004) also employed convenience sampling in their study.

3.7. Measurement and Instrumentation

In his paper Ng (2006) analyzed the factors that determine the attractiveness of ports by means of surveys addressed to customers that includes directors and agents of the main shipping lines operating in northern Europe. Ng (2006) in his study, survey respondents were asked to rank attributes on a five-point Likert scale, with one indicating not significant and five very significant. Similarly, Ruto and Datche (2015) used a likert scale measurement in their survey to evaluate customers' perceptions on different port characteristics. Therefore; in this study, in accordance to Ng (2006) similar attributes which relates to dry port and ranking scales have been used to investigate the opinions of Modjo dry port customers.

Hence, Customers perceived factors that determine the performance of dry port was measured through 5-point Likert scale where 1 indicating not significant and 5 indicating very significant. Satisfaction was measured through a psychometric 5-point Likert scale where 1 is for very

dissatisfied and 5 is for very satisfied. This scale was used to measure strength of opinion of selected service attributes.

3.8. Data Collection

In this study, both primary and secondary data was used. For primary data collection purpose, survey questionnaire is used. Customers of Modjo dry port was approached personally and asked to fill the questionnaire. The questionnaire has three sections. First section is about general information of the participant and the company. In the second section participants were asked to evaluate the overall performance of Modjo dry port based on the satisfaction they get from the service of Modjo dry port. In the final section respondents were requested to indicate the significance level of some identified port characteristics which has an impact on the performance of Modjo Dry port. Due to time and budget constraints the sample size was based on the availability and willingness of customers when the data was collected physically at Modjo dry port premise. Accordingly, questionnaire was distributed to 75 Modjo dry port customers who are willing to participate on the survey. Out of the 75 questionnaires 63 of it was filled completely and returned which means there were 84% response rate. Furthermore, secondary data from different publications of IMF and World Bank was used.

3.9. 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 purported to measure. In this study the standardized questionnaire which was developed by Ng (2006) was used. 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 customers and 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.

Table 1: Reliability Statistics

Cronbach's Alpha	Number of Items
0.78	34

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer the Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale and a value greater than 0.7 is acceptable (George and Mallery, 2003). As indicated in table 1, Cronbach's alpha test indicated that the instrument is reliable as 0.78 value which is in the acceptable range.

3.10. Methods of Data Analysis

To analyze the data this study used descriptive statistics. According to Marczyk*et.al*. (2005) descriptive statistical procedures allow researchers to describe groups of individuals and events, examine the relationships between different variables, measure differences between groups and conditions, and examine and generalize results obtained from a sample back to the population from which the sample was drawn. Furthermore, descriptive statistics of frequency tables are used to describe the data collected in research studies and to accurately characterize the variables under observation within a specific sample. In this study, the analysis was done with the help of Statistical Package for Social Sciences (SPSS) and Microsoft Excel. The responses in the questionnaire were coded into common themes to facilitate analysis. Data was presented in descriptive form supported by tables, frequency distributions, graphs and percentages.

3.11. Variable of the study

- Cargo handling equipment: includes equipment used to move cargo to and from marine vessels, on-road trucks and yards. The equipment typically operates at marine terminals or at rail yards and not on public roadways or lands.
- Port Infrastructure: includes quality of port infrastructure, connectivity to road network and quality of telecommunications infrastructure and IT service.
- Customs Operations: includes continuous operations of customs service, efficiency of customs service, speed of customs procedures, transparency of charges and customs clearance procedure and provision of adequate, on-time information.
- Size of Dry Port: is the total size of premises of the dry port. Measurement was made on s availability of storage capacity at the port and access to port premises for pick-up and delivery (gate congestion).

- Quality of Logistics Service: includes the competency and quality of service provided by road transport service providers, freight forwarder, and different regulatory agencies (e.g. quality/standards inspection agencies, health/sanitary and phyto-sanitary agencies).
- Port Staffs: includes all employees of the dry port and the measurement were made on the availability of professionals, speed of operators of cargo handling equipment and incentive to staff number
- Reliability of Port Operations: is a steady and predictable performance adapted to shipping lines' schedules. Measurement was made on incidence of cargo damage, incidence of cargo theft, incidence of delays and port security.

CHAPTER FOUR

4. RESULT, DISCUSSION AND INTERPRETATION

4.1 Result

4.1.1 Demographic Profile of Respondents

The study analyzed the background information of the respondents by using the following parameters: gender, level of education, type of organization, name of department section/unit, position held by the respondents.

Table 2- Demographic Profile of Respondents

		Frequency	Percent
Gender	Male	6	9.5
	Female	57	90.5
Education Level	Diploma	26	41.3
	First Degree	32	50.8
	Masters Degree	5	7.9
Types of Organization	Importer	21	33.3
	Exporter	18	28.6
	Import-Export	16	25.4
	Freight Forwarder	8	12.7
position	Senior Level Manager	14	22.2
	Middle Level Manager	32	50.8
	Lower Level Manager	17	27.0
Total		63	100

Source: Own compilation, 2016

As Table 2 indicated 90.5% of the respondents are male and the remaining 9.5% were female. Regarding the education level, 50.8% of the respondents had first degree, 41.3% had diploma and the remaining 7.9% respondents had Masters Degree. Furthermore, Table-2 indicated the types of organizations where customers are working, accordingly 33.3% of respondents work in

an importing company, 28.6% on Export Company and 25.4% and 12.7% of respondents work in Import-export and freight forwarder companies respectively. With regard to position of the respondents 22.2% of the respondents are senior level managers while the remaining 50.85 and 275 of the respondents are middle and lower level managers respectively.

4.1.2 Assessment on Cargo handling equipment

The assessments on port handling equipment were made on two indicators namely availability and quality of container handling equipment at Modjo dry port. Respondents were asked to evaluate the significance level of the availability and quality of container handling equipment in determining performance of the port. The result is presented in Table 3.

Table 3- Assessment of Cargo Handling Equipment

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Cargo Handling Equipment	Availability of cargo Handling Equipment	-	4	10	24	25	4.11	4.27
	Quality of Cargo Handling Equipment	-	-	8	20	35	4.43	

Source: Own compilation, 2016

From Table 3, significant number of customers was believed availability of cargo handling equipment determines the performance of Modjo dry port. On availability of cargo handling equipment, majority of the customers responded that either significant or very significant in determining performance of the port. The mean value of the respondents was 4.11 which indicated that availability of cargo handling equipment is a significant factor in determining the performance of Modjo dry port. Similarly, for quality of cargo handling equipment the cumulative of significant and very significant customers was more than the cumulative of others. Besides that the mean value of respondents on the quality of cargo handling equipment was 4.43 which mean not only the number but quality of cargo handling equipment also a determinant of Modjo dry port performance. The mean of mean value for cargo handling equipment is found to be 4.27 and it indicates that in general, cargo handling equipment are important determinants of

port performance. Likewise, the research works of Gujar (2011), Nyma (2014) and Tongzon (1995) also indicated that cargo handling equipment are important determinant of port performance.

In addition, the number of cargo handling equipmentare an important determinant as it directly affects the speed with which container loaded trucks may be served (more cranes may increase the number of containers handled per hour or day), and in effect, the turn-around time as well.Besides the number of container handling equipment, a well-organized procedure to ensure adequate spare parts are kept in stock is important, as surveys of ports, particularly in developing countries, have shown that delays have too frequently been caused by the lack of spare parts.

4.1.3 Assessment on Port Infrastructure

The result of responses on infrastructure is presented in Table 4. The assessment was made on quality of port infrastructure, connectivity to road network and quality of telecommunication infrastructure and IT services.

Table 4- Assessment on port Infrastructure

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Port Infrastructure	**Quality of port Infrastructure**	-	-	6	26	31	4.4	4.07
	Connectivity to Road Network	-	7	14	25	17	3.98	
	Quality of Telecommunication infrastructure & IT Service	-	7	8	27	21	3.83	

Source: Own compilation, 2016

Table 4 indicated that, the indicators on the infrastructure component of Modjo dry port are important in determining Modjo dry port performance. According to table 4, the mean value of the respondents was 4.4 that indicate majority of the respondents believed that quality of port infrastructure is very important in determining the performance of the port. Similarly the mean value of respondents on connectivity to road network and quality of telecommunication

infrastructure and IT service were 3.98 and 3.83 respectively which mean they are significant factors in determining in determining performance of Modjo dry port. Infrastructure deficiencies currently result insubstantial time delays and high costs for goods moving both into and out of Modjo dry port.

Relatively poor conditions in land transport and maritimetransport infrastructure not only increase transportation costs and transittimes for goods destined for export, but also increases the costs and length of time forimporting needed production inputs. In addition to increasing transportationcosts, poorly maintained road networks can also disrupt delivery schedules and can lead to poor performance of ports.

The research study of Sanchez *et al*. (2003), Yeo *et al*. (2008) and Balci*et al*. (2014) also confirmed that port infrastructure is an important determinant of port performance.

4.1.4 Assessment on Customs operations

Table 5 presents the result of customs indicators. The assessment were made on 5 indicators including continuous operations of customs service, efficiency of customs service, speed of customs procedures, transparency of charges and customs clearance procedure and provision of adequate, on-time information. The results on these indicators were presented in Table 5.

Table 5- Assessment on Customs operations

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Customs Operations	**Continuos Operation of Customs Operation**	-	--	5	26	32	4.43	4.08
	Efficiency of Customs servise	-	3	7	25	28	4.24	
	Speed of Customs Procedure	-	6	15	20	22	3.92	
	Transparency of Charges & Customs Procedure	-	5	15	23	20	3.92	
	Provision of Adequate on-time Information	-	6	13	26	18	3.89	

Source: Own compilation, 2016

From Table 5, significant number of customers responded the customs operations are very important in determining the performance of Modjo dry port. On continuous operation of customs operation, the mean value of customers respond was 4.43 that showed operation hour of customs at the dry port is an important factor that determines port performance. Limited days of operation and business hours at border crossings also affect freight flows.

Regarding efficiency of customs service, mean value of customers' response was 4.24.Similarly, the mean value of responds on speed of customs procedures, transparency of charges and customs clearance procedure and provision of adequate, on-time information were 3.92, 3.92 and 3.89 respectively that implied they are important determinants of Modjo dry port performance.

Customs and securityoperations are undoubtedly a vitalpart of maintaining safety and making sure that anything illegalisinstantlyspotted. The problem is, however, that these operations can cause delays.

Port operations remain adversely affected by customs delays and corruption. Customsrelatedissues that most commonly hamper portside operations include multiple clearanceprocedures, delays in the release of imported and exported cargo from the port, and insome cases, corrupt customs officials.Border-crossing costs are multiplied by information barriers. Customs organizations mayfail to communicate changes regarding border-crossing procedures to shipping firmsor to neighboring countries. According to the study of port performance determinants by Nyma (2014) and Ruto and Datche (2015) customs operations at port are an essential determinants of port performance.

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.

4.1.5 Assessment on Size of the dry port

The assessments on the size of the dry port were made on two indicators: availability of storage capacity at the port and access to port premises for pick-up and delivery (gate congestion). The results on these indicators were presented on Table 6.

Table 6- Assessment on Size of the dry port

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Size of the Dry Port	**Availability of Storage Capacity at Port**	-	2	12	24	25	4.14	3.78
	Access to Port Premises	6	10	15	16	16	3.41	

Source: Own compilation, 2016

Respondent customers perceived that the size of Modjo dry port is an important determinant of port performance. Table 6 indicated that the mean value of the respondents on availability of storage capacity at port was 4.14 which indicate respondent customers believed that storage capacity of the port is important in determining the performance of the port. Similarly the mean value of customers response on access to port premises was 3.41 which implied the respondents assumed that gate congestion as important factor in influencing Modjo dry port performance. The mean of mean value of size of dry port which is 3.78 indicates that in general size of dry port is an important determinant of Modjo dry port performance. The research works of Nyma (2014) and Ruto and Datche (2015) also indicated that size and storage capacity of ports are important factor in determining port performance.

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.

4.1.6 Assessment on Quality of Logistics Service

Table 7 presents the result of quality of logistics service providers. The assessments were made on the competency and quality of service provided by road transport service providers, freight forwarder, and different regulatory agencies (e.g. quality/standards inspection agencies, health/sanitary and phyto-sanitary agencies). In addition to internal organizational performance

indicators of the port other stakeholders performance such as quality of truck companies, freight forwarders and inspection agencies might have an impact in determining port performance.

Table 7- Assessment on Quality of Logistics Service

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Quality of Logistics Service	**Quality of Truck Companies**	4	6	10	19	24	3.84	3.13
	Quality of Freight Forwarders	12	15	16	12	8	2.83	
	Quality of Inspection Agencies	15	10	21	11	6	2.73	

Source: Own compilation, 2016

Table 7 indicated that, the mean value for quality of truck companies was 3.84 which indicates significant number of respondents assumed that quality of truck companies is important in determining performance of the port. Regarding quality of freight forwarders and inspection agencies the mean value of the respondents were 2.83 and 2.73 respectively which implied that respondents considered them as less significant factors in determining the performance of Modjo dry port. The mean of mean values of quality of truck companies, quality of freight forwarders and quality of inspection agencies were 3.13 that indicates respondent customers believed that quality of logistics service is a less significant factor in determining Modjo dry port performance. 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. Therefore, improving logistics service quality should be an ongoing focus for logistics service providers and they should never refrain from becoming more proactive with customers' satisfaction by providing better logistics service. The study by Sanchez *et al*. (2003), Ng (2006) and Panayidas and Song (2009) also confirmed that qualities of logistics service are important determinants of port performance.

4.1.7 Assessment on Port Staff

Table 8 presents the result of port's staff indicators at Modjo dry port. The assessments were made on the availability of professionals, speed of operators of cargo handling equipment and incentive to staff number.

Table 8- Assessment on Port Staff

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Port Staff	**Availability of Professional Personnel**	-	-	8	25	30	4.35	3.65
	Speed of Cargo Handling Equipment Operators	5	6	15	26	11	3.51	
	Incentive	10	12	11	22	8	3.10	

Source: Own compilation, 2016

The results in Table 8 showed that the mean value for availability of professional personnel was 4.35 which indicated that, majority of the respondent customers label the availability of professional personnel at the port as a significant factor in determining the performance of Modjo dry port. Regarding the speed of cargo handling equipment operators and the incentive scheme the mean value of respondent customers were 3.51 and 3.10 respectively that means majority of respondent customers considered them as an essential factor in influencing the performance of Modjo dry port.

The number of employees is usually taken as a critical factor influencing businesses of dry ports as more staffs can handle the inbound and outbound containers or bulk cargos more efficiently especially in peak hours. The study report of Gujar (2011) and Rajasekar and Deo (2014) also indicated that number of employee and their quality ar important factors which influence the performance of dry ports. Therefore, dry ports should have sufficient middle-level and front line managers as well as workers to handle the businesses.

4.1.8 Assessment on Reliability of Port Operations

The assessments for reliability of Modjo dry port operations were made in terms of incidence of cargo damage, incidence of cargo theft, incidence of delays and port security. The results were presented in Table 9.

Table 9- Assessment on Reliability of Port Operations

Variable	Sub variables	Frequency					Mean	Mean of Mean
		Not Significant	Slightly Significant	Moderately Significant	Significant	Very Significant		
Reliability of Port Operations	**Incedence of Cargo Damage**	10	15	22	10	6	2.79	3.25
	Incedence of Cargo Theft	10	16	25	7	5	2.70	
	Incedence of Delays	-	-	7	26	30	4.37	
	Port Security	8	12	17	16	10	3.13	

Source: Own compilation, 2016

According to Table 9, the mean value of incidence of cargo damage and incidence of cargo theft are 2.79 and 2.70 respectively. The result indicated that, respondents consider incidence of cargo damage and theft as a less significant factor in determining port performance. Another problem, which has always faced transport terminals,is security from theft.With the advent of containerization and the mass movementof high value goods, theft has become an even greaterproblem. The reason for respondent customers to consider cargo damage and theft as a less significant factor those incidences might not occur in Modjo dry port.

According to table 9, the mean value on incidence of delays was 4.37 that indicate majority of the respondents considered the incidence of delays at the port had a significant impact on the performance of Modjo dry port. According to USITC (2009), administrative procedures and delays at borders account for anestimated 20 percent of freight costs in East Africa. Delays in the release of imported cargo may increase port storage fees forimporters, and in extreme cases, an importer may choose to abandon cargo at the portrather than to accrue such charges.

Furthermore, regarding port security, the mean value 3.13 showed that port security had a significant role in determining port performance.

Supply chain reliability is a major concern for traders and logistics providers alike. In a global environment, consignees require more certainty about when and how deliveries will take place. This increases the demand for quality in logistics services, posing challenges for private agents and for governments, all of which face pressure to facilitate trade while safeguarding the public against criminal activity, health concerns, or terrorism threats. The research works of Zhao et al. (2002) Tongzon and Heng (2005), Ng (2006) and Balci et al. (2014) also confirmed that reliability of port operations are important factors in determining performance of ports. Hence, it is important for Modjo dry port to make its operations reliable to its customers.

4.1.9. Comparison on Determinants of Port Performance

Table 10 presents the comparison between factors which determine the performance of Modjo dry port. In the above sections each determinants were treated separately and in this section mean of mean value of the variables were compiled in order to determine the comparative level of importance of each factors.

Table 10- Average score for the determinants of port performance

Determinants of Port Performance	Average Score
Cargo Handling Equipment	4.27
Customs Operations	4.08
Port Infrastructure	4.07
Size of the Dry Port	3.78
Port Staff	3.65
Reliability of Port Operations	3.25
Quality of Logistics Service	3.13

Source: Own compilation, 2016

The result in table 10 can be used as a point of comparison on different factors which determines performance of Modjo dry port. According to table 10, cargo handling equipment, customs

operations and port infrastructure get the highest scores. While size of dry port and port staff get average scores but reliability of port operations and quality of logistics service scored lower. The result indicated that although all factors are important determinants of port performance based on their average values cargo handling equipment, customs operations and port infrastructure are important determinants of Modjo dry port performance.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The dry port concept is based on a seaport directly connected by rail to inland intermodal terminals, where shippers can leave and/or collect their goods in intermodal loading units as if directly at the seaport. In addition to the transshipment that a conventional inland intermodal terminal provides, services such as storage, consolidation, depot, maintenance of containers, and customs clearance are also available at dry ports. The dry port implementation itself certainly is not a straightforward solution for seaport terminal congestion or for better seaport inland access; however, it could be part of the solution.

As Modjo dry port users frequently complained about the slow pace goods and service delivered by Modjo dry port, that leads to a serious congestion problem in the dry ports which has, in turn, resulted in substantial increment of costs to customers it also magnified operating cost of Modjo dry port. Furthermore, as the dry port is key logistics channel to the country it contributes to overall poor logistics performance of the country. Thus, the focus of this research was to identify port users' perceived factors which influence the performance of Mojo dry port.

The study tried to identify customer's perceived determinants of Modjo dry ports. Customers were requested to indicate their perception on the variables of port performance indicators. Based on respondent customers response, cargo handling equipment, customs operations, port infrastructure, size of dry port, port staff, reliability of port operations and quality of logistics service are found to be an important factors in determining the performance of Modjo dry port. Furthermore; among those determinants, the overall average score of the variables showed that cargo handling equipment, customs operations and port infrastructure are very important determinants of Modjo dry port performance.

5.2. Recommendations

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

- Investment in port infrastructure including on cargo handling equipment will have a significant impact in improving port performance. Therefore, in order to improve the performance of Modjo dry port ESLSE should invest on port infrastructure.
- Reform of customs and other border control procedures is essential as reforms can result in the reduction of delays to trade consignments and accelerate the turnaround of containers in terminals.
- Efficient border management is critical for eliminating avoidable delays and enhancing predictability in border clearance. Coordination among government control agencies will remain essential in trade facilitation efforts.
- The port 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.
- Expansion of Modjo dry port area and efficient utilization of port area and its premises is essential to reduce congestion problems at the port.
- 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, or in the case of domestic intermodal freight terminals, between ultimate cargo origins and destinations. 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 could be useful in explaining the direct and indirect consequences of poor port performance on consumer prices, input prices, export costs, and economic competitiveness. The attendance of government decision makers, civil society participants, and others whose support may be required to effect change or support

meaningful change should also be important. Planned reforms, their justification and implementation plans could be presented in order to generate greater understanding and foster greater ownership and support for the planned reforms.

- 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, 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:

- An assessment of custom terminal checking procedure and process at port Djibouti, Ethiopia boarder terminal, and all the ways to dry ports in Ethiopia: what can be done in this regard?
- Is it possible to think of privatization of the "multimodal" freight transport system in Ethiopia to improve the logistics performance of the port?
- To what extent can the planned railways in Ethiopia contribute to improvement of freight transport in Ethiopia?
- Impact Assessment of the planned railways on congestion of Modjo Dry port.
- Alternative analysis of other dry ports that customers can use to avoid complete dependence on Modjo dry port.

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APENDIX 1

QUASTIONNAIRE

Dear participant:

My name is AbdurezakMussema and I am a graduate student at Addis Ababa University, School of Commerce, Department of Logistics and Supply chain Management. For my final project, I am examining determinants of dry port Performance: the case of Modjo dry port. Because your esteemed company is among the customers of the dry port, I am inviting you to participate in this research study by completing the attached surveys.

The following questionnaire has three sections and will require approximately 10 to 15 minutes to complete. In order to ensure that all information will remain confidential, please do not include your name. If you choose to participate in this project, please answer all questions as honestly as possible and return the completed questioner promptly (I personally collect it from your office). Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding customers' perceived factors which determines the performance of Modjo dry port.

Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

Sincerely,

AbdurezakMussema

Phone number: +2519118870884

Email: abdurezakmussema@gmail.com

SECTION I- GENERAL INFORMATION

1. BACKGROUND INFORMATION OF RESPONDENTS

1.1. Sex of the respondent: Male [ ] Female [ ]

1.2. Level of education:

Diploma [ ] First Degree [ ] Masters Degree [ ] Other (specify) _____

1.3. Type of organization

Importer [ ] Exporter [ ] import-Export [ ] Freight Forwarder [ ]

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

Senior Level Manager [ ] Middle Level Manager [ ] Lower Level Manager [ ]

Other (Specify)_____

SECTION II- PERFORMANCE EVALUATION

2. Customers Satisfaction

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?

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

2.2. How much do you satisfied by the infrastructure level of Modjo dry port?(E.g. Port infrastructure, telecommunications infrastructure, etc.)

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

2.3. How much do you satisfied by the size of Mojo dry port in handling international trade?

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

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

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

2.5. How much do you satisfied by the quality of logistics services provided at Modjo dry port? (e.g. Transport operators ,freight forwarders etc)

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

2.6. How much do you satisfied by the activities/performance off staffs at Modjo dry port?

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

2.7. How much do you satisfied by the reliability of Modjo dry port operations? (e.g. delivery time, security, etc.)

Very Satisfied [ ] Satisfied [ ] Neutral [ ] Dissatisfied [ ] Very Dissatisfied [ ]

SECTION III- CUSTOMERS PERCEIVED PERFORMANCE DETERMINANTS

This section deals with customers perceived determinants of Modjo dry port. Therefore, based on your experience at the port please rate the significance of each indicators in determining the performance of Modjo dry port. Please mark or encircle the value level of your perception in the table.

Dimensions	**Measurement Scale** 1-Very Insignificant/Not Significant at All 2- Insignificant 3- Neutral 4- Significant 5- Very Significant				
1. CONTAINER HANDLING EQUIPMENT					
1.1. Availability of cargo handling equipment	1	2	3	4	5
1.2. Quality of container handling equipment	1	2	3	4	5
2. **INFRASTRUCTURE**					
2.1. Quality of port infrastructure	1	2	3	4	5

2.2. Connectivity to road networks	1	2	3	4	5
2.3. Quality of telecommunication infrastructure and IT service	1	2	3	4	5
3. CUSTOMS					
3.1. Continuous operation of customs service	1	2	3	4	5
3.2. Efficiency of customs service	1	2	3	4	5
3.3. Speed of custom procedures	1	2	3	4	5
3.4. Transparency of charges and customs clearance procedures	1	2	3	4	5
3.5. Provision of adequate, on-time information	1	2	3	4	5
4. SIZE OF THE DRY PORT					
4.1. Availability of storage capacity at the port	1	2	3	4	5
4.2. Access to port premises for pick-up and delivery (gate congestion)	1	2	3	4	5
5. QUALITY OF LOGISTICS SERVICE					
5.1. Quality of truck companies	1	2	3	4	5
5.2. Quality of freight forwarders	1	2	3	4	5
5.3. Quality of different inspection agencies at the port (e.g. quality/standards inspection agencies, health/sanitary and phyto-sanitary agencies)	1	2	3	4	5
6. STAFF OF THE PORT					
6.1. Availability of professional personnel in port	1	2	3	4	5
6.2. Speed of Cargo handling equipment Operators in cargo loading/unloading	1	2	3	4	5

6.3. Port authority/terminal operator incentives	1	2	3	4	5
7. **RELIABILITY**					
7.1. Incidence of cargo damage	1	2	3	4	5
7.2. Incidence of cargo theft	1	2	3	4	5
7.3. Incidence of delays	1	2	3	4	5
7.4. Port security	1	2	3	4	5