THE PRACTICES AND CHALLENGES OF DRY PORTS OPERATIONS: THE CASE OF MODJO DRY PORT

By

Simie Kebede

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

May 2019

Addis Ababa, Ethiopia

Addis Ababa University
School of Commerce
Department of Logistics and Supply Chain Management
Graduate Studies

THE PRACTICES AND CHALLENGES OF DRY PORTS OPERATIONS: THE CASE OF MODJO DRY PORT

By

Simie Kebede

Advisor: Matiwos Ensermu (PhD)

A THESIS SUBMITTED TO THE ADDIS ABABA UNIVERSITY, SCHOOL OF COMMERCE, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN LOGISTIC ANDSUPPLY CHAIN MANAGEMENT

May 2019

Ababa, Ethiopia

Addis Ababa University

School of Commerce

Graduate Studies

Approved by Board of Examiners

_____	_____	_____
Advisor	Signature	Date
_____	_____	_____
Internal examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date
_____	_____	_____
Chairman of Graduate Committee	Signature	Date

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Matiwos Ensermu (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted and will not presented either in part or in full to any other higher learning institution for the purpose of a similar or any other degree award.

Simie Kebede _____

Name Signature

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Addis Ababa University a thesis entitled: **"The practices and Challenges of dry port operations: The case of Modjo dry port"** under my guidance and supervision. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for the award of Master of Arts in Logistics and Supply Chain Management.

Matiwos Ensermu (PhD)	_____	_____
Research Advisor	Signature	Date

Abstract

In Ethiopia, several dry ports have been developed and operated since 2009. Modjo dry port is one of these types of dry ports which have been operated since 2009. Modjo dry port faces several challenges, which have a significant impact on its operations performance. In this regard, this paper investigates the challenging factors of Modjo dry port operations. This research has adopted a mixed method research methodology by employing semi-structured face-to-face interviews in the qualitative method and questionnaire surveys in the quantitative method and used both explanatory and descriptive analysis. The researcher has distributed survey questionnaires for 170 samples of actors at Modjo dry port and interview discussions with eight key informants about the challenges at Modjo dry port operations. Multiple regression is employed for data analysis. Findings suggest that six significant challenging factors such as government policy, socio-cultural influence, hinterland conditions, technological advancement, information accuracy and capacity are identified as Modjo dry port operations challenges. Theses challenging factors have great impacts on the performance of Modjo dry port. Due to these impediments, the Modjo dry port performance is poor. This thesis is expected to be of managerial value to dry port operators, when developing strategies to enhance operational efficiency and imperative improvement is needed especially in customs clearance technology and introducing a range of value-added services especially in Modjo dry port for its own development and client's benefits.

Keywords: Modjo, dryport, challenges, logistics, operation, performance,

Acknowledgement

The researcher would like to express my thankfulness to my advisor, Matiwos Ensermu (PhD) for his expert advice throughout this thesis, particularly his knowledge of logistics and supply chains management.

I am truly thankful to Temesgen Dagne (PhD) who provided me priceless support to produce this study, without his timely support, it has not been completed. My appreciation also goes to Modjo dry port terminal employees, customs office employees, customs clearing agents and importers for their dedicated support on filling out the questionnaire and providing information on the issue of Modjo dry port operation challenges to support my research.

Finally, I must express my very profound gratitude to my parents and to my wife Ms. Mekoya Guangule, my daughter Arsemawit Simie and my son Nahoam Simie for providing me with unfailing support and continuous encouragement throughout my years of study and the process of the research and writing this thesis. This research would not have become reality without the support of these wonderful people. THANK YOU**...**from the bottom of my heart.

Simie Kebede

Table of Contents

List of Tables and Figures

Tables

Figures

List of Abbreviations/Acronyms

CFS	Container Freight Station
EFY	Ethiopian Fiscal Year
ESLSE	Ethiopian Shipping and Logistics Services Enterprises
FDT	Association of Danish Transport and Logistics Centers
FIP	Face-to-face interview participant
ICD	Inland Container Depot
ICT	Information, communication and technology
IMF	International Monetary Fund
IMF	International Monetary Fund
IT	Information Technology
LLDCs	Landlocked Developing Countries
LPI	Logistics Performance Index
PPP	Public-Private Partnership
SESTran	South East Scotland Transport partnership
SPSS	Statistical Package for Social Sciences
TEU	Twenty foot Equivalent Unit
TOS	Terminal Operating System
UN ESCAP	United Nations Economic and Social Commission for Asia and Pacific
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

CHAPTER ONE: INTRODUCTION

This chapter begins by presenting the research background. The research setting is then presented and Ethiopia is introduced as one of the landlocked countries in East Africa. Then, the practices and challenges of Modjo dry port operations are summarized in the problem identification section. Later, the research questions, the research objectives, significances of the research, scope of research, and limitations are outlined. The chapter closes by presenting the structure of the research.

1.1. Background of the Study

The development of a regional transport network depends on all forms of transport connections, such as railway, roads and waterways, connecting with transport nodes such as seaports and dry ports. The dry port network greatly facilitates trade and allows containers to be distributed between transport modes and ensures the optimal usage of networks (Jeevan 2016).

According to Jeevan (2016), recently containerization and global trade are adjoined twins indicating that one cannot live without the other. The ease with which containerization facilitates door to door delivery of cargo has facilitated the growth of global trade. 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 (Schoenherr 2009). In view of consistently growing expectations of shippers/consignees for faster, efficient and low cost services, the logistics services providers had no choice but innovate new concepts to improve their services while simultaneously endeavoring to lower costs. One of the objectives of this behavior of the service providers is to increase reliability of commitment towards the shipper/consignees. 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. Thus, it is a natural result 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.

Ethiopia is a landlocked country (LLC) in East Africa. As a result of this geographic disadvantage, a landlocked country has challenges with maritime transport access. To mix these challenges, a landlocked developing country (LLDC) is faced with a more problematic situation

emanating from both its geographic position and economic difficulties. Resultantly, an LLDC is often poorer than its coastal neighbors (UNCTAD 2003).Through containerization and globalization, dry ports have emerged. Dry ports are transshipment centers for cargo from seaports to inland destinations and vice versa. Globally, dry ports have been welcomed as an indispensable part of a modern multimodal transport logistics system. Notably, in Africa, most countries have embraced dry ports with customs procedures carried out at dry ports.

The Ethiopia-Djibouti corridor is the key conduit for trade. Since the independence of Eritrea in 1993, Ethiopia has been a land-locked country; a key factor shaping the external environment in which Ethiopia exports and imports. The Ethiopia-Djibouti Corridor linking Ethiopia to port of Djibouti is now the dominant gateway for the country with over 95% of Ethiopia's imports and exports using this route. Currently, very small volumes of Ethiopian traffic are using the other ports in the region; Port Sudan, Berbera and Mombasa. Recent investments in road and rail along the Djibouti corridor have the potential to significantly reduce transport costs and time and are a key element encouraging greater interest from investors in opportunities to develop manufacturing export capabilities in Ethiopia (UNDP-Ethiopia 2017).

According to World Bank (2017) study, Ethiopia is seeking to reduce its dependence on a single corridor; the immediate focus for logistics improvements is the corridor to Djibouti. The corridor now handles more than 90% of Ethiopia's trade; more than 11 million tons in 2015. For the Port itself traffic originating from, or destined to, Ethiopia accounts for more than 80% of all Port traffic (World Bank 2017). The government of Ethiopia has established the company Dry Port Service Enterprise (DPSE) for the development of dry ports in Ethiopia. Dry ports will improve the logistic network of Ethiopia. Ethiopia’s first dry port development Modjo Dry Port, has started on a small scale at the end of 2009(ESLSE 2015). Modjo dry port development is relieving the congested Djibouti port service. Dry port functions include distribution, consolidation, storage, customs services, and possibly equipment maintenance.

The main bottleneck on the logistics supply chain for containerized imports is currently the dry port at Modjo (World Bank 2017). The key issues are at the main nodes of the logistics supply chain for the Ethio- Djibouti corridor at the Port of Djibouti, the border crossing at Galafi, the dry ports, such as at Modjo and distribution/consolidation centers for agricultural products. There are challenges at each of these main nodes which lead to delays, uncertainties and increased logistics costs. For inbound container traffic, the constraints are most apparent at Modjo and are

manifest through long delays, significant uncertainties and unnecessary costs. Modjo regularly reaches its terminal capacity very quickly and stays crowded thereafter. According to the World Bank (2017), for Multimodal traffic - which currently accounts for more than 85% of containerized imports, 86% of the total transport time is spent at Modjo. There are significant operational constraints at the Modjo dry port including: insufficient cargo handling equipment ; lack of facilities for stuffing of export containers and unstuffing of import containers; lack of proper systems for the management of the facility, leading to delays in locating containers and necessitating increased moves of boxes; the port is operating without a proper TOS (Terminal Operating System) and gate system ; increased congestion around the facility due to poor traffic flow patterns and lack of parking spaces for trucks; Poor port security as evidenced by the absence of CCTV; and lack of facilities and readiness to handle inbound and outbound railway traffic when commercial operations start in early 2017. As mentioned above report (World Bank 2017), underinvestment in facilities and equipment, poor operational procedures and control, and lack of yard management system are responsible for the excess time for truck turnarounds and for 35%-40% of the container dwell time. For bulk imports the key weakness is the lack of storage and handling facilities in Ethiopia.

1.2. Statement of the Problem

The introduction of dry ports to transport networks facilitates trade, allows containers to be distributed between transport nodes and ensures optimal use of networks (Jeevan *et al.* 2018). Dry ports play a very important role in the African maritime industry because there are many landlocked countries in Africa and the establishment of dry ports is crucial to these regions. In African most of the dry ports not only execute the role of intermodal terminal but also balance the traffic between rail and road transportation, providing customs and border management services (Charuka 2014). Dry ports are an integral part of logistic centers and an element of the local, national and international transportation systems (Rodrigue *et al*. 2010). However, dry ports also face challenges in operations such as difficulty in meeting different stakeholders' objectives, having capacity constraints and a limited availability of transportation modes, and being located at less strategic zones which has a significant impact on its operations (Black *et al*. 2013; Ng *et al*.2013). These challenges reduce the benefit of developing dry ports for a national or regional freight transport system.

As addressed by World Bank (2017), most dry ports in Ethiopia have insufficient infrastructure and facilities, which has huge impacts on delivering efficient logistics services due to different

challenging factors. Additionally, the services provided by Ethiopian dry ports are not sufficient to fulfill customer needs (World Bank 2017; UNDP-Ethiopia 2017; IMF 2014).

According to World Bank Logistics Performance Index (Arvis *et al*. 2018), Ethiopia is at bottom quintile which shows that there is unfriendly logistics which is manifested with low level of customs clearance process efficiency, low quality of trade and transport-related infrastructure, difficulty of arranging competitive shipments in terms of price, low level of quality of logistics services, difficult to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time is rare. This requires further research on identifying challenges on Modjo dry port operations and how to improve its operations.

The International Monetary Fund Country Report (2014) understands that inefficient logistics not only impede Ethiopia's exports potential, they also increase the costs for consumers for imported goods. Ethiopia's poor logistics raise costs for local industries and hamper the country's competitiveness in the global market (IMF 2014). In order to reduce the transit time and cost, Ethiopian government has established dry ports in the country. Despite these initiatives, improvements in the logistics system did not show up. Modjo has been identified by the government as the key node for the emerging Ethiopian intermodal trade logistics system. As noted by IMF (2014), increased time for clearing imports worsening congestion at Djibouti port and Ethiopia's main dry port, i.e., Modjo dry port. This highlighted the problem to overall economy of the country by bringing about substantial operating costs for the dry port and importers. Dry ports like Modjo dry port face several challenges, which have a significant impact on their operations, often reducing the benefits from developing dry ports in national or regional freight transport systems (World Bank 2017). This needs further research to investigate the main obstacles for Modjo dry port operations.

In addition, World Bank (2017) study shows that 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, the inefficient logistics services at Modjo dry port lead to overall poor logistics performance of the country. Hence it is important to undertake research to identify those factors that lead to logistics inefficiencies and congestion at Modjo dry port. In this regard, this paper investigates the challenging factors of Modjo dry port operations in detail. Therefore, the very purpose of this research is to investigate the practices and challenges of Modjo dry port and thereby suggest mitigation strategies to fill the gaps in its operation.

1.3. Research Questions

The main reasons behind creation of dry ports in East Africa were to; reduce congestion at the main seaports, increase trade between the hinterland and the coast, as well as creating efficiency in services related to shipping.

In connection with the aim and objectives of this study, the following research questions are set to guide the study.

1. What are the practices of Modjo dry port operations?
2. How does Modjo dry port perform?
3. What are the success criteria for Modjo dry port operation success?
4. What are the key challenges of the operations of Modjo Dry Port operation?

1.4. Objective of the Study

1.4.1 General Objective

The general objective of this study is to explain and describe the practices and challenges of Modjo dry port operations.

1.4.2 Specific Objectives

The specific objectives of this research are:

1. To assess the practices of Modjo dry port operations
2. To determine the performance of Modjo dry port operations
3. To investigate the the success criteria for Modjo dry port operation success
4. To identify the challenges of Modjo dry port operations.

1.5. Significance of the Study

The outputs of this study will have paramount importance. First, it will help the researcher to get practical knowledge about the dry port operations and its challenges. Second, this research will have a great input for the port authority and the Ethiopian Shipping and Logistics Services Enterprise (ESLSE) to identify the key challenges in the operation of the Dry Ports and implementing corrective actions accordingly. Third, the study will contribute to the existing knowledge of dry port development and lastly it will serve as a source of information for further studies in the area. The policy makers, academicians, researchers, and potential service users who directly or indirectly involve in the Dry Port service would be benefited from this study if they make use of the outcome.

1.6. Scope of the Study

Modjo has been identified by the Government as the key node for the emerging Ethiopian intermodal trade logistics system. Most of medium and large manufacturing firms connected to international markets are located in the surrounding areas of Addis Ababa and the Modjo area. This corridor is the key link of Addis Ababa to Djibouti (seaport) using the Modjo dry port which accounts about 90% of inbound containers is processed in the dry port (World Bank 2017).

This study is delimited to assess the practices, challenges, and success factors of dry port operations in Modjo dry port and terminal. This research focused on the cross-sectional study at Modjo Dry port from the time 2012 to 2018 since multimodal system in Ethiopia has been fully implemented since 2012 (ESLSE 2015). The researcher used mixed research methodology. Both qualitative and quantitative data were collected concurrently.

1.7. Limitation of the Study

This research aims at assessing the key challenges of dry port operations in Ethiopia. The research was limited to identify the key challenges in the operation of the Modjo dry port rather than identifying the service reliability in the country and comparison with other country dry port operations challenges.

1.8. Definition of Terms

Dry port: According to the United Nations Conference on Trade and Development (UNCTAD 1991), a dry port is "a common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods (including containers) 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."

Landlocked country: landlocked country (LLC) as a state with no sea cost (UNCLOS, 1982). Therefore, an LLC is a country that is entirely enclosed by land, has no direct contact with the ocean at its borders and hence has no coastline.

The term TEU (Twenty foot equivalent units) is defined as a unit to standardize the number of containers that a port, vessel or mode of transport can handle, in a uniform manner (UNCTAD 2013).

The Terminal Operating System (TOS): is the core application used by container terminal for both for planning, monitor and execute the containers movement from truck to yard, yard to truck, truck to vessel and vessel to truck using heavy lifting equipment (called Container Handling Equipment—CHE) (Jemal *et al*.2017).

Tracking and tracing: The term tracking can be identified as the collecting and managing the information of the present location of a product(s) or delivery item(s) (Shamsuzzoha and Helo 2011).

Operational Definitions

Equipment - Crane, vehicles, reach stacker and others machines used in Modjo dry port terminal.

Gate - A point at an intermodal/dry port terminal where a clerk checks in and out all containers and trailer. All reservations and paperwork are checked at the gatehouse.

Performance - Expression relating the magnitude of a particular aspect of the object of consideration relative to specified requirements, objectives and/or targets.

1.9. Organization of the Study

The paper is organized into five chapters. Chapter one presents a brief summary of several sections of the proposal; essentially about the background of the study, the statement of the problem and the objectives of the research with procedures of the investigation that can give direction to the research. Chapter two discusses the “Literature review". In this chapter, the concepts and related theories are discussed systematically and help in investigation for the analysis of the data. Chapter three presents the "Methodology" and discusses the methods and techniques employed for the investigation. Chapter four seeks to address “Presentation and Data Analysis” focusing on detailed and logical presentation and analysis of the data. Finally, Chapter five presents “Conclusion and Recommendation" of the study. This chapter summarizes the data sequentially with the research questions to justify that they are properly set with the actual data and makes concluding remarks. In the last paragraph of this chapter, the study forwards some policy implications and suggests some area of further study as reflection.

CHAPTER TWO: RELATED LITERATURE REVIEW

2.1. Introduction

This chapter explains the theory of the dry port concept including definition, characteristics and their functions as well as how to classify the dry ports. Furthermore, the empirical evidences about dry ports operation challenges are discussed. The conceptual framework for which the research relies on has been designed as appropriate for this research. Gaps have been identified from different literatures in this chapter. And finally, the performance dimensions of dry ports are reviewed from different literatures.

2.2. Theoretical Literature Review

Given the growing significance of dry ports in the container transport network, the following sections discusses dry port definition, concept and roles of dry ports, functions and classification of dry ports.

2.2.1. Definition of dry port

The definition of a dry port has the same general concept but terminology may differ from region to region. Many researchers and academicians define dry port in different way but with similar concept.

Ng & Gujar (2009) define dry ports based on their core functions, multimodal transport connections, and the involvement of the private and public sectors in assisting stakeholders. They stated that a dry port in an inland setting with cargo-handling facilities allows various functions to be carried out to facilitate the interactions between different stakeholders along the supply chain. Roso *et al*. (2009) have provided a comprehensive definition of dry ports, that is: 'an inland intermodal terminal directly connected to seaports with high capacity transport means, where customers can leave and pick up their standardized units as if directly to seaports'. This term focuses on the function of a dry port as an extended gateway of a seaport as it imitates the function of a seaport existing inland.

From a logistic perspective, dry ports have been redefined as logistic nodes which improve cost efficiency, environmental performance and the logistic quality of hinterland connections (Woxenius & Bergqvist 2010; Cullinane & Wilmsmeier 2011). This definition indicates the aim of dry ports which focuses on efficiency and the excellence of the hinterland network. Additionally, UNESCAP (2012) defined dry ports as 'an inland logistic centre connected to one or more modes of transport for the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs controls and formalities'. Recently,

UNESCAP (2013a, 2013b) gave very broad definitions of the term dry port to refer to any inland location providing services similar to the ones offered by seaports, except for transshipment from/to sea-going ships.

Over the years, owing to the practice, functions and facilities used, dry ports and other terms for inland terminals are used interchangeably such as inland container depot, container freight station, inland container yard, and freight village (UNESCAP 2012). The different terms are used depending on the services offered and the role of the inland terminals (Anderson & Roso 2016).

In terms of the functions and facilities, and the role of the inland terminal, inland container depots (ICD), container freight stations (CFS), inland container yards and a freight village are used. Table 2.1 shows a distinction between the terms of inland terminals (see table 2.1), which is explained as follows.

Table 2.1: Difference between dry ports and other inland terminals

Intermodal terminals	Component of facilities								
	Container yard	Container freight station	Break bulk storage	Bonded storage	Non-bonded storage	Bulk storage	Repair facilities	International trade	Domestic trade
Inland container dept	√	√	-	√	√	-	√	√	√
Container freight station	-	√	-	√	√	-	-	-	-
Inland container yard	√	-	-	-	-	-	√	√	√
Freight village	√	√	√	√	√	-	√	√	√
Dry ports	√	√	√	√	√	√	√	√	√

Component of services								
Intermodal terminals	Container handling & storage	Container stuffing & destuffing	Break bulk store & handling	Bulk cargo handling & storage	Customs inspection & clearance	Freight forwar. & cargo consolidation	Financial services	Inventory management & material handling
Inland container dept	√	√	-	-	√	√	√	√
Container freight station	-	√	-	-	-	√	-	-
Inland container yard	√	-	-	-	-	-	-	-
Freight village	√	√	√	-	√	√	√	-
Dry ports	√	√	√	√	√	√	√	√

Source: Jeevan (2016).

An inland container depot (ICD) is a ‘A common user facility, other than a port or an airport, approved by a competent body, 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 admission, re-export, temporary storage for onward transit and outright export’ (Jeevan 2016).
An ICD provides facilities such as container yard, container freight station, bonded and non-bonded storage, customs and container repair facilities to the clients. An ICD offers services for handling containers and storage, break-bulk cargo handling and storage, and value adding services to their clients (UNESCAP 2009).

A container freight station (CFS) aggregates stakeholders’ consignments into containers and there is no site restriction in terms of location for container freight stations because this terminal can be located inside, outside or far away from seaports (Jeevan 2016). The facilities provided by the CFS are space for container freight and bonded and non-bonded storage. Services provided by this terminal are container stuffing and destuffing, freight forwarding and consolidation (UNESCAP 2009). The services offered by the CFS are space oriented with less focus on customs clearance and container management facilities.
An inland container yard provides storage, cleaning, and repair of empty containers. It is located near to the main seaport terminal or other logistic centers as a way to improve services and handling turnaround time (Jeevan 2016). Inland container yards provide basic facilities to the clients such as container yard space, container repair facilities, and to facilitate the clients in domestic and international trade (UNESCAP 2009). There are no customs clearance services and value adding activities in this type of terminal.
A freight village is an area of land dedicated to a number of transport and logistics facilities, activities and services, which are not just co-located but also coordinated to encourage maximum synergy and efficiency (Nam & Song 2011). Distinguishing features include an intermodal terminal and shared access to facilities and services.
In order to encourage intermodal transport for the handling of goods, a freight village must preferably be served by a multiplicity of transport modes such as road, rail, deep sea, inland waterway and air (Nam & Song 2011). A freight village provides facilities for container management, bonded and non-bonded storage, customs, and facilitates international and domestic trade as shows in Table 2.1. In terms of services, a freight village provides storage for

containerized and non-containerized cargo, freight forwarding, customs inspection and financial services (UNESCAP 2009).

Dry ports can provide all the services of a seaport except for the loading and unloading of cargo to and from seagoing ships. In comparison to container depots, dry ports can accommodate all types of cargo and not just containers (UNESCAP 2009). Simplification and flexibility does not occur in other intermodal terminals which only provide fundamental services with the basic facilities to the stakeholders (Ng & Gujar 2009). Furthermore, the services and facilities offered by dry ports are extensive compared to other intermodal terminals. This indicates that the roles of dry ports are various and broad, compared to other intermodal terminals.

It is argued that (Alam 2016) three main criteria are fundamental in the definition of dry ports:

A dry port is dominantly linked with the handling of containers, both maritime and domestic, but other intermodal activities, such as swap bodies also play a role. This involves an array of added value activities such as consolidation, deconsolidation, transloading or light manufacturing (containerization). Secondly, a dry port must be linked with a port terminal with a high capacity corridor. Although truck transport services can be used, rail or barge dedicated links are the best options (dedicated link). And finally, a dry port must permit economies of scale in inland distribution by being able to handle larger volumes at a lower unit cost. Otherwise, direct services from the maritime terminal are a better option (massification). A dedicated link and massification are mutually reinforcing.

The above discussion reveals that there is a consensus that a dry port is necessarily linked to the seaport with a dedicated high capacity means i.e. rail link to promote the intermodalism due to its obvious benefits and the efficient transfer of containers from seaport to the dry port and vice versa. It provides a variety of value added services to the customers like cargo consolidation and distribution, relabeling, packing, temporary storage of containers, custom clearance etc(Ng *et al*. 2009).

2.2.2. Concept and Roles of dry ports

According to FDT (2009), dry ports can be constructed from scratch or it may be developed from an existing inland terminal including some additional facilities that make the inland terminal as dry ports. An inland terminal theoretically counted to be as a dry port, the terminal should have direct connection to a seaport either by rail or by road; it should have a high capacity traffic mode (i.e. rail); and the terminal should offer the same types of facilities as seaport(FDT 2009; Crainic *et al.* 2014).

The dry port concept (Cullinane *et al*. 2012) goes beyond the conventional use of railway shuttles for connecting a seaport with its hinterland. Being strategically and consciously implemented jointly by several actors from the public and private sectors, it also goes beyond the common practice in the transport industry of "silos". In addition to the general benefits to the ecological environment and the quality of life of people living near main roads by shifting flows from road to rail, the dry port concept mainly offers seaports a possibility to secure a market in the hinterland, increasing the throughput without physical port expansion as well as better services to shippers and transport operators (Jeevan 2016).

Dry ports in developing economies differ from dry ports in developed systems. First, dry ports in developing countries like Ethiopia are likely to be situated close to production bases, or even inside economic zones, as illustrated in the case of India, Tanzania and South Africa (Nguyen & Notteboom 2016; Abdallah 2014). According to Ng & Cetin (2012), the least-cost model for dry port positioning, which is working well in advanced economies, might therefore be insufficient for a developing system. They argue that inland nodes in developing countries might be more "cluster-oriented" than "supply chain-oriented". Next to a location at the end node of an inland supply chain, dry ports in developing countries could also be situated in the middle of the chain for transloading between two transportation networks. Such type of dry port is easily seen at border locations. Inland terminals in close proximity of seaports are rarely found in developing systems as such kind of dry ports are mostly sea-driven.

The role of dry ports is considered by the part it plays in the container seaport system. The role of dry ports depends on demand from its clients, the aims of the investors, distance from seaports and its clients, and its capacity in terms of facilities and infrastructure (Roso *et al*. 2009; Beresford *et al*. 2012; Jeevan 2016; Aikaterini 2016). Reviewing the relevant literature, this research classifies the role of dry ports as an extended gateway for seaports, an integrator for intermodal transportation, a freight platform, and the promoting of the regional economy.

The role of dry ports as an extended gateway of container seaports refers to seaport functions, such as container storage, consolidation, customs clearance and logistic services including value adding services which are undertaken by dry ports because they have more space available to them than congested seaports (Veenstra *et al*. 2012a).

2.2.3. Functions and classification of dry ports

The functions of dry ports are clustered in terms of the services that they provide, depending on their capacity, location and transport modes connected. These characteristics are important in

planning the functions of dry ports in accordance with existing and forecasted market demands (FDT 2007; Bergqvist 2016).

According to Jeevan (2016), dry ports provide a range of services such as container handling and storage, container stripping and stuffing, break bulk cargo handling and storage, bulk cargo handling and storage, customs inspection and clearance, container light repairs, freight forwarding and cargo consolidation services, inventory management and materials handling, and banking/insurance/financial services. Based on these services, the function of dry ports can be categorized into four main functions including transport, logistic, value adding and administration (Aikaterini 2016; Bergqvist 2016).

The transport function requires the dry port to function as a transfer unit from one mode of transportation to another. Facilities to connect various modes of transportation and provide ample space to accommodate a high volume of containers are necessary so that transfer is a less time-consuming operation (Bergqvist 2016). Bergqvist (2016) explained that the ability of dry ports to perform a value adding function means their ability to add value to cargo in the containers during operations and via customized services. Capacity to provide a logistic service, labeling, re-packing, container weighing, fast adaptation to altering schedules and the capacity to provide new customized services are some of the examples of value-adding services for which stakeholders have high demand (Jeevan 2016).

Although the benefits gained from dry ports differ between the stakeholders, they are all concerned about modal shift or a combined transportation concept to reduce cost and smooth traffic flow. Shippers seek to reduce inland transportation costs to achieve a reduction in supply chain costs (Fremont & Franc 2010; Crainic *et al*. 2014).

According to Notteboom & Rodrigue (2011), dry ports can assume three main functions within the transport chain. The first function of dry ports are as satellite terminal which is located very near to the seaport facility to which it is connected and capable of providing services that are not available at the seaports such as warehousing, storage of empty containers and interface with the local markets; the second function of dry ports as major intermodal facilities is concerned with as load centers which depends on relevance railway corridor. The third function associated to dry ports is that of a transshipment facility that links together different freight distribution systems according to their multimodal (rail-to-rail) and intermodal (road-to-rail) nature, and associated to administrative functions for the international traffics and high value added logistics services (Crainic *et al*.2014; Jeevan 2016). These three main functions are not mutually exclusive and a dry port may serve more than one function at once.

Generally, 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 (Salglam *et al*. n,d ; Ng and Gujar 2009).

Dry ports are categorized based on the distance from seaports and their locations inland (Crainic *et al*. 2014; Beresford *et al.* 2012). Close, mid-range and distant are three types of dry port classified by their distance from seaports (see fig. 2.1 below).

Close dry ports are located less than 50 km from seaports, relatively near seaports. Therefore, the transport distances are fairly short; inbound and outbound cargo is mostly transported by road (Roso & Lumsden 2010; Crainic *et al*. 2014).

Midrange dry ports are located within a distance of 50 to 500km (Crainic *et al*. 2014) from the seaport and commonly covered by road and based on the presence of additional railway connections from the seaport to conventional inland intermodal terminals(dry ports). The functions of midrange dry port are consolidation and deconsolidation of cargos, customs inspection, modal shift, transloading cargos, reduce congestion, and value added services.

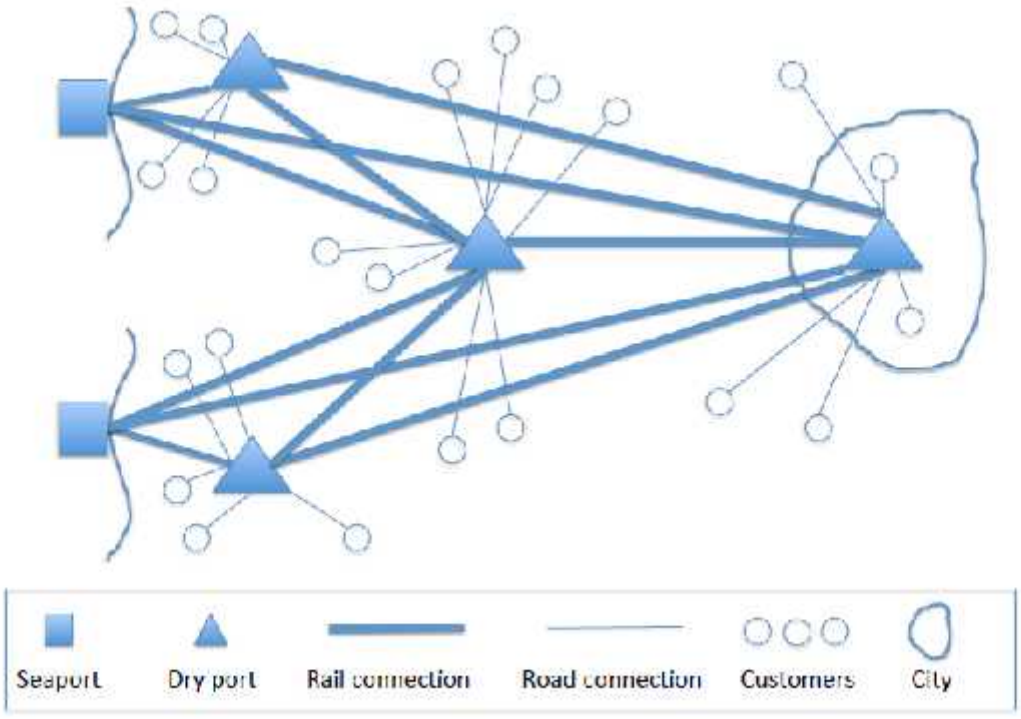


Fig. 2.1. A system with two seaports, two close dry ports, one midrange dry ports and one distant dry port.

Source: Crainic *et a*l. (2014).

The distant dry port configuration is the most common one. According to Crainic *et al* (2014), this type of dry port is located at a long distance from the seaport, higher than 500km. This type of dry port is associated to the maximum economies of scale for the railway operators and provides high capacity direct connections for a wide geographical area typically interesting one or more cities (Aikaterini 2016). This category of dry port helps for the function of modal shift towards rail transportation, reducing the port congestion, providing the shippers with a high quality service at low costs, facilitates distribution of cargos across the region, consolidation for export cargo and involves in high value- added services(Nguye & Notteboom 2016; Crainic *et al.*2014; Jeevan 2016).

Table 2.2. Dry port categories and their functions

	Close Dry port	Mid-range dry port	Distant dry port
Development reason	Seaport constraints	Hinterland access	Economic zone facilitation
Position In hinterland supply chain	Start point	Middle point	End point
Activities	Transit	Rail link between seaport and market	Rail link between seaport and market
Infrastructure	- Reduction of road maintenance costs - Rail infrastructure development	- Reduction of road maintenance costs - Rail infrastructure development	- Reduction of road maintenance costs - Rail infrastructure development
Logistics	- Reduction of waiting time for transporter operators - Increased inland access and city distribution - Intermodality	- Reduction of waiting time for transporter operators - Increased inland access and city distribution - Decrease of costs	- Decrease of transport costs - Coordination with rail traffic. - Increased inland access - Cost reduction
Role	- Handling Cargo -Customs Clearance - Low value added Services	-Transmodal -Transloading cargos - Reduce congestion - Modal shift - Consolidation & deconsolidation - Value added services	- Distribution - Consolidation for export cargo - Reduce congestion - Modal shift - High value added services

Market derived

Direction of hinterland access

Sources: Own compilation based on Nguyen and Notteboom (2016) & FDT (2007)

2.3. Empirical Literature Review

Empirical review refers to literatures or previous studies that relate or argue positively with the study hypothesis and variables. Various researchers have put forward issues on dry port functions and operational challenges in line with the research objectives.

Many countries have developed dry ports to facilitate trade and cargo flows between seaports and final destinations. Based on the experiences of dry port development in Europe, Africa, America, and Asia, this section reveals the challenges faced by these dry ports and the how dry ports perform. In the Scandinavian region, dry ports have faced challenges such as the location of dry ports not being in the East-West corridor, a lack of skilled laborers, low capacity of rail links and limited length of rail tracks (Visser *et al*. 2009).

2.3.1 Challenging factors on dry port operations

The influencing factors of dry port operations discussed in this section are derived from existing literature concerning the worldwide experience of dry port operations. The following sections discuss these factors which affect dry port operations.

2.3.1.1. Government Policy

Policy interventions are necessary to ensure least-cost intermodal solutions to container and cargo haulage between trade sources and seaports. Planning of terminal development and the regulation of road vehicle dimensions and weights should focus on the optimum use of roads for local delivery and rail for line-haul transport of containers and cargo (UNESCAP 2018).

The study in Australia, Enfield Terminal (Roso 2009), land use, infrastructure, environmental and institutional impediments is identified as the most common factor for the dry port operations. Accordingly, a dry port must fit into a complex system where the necessary supporting infrastructure (roads, railways) is in place, maintenance is assured, and the legislative, regulatory, and institutional systems are properly designed to optimize the involvement of both the public and the private sector (Jeevan 2016).

In the case of Uiwang ICD, near Seoul, Republic of Korea, and in Bangladesh the governments enter into build-operate-transfer-type contracts with private developers (UNESCAP 2017), in which their contribution was limited to the provision of land and/or basic road and rail accesses to terminals.

There is some case in Brazil where dry port development is unsuccessful because of lack or minimum support from the government (Padilha 2012). Moreover, also three dry ports in China (Kunming Dry Port, Xi'an Dry Port, and Shijiazhuang Dry Port) experienced problems such as

the lack of coordination in the top level of institutional organization and hence government support, the regulation and policy factors are more important than another factors in Kandangan dry port in Indonesia (Rahmanto 2016).

For example, a dry port in Egypt was unable to provide sufficient infrastructure, maintenance, and systematic legislative and institutional processes to optimize their involvement in the seaport system (Jeevan 2016). Therefore, governments in African countries, especially in Nigeria, South Africa and Tanzania, have initiated a strategy of upgrading the logistics infrastructure to improve dry port operations, aimed at enhancing the connectivity to seaports and reducing container dwelling time from 15 days to an international standard of 7 days (Ahamed 2010). This strategy increases the connectivity of seaports to their clients, smoothes cross border trade, and allows investment from private sectors to enhance trade competitiveness in Africa.

2.3.1.2. Technological Advancement

Information and communication technologies have become a crucial element in logistics. It helps to improve the efficiency of transportation and to create door-to-door and just-in-time deliveries by improvements in inventory control, warehouse management, customs clearing and ordering.

Information technology is one of the key means for reaching the efficiency in intermodal transport terminals, especially at large ones, as ICT systems enable easier and advanced coordination and management of the complex transport operations and supports the operations of intermodal terminal. The main aim of the installed terminal management system is to improve the quality and efficiency of terminal operators. For example, the computer programme TERMES is being used in the Dry Port of Madrid (FDT 2009) and this program enables the use of the wireless network in order to manage the traffic without documentation.

For increasing operational efficiency, modernized facilities should be invested in dry ports (Hanaoka & Regmi 2011). For example, the implementation of a Port Community System (PCS) in Valencia dry port in Spain integrated different stakeholders into the seaport operations and maritime transport by giving support, managing information exchange and administrative procedures in the dry port operations (Dotoli *et al*. 2010). In addition, modernized facilities, implemented information and communication technology for container tracking facilitated the freight task between Delhi-Mumbai- Kolkatta and have improved container volume from 1.5 million TEUs in 2000 to 2.2 million TEUs in 2010 at Dadri ICD in India (UNESCAP 2010).

Stakeholders need IT integration such as EDI (Electronic Data Interchange) or single window

/ one stop shop concept to improve their cooperation and improved Kandangan Dry Port to have fast and reliable services (Rahmanto 2016) and should be equipped with high-end modern superstructure technology in order to increase the service.

2.3.1.3. Socio- cultural influence

Managerial factor plays an important part in the dry port development and implementation. To get a good performance, dry port managers need a good planning, efficient and effective in marketing and also good human resources are needed (Ramhmanto 2016; Padilha & Ng 2012). The composition of the organizational structure is very influential on the performance of the Kandangan and Malaysian dry ports, from the owners of capital structure, the structure of the board of directors until structure under the Board of Directors (Rahmanto 2016; Jeevan 2015). Accountants for managing development resources, railway experts for track layouts, customs and shipping experts to establish clearance procedures, engineers to design the physical attributes of the facility and layout planners in Kandangan dry port operations are all needed (Rahmanto 2016). Dry ports in developing countries, for example in Nigeria, have more chance of facing a lack of trained/experienced human resources and a poor information system support for inland transportation (Garnwa *et al*. 2009).

The reliable workers with high skills and knowledge, with a good attitude / ethics and train them to become high-level people, which can speed up the development and operation of Kandangan dry port (Rahmanto 2016). The availability of professional personnel at the dry port is considered as a significant factor in determining the operational performance of Modjo dry port (Abdurezak 2016).

2.3.1.4. Economic Factor

The rapid development in the shipping and maritime industry, providing value-added services greatly affect the implementation of the dry port, such as container freight station (CFS), container maintenance, stuffing and stripping and also customs clearance (Crainic *et al*. 2014; Roso *et al*.2009). Value-added services are important, especially if the dry port acts as a consolidation and distribution center (The South East of Scotland Transport Partnership 2012; Rahmanto 2016). Customers will be able to feel the economic benefits if the dry port could successfully carry out value-added services.

Available modes of transportation are not only used for connections from and to the dry port, but can also be used to support the hinterland to get the potential market in distant areas.

Furthermore, to reduce traffic congestion due to the increased flow of containers and to reduce transport costs, the ports in Europe combine ground transportation and waterway transportation (Fremont & Franc 2010). In addition to the connections using a railway, transportation mode can also reduce logistics costs due to the increased volume of the container (Lumsden 2009; Ramhanto 2016). With a combination of modes of transport can reduce the number of congestion at ports in northern Europe and also make the growth of container traffic.

2.3.1.5. Capacity

Customers are normally willing to utilize the services provided by dry ports if good transport infrastructure and high standard and sophisticated equipment can be sufficiently provided to handle their valuable containers safely (Ramhanto 2016; UNESCAP 2015). Safe accessibility to and from a dry port is important in ensuring smooth operations in the dry port to gain confidence of the customers in its operation.

Infrastructure and facilities such as adequate highways and wide roads and sufficient equipment are the major concern for Malaysian dry port operations in terms of capacity factor (Jeevan 2015). For example, in Port Klang the existing narrow width of road lane unstable to cater freight transportation creates significant overloading pressure and defects the road condition. The imperfection of the road condition deteriorates the effectiveness of hinterland connectivity between hinterland and seaports in Malaysia (Jeevan 2015).

Sufficient equipment provided by dry ports is essential for effective operation of dry ports. Equipments such as tractor-trailers, lift trucks, rubber-tired gantries and rail-mounted gantries are basic facilities required for dry port operations (UNESCAP 2010).

Availability of space for current and future operations is also a main issue for Malaysian dry port operations. Dry ports in Malaysia and in India (Jeevan 2015; UNESCAP 2010) have restriction on land space for empty and laden container storage.

Space capacity at dry ports can assist in solving space restrictions at seaports so as to reduce seaport congestion, promote economic development and enhance logistic integration at the seaport (Andersson & Roso 2016).

2.3.1.6. Hinterland conditions

The location of dry ports to seaports and industrial zones affects how they can support the capacity of seaports to accommodate container traffic and help shippers reduce their transportation costs (Jeevan 2015; Bergqvist *et al*. 2010). For example, in Sweden dry ports are

located adjacent to industrial development zones to assist the shipper in maximizing their profits by reducing the cost of transportation from the hinterland to seaports (Jeevan 2015).

According to case studies in India,China and South Africa and some other developing countries usually dry port location is in the middle of the port facility and the market as cross-border transportation or locations near a production base that is at the end supply chain (Nguyen & Notteboom 2016a; Rahmanto 2016). Therefore, the selection of the right location in the development of the dry port would be very helpful in improving the quality of services for the supply chain as it can reduce transportation time, transportation costs, pollution, and congestion (Rahmanto 2016; Jeevan 2015).

Insufficient transportation infrastructure blocks dry ports in connecting with manufacturers or seaports, and affects the continuity of containers to the dry port. This indicates that the transportation networks of a dry port can determine whether it is in a good strategic location or not. For example, Amal dry port in Sweden recorded a low volume of container throughput from 2005, with only 2000 containers coming through per year due to a limitation in connectivity (Roso *et al*. 2009). This was due to poor transportation links in facilitating container freight to and from the dry port and the seaports (Woxenius & Bergqvist 2010).

The availability of the freight market from the production zone to seaports via dry ports importantly supports dry ports' operations. In Brazil, low freight flow from the Santos seaport through Dry Port Sao Paulo resulted in the de-concentration of freight and decreased the operational efficiency when compared to other dry ports (Padilha & Ng 2012).

Infrastructure deficiencies currently result insubstantial time delays and high costs for goods moving both into and out of Modjo dry port (Abdurezak 2016). Relatively poor conditions in land transport and maritime transport infrastructure not only increase transportation costs and transit times for goods destined for export, but also increases the costs and length of time for importing needed production inputs. In addition to increasing transportation costs, poorly maintained road networks can also disrupt delivery schedules and can lead to poor performance of ports (Abdurezak 2016).

Rail infrastructure such as rail platforms, rail sidings and sufficient and well-maintained railway tracks are necessary for effective dry port operations. According to Andersson & Roso (2016), the inclusion of a well developed rail and road infrastructure with value adding services at dry ports greatly improved their performance and attracted users.

2.3.1.7. Information Accuracy

Challenges that the dry port in Valencia, Spain, faced were a lack of standardized procedures between them and their stakeholders, a misperception in the roles of the different stakeholders, inconsistencies in information, and inadequate planning for dry port operations (Jeevan 2016).

As shown in Jeevan (2015), an information system for collaboration and coordination is the most highly influential factor for Malaysian dry ports operations. Information sharing among dry ports and also with container seaports can increase the performance of supply chain members in terms of efficiency and help to increase the schedule integrity at seaports. However, this has not been done well in the Malaysian dry port network (Yang *et al*. 2013; Jeevan 2015; Jeevan 2016). Additionally, coordination among stakeholders, especially in risk sharing, asset utilization, accurate forecasting and effective decision making are crucial for dry port operations in Malaysia (Zainuddin *et al*. 2018).

2.3.1.8. Connectivity

According to UNESCAP (2018), the concept of seamless connectivity conjures up the vision of an integrated transport system that is based on the operationalization of international intermodal transport corridors and that allows goods and people to travel efficiently across modes and national borders.

The frequent train services with double tracks, shorter transit times, and the loading time onto wagons were important parameters which provided a strategic advantage to the Lat Krabang inland container depot (UNESCAP 2014; Hanaoka & Regmi 2011). Besides the connectivity and time advantage, dry ports can survive competition by providing differentiated services from other inland terminals. This strategy may attract more clients to dry ports and eliminate competition with other inland terminals (UNESCAP 2014).

There should be a balance in modal split from transportation mode(rail to road and vice versa) during container distribution and pick up, compared to other modes. If the is imbalance of modal split, there will be poor linkage and leads to inefficiencies. A good example of this is the domination of road freight transportation against rail freight transportation in City Deep dry port, South Africa (Arvis *et al*. 2010; Charuka 2014; Kunaka 2013). This dry port faced an imbalanced proportion of modal split because of an inadequate and unreliable capacity in the railway system, frequent delays of trains to the dry port as a result of container checking and splitting and unpredictable turnaround times for train services.

The challenges of Indian dry ports include insufficient interactions between the stakeholders which provoke extra costs, overlaps in the schedules which can create bottlenecks in infrastructure planning. Hence, the strategies of information sharing between stakeholders, integrated facility sharing and coordination of facility development have been proposed to assist Indian dry ports in reducing unnecessary costs and generating a smooth flow in the daily schedule (Sohal & Rahman 2013).

2.4. Performance of Dry port operations

According to the study by Werikhe (2016), efficient logistics systems for transportation of goods are vital keystones in the continuous economic development of any region. Efficient logistics systems become necessary as an economy expands, becomes more diversified and globalized. For land locked countries that normally suffer less connectivity with the rest of the world, innovations must be generated and applied to increase speed and reduce costs within the supply chain. One of the best innovations for this connectivity is creation of dry ports.

The report (Arvis *et al*, 2018) contains an analysis of the logistics performance of 160 countries based on six indicators, namely, the efficiency of customs and border management clearance, the quality of trade and transport-related infrastructure, the ease of arranging international shipments, the competence and quality of logistics services, the ability to track and trace consignments, and the frequency with which shipments reach consignees within the scheduled or expected delivery time.

The results of the literature survey (Martin *et al*. 2016) indicated that clear and specific objectives and consistency in measuring are the key factors to success. They also stated the most widely used performance measurement was financial performance, usually related to strategic level of decisions such as rate of return on investment, sales, profit, etc. The non-financial most common measures were labor efficiency, capacity utilization, forecasting accuracy, cycle times, production flexibility, value added, service variety and perceived quality. They clearly put the dry port performance dimension as operation performance, financial performance, service quality, environment impact and safety. For the purpose of this study, operation performance and service quality accompanied by six indicators that are mentioned in World Bank's Logistics Performance Index (LPI 2018) are selected as Modjo dry port operation performance dimension.

The World Bank's Logistics Performance Index (LPI 2018) ranks countries on the categories of time, cost and reliability of import and export supply chains, infrastructure quality, performance of core services, and the friendliness of trade clearance procedures. The results showed that time

and cost for both importing and exporting are far higher for landlocked countries than their coastal neighbors. Moreover, this difference is amplified in poorer parts of the world. For example, European coastal countries achieved an LPI score of 3.68 compared with 3.58 for landlocked countries, whereas African coastal countries scored 2.46 against 2.39 for landlocked countries (World Bank, 2010). Moreover, Ethiopia's logistics sector appears to be considerably behind those of competitor countries in Asia as well as certain other land-locked countries in Africa, such as Uganda. In terms of actual costs it has been calculated that for a twenty foot container of garment exports to Germany, Ethiopia's logistics costs are 247% higher than those of Vietnam and 72% higher than those of Bangladesh (World Bank 2017).

Economy	Mean LPI Rank	Mean LPI Score	Customs		Infrastructure		International shipment		Logistics quality		Tracking& Tracing		Timeliness	
			Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Germany	1	4.19	1	4.09	3	4.38	4	3.83	1	4.26	1	4.22	1	4.40
Netherlands	2	4.07	3	3.97	2	4.23	6	3.76	2	4.12	7	4.08	6	4.30
Sweden	3	4.07	4	3.95	3	4.22	2	3.88	5	4.04	11	4.02	4	4.32
South Africa	29	3.51	29	3.29	28	3.39	26	3.53	33	3.42	30	3.56	31	3.85
Botswana	58	2.96	45	2.96	59	2.85	73	2.82	75	2.71	77	2.81	48	3.60
Egypt	60	2.95	65	2.67	55	2.91	59	2.94	55	2.95	64	2.91	67	3.30
Kenya	63	2.93	67	2.66	67	2.68	70	2.86	60	2.88	53	3.11	61	3.35
Rwanda	65	2.90	64	2.68	76	2.60	47	3.14	69	2.77	73	2.83	64	3.31
Tanzania	67	2.88	69	2.66	63	2.72	66	2.89	65	2.80	69	2.85	62	3.34
Uganda	72	2.79	53	2.78	96	2.45	74	2.82	78	2.70	86	2.69	68	3.27
Djibouti	126	2.43	124	2.29	90	2.47	141	2.33	154	2.14	121	2.46	115	2.90
Sudan	130	2.40	148	2.13	139	2.14	121	2.49	116	2.41	122	2.45	134	2.73
Ethiopia	131	2.40	79	2.54	140	2.13	112	2.54	119	2.39	145	2.24	158	2.49
Burundi	154	2.22	163	1.90	157	2.00	147	2.28	127	2.33	147	2.23	154	2.55

Table 2.3. Cumulative Distribution of LPI scores (2012, 2014, 2016, 2018) -Aggregate.

Source: Own compiled from Logistics Performance Index (2018).

2.5 Conceptual Framework

The research was guided by a Conceptual Framework that is indicated by the independent and dependent variables. As seen in the following conceptual framework diagram, there are five major categories of factors that influence dry port operations include hinterland condition, services features of dry ports, dry ports' capacity, government policy and information systems; each of which are discussed as well as their respective sub-factors being identified (Jeevan 2015).

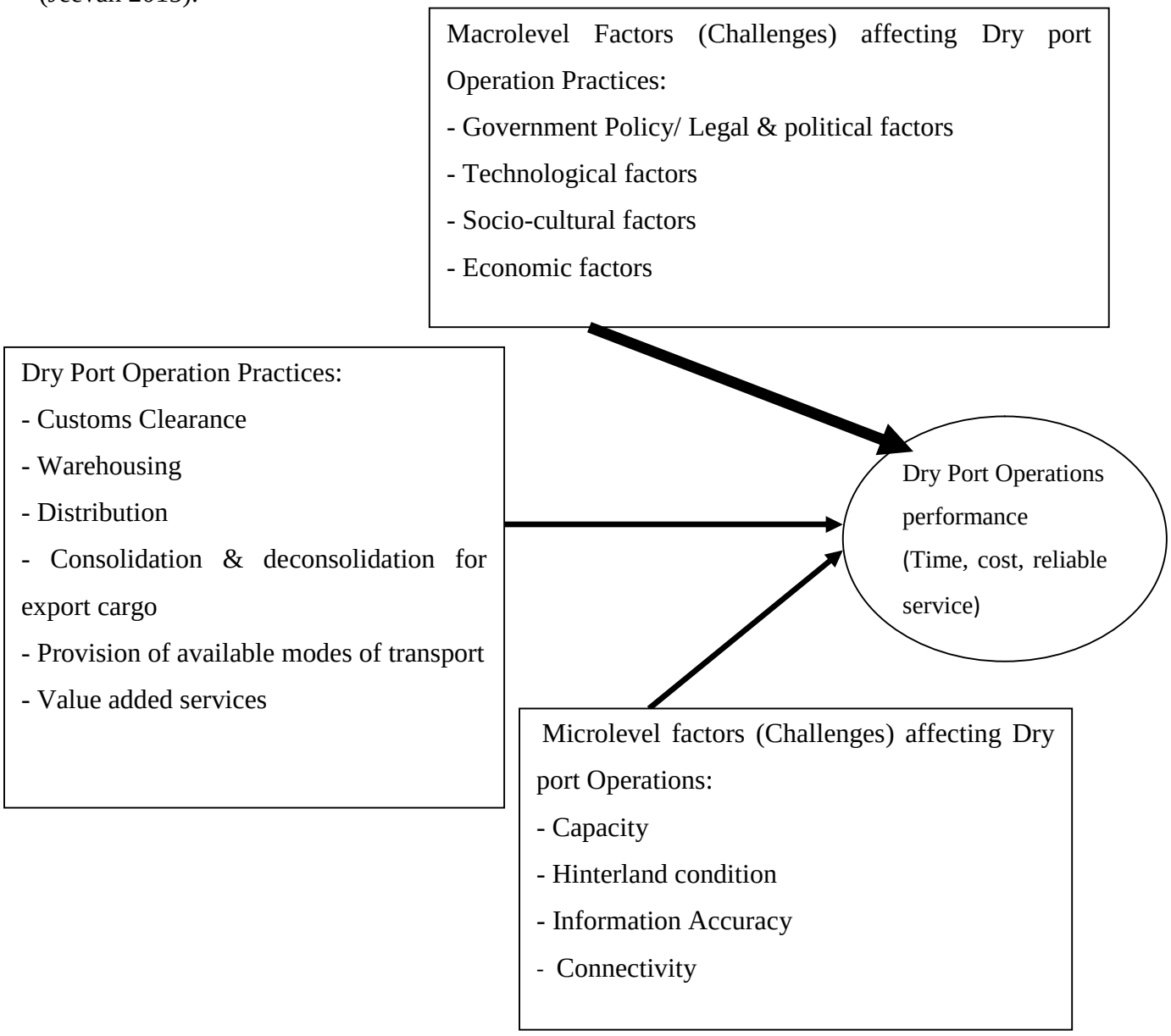


Fig.2.2: Conceptual Framework.

Source: Own compilation from different literatures.

Academic research on dry ports has grown exponentially in recent year. Existing literature shows that (Jevan 2016; Rahmanto 2016; Black *et al*. 2013) dry ports should be developed with adequate space so as to allow efficient, reliable and economical movement of containers, in particular when they are developed to support seaport operations but it is short of identifying the main challenging factors that affect the dry port operations in landlocked countries, like Ethiopia. Another study has been made on the determinants of Modjo dry port performance (Abdurezak 2016) but fails to address the challenging factors affecting the dry port operations success. Furthermore, most of the studies of dry port focus on the location of dry port (Monios *et al*. 2016; Jeevan *et al*. 2017; Nguyen and Notteboom 2017), but there are little researches on operational challenges on dry ports and their performance in developing countries in general and particularly in Ethiopia. In this paper, the researcher bridges this gap; the researcher presents the practices and challenges of Modjo dry port operations.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Description of the Study Area

This study was conducted at Modjo dry port. Modjo dry port is located in *Misraq Shewa Zone of the Oromia Region*, at a distance of 38 miles (75km) Southeast of Addis Ababa and 850km (528 miles) from Djibouti (the main gateway to sea for Ethiopia). The Modjo dry port covers more than 60 hectares of land, from which 27.84 hectares have been developed for container yards (see Annex G). Currently, the port has the capacity to hold 14,500 containers and handles 95% of Ethiopia's trade (UNDP/Ethiopia 2017).The study was engaged in identifying key operations challenges in the Modjo dry port. To identify those challenges data were collected from stakeholders of dry port at different level i.e. importers/exporters, customs clearing agents, custom offices, and Modjo dry port employees and top level managements. Hence the study area is operators (stakeholders) of Modjo dry port.

3.2. Research Approach

In this research study both qualitative and quantitative research methods were used. Qualitative data sources included observation and participation observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions. On the other hand, quantitative research method was employed to quantify all the data that were collected based on both qualitatively and quantitatively. Data for the study was collected through face-to-face interviews at Modjo dry port and well-structured open ended and closed questionnaires were prepared in order to assess the challenges of dry port operations. Prior the field study an extensive literature review had been carried out; in addition, a number of secondary sources had been used, such as reports and internal documents.

3.3. Research Design

Generally, research design means a structure to plan and execute a particular research. In this study the researcher applied both explanatory and descriptive research in order to identify the boundaries of the environment in which the practices and challenges of dry port operations that are likely to reside and to identify the salient factors or variables that might be found there and be of relevance to the research. And the controlling method of the research design is observational design which was prospective in an analysis. In the analysis part the researcher used descriptive (mean, standard deviation) and inferential statistics (correlation and regression). The correlation showed the association among the variables in the study and was done by SPSS software ver. 24.

3.4. Population and Sample

The population for the current study was the stakeholders of Modjo dry port and terminals (port authorities/ Dry port employees, importers/exporters, Customs office employees and customs clearing agents). Customs clearing agents consists of informal operators and represent about 75% of the services providers and focus on individual consignments in which they provide cheaper services based on personal contacts (UNDP Ethiopia 2017). The researcher made a sample frame (list) of population.

In order to get good quality data and manage the sample of population, the researcher selected the population that was served in three months (from December 1, 2018 to February 28, 2019). This period was selected because the proposal had been prepared at this time and it is also peak time for imports/exports (ESLSE, 2015). Modjo Dry port employees were selected based on their daily activities, i.e., those that had been doing in operational activities having with minimum diploma educational level (72 employees). Importers were selected based on importing goods with red risk category, served two and above in Modjo dry port from 1st of December 2018 to February 2019 and those with diploma and above educational level(70 importers as got from Customs office). Customs clearing agents were also selected on the basis of their number of declarations (minimum five declarations) that they declared in the month of January, 2019 (79 customs clearing agents from Modjo customs office data) and the Customs office employees at Modjo dry port branch who had been assigned as goods inspection, examination and assessing the values for taxes (75 employees with minimum diploma educational level) only. Setting the minimum educational level to be diploma did not have any intention rather to collect quality data.

It was difficult to reach at the importers/exports to fill out the questionnaires. The researcher first asked data from Modjo customs office by their tax identification number (TIN) and got the address of both the importers and customs clearing agents. Then after, the researcher went to the importers office, calling on telephone and made arrangements. The good opportunity was that the researcher is also employee of customs clearing agent company.

The study, therefore, took person involved in the operations of container terminal in the dry port of Modjo as well as stakeholders who make use of the facility in Modjo dry port operations.

The research first make a stratum of Modjo dry port operators as Modjo dry port authority/Dry port employees whose daily activity is related to terminal operations, importers/exporters, Customs office employees and customs clearing agents. Then use non-probability sampling technique called convenience sampling. In convenience sampling the researcher selected

participants because they were willing and available to be studied and finally simple random sampling technique was implemented.

The number of these people when put together is 296 (Customs office Modjo dry port branch and Dry port terminal 2019). Therefore the study targeted 296 people.

For face-to-face interview, the sample size was the key informants like managers, deputy managers and team leaders from each stakeholder who involved in the Modjo dry port operations i.e., the researcher interviewed only the key informants (those that were always in touch with the daily activities of the dry port). The sample size is determined by Solvin's formula (Yamane 1967).

$$n = \frac{N}{1 + N(e)2}$$

Where, 'n' is sample size, ' N' is target population and 'e' is significance level of 0.05.

$$n = \frac{296}{1 + 296(0.05)2}$$

$$n = 170$$

Therefore, for the purpose of this study the sample size is 170. Based on this sample size, the researcher assigned a proportion (170/296≈0.57) to each stratum. Then, each stratum targeted population had a multiple of 0.57 with its population size.

Table 3.1: Sample Size

Target population Type	Population size (N)	Proportion	Sample size (n)
Modjo Dry port Staff (ESLSE)	72	0.57	(72*0.57)= 41
Shipper(Import/Export)	70	0.57	(70*0.57)= 41
Customs Clearing Agent	79	0.57	(79*0.57)= 45
Customs Employees	75	0.57	(75*0.57)= 43
Total	296	170/296=.57	170

Source: own compilation from human resource at Modjo dry port terminal and Customs office (2019).

3.5. Data Sources and Types

The researcher used primary and secondary data sources. This was done in order to collect adequate and relevant data to address the research objectives of this study.

The researcher dealt with the analysis of evidences such as historical records and documents. It means gathering data from library materials which includes textbooks, both published and

unpublished academic documents such as journals, conference proceedings, dissertations and theses. The other sources of data were field visit, research which composes a number of research methods to solve the existing research problems such as questionnaire, interview and observation. This research had adopted the method of interview; the researcher made a selection of the participants for an interview. However, this encouraged the researcher to organize the interview by evaluating the facts that could emerge from it in order to reach the best decision.

Interview method is one of the ways to obtain primary data. Primary data were understood as data which were collected during the conduction of a particular research. Therefore, in order to obtain primary information, face-to-face interviews were employed. The researcher, with prepared written questions to the interviewees, used the semi-structured and structured interview. In this context, the structured interview protocols asked specific objective questions in an arranged order. In addition, the questions were well structured, planned and organized in line with the objective of the study. This process encouraged the participants to respond to the questions as accurately as possible.

3.6. Data Collection Procedures

In data collection procedurethe researcher had letter of support from AAU, asked the port authority to participate in the study, select the participants for the study, ask the participants consent to participate in the study, prepare or adapt questionnaire and interview guide and collect data through questionnaire and interview.

For the purposes of this research, in depth interviews and questionnaire were used. In depth interviews were personal and semi-structured interviews, whose aim was to identify participant's feelings, and opinions regarding to functions and challenges of Modjo dry port operations. The main advantage of personal interviews was that they involved personal and direct contact between interviewers and interviewees, as well as eliminate non-response rates, but interviewers needed to have developed the necessary skills to successfully carry an interview. In order to reach more participants, the researcher used questionnaire as additional means of primary data collection.

As far as data collection tools were concerned, the conduction of the research involved the use of structured questionnaire, which was used as an interview guide for the researcher. Some certain questions were prepared, so as for the researcher to guide the interview towards the satisfaction of research objectives, but additional questions were made encountered during the interviews. Structured questionnaire was also implemented in primary data collection.

The questionnaire was designed and collected through 5-point Likert scale where 1 indicating strongly disagrees and 5 indicating strongly agree. For the purpose of simplicity, the researcher translated the English version questionnaires to Amharic version. Hence, the data were collected by distributing the Amharic version questionnaires and it was self administered.

3.7. Ethical Considerations

The current study is subject to certain ethical issues. As the researcher interacts with different stakeholders, all participants were required to give their consent in written form. Report their written consent regarding their participation in the research, through a signed consent and briefing letter. At the same time, sample members were asked to sign a debriefing and withdrawal letter. The aim of both letters was to reassure participants that their participation in the research was voluntary and that they were free to withdraw from it at any point and for any reason. In fact, the research would not harm the participants either psychologically or financially. All the information that was collected would be kept confidential.

3.8. Data Analysis Techniques

For quantitative data the researcher used standard statistical software called SPSS for data entering and analyses .The data analyses would have both descriptive and inferential approach to analyze the data. Descriptive analysis used measurement of central tendency such as mean, measure of dispersion such as, standard deviation and variance. Inferential analysis used correlation. Results were reported using tables. For the qualitative analysis, the researcher used thematic analysis.

3.9. Reliability and Validity Test

3.9.1. Reliability Test

For assessing the credibility of the questionnaires designed for this study, researcher conducted a pilot testing before the delivery of questionnaires to respondents.

In this study, Cronbach's alpha reliability is taken as a measure of internal consistency of the mean of the items at the time of administration of the questionnaire. Cronbach's alpha is a reliability coefficient that indicates how well the items in a set are positively related to one another. The Cronbach alpha reliability coefficient ranges from 0 to 1 (George and Mallery 2016), hence the closer the alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale. According to George and Mallery (2016), a Cronbach alpha coefficient of 0.70 or more is considered ideal.

The instruments (variables) had a 5-point Likert-scale and reliability check of the instruments revealed a Cronbach alpha of 0.82 as an aggregate, which shows that the measure was reliable and acceptable. In this research, the reliability test has been conducted by using 140 participants through questionnaire to ensure the questionnaire used in this study is valid and reliable. After collecting the data from the main study, the reliability and validity test were constructed on the result by utilizing the Statistical Package for Social Sciences (SPSS) Version 24.0. Table 4.2 shows the entire related Cronbach's alpha (α) for independent and dependent variables.

Table 3.2: Reliability Results by Variables /Scaled Reliability

Variables	No. of items	Cronbach's Alpha(α)	Status
Dependent variable			
Dry port operation Success criteria	6	.72	Accepted
Independent variables			
1. Government policy(political& legal)	7	.85	Good
2. Technological advancement	5	.82	Good
3. Socio-cultural influence	7	.72	Accepted
4. Economic	6	.86	Good
5. Capacity	11	.76	Accepted
6. Hinterland condition	7	.74	Accepted
7. Information accuracy	7	.73	Accepted
8. Connectivity	10	.85	Good
Total	66		
Aggregate reliability	66	.82	Good

Source: Questionnaire Survey, 2019

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient to 1.0 shows greater internal consistency of the items in the scale. Georg and Mallery (2016) provide the following rules of thumb:" ->.9 - Excellent, ->.8 - Good, ->.7- Acceptable, ->.6- Questionable, ->.5-Poor and -<.5- Unacceptable.

As it can be seen from the above table (Table 3.2), constructs such as government policy, technological advancement and connectivity have good reliability value; and the remaining such as socio-cultural influence, capacity, hinterland condition and information accuracy have acceptable reliability value. The overall reliability value is acceptable.

3.9.2. Validity

Validity refers to the extent to which the research data and methods used obtain considered precise, correct and accurate findings establishing the correct operational measures for the studied concepts. The content validity of the instrument for the present study ensured as the challenging factors of Modjo dry port operations and items would be identified from the literature and from similar thesis works. Pilot tests conducted with a small group were also feedback on questions asked and received to redefine it.

The researcher ensures construct validity in this study by re-examining data entered in the analytical software (SPSS) before perform any analysis, this was hand in hand with repetition of analysis procedures to ensure that the answer(s) is correct.

CHAPTER 4: RESULTS, DISCUSSIONS AND INTERPRETATIONS

4.1 Introduction

This chapter presents the analysis of followed by a discussion of the research findings. The findings are related to the research questions which guides the study. Data were analyzed to identify and describe the practices of Modjo dry port; the key challenges of Modjo dry port operations and explain the relationship between the dry port operation success and the critical success factors which have been mostly affects the Modjo dry port operations.

The primary data were obtained from Modjo dry port terminal employees mostly involved in daily operations, Customs office Modjo dry port branch operational department employees , importers/ exporters who have been frequently used the port and customs clearing agents at Modjo dry port who were actively involved in cargo clearing process. Secondary data were also collected and used from monthly/annual reports, and bulletins.

Based on the sample selected, 170 questionnaires were distributed and 153 questionnaires were returned of which 140 were valid and met the required criteria. This represented 90.0% of response rate. To make the data collected via questionnaire complete, two dry port operation department senior officers, two customs office senior officers , two customs clearing agent managers and two import/export company owners were interviewed.

Table 4.1: Response Rate

Indicator	Distributed	Returned	Valid	Valid %
Dry port l employees	41	33	30	73.2
Importer/exporter	41	38	37	90.2
Customs clearing agent	45	45	40	88.9
Customs office	43	37	33	76.7
Total	170	153	140	82.4
Interviewee	8 Participants, i.e. 2 dry port senior officers, 2 importers, 2 managers of customs clearing agents and 2 senior customs officers			

Source: Questionnaire Survey 2019

4.1.1. Descriptive Statistics

This procedure summarizes variables both statistically and graphically. These statistics may be categorized as location(central tendency which includes mode, median and mean) and measures of spread which summarizes group of data by describing how spread out the scores are which includes range, quartiles, variance and standard deviation. In this study mean from measure of central tendency and standard deviation from measures of spread are repeatedly used.

4.1.2. Demographic Profile of Respondents

The demographic information from the survey was used to review the characteristics of respondents. Job designation/role/occupation /type of organization, years of work experience, educational qualification, age range (in years) and sex of by the respondents were indicators. This analysis helps to understand the relationship between these parameters with the questionnaires they filled.

As can be seen from the table 4.2 below, from the total respondents about 30(21.4%) represents the Modjo dry port terminal employees, while the shippers (import/export) represent 26.4%. The largest percent (28.6%) of the respondents were customs clearing agents in Modjo dry port. The remaining (23.6%) representing the customs office employees at Modjo dry port.

From table 4.2, the highest percentage (42.1%) of the participants had 6 to 10 years experience within the sector. This helped for the study that they could understand the questionnaires very well and filled it as appropriate. Those with experience in their respective business accounted for 32.1% had 5 and less years experience. The respondents had fifteen and more than fifteen years of experience represented the lowest proportion (5.7%). The remaining respondents (20.0%) had years of experience between 11 and 15 years. In total, about 67.8% of the respondents had at least 6 years experience. Respondents with more working experience are expected to provide more precise information than those with less experience, which ensures the quality of the research (Eshuis *et al*. 2013).

About 22.1% of the respondents were females and the remaining (77.9%) were male respondents. Of course, number of female respondents was low because (1) during the data collection the female employees were low and (2) most of them were busy and did not want to participant in the study.

Table 4.2: Summary of Respondent Demography

S/N.	Indicators	Indicators	Frequency	Percent
1	Job designation	Modjo dry port employees	30	21.4
		Import/Export	37	26.4
		Custom clearing agent	40	28.6
		Customs office employees	33	23.6
Total			140	100
2	Years of work experience	<=5 Years	45	32.1
		6-10 Years	59	42.1
		11-15 Years	28	20.0
		> 15 Years	8	5.7
Total			140	100
3	Educational Level	Diploma	41	29.3
		Bachelor's Degree	95	67.9
		Master's Degree	4	2.9
Total			140	100
4	Age	20-29 Years	28	20.0
		30-39 Years	79	56.4
		40-49 Years	29	20.7
		>49 Years	4	2.9
Total				
5	Sex	Female	31	22.1
		Male	109	77.9
Total			140	100

Source: Questionnaire Survey 2019

4.2. The Practices & Facilities of Modjo dry port Operations

According to academician researchers (Roso *et al*. 2009; UNESCAP 2009; Jeevan 2016), dry ports should have facility components such as container yard, container freight station, break bulk storage, bonded storage, non-bonded storage, bulk storage, customs, repair facilities, international trade and domestic trade facilitations. With these facilities, the dry ports are expected to deliver services like container handling and storage (warehousing), container stuffing and de stuffing, non-containerized break bulk cargo handling/storage, bulk cargo handling and storage, customs inspection and clearance, freight forwarding and cargo consolidation and financial services (see fig.4.1 below & for detail see section 2.2 of this paper).

As UNESCAP (2009) guiding principles of dry port practices, dry ports can provide all the services of a seaport except for the loading and unloading of cargo to and from seagoing ships. In comparison to container depots, dry ports can accommodate all types of cargo and not just containers (UNESCAP 2009). Furthermore, the services and facilities offered by dry ports are

extensive compared to other intermodal terminals. This indicates that the roles of dry ports are various and broad, compared to other intermodal terminals.

Fig. 4.1: Hierarchy of dry ports in inland terminals.

Source: Jeevan (2016)

However, based on the data analysis results, the facilities in Modjo dry port are container yard, container freight station, non-bonded storage (warehousing), customs and repair facilities. In Modjo dry port there are no enough facilities to perform as a dry port. The availability of well equipped warehouses for bulk break cargo in Modjo dry port is very low. About 37.1% of the participants confirmed this statement (for your observation, see annex, G.5).

The descriptive analysis findings show that one of the dry port facility components, i.e., repair facility is at low level to give sufficient services for repairing equipments and containers. The repairing and maintenance services are some of the value- added services in the dry ports. But these and other value-added services had not been practiced in Modjo dry port. As a distant dry port, Modjo dry port should give very high value -added services to be considered as distant dry port (Nguyen & Notteboom 2016). Therefore, according to the distant dry port criteria, Modjo dry port should be rather considered as inland container depot.

Modjo dry port does not have sufficient container handling equipments. As it is shown in table 4.6, and evidences from participants' responds, the available equipments are not sufficient enough to operate the dry port at good operational performance. Even there are no equipments like rubber gantry, rail side gantry and straddle carrier to unload full container from rail to and

empty container to rail. This with addition of other poor practices led the dry port to poor level of operational performance (for your observation, see annex, G.4).

About 15% of participants believed that the existing modal shift from rail to truck or vice versa is very low. Of the participants, 37.9% believed the modal shift is low. Only 12.1% of the participant responded that there is modal shift at Modjo dry port. The remaining 30% said neutral. Therefore, there is low level of modal shift practices at Modjo dry port. The distant dry port like Modjo dry (850km from Djibouti Seaport) can exploit more benefits from economies of scale and hence made the total logistics cost lower. However, due to low level of operational, personnel and capital infrastructural development the Modjo dry port could not improve to make the total logistics cost lower and did not deliver efficient and reliable services to its clients.

Distant dry ports are characterized by the roles they play in delivering consolidation of export cargo, packing/repacking, labeling/relabeling, and other very high valued- added services to clients (Nguyen & Notteboom 2016). Modjo dry port is expected to deliver such kind of services. But as observed and findings from data analysis show that there was no such type of services at Modjo dry port. Even the service of stuffing and de stuffing of containers at Modjo is very low if not absent.

Both qualitative and quantitative data analysis Findings show that, the multimodal system could not incorporate to its services loading of break bulk cargos from Djibouti to Modjo dry port. Since most capital goods are loaded as break bulk cargos, pay no attention to participating in this shipment from Djibouti to Modjo or other dry ports costs much for the improvement of logistics sector in Ethiopia. This fragmented multimodal practice adds to why the total logistics costs become higher and inefficiencies are always there.

To sum up, as a distant dry port, Modjo dry port should practice warehousing, customs clearance, distribution, consolidation/deconsolidation for export cargo, provision of available modes of transport and value-added service. In reality, Modjo dry port performs only in the area of customs clearing, warehousing, distribution and provision of available modes of transport.
Modjo dry port cannot organize all of the logistics process services for transporting the goods until tailored services such as repairing, blending, assembling, labeling, packaging, inventorying, sorting, storing, maintenance of the container, handling dangerous types of cargo and handling different types of cargo (Rahmanto 2016).

Table 4.3: Macrolevel Challenging Factors of Modjo dry port

Factors	Items n=140	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Dev.	Mean of Mean
Government policy (legal& political)	The current government policy encourages public ownership & operators.	0	0	3	136	1	2.014	.169	2.33
	The current government policy encourages private ownership & operators.	8	97	35	0	0	2.193	.521	
	The current government policy encourages public & private partnership.	22	75	43	0	0	2.150	.667	
	Ethiopian government is currently balancing infra-structural development (rail & road).	17	39	84	0	0	2.478	.704	
	The government continues to improve landside transportation network.	3	39	98	0	0	2.678	.513	
	Investment policy which allows an agglomeration between PPP in dry port has been widely adopted.	10	73	57	0	0	2.336	.607	
	Multimodal transport policy which affects modal split is important for Modjo dry port operations to alleviate congestion, and reduce distribution cost.	3	69	68	0	0	2.464	.543	
Socio-cultural influence	There is coordination between various intermodal players involved at dry port operations.	20	85	35	0	0	2.107	.619	2.25
	The available hard working labor in the dry port is sufficient enough.	19	83	38	0	0	2.134	.626	
	The team in Modjo dry port operations includes personnel with adequate technical & managerial skill	11	93	36	0	0	2.178	.553	
	There are enough human resources both in customs and dry port terminals.	6	99	35	0	0	2.207	.502	
	Limited working hours of customs officials influence on dry port operations.	14	67	59	0	0	2.321	.650	
	There is sufficient workforce with dry port operations knowledge.	13	88	39	0	0	2.186	.583	
	There is great awareness among the community about the importance of the dry port.	1	56	83	0	0	2.586	.509	
Technological Advancement	There is sufficient technological infrastructure for the dry port operations.	59	81	0	0	0	1.578	.496	2.00
	Modjo dry port uses modern equipment/facilities	19	118	3	0	0	1.886	.381	
	Modjo dry port uses Electronic Data Interchange (EDI).	1	37	89	13	0	2.81	.595	
	Real time container system is used in Modjo dry port to track entry/exit.	28	96	16	0	0	1.914	.556	
	Computerized yard control system is used in Modjo to determine container placement.	34	98	8	0	0	1.814	.517	
Economic Factor	Total import/export cost is decreased due to dry port operations.	61	79	0	0	0	1.564	.498	1.57
	There is marketing support by local economic agencies and state.	44	95	1	0	0	1.693	.478	
	Cost of living at the location of Modjo dry port is lower to attract distribution costs into the area.	59	81	0	0	0	1.579	.497	
	Modjo dry port gives value added services and hence facilitates international trade.	75	65	0	0	0	1.464	.501	
	Lower distribution costs (port charges, warehousing/ transloading fee) is prevailed at Modjo dry port	60	80	0	0	0	1.571	.497	
	The development of infrastructure in dry port is at its best for dry port operations.	66	74	0	0	0	1.529	.501	

Source: Questionnaire Survey 2019

Table 4.4: Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.754[a]	.568	.542	.22280
a. Predictors: (Constant), S, E, H, T, I, CP, C, P				
b. Dependent Variable: SC				

Table 4.5: Coefficients [a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.492	.278		1.770	.079
	Economic (E)	.043	.052	.050	.837	.404
	Hinterland (H)	.173	.051	.212	3.373	.001
	Connectivity (C)	.008	.032	.016	.236	.814
	Technology (T)	.148	.051	.178	2.901	.004
	Gov. policy (P)	.370	.061	.451	6.101	.000
	Information Ac.(I)	.110	.045	.153	2.474	.015
	Capacity (CP)	.185	.086	.144	2.165	.032
	Socio-cultural (S)	.176	.062	.189	2.815	.006

Table 4.6: Correlations(Multicollinarity Test)

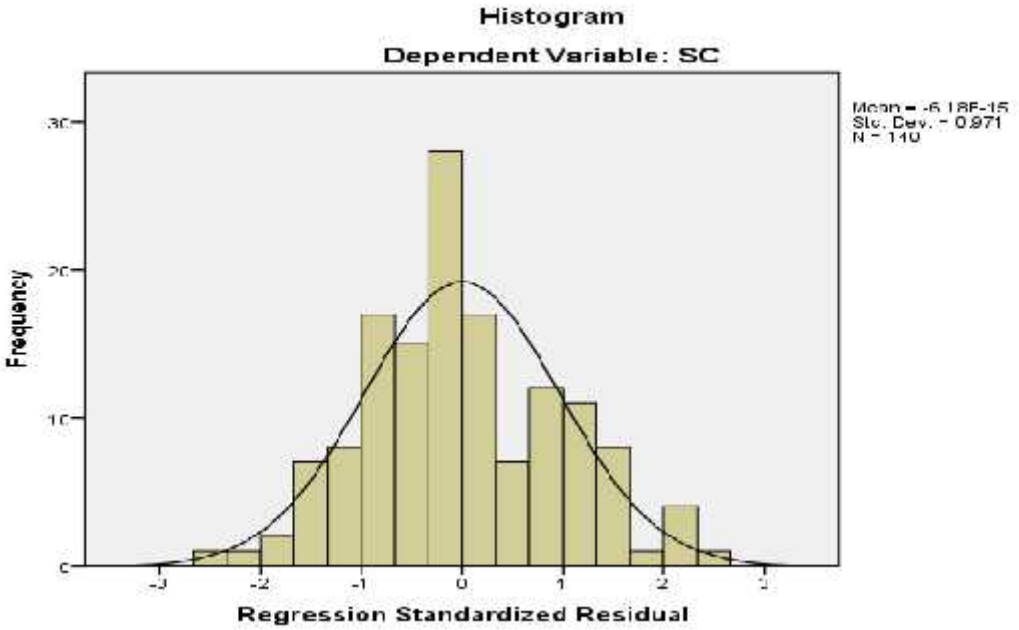
Correlations

		E	H	C	T	P	I	CP	S	SC
E	Pearson Correlation	1								
	Sig. (2-tailed)									
	N	140								
H	Pearson Correlation	.045	1							
	Sig. (2-tailed)	.594								
	N	140	140							
C	Pearson Correlation	.206*	.359**	1						
	Sig. (2-tailed)	.014	.000							
	N	140	140	140						
T	Pearson Correlation	.072	.079	.140	1					
	Sig. (2-tailed)	.395	.352	.099						
	N	140	140	140	140					
P	Pearson Correlation	.096	.131	-.026	.285**	1				
	Sig. (2-tailed)	.260	.122	.760	.001					
	N	140	140	140	140	140				
I	Pearson Correlation	.101	-.008	-.010	.004	.268**	1			
	Sig. (2-tailed)	.235	.928	.911	.958	.001				
	N	140	140	140	140	140	140			
CP	Pearson Correlation	-.188*	.234**	.237**	.059	.399**	.079	1		
	Sig. (2-tailed)	.026	.005	.005	.488	.000	.351			
	N	140	140	140	140	140	140	140		
S	Pearson Correlation	.031	.063	.118	.137	.456**	.301**	.282**	1	
	Sig. (2-tailed)	.717	.462	.166	.106	.000	.000	.001		
	N	140	140	140	140	140	140	140	140	
SC	Pearson Correlation	.011	.102	-.034	.319**	.654**	.350**	.337**	.489**	1
	Sig. (2-tailed)	.902	.228	.691	.000	.000	.000	.000	.000	
	N	140	140	140	140	140	140	140	140	140

*. Correlation is significant at the 0.05 level (2-tailed).

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

Fig. 4.2. Normality Test



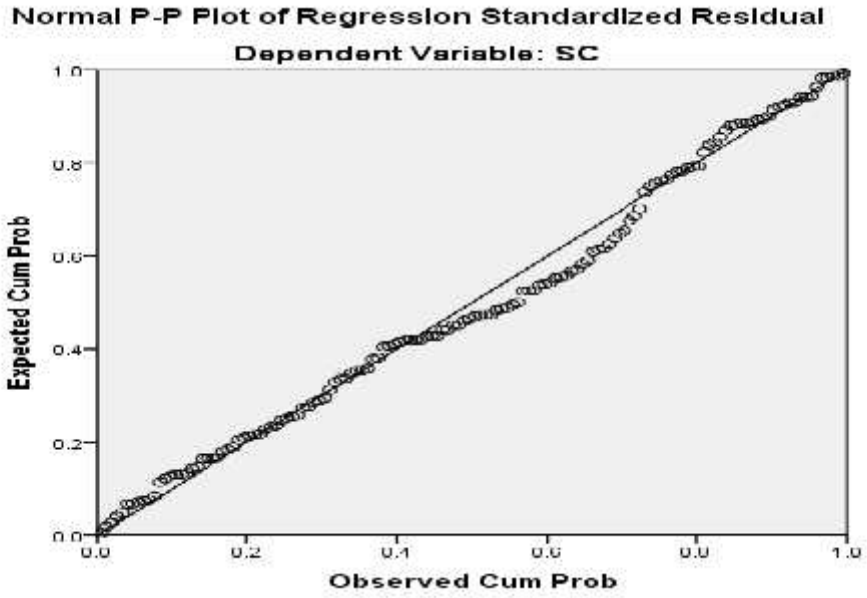


Fig. 4.3. Linearity Test

4.3. Challenging Factors of Modjo dry port Operations

After validating the influencing factors of dry port operations and the impacts of these challenges on Modjo dry port operations, the next stage is to examine the relationship between them to identify which influencing factor provides a significant impact on Modjo dry port operations success. A multiple regression analysis was conducted to indicate the regression coefficient (β) on how strong the relationship or goodness of fit (Keith 2006) is between dry port influential factors and their impacts on Modjo dry port operation success. During the regression analysis, the influential factor of dry port classified as dependent variable and the impacts on operation success become independent variable.

Standardized multiple regression was used to assess the ability of eight measures (economic, hinterland, connectivity, technology, government policy, information, capacity, and socio-culture) to predict operational success. Preliminary analyses were conducted to ensure no violation of normality, linearity and multi-collinearity. The assumption of no multi-collinearity was checked by checking correlation among predictors. The results of the inspection indicated that there was no too high correlation among predictors. Through checking a histogram, normal probability plot of the regression standardized residuals, and the scatter plots, the assumptions of normal distribution of errors, linearity and homoscedasticity have been tested. The histogram roughly looks like normal distribution and normal probability plot roughly looks like a diagonal line. The results of inspecting scatter plots also revealed that there were no serious problems on linearity and homoscedasticity (see table 4.6, fig.4.2 & fig.4.3 above).

As Table 4.3 &4.7 show, the model as a whole with all variables entered, significantly accounted for 56.8% of the total variance in operation success, F (8, 131) = 21.525, p=.000. Among the variables entered, the strongest predictors of operational success were government policy (β=.451, p=.000), hinterland (β=.212, p=.001), socio-cultural (β=.189, p=.006), technology (β=.178, p=.004), information (β=.153, p=.015), and capacity (β=.144, p=.032).

As seen in Table 4.3 above, four major (macro-level) categories of factors that influence dry port operations include government policy, socio-cultural influence, technological advancement and economic factors with mean value of ; each of which are discussed as well as their respective sub-factors being identified.

4.3.1. Government Policy

As can be seen from the above table (table 4.3), regarding whether the current government policy encourages public ownership and operators 136 (97.1%) of the respondents replied agree and 3 (2.1%) selected neutral. Few respondents 1(.7%) replied strongly agree. The interview respondents also confirm that almost all logistics activities in Modjo dry port are managed and facilitated by government owned company (Ethiopian shipping and Logistics Services Enterprise- ESLSE). The six (75%) respondents confirmed that the Ethiopian government owned 100% the dry ports logistics activities and inefficiencies in the sector have been common due to this monopolistic characteristic.

This earmarks that the current government policy is conducive for government owned logistics sectors. Open ended questions also confirmed that one of the factors for poor performance of Modjo dry port is the monopoly behavior. The government could not cover the finance for acquiring modern machineries and information infrastructure which are necessary driving factors for good operational performance.

Regarding to the Ethiopian government policy encouraging private ownership and operators, about 105 (75.0%) of the respondents replied that the government did not have any policy that encourages private ownership & operators in dry port implementation & operations. To this statement, 35(25.0%) respondents replied neutral. From the data collected via interview questions, 5(62.5%) of respondents confirmed that the excessive involvement of the government in dry port operation both in financing and implementation had left the sector inefficient. All interview participants (100%) declared that the involvement of both public and private sectors in dry port operations could help to improve logistics services in Ethiopia. Senior personnel at Modjo dry port commented that (FIP1), 'the incorporation of public and private strategy is acknowledged as corporations where government bodies encourage the involvement of the private sector mainly to support the development of the dry ports and facilities financially. These joint-stock organizations are expected to be flexible; customer oriented, and become an efficient service provider.'

From table 4.3, it is possible to detect that the Ethiopian government did not have a policy that encourages the joint operation of dry ports with public- private partnership (PPP) in Ethiopia. About 69.3% of respondents declared that the current Ethiopian did not encourage PPP in dry port operations. The remaining 30.7% of respondents became neutral about government encouragement policy of PPP.

There is a green light that the government of Ethiopia tries to develop infrastructures both rail and road development. About 84 (60.0%) of respondents showed their view as neutral for the statement. This opinion is supported by the World Bank (2017) study. According to the study (World Bank 2017), the government of Ethiopia has taken several steps to improve the transport infrastructure. The Government of Ethiopia through the Ethiopia Railways Corporation (ERC) recently completed the first phase of an extensive railway development program to build a modern railway network extending over 5,000 km. The priority route and the first one to be built is a line linking Addis Ababa to the Port of Djibouti, stretching some 752 kilo meters in total of which 82km are in Djibouti. The line is dual track between Addis Ababa and Adama and is electrified, except for the stretch inside the port area (13km). The railway is designed to have an operational speed of 120km/hour which could in theory reduce transit time between the port and Addis Ababa to about 6 hours, compared to 3 days by road (World Bank 2017).

On the side of road construction, there is wide road from Adama to Addis Ababa (Express way) and Modjo to Hawassa expressway is under construction. And the rail from Djibouti to Addis Ababa has been renovated since 2018. This shows that the government tries to develop the infrastructure to enhance connections from/to Modjo dry port to/from other industrial areas like Hawassa, Bole Lemi, Kilinto Pharmaceutical and Adama industrial parks.

Multimodal transport policy balances rail and road freight transportation and eases traffic congestion, lowers carbon emissions, and reduces distribution costs and times (Horst *et al*. 2011). The multimodal transport policy, which encourages high capacity transport system, is at infant stage. According to the respondents (48.6%), this policy helps a little bit to reduce cost and transit time at Djibouti. While the remaining respondents (51.4%) declared that they did not recognize any fruitful multimodal policy of Ethiopian government. From the interviewees view point, by using the new railway line which has significant economic impact through moving large volumes of cargo in and out of the port in one movement (up to 180 TEUs or 3,500 tons of goods per train), potentially reducing transit time to a quarter of what it is through road transport, reducing the amounts of demurrage payable to shipping lines for containers at Djibouti sea port and finally reducing some of the steps needed to clear transit movements through the border between Ethiopia and Djibouti. This is also confirmed by World Bank study (World Bank 2017). As stated by a participant from Modjo dry port terminal (FIP1) 'the incorporation of multimodal transportation at the dry port has managed to reduce the freighting costs and transit time at Djibouti.'

The analysis result shows that the government policy (β= 0.451, p=.000) is the most highly influential factor for Modjo dry port operations. Survey respondents considered that encouraging PPP, private ownership and operators, investment in balancing rail and road infrastructural development and improving the land side transportation networks as a government policy is important for effective and efficient dry port operations. The Ethiopian government has been establishing the committee/ advisory council to pave ways how to privatize some of the companies and enterprises that have been owned and operated by the government. The logistics and shipping sector is one of those enterprises. Under this (PPP) scenario, the public sector is responsible for legal procedures such as land planning, licensing as well as customs clearance protocols and the private sector takes part in fund allocation for infrastructure development (Rodrigue *et al*. 2010).

Respondents believed that the development of land side transportation promoting multimodalism affects dry port operations. Promoting multimodalism and improving land side transportation are two of the objectives of the national logistics strategy in Ethiopia (UNDP/Ethiopia 2017). The continued improvement and development of land side transportation especially in wide roads and railway networks are highly expected by the dry port stakeholders. The improvement in land side transportation is urgently required especially in rail network because the imbalance proportion between road and rail in freight transportation hindering the efficiency of modal shift in the transport chain in Ethiopia. Furthermore, the mean value and beta value for government policy is 2.33& .451respectively and this shows that it strongly affects the Modjo dry port operations performace.

4.3.2. The socio-cultural influence

In this research, socio-cultural influence refers to the managerial skill, discipline of job, the organization culture (which includes smooth interaction of stakeholders in Modjo dry port, internal coordination, bureaucracy, etc).

In respect to coordination between various intermodal players involved at dry port operations, from the above table 4.2, 75% of respondents replied that there was no coordination among actors of dry port operations at Modjo dry port. About 25% of the respondents reacted as neutral. From open ended questions, about 11.4% of respondents confirmed the lack of coordination among the stakeholders in the dry port terminal operations. Lack of coordination among the actors like regulatory agencies, port terminals and customs in the dry port terminal creates communication gap and adds burden on importers for wasting time and additional costs.

Regarding to labor availability with hard working sprit in the dry port, from table 4.3, about 73% replied that there was scarcity of hard working labor at Modjo dry port. And the remaining 27.1% replied neutral. Regarding to the presence personnel with adequate technical and managerial skills, 104(74.3%) respondents declared that there is shortage of personnel with technical and managerial skills. This opinion is also supported by key informants at Modjo dry port. In this regard, all (FIP1, FIP2, FIP3, FIP4, FIP5, FIP6, FIP7 &FIP8) of participants considered human resources are critically important for Modjo dry port management and operations but there is a critical shortage of skilled and well trained manpower at Modjo dry port. .These participants indicated that well trained manpower in logistics is greatly important for effective, efficient and responsive dry port operations. Managers with skilled leadership should be there to facilitate operations smoothly.

Replies from Open ended questions also added that there was severe shortage of skilled leadership among port terminal heads and lack of operational skilled managers at Modjo dry port. Respondents opinion on the availability enough human resources both at customs and dry port terminals, almost 3/4 (75.0%)of them replied that there is shortage of skilled and well experienced human resources both at Modjo dry port terminal and customs office. From open ended questions about 17.5% of the respondents confirmed this opinion. About 87.5% (FIP1, FIP2, FIP3, FIP4, FIP5, FIP6 &FIP8) of the interview participants declared that there is lack of human resources both at customs and dry port terminal. A participant from customs office said that:' lack of well trained professionals and skilled managers (this is due to political assignment of managers and instability of job positions) are a serious problem both at dry port terminal and customs office.' From the above opinions, it is possible to conclude that the lack of skilled and well trained professionals having knowledge in the area of customs operation and dry port operation management.

Regarding to the effect of limited working hours of customs offices on dry port operations, about 58.0% responded that there is no such significant influence on dry port operations. From all the above views we can conclude that well trained professions with knowledge of dry port operations area are a critical issue in dry port operations performance. Previous studies also supported that managerial factor and composition of the organizational structure is very influential on the performance of the dry port implementation and operations (Ramhmanto 2016).

The regression coefficient value shows that socio-cultural (β =0.189, p = 0.006), is the third most influential factor for Modjo dry port operations success. Survey respondents considered that the availability of managerial/leadership skill and sufficient hard working human resource with strong ethical discipline are a necessary pre-requisite for Modjo dry port operations. Good interaction of managers with subordinates lead to good performance of operations. Based on the information obtained from the participants, lack of coordination among various intermodal players involved at Modjo dry port operations, inadequate team in the Modjo dry port operation includes personnel with adequate technical and managerial skills, lack of skilled leadership, absence of on job training for the employees, are all contributed for the poor operational success of Modjo dry port. Promoting human resource assignments based on their skill and ability not political, providing on job training and entertaining coordination among various actors in dry port operations are some of the strategies for Modjo dry port operations success.

4.3.3. Technological Advancement

Currently information technology plays a great role for the flow of information in the supply chain. So members of the supply chain should utilize modern technologies for information sharing. The use of advanced ICT via the introduction of the 'One-Stop Border' system provided a solution to this problem. This 'One-Stop Border' system interlinking customs and border management systems of neighboring countries reduced clearance times from 5 days to 3 hours (Kunaka 2013). Also, the development of ICT application in Isaka dry port reduced container dwelling times from 25 days to 4 days (Kunaka 2013). Therefore, technological advancement can improve the performance of dry port operations if it is applied timely & properly.

From table 4.3, it is possible to identify that the level of technological advancement in Modjo dry port terminal is sufficiently unavailable. Of 140 respondents all replied that the available technology at Modjo dry port is poor. Information from the participants both open ended and interview questions confirmed the insufficient and poor level of technology availability at Modjo dry port is common. All interviewees (100%) complained about the poor technology infrastructure in the dry port. As mentioned by one participant (FIP6): 'Due to the frequent interruptions of network, it is difficult to track and trace the shipments and declare the cargo on time. Hence, customers incurred additional unnecessary costs and wasted their time'(FIP6).

Regarding to the modern and sophisticated equipment/facilities availability in Modjo dry port, respondents (97.9%) declared that there was no such equipments and facilities in the dry port. Some (2.1%) replied neutral. The information obtained from open ended questions also

confirmed that the main challenging problem at Modjo dry port operations is insufficient availability of modern loading, unloading and scanning machineries. The secondary data obtained from ESLSE and Modjo dry port also added to this opinion.

Table 4.7: Machineries/Equipments Available at Modjo dry port

Machineries/equipments	2004	2005	2006	2007	2008	2009	2010
Reach stacker	-	-	4	8	10	10	10*
Forklifts (3-20 Tone)	-	-	6	6	12	14	16
Empty container handler			2	2	3	3	3**
Terex machine						4	4
Terminal Tractor			1	1	2	6	6
Terminal chassis			2	2	2	2	2
Fire bridge car			1	1	1	1	1
Crane			1	1	1	1	1
Total			18	21	31	41	43

* 9 functional and 1 on commission, ** 2 functional and 1 in garage for maintenance

Source: owned compiled from ESLE (2000-2007&2010)

From the above table (table 4.7) and the information obtained from participants showed that there is insufficient available of modern machines. As declared on open ended questions, participants gave more emphasis on shortage of forklifts for cargos movement, recurrent malfunction of loading /unloading machines, lack of container unloading machines like gantry machine from rail to container yard and less available of reach stacker machines for loading and unloading containers from rail to container yards and trucks for poor performance of services at Modjo dry port. A participant from customs clearing agent (FIP6) stated that 'recurrent malfunction and shortage of reach stackers and forklifts greatly contributed for the delay of delivery of containers from container yards to customs inspection area.'

From the data collected, about 38(27.1%) of respondents reacted that Modjo dry port most of the time did not use electronic data interchanges (EDI). Some participants (FIP3, FIP6) responded that much paper work involved at each level of operations made the clients unsatisfied. More than half of the respondents 89(63.6%) replied neutral. This implied that sometimes the Modjo dry port uses EDI. The other remaining respondents 13 (9.3%) declared that the Modjo dry port uses EDI all the time.

Those participants who asked to fill the questionnaires that whether Modjo dry port used real time computer system to track entry, exit and placement into storage of containers, 124(88.6%) replied that Modjo dry port did not use real time computer system to track entry, exit and

container placement storage. Information from open ended questions 12(8.6%) confirmed that lost of containers in the container yard is a repeatable phenomenon. Participants (50.0%) from customs clearing agents and Importers (FIP5, FIP6, FIP7 &FIP8) agreed on the long queue at exit point due to absence of real time computer system. All these contributed for the inefficiency operation of Modjo dry port. For increasing operational efficiency, modernized facilities should be invested in dry ports (Hanaoka & Regmi 2011).

Both descriptive and inferential analysis result show that technological advancement (β =0.178, p = 0.004) is the fourth challenging factor for Modjo dry port operations success. Survey respondents considered the frequent interruptions of network due to its obsoleteness, it is difficult to track and trace the shipments and declare the cargo on time. Hence, customers incurred additional unnecessary costs and wasted their time for this poor technology. The participants also confirmed that the main challenging problem at Modjo dry port operations is insufficient availability of modern loading, unloading and scanning machineries. The modern and sophisticated equipment/facilities, which are the necessary infrastructure for dry port operations, availability in Modjo dry port are very low to perform dry port operation. As a result, using obsolete technology hinders Modjo dry port operations to perform at its standard level.

4.3.4. Economic Factor

In this issue, the distribution cost, total logistics cost, and capital infrastructure development was discussed. As can be seen from table 4.3, all respondents replied that the total cost of import/ export is not decreased as a result of dry port operations. This is due to the absence of a range of value-added services in dry ports(100% of the respondents confirmed that there is no value added service at Modjo dry port), such as sorting, stuffing, consolidating, making, barcoding, packing, and labeling goods for export and import. From open ended questions, respondents confirmed that due to poor performance and follow up of Customs Clearing agents to clear their clients' cargos at the terminal, insufficient availability of modern loading and unloading, scanning machineries, lack of coordination among the stakeholders in the dry port terminal operations, absence of necessary terminal equipments, the long bureaucracy procedures to clear goods increase warehouse fee and adds costs to imports. Therefore, the total logistics cost is not decreased despite the implementation of dry port operations at Modjo.

Regarding to the infrastructure development in the dry port, all respondent replied that the existing infrastructure (both operational and capital infrastructure) at Modjo dry port is at low level for dry port operations. All respondents (FIP1, FIP2, FIP3, FIP4, FIP5, FIP6, FIP7 &FIP8)

confirmed that the existing infrastructure at Modjo dry port is too low to deliver services. A participant from dry port terminal (FIP1) stated that 'the working environment is not comfortable. The existing container yard is not sufficient to accommodate the imports, poor network infrastructure, and there is no standard administrative building (due to this, there is no common utilities like toilet, shower rooms, cafeteria, even water for drinking).

Generally, we can conclude that providing value-added services, such as consolidation, container maintenance, stuffing and stripping, packing and also ease of customs clearance greatly reduces the total logistics cost of the operation of the dry port, (Crainic *et al*. 2013; Roso *et al*. 2009).

Factors	Items n=140	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev.	Mean of Mean
Dry port capacity	In Modjo dry port, there is well maintained warehouse equipment /facilities	0	58	82	0	0	2.586	.494	2.49 β=.144 *p*=.006*
	In Modjo dry port; there is sufficient container yard area for receipt/ dispatch of containers by rail or road.	0	25	114	1	0	2.828	.397	
	There is sufficient space for current and future containers storage.	0	38	102	0	0	2.728	.446	
	The dry port has safe environment to safeguard the containers.	0	61	79	0	0	2.564	.498	
	The dry port has sufficient equipment for loading/unloading containers.	0	70	70	0	0	2.500	.502	
	There are sufficient warehouse for storage of break bulk cargos.	0	52	88	0	0	2.628	.485	
	There is fenced customs secure area which separated entry/exit points for entry and exit of vehicles.	8	98	34	0	0	2.186	.512	
	The dry port has enough area for customs inspection, consolidations, labeling and packing where cargo may be discharges for inspection.	13	118	9	0	0	1.971	.397	
	Administrative buildings for dry port management, customs, regulatory agencies, customs clearing agents, etc. are available.	2	110	28	0	0	2.186	.426	
	There are sufficient maintenance spaces & practices for container and handling equipments.	0	62	78	0	0	2.557	.499	
	There is enough vehicle entry/exit points at Modjo dry port	0	55	85	0	0	2.607	.490	
Hinterland Conditions	Modjo dry port is at strategic location where it is near to an industrial area and connected to seaport via rail and highway.	0	0	22	86	32	4.071	.619	3.67 β=.212 *p*=.001**
	The Modjo dry port is connected to seaports with high capacity transport means, where customers can leave and pick up their standard units.	0	0	77	52	11	3.529	.639	
	Limitations in transport infrastructure affect Modjo dry port's accessibility and connectivity and hence create inefficiencies.	0	0	61	64	15	3.671	.662	
	There is a challenge for Modjo dry port in the fact that haulers are reluctant to deliver and pick up containers for short trips.	0	0	104	34	2	3.271	.477	
	There is effective Modjo dry port -Djibouti seaport connectivity.	0	0	46	58	36	3.928	.765	
	There is a potential for future land expansion of Modjo dry port.	0	0	49	55	36	3.907	.776	
	There is adequate highway and wide roads in Modjo dry port	0	0	101	34	5	3.314	.539	
Information Accuracy	There is high level of consistency of information given to various parties in the logistics chain.	52	68	18	2	0	1.786	.718	2.01 β=.153 *p*=.015*
	There is sufficient information sharing among Modjo dry port operators.	32	83	20	5	0	1.986	.719	
	The dry port is providing accurate forecasting about the status of the shipment to the shipper.	12	58	50	20	0	2.557	.842	

	There is no technical challenge in EDI systems at Modjo dry port operation.	17	55	66	2	0	2.378	.714	
	In Modjo dry port operations; there is high level for accuracy of information.	39	76	23	2	0	1.914	.704	
	There is high level of integrity with stakeholders' relationship in Modjo dry port.	44	71	18	7	0	1.914	.800	
	There is dedicated network connectivity at each level of ICT usage.	73	57	8	2	0	1.564	.670	
Dry port Connectivity	In Modjo dry port, there is interconnection of actors of dry ports.	65	59	15	1	0	1.657	.697	
	Modjo dry port is connected with intra-regional and larger inter-regional transport system.	14	50	39	29	8	2.764	1.070	
	There is less inegrity in container flow to and from seaports to Modjo dry ports.	11	44	47	31	7	2.850	1.017	
	Connectivity among stakeholders reduces length of clearing procedures.	13	46	35	28	18	2.943	1.192	2.70
	Unhealthy and weak road & rail infrastructure which is connected to the highway at Modjo dry port leads inefficient operations.	11	35	33	41	20	3.171	1.187	β=..016
	A modal shift of cargo from road to rail and vice -versa is cost effective.	21	53	42	17	7	2.543	1.048	*p*=.814
	There is efficient inter-modal connectivity and provides a wide range of logistics services.	50	52	24	12	2	2.028	1.003	
	In Modjo dry port, there is coordination for risk sharing.	14	35	63	25	3	2.771	.932	
	In Modjo dry port, there is coordination for facility utilization.	14	35	60	27	4	2.800	.961	
	There is increase seaport hinterland connectivity at Modjo dry port.	7	25	26	53	29	3.514	1.154	

Table 4.8: Microlevel Factors *** *p<.001, **p<.01, *p<.05*

Source: Questionnaire Survey 2019

4.3.5. Hinterland Conditions

The strategic location of dry ports influences dry port operations. Well positioned dry ports attract customers (Jeevan 2015). Common aspects determining the location of dry ports are basically the cost of development and economic stimulus for regional economic development (Hanaoka and Regmi, 2011). Modjo dry port is well located on the Ethio- Djibouti main trade conduit corridor. This provides a continuity of container volume to Modjo dry port.

As can be seen from table 4.8 above, about 84% of the participants responded that Modjo dry port is located at a strategic location where it is near to industrial areas and connected to Djibouti seaport via rail and road transport. The remaining 16% replied neutral. Regarding to the question whether Modjo dry port is connected to seaports with high capacity transport means, where customers can leave and pick up their standardized units, more than half of the respondents replied neutral whereas 45% of them replied that Modjo dry port is connected to seaports with high capacity transport means.

About 56% of the participants declared that limitations in transport infrastructure affect Modjo dry port's accessibility and connectivity which in return create inefficiency. In regarding to the availability of a potential land for future expansion of Modjo dry port, 65% of the respondents agreed on this issue, while 35% replied neutral. A participant from Modjo dry port terminal (FIP1) added that there is about 60 hectare of land of which only 27.84 hectare are being used currently and the negotiation for acquiring additional 20 hectare of land is near to complete. Secondary data sources also confirmed that the current owned land is about 60 hectare of which about 27.84 hectare are currently developed for container yard services (ESLSE 2018). From this we can conclude that the current and future land for expansion of Modjo dry port is not a serious issue.

The result showed that hinterland conditions (β =0.212, p = 0.001), is the second most influential factor in macrolevel and the most challenging factor in microlevel category factrors for Modjo dry port operations success. Hinterland conditions interms of a strategic location where it is near to an industrial area, and connected to seaport via rail and highway, limited in transport infrastructure accessibility and connectivity, and potential for land expansion of Modjo dry port for future use are those that respondents concerned more for the successful operations of Modjo dry port. The strategic location of dry ports influences dry port operations in Ethiopia. Well positioned dry ports attract customers (Bergqvist *et al*. 2010). The availability of road connection in every dry port becomes an advantage for freight distribution compared to rail links

which have limited connection to Modjo and Djibouti. The mean value (3.67) for hinterland conditions shows that Modjo dry port has been located at strategic location.

4.3.6. Information Accuracy

Information sharing can promote effective inland-based freight distribution (Monios *et al*. 2016). Nonetheless, there are issues related to information sharing among dry ports and other players for container freight distribution, and these affect the performance of dry ports as well as influence the competitiveness of container seaports (Jeevan 2016).

Information collaboration, coordination among stakeholders especially for risk sharing, asset utilization, accurate forecasting and effective decision making are crucial for dry port operation.

From table 4.8, almost 86% of respondents replied that in Modjo dry port there is low level of consistency of information given to various parties in the logistics chain. Only two (1.4%) participants agree that there is high level of consistency of information given to various parties in the logistics chain at Modjo dry port. The remaining 12.9% of respondents replied neutral. Opinions obtained from open ended questions also confirmed that there is high level of inconsistency of information given to various parties in the logistics chain.

Regarding to the accurate forecasting service, 115(82.2%) of respondents declared that there is no accurate forecasting of shipments. Opinions obtained from open ended questions also confirmed that there is no accurate information about the shipment and frequent change of documentation requirement for clearance. A few respondents (3.6%) agreed that the dry port is providing accurate forecasting about the status of the shipment to the shipper.

Most participants (82.2%) responded that there is low level of accuracy of information in Modjo dry port operation. Only two (1.4%) participants agreed that there is high level of information accuracy in Modjo dry port. Responses from open ended questions are also confirmed that there is lack of accurate information sharing among dry port actors.

In respect to dedicated network connectivity at each level of ICT usage, more than half (52.1%) of participants responded that there is no sustainable dedicated network connectivity at each level of ICT usage. From open ended question responses, many participants (35%) complain about the recurring interruption of networks during clearance and tracking of goods. Regarding to this statement, about 75% participants (FIP1, FIP3, FIP4, FIP5, FIP6 & FIP8) put it as the most critical impediment for the day to day operational activities of Modjo dry port. Interruption of networks (malfunction of systems) during clearance made service delivery very difficult.

Sometimes there were long queues at the customs facebet and dry port terminal exit winds due to frequent interruptions of networks.

Dry ports need to be able to possess adequate and accurate information from other players within the container freight system for moving container freight efficiently and effectively. Therefore, dry ports involved in information collaboration and coordination with other actors in the logistics chain are necessary. Information collaboration and coordination with significant stakeholders help dry ports especially in risk sharing, asset utilization, accurate forecasting and decision making both vertically and horizontally (Jeevan 2016).

The analysis result shows that an information system (β =0.153, p = 0.015) for collaboration and coordination is the fifth influential factor for Modjo dry port operations. Sufficient information sharing between dry ports related to information collaboration and providing accurate forecasting related to coordination was considered challenging factor for daily operations of Modjo dry port. Information sharing among dry port actors can increase the performance of supply chain members in terms of efficiency (Jeevan 2016). However, this has not been done well in the Modjo dry port network. In Modjo dry port, the information about the schedule of containers delivered to the dry port is not always accurately delivered to consignee on time, resulting in a delay of handling containers on time thus affecting the reliability of Modjo dry port operations. The ability of Modjo dry port to provide accurate information on asset utilization and throughput forecasting influences its operational performance. Therefore, we can deduce that information accuracy significantly affects the Modjo dry port operation performance.

4.3.7. Capacity

Infrastructure and facilities such as well maintained warehouses, wide container yards, safety, wide roads and sufficient equipment are the major concern for Modjo dry port operations in terms of capacity factor. Capacity refers to the availability of facilities, transport infrastructure and space are major factors determining dry port capacity and affect their operations (Black *et al*. 2013). These elements allow dry ports to perform logistic, transport, administrative and value adding functions for their clients.

As demonstrated on table 4.8 regarding the well maintained warehouses facilities, about 41.4% of respondents replied that there is no well maintained warehouse equipment /facilities in Modjo dry port. The remaining 58.6% of respondents replied neutral. From open ended questions, participants mentioned that lack of warehouses fitted with CCTV camera and scanning machines.

Regarding to the sufficient availability of container yards in Modjo dry port, about 18% of the respondents replied disagree. Of the participants, 81.4% replied neutral and the remaining one

(.7%) replied that there is sufficient availability of container yards in Modjo dry port. During the interview session, a participant (FIP1) indicated that there is a sufficient container yard for current operations. But sometimes, at the peak season (December to May), congestions are created and container yard is short of available for this season.

About 43.6% of participants replied that the port is not safe environment to safeguard the containers. Participants also mentioned that sometimes they heard about lost of containers at Modjo dry port. Of the total respondents, 56.4% replied neutral.

Those participants who were asked to put their opinion on the availability of sufficient equipment for loading and unloading of containers, 50% of them replied for the insufficient available of equipments for container loading and unloading at Modjo dry port. Half (50%) of the respondents replied neutral. During the interview session, participants (FIP1, FIP2, FIP4, FIP5 & FIP6)) indicated that before 2 to 3 months, Modjo dry port operated with outdated container handling equipment. The current equipment is also less in number and unable to be utilized for rapid operations and to cater for the increasing volume of containers in the future. In addition, according to the information provided by the interview, Modjo dry port only operates with 9 reach stackers and 16 forklifts. This shows that Modjo dry ports lack sufficient equipment, such as tractor-trailers, lift trucks, straddle carrier, rubber-tired gantries and rail-mounted gantries required for dry port operations. According to guiding principles for dry port operations set by UNESCAP (2010), which stipulate basic facilities as tractor-trailers, lift trucks, rubber-tired gantries and rail-mounted gantries required for dry port operations, Modjo dry port does not meet minimum handling requirements. The previous study by Jeevan (2015) that carried out in Malaysian dry ports supported this idea.

From table 4.8, we can generalize that Modjo dry port generally lacks value services, fenced customs areas, sufficient equipments, administrative buildings and maintenance areas for equipments and containers.

Infrastructure and facilities such as well maintained warehouses, wide container yards, safety wide roads and sufficient equipment are the major concern for Modjo dry port operations in terms of capacity factor. Infrastructure such as adequate highways and wide roads and sufficient equipment are also the major concern for Modjo dry port operations.

The regression coefficient value shows that capacity (β =0.144, p = 0.032), interms of well maintained warehouse equipment /facilities, sufficient container yard area for receipt/dispatch of containers by road and rail, safe environment to safeguard the containers, sufficient equipment for loading and unloading of containers, enough area for customs inspection, consolidation,

labeling and packing where cargo may be discharged for inspection, availability of administration buildings for dry port management, customs, regulatory agencies, customs clearing agents, etc. and exit and entry gates, is one of the challenging factors that affect Modjo dry port operations.

The customs clearance service is operated with insufficient infrastructure because this dry port is operating without differentiating requisites such as office buildings for customs, customs clearing agents and quarantine department in Modjo dry port.

Sufficient equipment provided by dry ports is essential for effective operation of dry ports in terms of the finding, aligned with the argument by Roso (2009). Equipment such as tractor-trailers, lift trucks, reach stackers, rubber-tired gantries and rail-mounted gantries are basic facilities required for dry port operations (UNESCAP 2010). But the mean value for this indicator is 2.49 which shows capacity strongly& significantly affects the Modjo dry port operations performance.

4.3.8 Connectivity

The concept of connectivity relates to both the physical transportation with associated extended services of the dry port, as well as the virtual connection related to communication and information exchange among the actors of the dry port (Bergqvist *et al* 2013).

From the participants, see table 4.8, about 88.5% of them replied that there is no inter-connection among importers, shippers, Customs clearing agents, and manufacturers that actively involved in Modjo dry port operations. A participant (.7%) replied that there is interconnection among importers, shippers, Customs clearing agents, and manufacturers that actively involved in Modjo dry port operations. The remaining 10.7% replied neutral.

According to the respondents, (42.1%) declared that connectivity among stakeholders did not reduce length of procedures of clearing cargos from dry port. About 33% of them agreed on this statement. The remaining participants (25.0%) replied neutral. Open ended questions also confirmed that lack of coordination among the stakeholders in the dry port terminal operations led to poor performance of service delivery at each level of actors.

Regarding to coordination for risk sharing, of 35% participants gave their opinion that there is no coordination for risk sharing among actors in Modjo dry port operations. About 20% of the respondents replied that there is coordination for risk sharing. The remaining 45% replied neutral. Information obtained from open ended questions showed that lack of sharing responsibility both in dry port terminal and customs office, and absence of clarity and

accountability in the dry port operations contributed for the poor service performance of Modjo dry port. No one responsible for problems created in the process of clearance on the side of port terminal and customs office.

For the statement, modal shift of cargo from road to rail and vice versa is cost effective, about 52.9% of the respondents rejoined that the modal shift from road to rail is not cost effective. About 17.1% participants responded that the modal shift is cost effective. 30% of the respondents replied neutral. According to the information I obtained during interview discussion session, the modal shift from the road to the rail is recent phenomena and due to this it is not visible to see whether it is cost effective or not (FIP1, FIP3 & FIP6).

As it has been shown in table 4.5, respondents (58.6%) replied that the physical connectivity of Modjo dry port to Djibouti seaport is increasing. This happens due to the newly established rail way line from Addis Ababa to Djibouti via Modjo dry port. Of 22.9% replied that the connectivity of Modjo dry port to Djibouti seaport does not increase. 18.6% of participants replied neutral.

The focus on transport connection should be in equally balanced among the component in multi-modal transportation to ensure effective connectivity between the Modjo dry port and Djibouti seaport. The integration between dry ports and intra-regional network overcomes the location issue of the dry port and improves its contribution to stakeholders as well as enhances the competitiveness Ethiopian import/export trade.

4.4. Success Criteria of Modjo dry port Operations

According to the study by Werikhe (2016), efficient logistics systems for transportation of goods are vital keystones in the continuous economic development of any region. Efficient logistics systems become necessary as an economy expands, becomes more diversified and globalized.

The World Bank's Logistics Performance Index (LPI 2018) ranks countries on the categories of time, cost and reliability of import and export supply chains, infrastructure quality, performance of core services, and the friendliness of trade clearance procedures. The efficiency of customs and border management clearance, the quality of trade and transport-related infrastructure, the ease of arranging international shipments, the competence and quality of logistics services, the ability to track and trace consignments, and the frequency with which shipments reach consignees within the scheduled or expected delivery time.

According to Andersson and Roso (2016), the inclusion of a well developed rail and road infrastructure with value adding services at dry ports greatly improved their performance and attracted users.

Table 4.9: Success Criteria for Modjo dry port Operation.

Item/code	Statement	Measurement	F	%	Mean	SD
SC66	Clearance of imports and exports is done as schedule.	Strongly disagree			2.664	.531
		Disagree	51	36.4		
		Neutral	85	60.7		
		Agree	4	2.9		
		Strongly agree	0	0		
Total			140	100		
SC67	The quality of infrastructure at Modjo dry port is at acceptable level.	Strongly disagree	13	9.3	2.050	.485
		Disagree	107	76.4		
		Neutral	20	14.3		
		Agree	0	0		
		Strongly agree	0	0		
Total			140	100		
SC68	The competency and quality of logistics services at Modjo dry port is at its best level.	Strongly disagree	20	14.3	2.000	.356
		Disagree	100	71.4		
		Neutral	20	14.3		
		Agree	0	0		
		Strongly agree	0	0		
Total			140	100		
SC69	At Modjo dry port, the ability to track and trace consignments is at high level.	Strongly disagree	18	12.9	2.000	.509
		Disagree	104	74.3		
		Neutral	18	12.9		
		Agree	0	0		
		Strongly agree	0	0		
Total			140	100		
SC70	The Modjo dry port provides fast and reliable service with reasonable price.	Strongly disagree	24	17.1	1.864	.346
		Disagree	111	79.3		
		Neutral	5	3.6		
		Agree	0	0		
		Strongly agree	0	0		
Total			140	100		
SC71	Shipments are reached at consignees within scheduled or expected delivery times.	Strongly disagree	8	5.7	2.271	.561
		Disagree	86	61.4		
		Neutral	46	32.9		
		Agree	0	0		
		Strongly agree	0	0		
Total			140	100		

Source: Questionnaire Survey 2019

4.4.1. Customs clearance service

Considering that customs clearance is the core function of dry ports, it follows that the connections with customs are the most important in dry port operations. Customs clearance services were perceived by respondents as important factors. However, the customs clearance service in Modjo dry port is operated with insufficient infrastructure because this dry port is operating without differentiating requisites such as office buildings for customs, customs clearing agents, freight forwarders and quarantine department in Modjo dry port.

As depicted on table 4.9 above, about 36.4% of the participants responded that clearance of imports and exports at Modjo dry port is not done as schedule. About 61% replied neutral. Only 2.9% of the respondents agreed that Clearance of imports and exports at Modjo dry port is done as schedule. Information obtained from open ended questions shows that the absence of necessary terminal equipments, inconvenience work place, lack of operational standards in terminal operations, lack of coordination among employees in the dry port terminal operations and customs office, unavailable of fenced container yard for customs inspection, incomplete import documentations, long waiting time (a week) for cargo clearance due to unavailability of machines to bring the container to the customs inspection area, poor performance and follow up of Customs Clearing agents to clear their clients' cargos at the terminal and lack of well equipped warehouses (those with scanning machines, CCTV camera, etc) in dry port operations have contributed to the poor performance of Modjo dry port customs clearance services. In addition, presence of excessive bureaucracy, and unethical behavior of the terminal operators and customs office are main challenges for delivery of customs clearance service in Modjo dry port. In addition, physical inspection and excessive and opaque procedural requirements at Modjo dry port customs is more prevalent.

Furthermore, the outdated clearance infrastructure at Modjo dry port, a lack of well trained customs staff at Modjo dry port, leadership instability(due to high turnover of well experienced staffs), political assignment of leadership, absence of measurement instrument for goods and lack of spot inspection have affected the efficiency of customs clearance services at Modjo dry port.

4.4.2. Quality of infrastructure

Quality of infrastructure refers to the quality of trade and transport infrastructure. Participants were asked to put their opinion on the quality of infrastructure at Modjo dry port, about 86.0% of them responded that the infrastructure at Modjo dry pot is poor or at low level for operational activities. About 14% of them replied neutral. Participants put their own perception on the existing infrastructure quality of Modjo dry port. From their view, the existing infrastructure at

Modjo dry port is characterized by obsolete technology which is not better off manual operations, poor ICT infrastructure, unavailability of infrastructure for consolidation and packing services for export at the dry port, poor computerized yard control system which is very important to determine with precision where a container is to be placed within stack and lack of well equipped warehouses like cold warehouse fitted with security cameras.

A multi-modal transport policy encourages modal shifts in a freight transport system, which affects time and costs of freight movements (Horst *et al*. 2011). Government policies aimed at utilizing and improving landside transportation and establishing inland networks impacts on dry port operations. The effectiveness of the above mentioned government policies cannot be achieved without infrastructure policy. Therefore, the investment in transport infrastructure to increase collaboration between seaports, dry ports and other stakeholders becomes a fundamental factor for logistics infrastructure development and economic benefits (Ng and Cetin 2012).

4.4.3. Quality of logistics service

Logistics is understood as a network of services that support the physical movement of goods, trade across borders, and commerce within borders. It comprises an array of activities beyond transportation, including warehousing, brokerage, express delivery, terminal operations, and related data and information management. From table 4.9, about 86.0% of respondents declared that the competency and quality of logistics services at Modjo dry port is at its low level. The remaining replied neutral. From this we can deduce that currently, the quality of information and communications technology (ICT), and physical logistics infrastructure is poor at Modjo dry port.

The quality, training, and retention of the well experienced employees at Modjo dry port (both in customs office and dry port terminal) are a major factor in logistics performance. Lower-quality logistics service hurts production and international trade. Though still a constraint in Modjo dry port, infrastructure seems to be improving.

4.4.4. The ability to track and trace shipment

The tracking and tracing of logistics networks is recently considering a very important issue in the global supply chain management (SCM). According to Shamsuzzoha and Helo (2011), without proper and suitable tracking and tracing system, efficient co-ordination of logistic flow would be difficult to acquire.

Regarding to the statement, the ability to track and trace consignments at Modjo dry port, about 74.2 % of participants declared that the ability to track and trace consignments at Modjo dry port

is at very low level. The remaining respondents replied neutral. Information from open ended questions also confirmed this opinion. Due to weak ICT infrastructure and lack of coordination and collaboration of Modjo dry port actors, it is impossible to get the accurate forecasting about the status of consignments. It measures the tracking and tracing of shipments. It is important to identify the exact location and the route of each consignment up to its delivery to the end customer. All parties in the good's supply chain are involved in this component, and consequently traceability is the result of the activity of the sector as a whole.

4.4.5. Fast and reliable service (international shipment)

It measures how easy it is to arrange shipments at competitive prices. In Modjo dry port, the time to clear goods through customs rises sharply if goods are physically inspected. As shown in table 4.9 above, about 96.4% of respondents replied that the Modjo dry port does not provide fast and reliable service with reasonable price. This is due to, according to the information obtained from open ended questions and interview (FIP, FIP3, FIP4, FIP5, FIP6, FIP7 and FIP), (1) lack of coordination among the dry port actors, (2) the presence of long hierarchal bureaucracy in customs and dry port authorities, (3) unavailability of sufficient cargo moving machineries and customs inspection spot area, (4) red tape and unethical behavior of dry port terminal employees and customs office, (5) lack of well trained customs officers, (7) lack of experts and measuring instruments for those cargos such as chemicals and other raw and finished goods which need further inspection, (8) unhealthy hierarchal relationship between the top management and the officers, (9) communication gap among the regulatory agencies, port terminals and customs office and (10) recurrent interruptions of networks.

Generally, Causes for unexpected delays in import/export of goods including unpredictability in clearance, informal (corrupt) payments, compulsory warehousing, pre-shipment inspection, inland transit delays, and low service reliability characterize Modjo dry port operations.

4.6.6. Timeliness

Timeliness refers to the frequency with which shipments reach consignees within the scheduled or expected delivery time (Arvis *et al*. 2018). It measures the punctuality of shipment delivery times. This is an important factor for consideration, because with the existing high level of competition, failure to comply with delivery schedules is unacceptable. This has influenced the need for increasingly sophisticated computerization processes.

From the table above, about 67.4% of the participants responded that shipments did not reach at consignees within scheduled or expected delivery times. The remaining 32.9% replied neutral.

All the interview participants (FIP1, FIP2, FIP3, FIP4, FIP5, FIP6, FIP7 and FIP8) confirmed that due to the absence of value added services in Modjo dry port, it is impossible to deliver the export cargo on time. The export packing and stuffing is done by the shippers on their premises.

4.5. The Performance of Modjo dry port Operations

The findings show that the most common feature contributing the poor performance in Modjo dry port are the time taken to clear cargos, the cost that importers and the dry port itself incurred, equipment utilization, storage area utilization and service feature that the dry port delivers to its clients.

Information obtained from open ended questions shows that the absence of necessary terminal equipments, inconvenience work place, lack of operational standards in terminal operations, lack of coordination among employees in the dry port terminal operations and customs office, unavailable of fenced container yard for customs inspection, incomplete import documentations, long waiting time (a week) for cargo clearance due to unavailability of machines to bring the container to the customs inspection area, poor performance and follow up of Customs Clearing agents to clear their clients' cargos at the terminal, all these contributed for long delay of cargo clearance. Due to this cargos are not cleared as schedules. This in turn has great impact for Modjo dry port operations performance. In addition, shipment did not reach at the shipper as schedule. With existing high level of competition, failure to comply with delivery schedule is unacceptable. From table 4.9, it is possible to see the mean value for customs clearance is 2.66. The LPI (2018) result for Ethiopia is about 2.54 with rank of 79 from165 countries. This confirms how the Modjo dry port performs poorly.

The other indicator of Modjo dry port performance is the presence of quality infrastructure (i.e., the equipment utilization and storage area utilization). The mean value for this indicator (2.05) shows that the Modjo dry port performs at poor level even below the LPI (2018) which is 2.13. In regarding to the logistics cost at Modjo dry port, about 86% of respondents replied that the cost is high and makes imported and exported goods expensive.

The ability to track and trace consignments at Modjo dry port is at low level. This shows that inefficient coordination of logistics flow at Modjo dry port is common. The mean value for this indicator is 2.00 which is lower than the LPI (2018) score value, i.e., 2.24. Lack of on time tracking and tracing of consignments lead to more time consuming and incurred more cost to deliver the cargos to the shipper.

The Modjo dry port does not provide fast and reliable services. From table 4.9 above, about 96% of the respondents confirmed this statement. The mean value for this indicator is 1.86 which is very low as compared to LPI (2018) score of 2.54. According to the information obtained from participants (FIP1, FIP3, FIP4, FIP5, FIP6, FIP7 and FIP8) and open ended questions, the low level of services at Modjo dry port is common due to lack of coordination among the dry port actors, the presence of long hierarchal bureaucracy in customs and dry port authorities, red tape and unethical behavior of dry port terminal employees and customs offices and lack of well trained professionals at Modjo dry port terminal.

In Modjo dry port, the information about the schedule of containers delivered to the dry port is not always accurately delivered to consignee on time, resulting in a delay of handling containers on time thus affecting the reliability of Modjo dry port operations. The ability of Modjo dry port to provide accurate information on asset utilization and throughput forecasting influences its operational performance.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMONDATIONS

5.1. Introduction

This chapter looks at the main findings presented in chapter four by relating them to the objectives of the study, and also reflects on the methodologies used to obtain and analyze data. From the findings, conclusions are drawn and recommendations are made. The chapter ends with identifying research limitations and areas of further research.

5.2. Summary

This paper used thematic analysis of qualitative data, descriptive and inferential statistics to analyze the quantitative survey data collected for this research. Several procedures were selected to examine data suitability and to undertake assumption validation during the quantitative analysis. The findings revealed that the requirements of different stakeholders differ according to their business activities.

Modjo dry port performs only in the area of customs clearing, warehousing, distribution and provision of available modes of transport. But the Modjo dry port could not deliver services like container handling and storage (warehousing), container stuffing and destuffing, non-containerized break bulk cargo handling/storage, bulk cargo handling and storage, customs inspection and clearance, freight forwarding and cargo consolidation, financial services and value- added services.

The survey respondents believed that the government policy, hinterland conditions, socio-cultural influence, technological advancement, information accuracy, and capacity of the dry port are greatly and significantly affects the Modjo dry port operations performance. This shows that the improvement in these challenging factors leads to enhancing the Modjo dry port operations performance.

Findings show that the success criteria for the Modjo dry port operations are the customs clearance service, the infrastructure quality, quality of logistics services at Modjo dry port, fast and reliable services, the ability to track and trace shipments and the timeliness. The mean value for all these indicators is 2.14 which is very low compared to World Bank's LPI (Arvis *et al*. 2018).

This study reveals that due to inadequate infrastructure, poor quality of logistics services at Modjo dry port, lengthy procedures of customs clearance services, low level of technologies which has great impact to trace and track shipments, absence of value added services at the port which in turn has impacts to reduce costs, shipments were not reached at the consignees on time and all these contributed to the poor performance of Modjo dry port operations.

5.3 Conclusions

Based on the major findings of the study the following conclusions were drawn. As a distant type of dry port, Modjo dry port could not deliver services like consolidations/deconsolidations of export cargo, very high value added services, break bulk cargos, bulk cargo storage, and cold warehousing. The dry port currently delivers services like customs clearing, normal warehousing, distribution of cargos in the local areas, low level of repairing services for light machineries and containerized cargos storage. The main factors affecting Modjo dry port operations performance are government policies (like PPP, investment policy, and multimodal policy), hinterland conditions, socio-cultural influences, technological advancement, information accuracy and dry port capacity. These challenging factors are affecting the operational performance of Modjo dry port.

After identifying these challenging factors, the researcher has tried to set the success criteria for Modjo dry port operations success. In this regard, findings show that the main success criteria for Modjo dry port operations are customs clearance services, quality of logistics services, quality of existing infrastructure, fast and reliable services, the ability to track and trace shipments at Modjom dry port and the frequency with which shipments reach at consignees within the scheduled or expected delivery time. Based on these indicators and other operational performance dimensions like equipment utilization, storage utilization and labor utilization, Modjo dry port performance is very low.

5.4. Recommendations

Based on the findings of the study and conclusions drawn from them, the following possible and plausible recommendations are suggested for actions to be undertaken by each stakeholder at different levels.

1. Customs inspection and value-added services (especially for export goods which includes consolidation, packing, stuffing, labeling, etc) in Modjo dry port located adjacent to its respective economic corridors provide noteworthy benefits of cost and time advantages.

Therefore, imperative improvement is needed especially in customs clearance technology and introducing a range of value-added services especially in Modjo dry port for its own development and client's benefits.

2. The Ethiopian government should fulfill the operational requirements (like a container yard, customs, rail and truck access, rail siding, express clearance lane, and quarantine check), personnel requirements (like warehouse staff, yard staff, and safety& security staff) and capital infrastructure(like transport infrastructure, dry port handling equipments). A lack of the above requisites may have negative impacts on container supply chains. This can be done by inviting the private sector participation (PPP) in the development of dry ports and outsourcing operational activities.

3. Implementations and operations of dry ports in land locked developing countries (LLDCs) like Ethiopia helps for durable regional sustainability, creating new jobs and costs would be reduced by value-added services. On a different level, competitiveness of importers and exporters would be increased, with or without economic growth, chaotic movements of cargo in hinterland would be eliminated, and finally, the issue of empty containers would be solved by reallocation.

4. A dry port is a set of efficient services such as transshipment, storage, depot and containers' maintenance, customs clearance, tracing and tracking. Anyhow, the dry port performance depends on the quality and quantity of ways of land access such as railway and road (logistics infrastructure), capacity, fast and reliable services, good quality of logistics services, the ability to track and trace shipments and timeliness. Based on these the Modjo dry port performs poorly.

To conclude, as industry and commerce continue to expand through globalization,

5. Electronic exchange of data is essential for dry port operations. Ethiopia should acquire internationally compatible systems to enable frequent updating of information and specific services as well as connectivity worldwide. The ongoing infrastructure development should be continued in terms of expansion in road networks, development of strategically located dry ports operation services as well as fast, reliable, and cost-effective railway operations. The system should be supported by vibrant, private logistics providers with good logistics knowledge. The technological and legal requirements should be put in place to facilitate doing business in Ethiopia. Equally important is strengthening internal capacity of government institutions (like dry port terminal, customs office) with leading role in trade logistics serves for the initiative to bear fruitful results. Efficiency of logistics becomes a very important subject for developing

countries to address. Consequently, investing in dry ports is crucial for improving maritime transport access, trade-led economic development and overall competitiveness of landlocked countries, like Ethiopia

The researcher's viewpoint is that Ethiopian can benefit from dry ports if dry ports can be effectively implemented and efficiently managed. This includes the encouraging of PPP in dry port operations infrastructure development and management, fulfilling the human resources requirement and investing in capital infrastructure to increase the efficiency and reliability of the dry port operations. On that note, there will be no problem of seaport access for the country but an integrated logistics chains with its focal point at the dry ports.

5.5. Limitations of the Research

Despite mixed methods research providing significant benefits, it requires more work, extensive resources and considerable time to apply this design in this research (Creswell & Clark 2011). Semi-structured face-to-face interviews have been conducted to gain more comprehensive and complex data. However, most of the respondents were reluctant to expose some important and additional data which they considered confidential and a wider scope might have been opened in this research if they had revealed this information. The qualitative phase may have a potential bias executed by the researcher during the data collection and analysis procedures. To overcome this bias, a reserve has been maintained from the interviewees to prevent any beliefs or judgments towards them.

There are also some respondents that the data answer from the questionnaire results would not be exposed for reasons of confidentiality about their company despite the results of the questionnaires were guaranteed confidentiality and also for academic purposes. Biased answers may exist of the respondents because of the desire of the respondents, but most respondents provided real answers and honestly so this was ideal for this study. Therefore, time is still needed for analysis to translate the biased answers.

5.6. Directions for Future Research

During collecting of the qualitative data, the participants were hesitant to disclose some of the confidential information, especially on the challenges that Modjo dry ports faced in it operations. Therefore, further research to investigate those issues needs to be conducted to provide significant improvement to the operational efficiency of Modjo dry port. A focus group interview approach is ideal to explore the complexity about a topic based on the knowledge and

applicability of the participants (Dilshad & Latif 2013). This approach can be conducted to gain interactive information on participants' perceptions, opinions and beliefs towards the challenges faced by Modjo dry port.

Secondly, this research has identified the influencing factors of Modjo dry port operations. Further research can be focused on dry port performance such as developing the measures for evaluating Modjo dry port performance. Extensive research like exploratory mixed methods research can be conducted to gather the most important variables to measure Modjo dry port performance and validate those findings in other research in Ethiopian dry ports which can provide insights into the differences to lay a base for improvements in Malaysian dry ports' performance.

Thirdly, this research validated the impacts of challenging factors on Modjo dry port operations performance. Further research may be focused on the impact of dry ports on seaport competitiveness, e.g. how Djibouti seaport collaborates with Ethiopian dry ports to enhance the performance of container seaport systems.

Finally, a comparative regional study on dry ports can be conducted between Ethiopia and other regions from East Africa. The method used in this research and its findings can be generalized to conduct a dry port study in any of the Ethiopian dry ports Overall, this thesis makes a contribution to the discussion about dry ports and in particular how government in Modjo dry port can propose strategies for dry development to improve dry port operations and provide significant impact on international trade competitiveness.

REFERENCES

Abdallah, K.F (2014). Inland Container Depots and Container Freight Services Decongestion Strategies: A Case of Tanzania Ports Authority, Unpublished.

Abdurezak M. (2016). An Assessment on Determinants of Dry Port Performance: The Case of Modjo Dry Port, Unpublished

Ahamed, Y. (2010). Final report of feasibility study of dry ports. *Report for African trade Policy Centre (ATPC)*, United Nation, Economic Commission for Africa, Abu Dhabi, pp. 379-416.

Aikaterini, B. (2016). Evolution of the role of dry ports. Unpublished.

Alam, J. (2016). Role of Effective Planning Process in Boosting Dry Port Effectiveness: A Case Study of Central Pakistan. *International Journal of Supply Chain Management*, Vol. 5, No.3,

Andersson, D. & Roso, V. (2016). Developing dry ports through the use of value-added services, Springer International Publishing, Switzerland.

Arvis, J.F., Ojala, L., Wiederer, C., Shephered, B., Raj, A., Dairabayeva, K. & Kiiski, T. (2018). Connecting to Compete 2018: Trade Logistics in the Global Economy. The Logistics Performance Index and Its Indicators. The International Bank for Reconstruction and Development/The World Bank, Washington, DC.

Arvis, J. F., Mustara, M. A., Ojala, L., Shepperd, L. & Saslavsky, D. (2010). Connecting to compete-trade logistics in global economy report. *The logistics performance index and its indicator*, World Bank and Turku School of Economics, Finland, Washington D.C., pp. 53-65.

Bentaleb, F., Mabrouki, C. &Semma, A. (2015). Key Performance Indicators Evaluation and Performance Measurement in Dry Port-Seaport System: A Multi Criteria Approach. Journal of ETA Maritime Science. Vol.3, No.2, pp 97-116.

Bergqvist, R. (2016). *Dry Ports–A Global Perspective: Challenges and Developments in Serving Hinterlands*. Routledge.

Beresford, A., Pettit, S., Xu, Q. and Williams, S. (2012). A study of dry port development in China.

Bergqvist, R, Wilmsmeier, G. and Cullinane, K. (2010). Dry Ports – A Global Perspective: *Challenges and Developments in Serving Hinterlands.* MPG Books Group, UK.

Black, J., Kyu, T., Roso, V. & Tara, K. (2013). Critical evaluation of Mandalay dry port, Myanmar. *Proceedings of the 5th International conference on logistics and transport 2013 (ICLT 2013). Sustainable Supply Chain Management in Asia Pacific.* November 5-8, 2013, Doshisha University, Kyoto, Japan.

Bryman, B. & Bell, E. (2011). Business Research Methods, 3rd ed., Oxford: Oxford University Press.

Charuka, B. (2014). Unlocking the landlocked: Appraising the economic viability of dry ports for Zimbabwe. World Maritime University. University Dissertations (Unpublished).

Crainic, T.G., Olmo, P.D., Ricciardi, N., & Sgalambro, A. (2014). Modeling Dry-Port- Based freight Distribution Planning. CIRRELT- 2014-47, Canada.

Creswell, J. W. & Clark, L. P. (2011). *Designing and conducting mixed methods research, 2nd* ed. Thousand Oaks, CA: SAGE publication. London.

Cullinane, K., Bergquist, R., Wilmsmeier, G. (2012). The dry port concept- Theory and practice. Maritime Economics& Logistics, vol. 14, 1–13. Macmillan Publishers Ltd.

Cullinane, K., &Wilmsmeier, G. (2011). The contribution of the dry port concept tothe extension of port life cycles. New York: Springer.

Dilshad, R.M. & Latif, M.I. (2013). Focus Group Interview as a Tool for Qualitative Research: An Analysis. *Pakistan Journal of Social Science. Vol.33. No.1, PP.191-198.*

Dotoli, M., Fanti, M. P., Mangini, A. M., Steco, G. & Ukovich, W. (2010). The impact of ICT on international transportation systems: A modelling approach. *Journal of Engineering Practice,* vol. 18, no. 6, pp. 893-903.

Eshuis, J., Braun, E. & Klijn, E.H. (2013). Place marketing as governance strategy: An assessment of obstacles in place marketing and their effects on attracting target groups. *Public Administration Review,* vol. 73, no. 3.

ESLSE (2015). ESLSE Statistical Bulletin (EFY 2000-2007). Addis Ababa, Ethiopia

FDT (2007). Feasibility study on the network operation of hinterland hubs (Dry Port Concept) to improve and modernize ports' connections to the hinterland and to improve networking. *Integrating Logistics Center Networks in The Baltic Sea Region (INLOC)*, Netherlands.

FDT (2009). The Dry Port –Concept and Perspectives. Denmark.

Fekadu, M. D. (2013). Logistics Practices in Ethiopia. SUAS, Swedish University of Agricultural Sciences, unpublished.

Fremont, A. & Franc, F. (2010). Functions and actors of inland ports: European and North American dynamics. *Journal of transport Geography*.

Garnwa, P., Beresford, A. & Pettit, S. (2009). Dry ports: A comparative study of the UK and Nigeria. *UNESCAP Transport and Communications Bulletin for Asia and the Pacific*, United Nation, pp. 58-81.

George, D. & Mallery, P. (2016). IBM SPSS statistics 23 step by step: A simple guide and reference Routledge.

Hanaoka, S. & Regmi, M. B. (2011). Promoting intermodal freight transport through the

development of dry ports in Asia: An environmental perspective. Journal of International Association of Traffic and Safety Science, vol. 35, no. 1, pp. 16-23.

Haralambides, H., Gujar, G. (2011).The Indian dry ports sector, pricing policies and opportunities for public-private partnerships. *Research in Transportation Economics 33 (2011) 51-58. Elsevier Ltd.*

Heilig, L. (2017). Information systems in seaports: A categorization and overview. Inf. Technol. Manag. vol. 18, No.1, 179-201

Horst, V. D., Larissa & Lugt, L. M. (2011). Coordination mechanisms in improving hinterland accessibility: Empirical analysis in the port of Rotterdam. *Journal of Maritime Policy & Management:* vol. 38, no. 4, pp. 415-435.

Hummels, D.L. & Schaur G (2012). Time as a trade barrier. National Bureau of Economic Research working paper No. 17758. Cambridge, MA.

IMF (2014). *The federal democratic republic of Ethiopia, selected issues paper*. Country Report No. 14/304, Washington, D.C.

Jeevan, J (2015). Influential Factors of Malaysian Dry Port Operations. Kuala Lumpur, Malaysia

Jeevan, J. (2016). The Role of Malaysian Dry Ports in the Container Seaport System. University of Tasmania, Unpublished.

Jeevan, J., Chen, S. L and Cahoon, S. (2018). Determining the influential factors of Malaysian Dry port Operations: Worldwide experiences and empirical evidence from Malaysia. *Journal of Maritime Economics & Logistics*, Vol.20, No.3. Palgrave Macmillan, UK.

Jeevan, J., Salleh, N.H.M, Loke, K.B. & Saharuddin, A.H. (2017). Preparation of dry ports for a competitive environment in the container seaport system: A process benchmarking approach. *International Journal of e-Navigation and Maritime Economy.Vo. 7, No.1.*

Jamal, A., Sarno, R. & Ginardi, H. (2017). Analyzing the benefit of implementing integrated digital GPS and terminal operating system at yard terminal Surabaya. J. Theory. Appl. Inf. Techno, Vol. 95, 948–959.

Keith, T. (2006). Multiple regression and beyond. PEARSON Allyn & Bacon, United States.

Kunaka, C. (2013). Dry ports and trade logistics in Africa. *A global perspective,* Ashgate Publishing Limited., Great Britain,

Martin, E., Dombriz, M.A. & Soley, G. (2016). Study of the state of the art and description of KPI and KRI of terminals, hinterland mobility and rail network. Intermodal, EU: Unpublished

Monios, J., Notteboom, T., Wilmsmeier, G. & Rodrigue, J. P. (2016). Competition and complementarity between seaports and hinterlands for locating distribution activities. *Port Economics Discussion Report*, Chios, Greece.

Nam, H.K & Song, D.W. (2011). Defining maritime logistics hub and its implication for container port, *Maritime Policy & Management,* vol. 38, no.3, pp. 269-292,

Ng, A. K. Y, &d Gujar, G.C. (2009). *Government policies, efficiency and competitiveness*: The case of dry ports in India. *Transport Policy*: 232-239.

Ng, A. K. & Cetin, I. B. (2012). Locational characteristics of dry ports in developing economies: *Some lessons from Northern India*. *Regional Studies*, Vol.46,

Ng, A. K. Y., Padilha, F. & Pallis, A. A. (2013). Institutions, bureaucratic and logistical roles of dry ports: the Brazilian case. *Journal of Transport Geography. Vol.* 27**, No.1**, pp 46-55.

Nguyen, C. L. & Notteboom, T. (2016a). Dry Ports As Extensions of Maritime Deep-Sea Ports: A Case Study of Vietnam. *Journal of International Logistics and Trade.* Vol. 14, No. 1, April 2016, Pp.65~88

Nguyen, C. L. & Notteboom, T. (2016b). A Multi-Criteria Approach to Dry Port Location in Developing Economies with Application to Vietnam. *The Asian Journal of Shipping and Logistics.* Vol. 32, No.1. The Korean Association of Shipping and Logistics, Inc.

Nguyen, L.C. & Notteboom, T. (2017). Public-private partnership model selection for dry port development: an application to Vietnam. *World Review of Intermodal Transportation Research*, Vol. 6, No. 3.

Notteboom, T. & Rodrigue, J.P (2011). Dry ports and the maritime hinterland: gaining momentum. *Port technology international: The review of advanced technologies for ports and terminals world-wide. vol.50, No.1 (2011), pp21-24.*

Padilha, F. (2012). The spatial evolution of dry ports in developing economies*: The Brazilian experience.*

Padilha, P. & .Ng, A.K (2012).The spatial evolution of dry ports in developing economies. The Brazilian experience', *Journal of Maritime Economics & Logistics.* Vol. 14, No. 1, pp. 99-121.

Rahmanto, W. P. (2016). Kandangan dry port project: An option of solution for congestion: case of Lamong Bay Terminal (Surabaya, Indonesia). *World Maritime University Dissertations*.

Rodrigue, J.P., Debrie, J., Frémont, A., & Gouvernal, E. (2010). Functions and actors of inland ports: European and North American dynamics, *Journal of Transport Geography*, Vol.18, pp. 519-529.

Roso, V. (2009). Factors influencing implementation of a dry port. *International Journal of Physical Distribution & Logistics Management,* Vol.38, No.10, pp. 782-798.

Roso, V., &Lumsden, K. (2010). A review of dry ports. *Maritime Economics &Logistics, Vol.2, No.2*, PP, 196–213.

Roso, V., Woxenius, J., &Lumsden, K. (2009). The dry port concept: connecting container seaports with the hinterland. *Journal of Transport Geography*.

Saglam, B.B., Esmer, S. and Ateş, A. (N, d). The Dry Ports: A Review of the concept and its applications in Turkey. Dokuz Eylul University, Izmir -Turkey.

Schoenherr, T. (2009). Logistics and Supply Chain Management Applications within a Global Context: An Overview. *Journal of Business Logistics, Vol. 30, No.2.*

Shamsuzzoha, AHM & Helo, P.T. (2011). Real-time Tracking and Tracing System: Potentials for the Logistics Network. *Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management.* Kuala Lumpur, Malaysia, January 22 – 24, 2011.

Sohal, A.S. & Rahman, S. (2013). Use of Third Party Logistics Services: An Asia-Pacific Perspective. Spring Science + Business Media, New York.

The South East of Scotland Transport Partnership (2012). Dry port Project. Report from SEStran.

Trainaviciute, L. (2009).The dry port: Concept and perspectives. *Association of Danish Transport and Logistics Centers Denmark*.

UNCLOS (1982). Oceans and Law of the Sea. *Division for Ocean affairs and the Law of the Sea.* Untited Nations, New York.

UNCTAD. (1991). *Handbook on the management and operations of a dry port.* Geneva: UNCTAD.

UNCTAD (2003). Challenges and opportunities for further improving the transit systems and economic development of landlocked and transit developing countries. Geneva: UNCTAD.

UNCTAD (2013). The Way to Ocean*: Transit corridors servicing the trade of landlocked developing countries.* Geneva: United Nations Conference on Trade and Development.

UNDP-Ethiopia (2017). Notional Logistics Strategy. *Summary of Commissioned Study*. Addis Ababa, Ethiopia.

UNESCAP (2009). Review of Developments in Transport in Asia and the Pacific. *Economic and Social Commission for Asia and the Pacific*, New York. United States.

.UNESCAP (2010). Development and operation of dry ports in Nepal. United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Bangkok.

UNESCAP (2012). Development of an integrated transport and logistics system in ASEAN countries and the Pacific Sub region. Introduction to the development of dry ports in Asia. *United Nation*, Bangkok, Thailand, pp. 321-344.

UNESCAP (2013a). Intergovernmental Agreement on Dry Ports. Bangkok.

UNESCAP (2013b). Review of Developments in Transport in Asia and the Pacific 2013. Bangkok.

UNESCAP (2014). Capacity-building for the development and operation of dry ports of international importance. *Intergovernmental agreement on dry ports*, United Nation, Bangkok.

UNESCAP (2015). Planning, development and operation of dry ports of international importance. *Report on trends in the development of inland ports and policies underlying their development in selected countries of the UNESCAP region.* Bangkok.

UNESCAP (2018). Development and operation of dry ports of international importance. Bangkok.

Veenstra, A., Zuidwijk, R. and Van Asperen, E. (2012a). The extended gate concept for container terminals: Expanding the notion of dry ports. *Maritime Economics & Logistics*, vol. 14, no. 1, pp. 14-32.

Visser, J., Konings, R., Pielage, B. J. & Wiegmans, B. (2009). A new hinterland transport Concept for the port Rotterdam: Organizational or technological challenges? *Journal of Transportation Research,* vol. 4, no. 3,

Werikhe, G.W (2016). Dry ports development in East Africa –A Bench marking approach. Dalian Maritime University, China

World Bank (2010). Connecting to Compete; Trade Logistics in the Global Economy 2010. World Bank, Washington DC.

World Bank (2017). Combined Project Information Documents / Integrated Safeguards Data Sheet (PID/ISDS) Appraisal Stage. Washington DC

World Bank, Connecting to Compete (2018). Trade Logistics in the Global Economy – The Logistics Performance Index and Its Indicators. Washington, D.C.

Woxenius, J. & Bergqvist, R. (2010). Hinterland transport by train: Comparing the Scandinavian conditions for maritime containers and semi-trailers. *Journal of Transport Geography*. vol. 8, no. 4, pp. 125-136.

Yamane, T. (1967). Elementary Sampling Theory.

Yang, D., Zhang, A. & Lam, J. S. L. (2013). Impacts of port productivity and service level on liner shipping operating cost and schedule reliability. *International Forum on Shipping, Ports and Airports (IFSPA): Trade, Supply Chain Activities and Transport: Contemporary Logistics and Maritime Issues*.

Zainuddin, N., Saifudin, A.M., Zalazilah, M.H., Bahaudin, A.Y.and Khalid, R. (2018). A Critical Review on the Critical Success Factor of Inland Port. A Case of Northern Region of Peninsular Malaysia. University Utara Malaysia (UUM).

ANNEXES

Annex A: Introductory Letter to Respondents

Re: Data Collection

Dear Respondent,

I am a student pursuing Master of Arts (MA) degree in Logistics and Supply Chain Management at Addis Ababa University, School of Commerce. Currently, I am undertaking a research study on **"PRACTICES AND CHALLENGES OF DRY PORT OPERATIONS; A CASE OF MODJO DRY PORT**, impartial fulfillment of the requirements for the award of the degree of Master of Arts in Logistics and Supply Chain Management.

You have been selected to participate in the survey and the researcher would highly appreciate if you assist him by responding to all questions as completely, correctly and honestly as possible. It is solely for academic purposes. Your opinions, responses and views are very important to this study and are completely confidential. No respondent was be identified.

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

Sincerely,

Simie Kebede
Researcher

Annex B: Questionnaire

Addis Ababa University
School of Commerce
Department of Logistics and Supply Chain Management

Survey Questionnaire

The practices and Challenges of dry port operations: The case of Modjo dry port

The questionnaire consists of **four** sections. **Section I** contains biographical data of respondents, **section II** contains the challenging factors of dry port operations, **section III** consists of criteria of the success of dry port operations and **section IV** contains open-ended questions.

Thank you in advance for agreeing to complete this questionnaire.

Prior consideration before filling the questionnaire:

1. No need to write your name on the questionnaire.
2. All information provided will be treated anonymously.
3. The information will be kept confidential.
4. A report showing the research main results will be provided to all organizations.

Researcher: Simie Kebede

Instruction: Insert a tick mark (Ě) inside the circle and write your answer in space provided.

Section I: Biographical Data of Respondents			
No.	Items	Response Category	
1.	Job designation/role/occupation /type of organization	Modjo dry port terminal employee	◯
		Importer/Exporter	◯
		Customs Clearing Agent	◯
		Customs Office	◯
2.	Years of work experience	< 5 years	◯
		6 - 10 years	◯
		11-15 years	◯
		> 15 years	◯
3.	Educational qualification.	Diploma	◯
		Bachelor's degree	◯
		Master's degree	◯
4.	Age range (in years)	20-29 years	◯
		30-39 years	◯
		40-49 years	◯
		>49 years	◯
5.	Sex	Female	◯
		Male	◯

Section II: Challenges of Dry port operations

Based on literature review, interviews and personal experience, the researcher has compiled a list of 8 challenging factors that could impact on the operations of Modjo dry port.

Therefore, you are kindly requested to indicate your level of agreement on the **relevance/importance** of each of the influential factors on a scale of 1 to 5. Taking into account Modjo Dry port Operations, rate each statement according to the degree to which you agree with the statement as it concerns your role/activities.

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Macro level factors

Items	1	2	3	4	5
Factor 1: Government Policy(Legal and Political factors)					
6. The current government policy does not encourage Public ownership& operators.	○	○	○	○	○
7. The current government policy encouraging Private ownership & operators.	○	○	○	○	○
8. The current government policy encouraging Public & Private Partnership.	○	○	○	○	○
9. Ethiopian government is currently balancing infrastructure development (rail& road infrastructure).	○	○	○	○	○
10. The government does not have any initiation to improve land side transportation networks.	○	○	○	○	○
11. Investment policy which allows an agglomeration between private and public partnerships (PPP) in dry port operations has been widely adopted.	○	○	○	○	○
12. Multimodal transport policy which affects modal split (utilizing rail transport, for example) is important for Modjo dry port operations to alleviate traffic congestion, lowered emissions, and distribution costs and time are reduced.	○	○	○	○	○
Factor 2: Technological Advancement	1	2	3	4	5
13. There is sufficient technological infrastructure for the dry port operations.	○	○	○	○	○
14. The port uses modern and sophisticated equipment/facilities.	○	○	○	○	○
15. Most of the time the dry port uses electronic data interchanges (EDI).	○	○	○	○	○
16. In Modjo dry port, for entry, exit and placement into storage of containers are tracked by real time computer system.	○	○	○	○	○
17. Computerized yard control system is there to determine with precision where a container is to be placed within stack.	○	○	○	○	○
Factor 3: Socio-cultural influence	1	2	3	4	5
18. There is coordination between various intermodal players involved at dry port operations.	○	○	○	○	○
19. I know that the available labour in the dry port is sufficient enough and they are hard working.	○	○	○	○	○
20. The team in the Modjo dry port operation includes personnel with adequate technical and managerial skills.	○	○	○	○	○
21. There is enough human resources both at customs and dry port terminals.	○	○	○	○	○
22. Limited working hours of customs officials has influence on port operations.	○	○	○	○	○
23. There is sufficient workforce with dry port operation's knowledge.	○	○	○	○	○
24. There is great awareness among the community about the importance of the dry port.	○	○	○	○	○
Factor 4: Economic factor	1	2	3	4	5
25. It is possible to say that total cost import/ export is decreased as a result of dry port operations.	○	○	○	○	○
26. There is no marketing support by local economic agencies and state for Modjo dry port.	○	○	○	○	○
27. The cost of living in the location of Modjo dry port is lower to attract distribution centers into the area.	○	○	○	○	○

Items	1	2	3	4	5
28. The Modjo dry port gives value added services and hence facilitates international trade.	○	○	○	○	○
29. Lower distributions cost (dry port charges, warehousing/ transloading fee) is prevailed in Modjo dry port.	○	○	○	○	○
30. The development of infrastructure in the dry port is at its best for dry port operations.	○	○	○	○	○
Micro level Factors					
Factors 5: Capacity	1	2	3	4	5
31. In the Modjo dry port, there is well maintained warehouse equipment /facilities	○	○	○	○	○
32. In the dry port, there is ample container yard area for receipt/dispatch of containers by road and rail.	○	○	○	○	○
33. There is sufficient space for current and future containers storage.	○	○	○	○	○
34. The port has safe environment to safeguard the containers.	○	○	○	○	○
35. The port has sufficient equipment for loading and unloading of containers.	○	○	○	○	○
36. There are enough warehouses (Bonded or other) for storage of break-bulk cargos.	○	○	○	○	○
37. There is fenced customs secure area which is segregated entry/exit points for different traffic and has enough gates for entry and exit of vehicles.	○	○	○	○	○
38. The port has enough area for customs inspection, consolidation, labeling and packing where cargo may be discharged for inspection.	○	○	○	○	○
39. Administration buildings for dry port management, customs, regulatory agencies, customs clearing agents, etc. are available at required level.	○	○	○	○	○
40. There are enough maintenance spaces and practices for container and handling equipments.	○	○	○	○	○
41. There are enough vehicle entry points at Modjo dry port.	○	○	○	○	○
Factor 6: Hinterland Conditions	1	2	3	4	5
42. Modjo dry port is a strategic location where it is near to an industrial area, and connected to seaport via rail and highway.	○	○	○	○	○
43. The Modjo dry port is connected to seaports with high capacity transport means, where customers can leave and pick up their standardized units.	○	○	○	○	○
44. Limitations in transport infrastructure affect Modjo dry port's accessibility and connectivity and hence create inefficiency.	○	○	○	○	○
45. There is a challenge for dry Modjo dry port in the fact that hauler operators are reluctant to deliver and pick up containers for short trips.	○	○	○	○	○
46. Someone can say that, there is effective Modjo dry port- Djibouti Seaport connectivity...	○	○	○	○	○
47. There is a potential for land expansion of Modjo dry port.	○	○	○	○	○
48. There is adequate high way and wide roads in Modjo dry port.	○	○	○	○	○
Factor 7: Information Accuracy	1	2	3	4	5
49. There is high level of consistency of information given to various parties in the logistics chain.	○	○	○	○	○
50. There is sufficient information sharing between Modjo dry port operators.	○	○	○	○	○
51. The dry port is providing accurate forecasting about the status of the shipment to the shipper.	○	○	○	○	○
52. There is no Technical challenge in EDI systems at Modjo dry port operations.	○	○	○	○	○
53. In the dry port operation, there is high level of accuracy of information.	○	○	○	○	○
54. There is high level of integrity with stakeholders' relationship in Modjo dry port.	○	○	○	○	○
55. There is dedicated network connectivity at each level of ICT usage.	○	○	○	○	○
Factor 8: Connectivity	1	2	3	4	5

Items	1	2	3	4	5
56. In Modjo dry port there is interconnection of importers, shippers, Customs clearing agents, and manufacturers.	○	○	○	○	○
57. Modjo dry port is connected with intra-regional and larger inter-regional transport system.	○	○	○	○	○
58. It is possible to say that there is less integrity in container flow to and from seaports to Modjo dry ports.	○	○	○	○	○
59. Connectivity among stakeholders reduces length of procedures of clearing cargos from dry port.	○	○	○	○	○
60. Unhealthy and weak road and rail infrastructure which is connected to the high way at Modjo dry port leads inefficient operations.	○	○	○	○	○
61. It is possible to say that a modal shift of cargo from road to rail and vice versa is cost effective.	○	○	○	○	○
62. There is efficient inter-modal connectivity and provides a wide range of logistics services.	○	○	○	○	○
63. In Modjo dry port, there is coordination for risk sharing.	○	○	○	○	○
64. In Modjo dry port, there is coordination for facility utilization.	○	○	○	○	○
65. There is increase seaport hinterland connectivity at modjo dry port.	○	○	○	○	○
Section III: Modjo Dry Port Operation Success Criteria	1	2	3	4	5
66. Clearance of imports and exports are done as schedule.	○	○	○	○	○
67. The quality of infrastructure at Modjo dry port is at acceptable level.	○	○	○	○	○
68. The competency and quality of logistics services at Modjo dry port is at its best level.	○	○	○	○	○
69. At Modjo dry port, the ability to track and trace consignments is at low level.	○	○	○	○	○
70. The Modjo dry port provides fast and reliable service with reasonable price.	○	○	○	○	○
71. Shipments are reached at consignees within scheduled or expected delivery times in.	○	○	○	○	○

Section IV: Open ended Questions

72. What are the major problems of Modjo dry port operations?

_____

_____

73 What do you suggest to tackle the identified problems in Modjo dry port operations?_____

_____

_____

_____

Once again, thank you for all of your help and attention to detail!

አዲስ አበባ ዩኒቨርስቲ

የንግድ ሥራ ት/ቤት

ሎጂስቲክስ እና ሰፕላይ ቼን ማኔጅመንት ዲፓርትመንት

የዳሰሳ ጥናት መጠየቂ

የጥናቱ ርዕስ፡ በሞጆ ደረቅ ወደብ የሚከናወኑ ሥራዎችና ለወደቡ ሥራ ተጽኖ የሚያሳድሩ ተግዳሮቶች

ይህ መጠይቅ አራት ክፍሎች አሉት፡፡ ክፍል አንድ የመላሾችን የህይወት ታሪክ ሲይዝ& ክፍል ሁለት የሚይዘዉ የሞጆ ደረቅ ወደብ ኦፕሬሽን/ ሥራ ክንዉን/ ተግዳሮቶችን & ክፍል ሶስት የሚይዘዉ የሞጆ ደረቅ ወደብ ኦፕሬሽን/ ሥራ ክንዉን/ ፍሬያማ ሊያደርጉ የሚችሉ ሁናቴዎች እና ክፍል አራት ደግሞ ያልተገደበ መጠይቅ ይይዛል፡፡

መጠየቄን ከመሙላተዉ በፊት መገንዘብ ያለበዎት፤

1. **መጠየቄ ላይ ስም መጻፍ አያስፈልግም፡**
2. **ሁሉም የተሰጡት መረጃዎች በሰም- አልባነት ይያዛሉ፡**
3. **ሁሉም መረጃዎች በሚስጢር ይያዛሉ፡፡**

የዳሰሳ ጥናት አድራጊዉ፡- ስሜ ከበደ

መመሪያ፡ መልስዎትን የ(√) ምልክት በክቡ ላይ በማድረግና በተሰጠዎት ቦታ ላይ ያስፍሩ፡፡

ክፍል አንድ፡ የመላሾች የህይዎት ታሪክ መረጃ			
ተ.ቁ.	ዝርዝር መግለጫ	የመላሾች ምድብ	
1.	የስራ ምድብ /ኃላፊነት/ሥራ/ የድርጅት ዓይነት	ሞጆ ደረi ወደብ ተርሚናል ሠራተኛ	○
		አስመጪ/ ላኪ	○
		የጉምሩክ አስተላላፊ	○
		የጉምሩክ ሠራተኛ	○
2.	የስራ ልምድ(በዓመት)	< 5 ዓመት	○
		6 - 10 ዓመት	○
		11-15 ዓመት	○
		> 15 ዓመት	○
3.	የትምህርት ደረጃ	ዲፕሎማ	○
		የመጀመሪያ ድግሪ	○
		ሁለተኛ ድግሪ/ ማስተርስ	○
		የፍልስፍና ድግሪ/ፒ.ኤች.ዲ	○
4.	የዕድሜ ክልል(በዓመት)	20-29 ዓመት	○
		30-39 ዓመት	○
		40-49 ዓመት	○
		>49 ዓመት	○
5.	ፆታ	ሴት	○
		ወንድ	○

ክፍል ሁለት፡ የሞጆ ደረi ወደብ ኦፕሬሽን/ ሥራ ክንዉን/ ተግዳሮቶች

ከዚህ በፊት የተደረጉ ተጥናቶችን፣ መጠየj ችና የግል ልምድ በመንተራስ ጥናት አድራጊዉ ስምንት(8) ዋና ዋና በሞጆ ደረi ወደብ ሥራ ላይ ተጽኖ የሚያሳድሩ ተግዳሮቶችን ለይቶ በዝርዝር አስdምጧል፡፡

በመሆኑም፣ በጉልህ አስተዋጽኦ/ ጠgሚነቱ መሰረት ከ 1 እስከ 5 በተሰጠዉ ስኬል መሰረት ሀሳቦዎን እንዲያስdምጡ ይጠየgሉ፡፡ የሞጆ ደረi ወደብ ኦፕሬሽን/ ሥራ ክንዉን/ በመዉሰድ በእያንዳንዱ ተግዳሮት ሥር ከተሰጠዉ ዓረፍተ ነገር ትዩዩ ላይ እንደ ሥራዎ/ እንiስgሴዎ መሰረት ስምምነትዎን መርጠዉ ያስፍሩ፡፡

1 = በፍጹም አልስማማም
2 = አልስማማም
3 = ምንም
4 = እስማማለሁ
5 = በጣም አስማማለሁ

በማክሮ ደረጃ ያሉ ወሳኝ ነገሮች

መግለጫ	1	2	3	4	5
ወሳኝ ነገር 1: የመንግስት ፖሊሲ(ፖሊቲካላዊና ህግ ነክ)					
6. የመንግስት ፖሊሲ በአሁኑ ወቅት በመንግስት ባለቤትነት የሚከናወኑ የደረጃ ወደብ ሥራዎችን አያበረታታም።	○	○	○	○	○
7. የመንግስት ፖሊሲ በአሁኑ ወቅት የግሉን ዘርፍ በደረጃ ወደብ ሥራዎችን እንዲሳተፍ ያበረታታል።	○	○	○	○	○
8. የመንግስት ፖሊሲ በአሁኑ ወቅት የመንግስትና የግሉ ዘርፍ በደረጃ ወደብ ሥራዎች ላይ ተወዳዳሪነትን እንዲሰፍን ያበረታታል።	○	○	○	○	○
9. የኢትዮጵያ መንግስት በአሁኑ ጊዜ የመሰረተ ልማት ሥራዎችን በሞጆ በደረጃ ወደብ ላይ አጣጥሞ እየሰራ(የመንገድና የባቡር መሰረተ ልማት) ነዉ ።	○	○	○	○	○
10. መንግስት በሞጆ በደረጃ ወደብ ላይ ተከታታይ የሆነ የመሰረተ ልማት ትስስር ማሻሻያዎችን እያከናወነ አይደለም።	○	○	○	○	○
11. የመንግስት ኢንቨስትመንት ፖሊሲ በደረጃ ወደብ ሥራ ላይ የግሉን ዘርፍ ከመንግስት ጋር በማወዳደር በስፋት እየሰራበት ነዉ።	○	○	○	○	○
12. መንግስት አሁን እየተገበረ ያለዉ የመልቲ ሞዳል ትራንስፖርት ፖሊሲ (ለምሳሌ ከመንገድ ወደ ባቡር መዞር) በሞጆ ደረጃ ወደብ ሥራ ላይ የትራፊክ መጨናነቅን አስወርዷል & የአካባቢ ብክለት ወንዷል እንዲሁም የስርጭት ወጪና ጊዜ እንዲወንስ አድርጓል።	○	○	○	○	○
ወሳኝ ነገር 2: የቴክኖሎጂ ዕድገት	1	2	3	4	5
13. በሞጆ ደረጃ ወደብ ዉስጥ ለስራ ክንዉን በፍና ምቹ የሆነ የቴክኖሎጂ መሠረተ ልማት አለ።	○	○	○	○	○
14. ሞጆ ደረጃ ወደብ ለስራ ክንዉን ዘመናዊ መሳሪያዎችን ይጠቀማል።	○	○	○	○	○
15. ሞጆ ደረጃ ወደብ አብዛኛዉን ጊዜ ኤሌክትሮኒክ ዳታ ኢንትርቼንጅ(EDI) ይጠቀማል።	○	○	○	○	○
16. በሞጆ ደረጃ ወደብ ለመግቢያ& ለመዉጫና ኮንቴነር ያለበትን ቦታ በኮምፒዩተር በመታገዝ በቀላሉ በአጭር ጊዜ አገልግሎት ይሰጣል።	○	○	○	○	○
17. የኮንቴነር ማስወጫ ቦታዉ ሙሉ በሙሉ በኮምፒተር በመጠቀር ኮንቴነር የትኛዉ ድርድር ላይ እንዳለ በትክክል ይታወቃል።	○	○	○	○	○
ወሳኝ ነገር 3: ማኅበረሰባዊ- ባህል ተጽኖ	1	2	3	4	5
18. በሞጆ ደረጃ ወደብ ሥራ ላይ የሚሳተፉ የተለያዩ አካላት ትብብራዊ መስተጋብር አላቸዉ።	○	○	○	○	○
19. እኔ እንደማዉቀዉ በሞጆ ደረጃ ወደብ ያሉት ሰራተኞች በፍና ጠንካራ የስራ ባህል ያላቸዉ ናቸዉ።	○	○	○	○	○
20. በሞጆ ደረጃ ወደብ ያሉት ሰራተኞች የሚመሩት በፍ አስተዳደራዊና ቴክኒክ ክህሎት ባላቸዉ አመራሮች ነዉ።	○	○	○	○	○
21. በሞጆ ደረጃ ወደብ ተረሚናል እና በጉምሩክ እንዲሁም በሌሎችም ተሳታፊዎች አስተማማኝ የሆነ የሰዉ ኃይል አለ።	○	○	○	○	○
22. የጉምሩክ ሰራተኞች የስራ ስዓት(በቀን 8 ስዓት) በሞጆ ደረጃ ወደብ ተረሚናል የስራ ክንዉን ላይ ምንም ዓይነት ተጽኖ የለዉም።	○	○	○	○	○
23. ሞጆ ደረጃ ወደብ ተረሚናል በፍ የሆነ የደረጃ ወደብ ሥራ/ኦፕሬሽን/ እዉቀት ያለዉ የሰዉ ኃይል ባለቤት ነዉ።	○	○	○	○	○
24. በሞጆ ደረጃ ወደብ አካባቢ የሚኖረዉ ማኅበረሰብ ስለ ወደቡ ጥቅምና አገልግሎት በፍ የሆነ ግንዛቤ አለዉ።	○	○	○	○	○
ወሳኝ ነገር 4: ኢኮኖሚ	1	2	3	4	5
25. በሞጆ ደረጃ ወደብ በመጠቀም ምክንያት የአስመጪዎች/ላኪዎች ጠቅላላ የሎጂስቲክስ ወጪ ቀንሷል ማለት ይቻላል።	○	○	○	○	○

መግለጫ	1	2	3	4	5
26. ሞጆ ደረi ወደብ በአካባቢዉ መንግስት አስተዳደርና የኢኮኖሚ አንdሳgሾች ገበያ የማስተዋወi እገዛ አይደረግለትም፡፡	○	○	○	○	○
27. በሞጆ ደረi ወደብ አካባቢ ያለዉ የኑሮ ዉድነት ዝiተኛ መሆን መጋዘኖች እና ሌሎች ሎጂስቲክስ አገልግሎት መስጫ አዉታሮች በአካባቢዉ እንዲስፋፉ አገዟል፡፡	○	○	○	○	○
28. በሞጆ ደረi ወደብ እሴት የሚጨምሩ አገልግሎቶች በመኖራቸዉ ዓለም ዓdፍ ንግዱ እንዲሳለጥ አድርጓል፡፡	○	○	○	○	○
29. የሞጆ ደረi ወደብ ወጪ(የወደብ ክፍያ& የመጋዘን/ የአገር ዉስጥ ማጓጓዣ ወጪ) ዝiተኛ ነዉ ማለት ይቸላል፡፡	○	○	○	○	○
30. በአጠgላይ በሞጆ ደረi ወደብ ላይ ያለዉ መሰረተ ልማት ደረi ወደቡ የሥራ ክንዉን አመቺ ነዉ፡፡	○	○	○	○	○
በአነስተኛ ደረጃ ያሉ ወሳኝ ነገሮች					
ወሳኝ ነገር 5: አiም	1	2	3	4	5
31. የሞጆ ደረi ወደብ ጥሩ የሚባል የአg ማከማቻ መጋዘን ከእነሙሉ መሳሪያዉ ባለቤት ነዉ፡፡	○	○	○	○	○
32. ሞጆ ደረi ወደብ ሰፊ የሆነ ኮንቴነር ከባቡር /መኪና መdበያና ማስመጫ የኮንቴነር ቦታ አለዉ፡፡	○	○	○	○	○
33. ሞጆ ደረi ወደብ ለአሁኑም ለወደፊቱም የሚሆን በf የሆነ የኮንቴነር ማሰdመጫ ቦታ አለዉ፡፡	○	○	○	○	○
34. በሞጆ ደረi ወደብ ያሉ ኮንቴነሮች አስተማማኝ እና ደህንነታቸዉ የተጠበd ነዉ፡፡	○	○	○	○	○
35. ሞጆ ደረi ወደብ በf የሆኑ የማዉረጃና መጫኛ መሳሪያዎች አሉት፡፡	○	○	○	○	○
36. ሞጆ ደረi ወደብ በf የሆኑ ለብትን ዕgዎች የሚሆኑ መጋዘኖች(ቦንድድ ወይማ ሌላ አሉት፡፡	○	○	○	○	○
37. በሞጆ ደረi ወደብ የታጠረ ለተሸከርካሪዎች መግቢያ/ መዉጫ በር ያለዉ የጉምሩክ ክልል አለዉ፡፡	○	○	○	○	○
38. ደረi ወደቡ በf የሆነ የጉምሩክ መፈተሻ& መሰብሰቢያ& ማሸጊያ& ለዉጪ ምርት ማዘጋጃ እና ማራገፊያ ቦታ አለዉ፡፡	○	○	○	○	○
39. በደረi ወደቡ ዉስጥ ለወደቡ አስተዳደር ቢሮ& ለጉምሩክ ቢሮ& ለየተjጣጣሪ መ/ቤቶች& ለጉምሩክ አስተላላፊዎች እና ለሌሎች አካላት የሚሆኑ ህንጻዎች በበf ሁኔታ ተገንብተዋል፡፡	○	○	○	○	○
40. በደረi ወደቡ ዉስጥ ለሚከናወኑ የኮንቴነርና የመሳሪያዎች የጥገና ሥራዎች የሚሆን በf ቦታ አለ፡፡	○	○	○	○	○
41. ደረi ወደቡ በf የሆነ የተሸከርካሪዎች መግቢያና መዉጫ አለዉ፡፡	○	○	○	○	○
ወሳኝ ነገር 6: ደረi ወደቡ የተገነባበት ቦታ	1	2	3	4	5
42. ሞጆ ደረi ወደብ የተገነባዉ ስትራቴጂካል በሆነ ቦታ ማለትም ለኢንዱስትሪ ቦታዎች የdረበና ከጅቡቲ ወደብ በባቡር መስመር የተገናኘ ነዉ፡፡	○	○	○	○	○
43. ሞጆ ደረi ወደብ ከባህር ወደብ ጋር ትልi አiም ባለዉ የትራንስፖርት አዉታር የተየያዘና ደንበኞች በdላሉ ዕgቸዉን መስጠትና መdበል የሚያስችል አሰራር ያለዉ ነዉ፡፡	○	○	○	○	○
44. የትራንስፖርት መሰረተ ልማት ዉስንነት የሞጆ ደረi ወደብን ተደራሽነትንና ትስስር በመግታት ወደቡ ዉጤታማ እንዳይሆን አድርጎታል፡፡	○	○	○	○	○
45. በሞጆ ደረi ወደብ የሚገኙ የአገር ዉስጥ ትራንስፖርት አገልግሎት የሚሰጡ ድርጅቶች ከወደቡ ለሚነሱና ወደ ወደቡ ለሚገቡ ዕgዎች የአጭር ርdት አገልግሎት ለመስጠት ፈgደኛ አይደሉም፡፡	○	○	○	○	○
46. በአሁኑ ወiት የሞጆ ደረi ወደብ እና የጅቡቲ ወደብ(የባህር ወደብ) ጥሩ ትስስር አለዉ ለማለት ይቻላል፡፡	○	○	○	○	○
47. የሞጆ ደረi ወደብ ለወደፊቱ ማስፋፊያ የሚሆን በf ቦታ አለዉ፡፡	○	○	○	○	○
48. ሞጆ ደረi ወደብ ሰፋፊ እና በጥሩ ሁኔታ ላይ ባሉ መተላለፊያ መንገዶች የተሳሰረ ነዉ፡፡	○	○	○	○	○

መግለጫ	1	2	3	4	5
ወሳኝ ነገር 7: የኢንፎርሜሽን ትክክለኛነት	1	2	3	4	5
49. በሎጂስቲክስ ሰንሰለት ዉስጥ በሚሳተፉት ባለድርሻ አካላት መካከል ያልተዛነፈ መረጃ ፍሰት አለ፡፡	○	○	○	○	○
50. በሞጆ ደረi ወደብ ኦፕሬሽን በሚሳተፉ አካላት መካከል በf የሆነ የመረጃ ልዉዉጥ አለ፡፡	○	○	○	○	○
51. ሞጆ ደረi ወደብ ለተጫነዉ ዕg ያለበትን ሁኔታ ትንቢያ በትክክል ለደንበኛዉ ያስተላልፋል፡፡	○	○	○	○	○
52. ሞጆ ደረi ወደብ በ EDI ሲስተም ላይ ምንም አይነት የቴክኒክ ችግር የለበትም፡፡	○	○	○	○	○
53. በሞጆ ደረi ወደብ ሥራ ክንዉን የመረጃ ፍሰት በጣም አስተማማኝ ደረጃ ላይ ነዉ ያለዉ፡፡	○	○	○	○	○
54. በሞጆ ደረi ወደብ ላይ በሚሳተፉ ባለድርሻ አካላት መካከል iንጅትን የሚያሳይን ትስስር አለ፡፡	○	○	○	○	○
55. በሞጆ ደረi ወደብ ዉስጥ ለእያንዳንዱ የአይሲቲ ተጠgሚ ዘላf የሆነ የማይkረጥ የኔትወርክ ዝርጋታ አለ፡፡	○	○	○	○	○
ወሳኝ ነገር 8: ትስስር/ግንኙነት	1	2	3	4	5
56. በሞጆ ደረi ወደብ አስመጪዎቸን& ላኪዎችን& የዕg አስተላላፊዎችን እና አምራቾችን እርስ በእርስ የሚያገናኝ አሰራር ዘርግቷል፡፡	○	○	○	○	○
57. ሞጆ ደረi ወደብ በአካባቢዉ እና ከአካባቢዉ ራi ብሎ ካለዉ የትራንስፖርት ስስተም የተjራኘ ነዉ፡፡	○	○	○	○	○
58. ከባህር ወደብ ወደ ሞጆ ደረi ወደብ የሚጋባዉና የሚወጣዉ ኮንቴነር ፍሰት iንጅት አነስተኛ ነዉ ማለት ይቻላል፡፡	○	○	○	○	○
59. በባለድርሻ አካላት መካከል ያለዉ ትስስር/iንጅት እgዎችን ከሞጆ ደረi ወደብ ለማስወጣት የሚወስደዉን ጊዜ ይdንሳል፡፡	○	○	○	○	○
60. ጤናማ ያልሆነ እና ደካማ የሆነ የመንገድ እና የባቡር መሰረተ ልማት ትስስር ሞጆ ደረi ወደብ ዝiተኛ አፈጻጸም እንዲኖረዉ አድርጓል፡፡	○	○	○	○	○
61. ከመንገድ ወደ ባቡር እና ከባቡር ወደ መንገድ የሚደረገዉ ለዉጥ ሞጆ ደረi ወደብ በዝiኛ ወጪ አገልግሎት እንዲሰጥ አስችሎታል፡፡	○	○	○	○	○
62. ሞጆ ደረi ወደብ dልጣፋ የሆነ ግንኙነት ከሎጂስቲክስ አገልግሎት ሰጪዎች ጋር በመፍጠር የተdላጠፈ አገልግሎት ይሰጣል፡፡	○	○	○	○	○
63. ሞጆ ደረi ወደብ ከሚመለከታቸዉ አካላት ጋር በመተባበር በስራ ላይ የሚከሰተዉን አደጋ/ጉዳት ይከላከላል/ይሸፍናል፡፡	○	○	○	○	○
64. ሞጆ ደረi ወደብ በዉስጥ የሚገኙትን መገልገያዎች በትብብር ጥiም ላይ እንዲዉሉ ያደርጋል፡፡	○	○	○	○	○
65. ሞጆ ደረi ወደብ የባህር ወደብን ከየብስ ጋር የማገኛኘዉ ሥራ ይበልጥ እየጨመረ ሄዷል፡፡	○	○	○	○	○
ክፍል ሦስት: የሞጆ ደረi ወደብ ዉጤታማነት ማሳያ መስፍርት	1	2	3	4	5
66. በሞጆ ደረi ወደብ የገቢና ወጪ ዕgዎች ለማስወጣት በተdመጠላቸዉ ጊዜ የጉምሩክ ሥነ ስርዓት ይጽማል፡፡	○	○	○	○	○
67. ሞጆ ደረi ወደብ ዉስጥ ጥራት እና ብgት ያለዉ መሰረተ ልማት ተዘርግቷል፡፡	○	○	○	○	○
68. ደንበኞች ብgትና ጥራት ያለዉ የሎጅስቲክስ አገልግሎት በሞጆ ደረi ወደብ እያገኙ ነዉ ማለት ይቻላል፡፡	○	○	○	○	○
69. ሞጆ ደረi ወደብ ጭነቶች ያሉበትን እና የደረሱበትን ሁኔታ የማወi አiሙ ዝiተኛ ነዉ፡፡	○	○	○	○	○
70. የሞጆ ደረi ወደብ በተመጣጣኝ ዋጋ ፈጣንና አሰተማማኝ የሆነ አገልግሎት ይሰጣል፡፡	○	○	○	○	○
71. ጭነቶች በሙሉ በተdመጠላቸዉ የጊዜ ሰሌዳ ለአስመጪዉ ይደርሳሉ፡፡	○	○	○	○	○

ክፍል አራት: ያልተገደበ መጠይi

72. **የሞጆ ደረi ወደብ ኦፕሬሽን/ሥራ ክንዉን/ ዋና ዋና ችግሮች /ተግዳሮቶች የሚባሉት የትኞቹ ናቸዉ?**

_____
_____
_____
_____
_____

73. **ከላይ ለተለዩት ችግሮች /ተግዳሮቶች መፍትሔ ነዉ ብለዉ የሚያdርቡት ሃሳብ ምንድነዉ?**

_____
_____
_____
_____
_____

ዉድ ጊዜዎትን ስጥተዉ ይህን መጠይi ስለሞሉልኝ በጣም አመሰግናለሁ፡፡

Annex C: Interview

The Practices and Challenges of dry ports: The case of Modjo dry port.

Consent Form (For Interview):

This consent form is for interview participants from Modjo dry port operators, Port authorities, Customs authorities and importers /exporters.

1. I agree to take part in the research study named above.
2. I have read and understood the Information Sheet for this study.
3. The nature and possible effects of the study have been explained to me.
4. I understand that the study involves me taking part in a face-to-face interview which took about 20-45 minutes. My answers may be recorded with my consent and permission.

I agree to have the interview voice recorded. Yes ☐ No ☐

5. I understand that there are no specific risks anticipated with participation in this study.
6. Any questions that I have asked have been answered to my satisfaction.
7. I understand that the researcher will maintain confidentiality and that any information I supply to the researcher will be used only for the purposes of the research.
8. I understand that the results of the study will be published so that I cannot be identified as a participant.
9. I understand that my participation is voluntary and that I may withdraw at any time without any effect. If I so wish, until 19 March 2019, I may request that any data I have supplied be withdrawn from the research.

Participant's name: _____

Participant's signature: _____

Date: _____

Annex D. Profile of interview participants and interview durations

No.	Identify code	Participants	Years of experience	Designation of respondents	Academic qualification	Organizations	Interview session	Duration of interview
1	FIP 1*	Dry port terminal	6 years	Senior terminal officer	Bachelor degree	Modjo dry port	11th Mar. 2019 10:15-10:55	40 minutes
2	FIP 2	Dry port terminal	7 Years	Senior technical officer	Bachelor degree	Modjo dry port	12th Mar. 2019 09:20-09:45	25 minutes
3	FIP 3	Customs office	8 years	Senior office , valuation TSC unit	Bachelor degree	Customs office Modjo dry port branch	13th Mar. 2019 10:00-10:45	45 minutes
4	FIP 4	Customs office	12 years	Senior office , valuation MG unit	MA degree	Customs office Modjo dry port branch	15th Mar. 2019 10:15-11:00	45 minutes
5	FIP 5	Clearing Agent	10 years	Manager	Bachelor degree	SAS Transit	15th Mar. 2019 14:05-14:45	40 minutes
6	FIP 6	Clearing Agent	13 Years	Manager	Bachelor degree	Family Transit	16th Mar. 2019 10:25-11:10	45 minutes
7	FIP 7	Import/ export	7 years	Operation Head	Bachelor degree	Coma import/export	16th Mar. 2019 14:10-14:45	35 minutes
8	FIP 8	Import/ export	10 years	Manager	Bachelor degree	Sole	17th Mar. 2019 09:10-09:55	45 minutes

* Face-to-face interview participant (FIP)

Annex E: Interview Guide for Modjo Dry port stakeholders (actors)

Interview guide for dry port terminal staffs, shippers, Customs officers and Customs clearing agents.

Interview Questionnaire

Research title: The Practices and challenges of dry port operations: The case of Modjo dries Port.

Q1. What are the main functions of Modjo dry port?

Q2. Do you think that the stakeholders benefit from the assistance of dry ports in managing cargo transported to and from Djibouti seaports in terms of time and cost?

Q3. What are the infrastructure/personnel requirements for Modjo dry port operations?

Q4. What do you think are the major challenges facing Modjo dry port?

Q5. Based on the challenges mentioned in Q5, what do you think are the best strategies for improving Modjo dry port operations performance?

Q6. What are the factors that influence Modjo dry port operations?

Q7. How does Modjo dry port perform?

Q8. What is the measures in Modjo dry port that the government should implement?

END OF INTERVIEW

I sincerely appreciate your time and cooperation**!**

Annex F: Figures

Fig.G.1: Modjo dry port site plan

Fig. G.2: Container Yard

Fig.G.3: Empty Container Yard

Fig. G.4: Forklift moving pallets from/to container

Fig. G.5: Warehouse