EFFECT OF INSTITUTIONAL FACTORS ON DRY PORTS PERFORMANCE AT EMBAKASI INTERNAL CONTAINER DEPOT, KENYA

BY

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DECLARATION

Declaration by the Candidate

This thesis is my original work and has not been presented for degree in any other University. No part of this thesis may be produced without prior written permission of the author and/or Moi University.

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DEDICATION

I dedicate this project to my Almighty God, my family and all my lecturers and supervisors for working tirelessly in ensuring completion in my studies.

ABSTRACT

Poor performance of dry port that is characterized by delay has been experienced lately in Kenya. Delay of containers on container clearance has emerged and evident at Embakasi Internal Container Depot which has indicated long clearance period or overstay of received containers at the port for more than 10-12 days. The delay in clearing containers at the port is made worse by lack of suitable container handling equipment, poor customs operations, inadequacy of port infrastructure, staff incompetence and the size and capacity of the port. To reap the maximum benefit from dry ports, the efficient and effective performance of the dry ports is very crucial and to do that it is important to identify factors which affect the performance of dry ports. The main objective of this study was to determine the effect of institutional factors on performance of Embakasi Internal Container Depot, a Kenyan Dry Port. The objectives of the study were: to determine the effect of port infrastructure on performance of Embakasi Internal Container Depot, to evaluate the effect of human resources on performance of Embakasi Internal Container Depot, to establish the effect of operations on performance of Embakasi Internal Container Depot and to find out the effect on customers/stakeholder perception on performance of Embakasi Internal Container Depot.. This study adopted d explanatory research design. The study targeted a total population of 302. A sample size of 169 respondents was selected using Kumar's formulae and the study adopted stratified sampling design. Primary data was collected using structured questionnaires. Research instruments were validated by the university supervisors. Piloting was used to test the reliability of the research instruments. An overall correlation coefficient of 0.76 was obtained for all variables which exceeded the prescribed threshold of 0.7 meaning they were reliable. Data was collected using structured questionnaire which was analyzed using both descriptive with the aid of SPSS version 24.0 and inferential statistic. Results of the study were presented in form of frequency tables, charts and graphs. From the regression findings, the predicted value of dry port performance at dry port performance holding infrastructure, human resources, operations and customers' perception to a constant zero would be 4.011. Infrastructure has a significance effect on dry port performance as indicated by β_1= 0.754, p=0.013< 0.05. This implies that a unit increase in infrastructure would lead to an increase in dry port performance by 0.772 units. Human resources had a significance effect on dry port performance as indicated by β_1= 0.772, p= 0.013< 0.05. This implies that a unit increase in human resources would lead to an increase in dry port performance by 0.772 units. Operations had a significance effect on employee performance as shown by β1= 0.661, p=0.014< 0.05. This implied that a unit increase in operations would lead to an increase in dry port performance by 0.661 units. Customers perception has a significance effect on dry port performance as indicated by β_1= 0.642, p= 0.015< 0.05. This implied that a unit increase in Customers perception would lead to an increase in dry port performance by 0.642 units. At 5% level of significance and 95% level of confidence, all the variables were significant (p<0.05). The study recommended that in order to improve the performance of Embakasi Internal Container Depot, the government should invest on port infrastructure. The study was limited to Embakasi Internal Container Depot and to enhance generalization, further studies should be carried in other ports.

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ABBREVIATIONS AND ACRONYMS

EAC	East African Community
GDP	Gross Domestic Product
ICD	Internal Container Depot
KPA	Kenya Ports Authority
KRA	Kenya Revenue Authority
SPSS	Statistical Package for Social Sciences
TEUs	Twenty Foot Equivalent Unit

OPERATIONAL DEFINITION OF TERMS

Capacity	This is the extent to which an enterprise or a nation actually uses its installed productive capacity commercially (Gujar, 2011).
Effectiveness in port operations	The expected performance of the port (Gerald, 2010)
Handling equipment	These are machines present in the port that aid in loading and unloading the cargo Panayides and Song (2009)
Port infrastructure	This constitutes number of tarmac roads at the port, the state of railway line and communication network (ICT) (Wirtz & Lihotzky, 2013).
Port Performance	This can be broadly classified into customer service delivery levels and the operational costs of the firm. According to balanced scorecard it is the performance in delivery increased output, financial independency perspective, customer satisfaction perspective and port safety and security (Yap and Lam 2013).

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

Chapter one of this study comprises of its background, the statement of the problem, the purpose, objectives of the research as well as questions, the justification and the significance of the study and the scope of the study

1.1 Background of the Study

Port performance indicators extend from port financial and operational to environmental, safety, security and trade facilitating issues, and can also be used for other port services, hinterland (rail and road) connections and trucks. Port performance is an investigation of effectiveness and performance in the accomplishment of a given activity and where the assessment is carried out in relation to how well the objectives have been met. In relation to performance, Bichou and Gray (2004) expressed three broad categories: physical indicators, factor productivity indicators and economic and financial indicators they further argued that physical indicators generally refer to time measures and are mainly concerned with the ship (for example, ship turn round time, ship waiting time, berth occupancy rates and working time at berth). Factor productivity indicators focus on the maritime side of the port as it measures both labour and capital required to load and unload goods from ship. Economic and financial indicators are also related to the sea side access in relation to operating surplus or total income and expenditure in respect to Gross Registered Tonnes or Net registered tonnes (Bichou and Gray (2004). The more efficiently a port is operated, the more throughputs can be accommodated within the physical capacity of its infrastructure. It is therefore critical to accompany investments

with institutional reforms that increase the performance and performance of port operations.

1.1.1 Global Perspective

Ports have traditionally evaluated their performance by comparing their actual and optimum throughputs (measured in tonnage or number of containers handled). If a port's actual throughput approaches its optimum throughput over time, the conclusion is that its performance has improved over time. On the other hand when the port registers poor performance such as high container dwell time, threat of Vessel delay surcharge and worst still is the big ships avoiding the port. In the long run this renders transport from the port un-competitive by factual analysis. Efficient dry ports are essential for efficient national, regional and international logistics and business more generally. However, efficient dry port performance depends on a number of factors, including adequate and efficient facilities and technology for cargo handling, accessibility and connectivity (both seaside and landside), port location in relation to trade routes and hinterland, skills and labour, proper container security, available services like customs as well as appropriate managerial technologies. While some of these factors may be in the control of port management, others may be beyond their immediate control.

According to the shippers Council of East Africa (2013), between 2001 and 2012, the annual container traffic growth at Mombasa and Dar-es-Salaam Ports was 11.1% and 12.9% respectively. This growth created bottlenecks such as congestion at ports, traffic jam, increase in cargo dwell time, truck turnaround time and generally in performance in service delivery. From physical observation particularly Mombasa, the point between the port exit gate and Mariakani, traffic is

so heavy that trucks spend up to six hours to navigate through a 30km distance which would take half an hour.

The East African region suffers high transport and trade logistics costs like most of Sub-Sahara Africa. To Elayne Wangalwa (2015), transport and logistics costs of East Africa account for 30% to 50% of the exports value and at times goes up to 75% for some landlocked countries in the region. This is estimated to be 60% above USA transport costs from the coast to the hinterland. This unprivileged situation negatively affects business and renders the region less competitive. The high costs are attributed to over reliance on road transport and inefficient ports, which is a costly interim of energy consumption, speed and environment. To reduce costs and make the region competitive, investment in dry ports and high capacity rail links would be ideal. The cost of shipping a container from China to East African ports which is thousands of miles away costs $4000, the same as transporting the same container from Mombasa port to Kampala city in Uganda which is just 1000km.

Andrew Roberts (2013) reported that as the trade and economic growth figures in East Africa increased Sea port activities, traffic jam and congestion increased at Mombasa Sea port too. For example, from 2005 to 2008, imports at Mombasa port grew at an annual rate of 9.7 %(liquid bulk), 11.5% containerized cargo and at 23 % (dry bulk). This implies that as trade and economic growth increased, the need for port services also increased and due to limitations in expansion of existing sea ports, investment in dry ports was required and this trend has led to recent investment in dry ports in East Africa. According to the Shippers Council of East Africa, (2013), Mombasa, the busiest container terminal in East Africa saw container volume increase by 25% in the first half of 2012 alone, and handled an estimated 840,000 TEU in 2013 from about

700,000 TEUs the previous year. Figure.1 in this paper shows the growth trend in traffic (Container, general cargo, liquid and bulk) at Dar es Salaam port in Tanzania between June 2005 and June 2013.

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

Dry port as defined by Roso *et al*. (2009) is an inland intermodal terminal directly connected to seaport(s) with high capacity transport mean(s), where customers can leave/pick up their standardized units as if directly to a seaport." A dry port can be understood as an inland setting with cargo-handling facilities to allow several functions to carry out, for example, cargo consolidation and distribution, temporary storage of containers, custom clearance, connection between different transport modes, allowing agglomeration of institutions (both private and public) which facilitates the interactions between different stakeholders along the supply chain, etc (Ng and Gujar, 2009).

The World Bank Logistics Performance Index (LPI) which is an overall LPI score measures the performance of a country's logistics based on performance of customs

clearance process, quality of trade and transport-related infrastructure, ease of arranging competitive shipments in terms of price, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time (Arvis, *et al*.2014).

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

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

Developing countries like Kenya have experienced high transit transportation costs, limitation of technical and technological capacity, imported inflation, limited

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

Mombasa and Dares Salaam Sea ports found in Kenya and Tanzania respectively are the current gateways to East Africa from the Indian Ocean, although a third Sea port in Lamu (Kenya) is under construction by China Communications Construction Company in a deal worth $478.9 million to directly link the coast, Kenya, Ethiopia and Southern Sudan. Traditionally, dry ports development and expansion was linked to economic growth and increase in volume of trade. The growth in the volume of trade turned such regions or places into the centers of attraction (Grishi, 2010). Key South East Asian ports like Singapore, Hong Kong, Mumbai and Shanghai are a classic example. Continuous rise in trade resulted in a rapid rise in demand for port services, of which failure to meet capacity needs created inperformance and operational bottlenecks. Challenges to expansion in original sea ports included limited land or high cost of land, together with the high cost of relocating people and compensations for the destroyed property to pave way for port expansion. Many nations beginning with the most developed and industrialized established dry ports as a solution.

1.1.2 Kenyan Perspective

Kenya's economy (and most other countries of the EAC) which depend on imports for all of its petroleum needs, would grind to a half. The next four largest items by weight, maize clinker, wheat, iron and steel are critical in meeting the country's food needs and in supporting its vibrant construction industry (Kenya Ports Authority, 2010).

The Nairobi ICD is located within a fenced area of 18.7ha at Embakasi and has a capacity of 180 000 TEU per annum. Due to its geographic position, the Nairobi ICD is best positioned to serve local traffic. It does, however, serves as a transit point for traffic to Kisumu. The Kisumu ICD in Kibosis designed for a capacity of 15,000 TEU per annum and has recently recorded a 150 per cent increase in its traffic. Plans are underway to transform the Kisumu dry port to become a transshipment point between the Port of Mombasa and other remote Kenyan counties along the Northern Corridor as well as Uganda, South Sudan, Rwanda and Burundi. The Kisumu ICD may be complimented by the Eldoret ICD, which was established in 1994 to primarily target the land-locked countries of Uganda, Rwanda and Burundi. However, this dry port facility is not currently in use and the volume of traffic heading from Nairobi to the Rift Valley and neighboring countries to the north is low given lack of rail and road connections and instability in South Sudan

Kenya's neighbours may also develop their own ICDs with reports that there is a project underway for the establishment of an ICD in Kampala. Rwanda is also reportedly improving operations at its container depot in Gikondo with assistance from the KPA and there are reports that. Dubai Ports World plans to construct a US$40 million ICD in Masaka, a suburb of Kigali, as Rwanda seeks to become a regional trade logistics centre.

Conversely, Mombasa entry port has exceeded its design capacity, yet it is expected to handle growing imports and exports. The port is already operating at maximum capacity for both general and containerized cargo, and will suffer progressive declines in operational performance unless both capacity and terminal performance issues are urgently addressed (Kenya Ports Authority, 2010). In terms of capacity, container imports at the port have risen on average 10 percent each year since 2005 (Kenya Ports Authority, 2010), despite relatively low GDP growth rates in 2007 to 2008. In term of performance, several key issues need to be addressed for both imports and exports that relate to movement of goods through the port, and inefficiencies caused by the management of trucks loading and unloading goods, collection of custom duties, inspection.

As trade volumes along world's trade routes increases, pressure has been experienced in transport facilities including ports. Ports being nodal point in the global logistics and supply chain have had their roles clearly defined. However, their performance of operations can be inhibited or promoted by performance and performance of other elements in the chain as they complement each other in service delivery. Traditionally, port performance of operation has been measured through analysis of internal port logistics and sea side access facilities with no focus on correlation between hinterland transport connectivity and port performance, which has led to paradigm shift in trade route decisions and choices where shippers do not only choose a convenient gateway but a gateway characterized by efficient and performance of logistics.

The operational capacity for container cargo is particularly acute with the growing demand in containerized cargo; the Mombasa entry Port is facing serious capacity

problems (Kenya Ports Authority, 2010). Short-term immediate impact is an increased in vessel delays, port congestion surcharges, and slower throughput of the port (when congested) thus causing significant cargo delays and higher costs to importers. Exporters also experience increased costs because of possible unscheduled delays at the port, disappointing customers who have based their own business decisions on fixed delivery schedules. The fact of the matter remains that, the capacity issues at the port of Mombasa could act as a brake on growing trade within the region (Kenya Ports Authority, 2010).

1.1.3 Dry Port Performance

The purpose of dry ports the world over is not to drive existing mother seaports and inland depots out of business, but to complement them. Dry ports allow the provision of additional logistic services for the mother ports such as cargo consolidation, provision of additional storage space for both cargo and empty containers, as well as container cleaning, fumigation and light repairs. All these cannot be undertaken in congested seaports and inland container depots. The establishment of dry ports, therefore, relieves the stiff competition for space between cargo storage and clearing as well as customs activities at the seaports and makes them more efficient, neat and competitive. Dry ports, therefore, relieves the stiff competition for space between cargo storage and clearing as well as customs activities at the seaports and makes them more efficient, neat and competitive.

Port Performance Understanding performance is a concept fundamental to any business, whether it is the measuring of achievements against set goals and objectives or, against the competition. Ports are no exception and it is only by comparison that performance can be evaluated. Ports are, however, a complex business with many

different sources of inputs and outputs which make direct comparison among apparently homogeneous ports seem difficult (Valentine and Gray, 2002). The port industry like any other industry measures its performance, such measurement has been focused on productivity indicators. Performance appraisal is a requirement for the development of any economic activity and the literature offers different definitions of performance (Marlow and Casaca, 2003). Mentzer and Konrad (1991) define performance as an investigation of effectiveness and performance in the accomplishment of a given activity and where the assessment is carried out in relation to how well the objectives have been met. In relation to performance, Bichou and Gray (2004) expressed three broad categories : physical indicators, factor productivity indicators and economic and financial indicators they further argued that physical indicators generally refer to time measures and are mainly concerned with the ship (for example, ship turn round time, ship waiting time, berth occupancy rates and working time at berth). Factor productivity indicators focus on the maritime side of the port as it measures both labour and capital required to load and unload goods from ship. Economic and financial indicators are also related to the sea side access in relation to operating surplus or total income and expenditure in respect to Gross Registered Tonnes or Net registered tonnes (Bichou and Gray (2004).

The more efficiently a port is operated, the more throughputs can be accommodated within the physical capacity of its infrastructure. It is therefore critical to accompany investments with institutional reforms that increase the performance and performance of port operations. A first key step would be to move toward the adoption of the internationally preferred landlord model of port management, whereby the public sector provides port while the private sector provides port services; second step would be to seek greater private participation in port operation and investment. To reap the

maximum benefit from those dry ports, the efficient and effective performance of the dry ports is very crucial and to do that it is important to identify factors which effect the performance of dry ports.

1.2 Statement of the Problem

Port performance is essential. Dry ports use performance indicators to enhance their productivity and competitive position (Fekadu, 2013). Certain indicators concerning port services and operations can be evaluated from financial and operational points of view, to serve the overall port management, especially the middle management in its day-to-day strategy implementation. Port performance helps dry ports to achieve their objectives and the Balanced Scorecard (BSc) serves to create, select and present performance indicators.

At Embakasi Internal Container Depot users frequently complained about the slow pace goods and service delivered by Embakasi Internal Container Depot 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 Embakasi Internal Container Depot is key logistics channel to the country it contributes to overall poor logistics performance of the country. Hence it is important to identify those factors which bar the efficient performance of Embakasi Internal Container Depot and which have impact on the performance of the port.

A study by Balci *et al.* (2014) on the determinants of dry bulk port selection and analyses factors considered by shippers and forwarders showed that physical and technical structure of port, cargo handling speed, handling cost, storage facilities, location, customer relations, port reliability and hinterland connection are found to be important factors in determining the performance of ports. Panayides and Song (2009)

in their study, identified information systems, communication and informal relations in the supply chain as essential to performance, productivity and competitiveness of supply chains and port networks. . However, there is limited research examining the effect of institutional factors on performance of Embakasi Internal Container Depot, a dry port in Kenya.

1.3 Research Objectives

The main objective of the study was to assess the effect of institutional factors on performance of Embakasi Internal Container Depot, a dry port in Kenya.

Specific objectives of the study included:

a) To determine the effect of port infrastructure on Dry ports performance at Embakasi internal container depot in Kenya. .
b) To evaluate the effect of human resources on Dry port performance in Kenya.
c) To establish the effect of operations on Dry ports performance at Embakasi internal container depot in Kenya.
d) To find out the effect on customers/stakeholder perception on Dry ports performance at Embakasi internal container depot in Kenya.

1.4 Research Hypothesis

The study sought to test the following hypotheses:

$H0_1$: Port infrastructure has no significant effect on Dry ports performance at Embakasi internal container depot in Kenya

$H0_2$: Human Resources have no significant effect on Dry ports performance at Embakasi internal container depot in Kenya

$H0_3$: Operations have no significant effect on Dry ports performance at Embakasi internal container depot in Kenya.

$H0_4$: Customers/stakeholder perception has no significant effect on Dry ports performance at Embakasi internal container depot in Kenya.

1.5 Significance of the Study

The research will be of great benefit to the Government of Kenya, it neighboring countries and other African countries who have similar problems regarding port infrastructure, human resources and operations; because when the findings and recommendations from the study are well utilized and taken into consideration by the appropriate authority and stakeholders, then the issues of container terminal inefficiencies can be adequately addressed thus enhancing the capacity and productivity of their ports which onward will boost economic growth and development.

The findings of this study will have practical importance to port authorities in order to address the institutional factors on performance dry port in Kenya

The study will help stakeholders by providing information and guidelines for the implementation of port policies and organizational reforms which enhance the performance of the dry ports.

The study will be beneficial to policy makers because the findings from the research will provide an in-depth knowledge on practical implications on institutional factors on performance dry port in Kenya.

Moreover, it will add to the existing knowledge gap in this area and could also serve as a reference for future studies in the area.

1.6 Scope of the Study

The study sought to assess effect of institutional factors on performance of Embakasi Internal Container Depot, a dry port in Kenya. The study was delimited to effects of port infrastructure, human resources, operations and customers' perception on port performance. The study was carried out between October and November 2019 using explanatory research design.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives a review of the existing literature on the determinants of effective port operations. The review is meant to exemplify the key concepts of the topic of discussion. It provides the basis of critical review and a clear understanding of the problem. The main sections included therein are; theoretical review, empirical review, the conceptual framework, critique of existing literature relevant to the study, summary and research gaps.

2.2 Concept of Dry Port

A dry port "is an inland intermodal terminal directly connected to a seaport, with high-capacity traffic modes, preferably rail, where customers can leave and/or collect their goods in intermodal loading units, as if directly to the seaport" (Roso et al., 2009). This definition is used as a reference in this research as it is commonly cited in academic papers and provides a unique definition of the concept.

A dry port can be understood as an inland setting with cargo-handling facilities to allow several functions to carry out, for example, cargo consolidation and distribution, temporary storage of containers, custom clearance, connection between different transport modes, allowing agglomeration of institutions (both private and public) which facilitates the interactions between different stakeholders along the supply chain, etc (Ng and Gujar, 2009). Dry ports can be categorized into three as close, mid-range and distant. Woxenius et al. (2004) describes distant dry ports as the most conventional of the three. These kind of dry ports are beneficial for opening up new markets by increasing seaports' access to areas outside their traditional hinterland. Woxenius et al. (2004) states that a mid-range dry port is consequently situated within

a distance from the seaports generally covered by road transport and creates value by serving as a consolidation point. Woxenius et al. (2004) states that a close dry port consolidates road transport to and from shippers outside the city area offering a rail shuttle service to the port relieving the city streets and the port gates.

Several attempts to advance the concept have been identified. Extended Gate concept is argued to be an extension of a dry port concept and refers to "an inland intermodal terminal directly connected to seaport terminal(s) with high capacity transport mean(s), where customers can leave or pick up their standardized units as if directly with a seaport, and where the seaport terminal can choose to control the flow of containers to and from the inland terminal" (Veenstra et al., 2012). Even though Extended Gate is claimed to be a concept advancing the dry port concept (Veenstra et al., 2012), the authors conclude that conceptually it does not "go beyond the dry port idea" (ibid). Moreover, the same (or a similar) concept is often referred to by many different terms. Wilmsmeier et al. (2011) refer to Inland Clearance (or Container) Depot (ICD), Beresford et al. (2012) parenthesizes offshore ports as a synonym, Jeevan et al. (2015) label African Dry ports to be Forward-Ports, Hanaoka and Regmi (2011) list the terms "inland port," "inland container depot," "freight terminal," "freight station," and "consolidation center" to be synonymously used.

Dry ports as facilities aiming to improve seaport's hinterland transport system, have a number of benefits for multiple stakeholders – economic, i.e., stimuli for regional development, environmental, i.e., reduction of harmful emissions, and social, i.e., noise reduction and job creation. Firstly, a dry port might be an important element of regional development (see, e.g., Beresford et al., 2012; Lättilä et al., 2013; Roso et al., 2009; Veenstra et al., 2012). Establishment of a dry port in a region stimulates the development of intermodal transportation with consequent benefits such as, e.g.,

attracting investments by focusing on logistics and therefore providing new opportunities for new business to open up and for large established companies to move to the region (Flämig & Hesse, 2011; Hanaoka & Regmi, 2011; Jeevan et al., 2015) and improving of the services along the transport chain (Bask et al., 2014). Seaports gain better accessibility, i.e., faster cargo transportation to destination point/from origin point and greater coverage of the hinterland (Hanaoka & Regmi, 2011; Rodrigue & Notteboom, 2010; Roso et al., 2009). In turn, better accessibility means more efficient integration of the seaport to distribution system (Bask et al., 2014) and by that a gain of competitive advantages (Jeevan et al., 2015), which is especially important for landlocked countries (Hanaoka & Regmi, 2011). Conversely, inland (remote) locations gain better access to new import and export possibilities (Jeevan et al., 2015). In addition, heavy investments into a seaport expansion are avoided, and at the same time valuable space at the seaport area is released in favor of new shipments to arrive (Roso et al., 2009), thus decreasing turnaround time (Korovyakovsky & Panova, 2011). This is also accompanied by seaport capacity increase and potential productivity rise (Roso, 2007). Finally, a port city experiences a decrease in traffic and therefore a decrease in associated congestion, road maintenance costs and rate/probability of accidents that eventually translates into better quality of life (Rodrigue & Notteboom, 2010; Roso, 2007). The dry port concept is claimed to be environmentally friendly. It assures reduction of CO2 emission generated by trucks during waiting time at the seaport and overall by substituting road transportation with rail (Hanaoka & Regmi, 2011; Roso, 2007). In addition, emissions generated during waiting time at the seaport gate are more harmful than emission generated during operational time, and those can be decreased or fully eliminated when a dry port is in the hinterland transportation system (Roso,

2007). The emission associated with the hinterland transport leg associated with cargo going through the seaport can be decreased by 25% (Roso, 2007) to 32-45% (Lättilä et al., 2013) in case when a dry port is in the hinterland transportation system if compared to transportation routes without a dry port.

2.2.1 Dry Port Performance

Ports have traditionally evaluated their performance by comparing their actual and optimum throughputs (measured in tonnage or number of containers handled). If a port's actual throughput approaches its optimum throughput over time, the conclusion is that its performance has improved over time. On the other hand when the port registers poor performance such as high container dwell time, threat of Vessel delay surcharge and worst still is the big ships avoiding the port. In the long run this renders transport from the port un-competitive by factual analysis. Crane productivity which is calculated per crane and can be expressed in gross and net values;

Port Productivity, there are seven different productivity measures which terminal operators need to compute, al-though they may wish to include others for monitoring their productivity. These core productivity measures are: Ship productivity which is the broadest measures of ship productivity relate container handling rates for a ship's call to the time taken to service the vessel; Quay productivity which defines the relation between production and quay resources, the latter can be measured by defining, for a given unit time. Terminal area productivity which is similar to the quay productivity indicator is the measure of 'terminal area productivity' which applies to the entire terminal and expresses the ratio between terminal production and total terminal area for a given unit time; Equipment productivity is the value that is of interest is the number of container moves made per working hour, either for an

individual machine or for the stock of a particular type of machine. The number of moves can be deduced from data collected;

Labour productivity even with a high level of mechanization, labour costs still form a large part of total terminal costs and it is important to monitor labour well and know what the productivity per man-hour is over a measured period; Cost effectiveness this brings the all- important element of cost into the equation. Perhaps the simplest and most revealing measure of a terminal's performance is the cost of handling its container traffic or throughput over a specified period, Port dwell time which refers to the time cargo spends within the port or its extension.

To separate the components of cargo delays, Dwell time figures have become a major commercial instrument to attract cargo and generate revenues. Port authorities and container terminal operators have increasingly strong incentives to lower the real figure. The average or mean dwell time has usually been the main target indicator in the best performing ports worldwide. (Raballand et al, 2005).

Productivity at the East African ports is affected by several factors, among them are: Equipment Utilization and Labor productivity; For Mombasa, labour productivity still remains low despite heavy investment in equipment modernization and infrastructure development over the past five years. For instance, ship to shore gantry cranes recorded an average 18 mph in Mombasa and 14 mph in Dar – es – Salaam against an internationally accept-able standard of 25 – 30 mph. It is evident that dock workers are not making the best use of the recently acquired modern and more efficient equipment. In order to improve berth productivity at Mombasa, some shipping lines have been forced to implement an independent bonus scheme for dock workers in order to improve vessel turnaround time (Kenya Shipping Council, 2008).

2.2.2 Quality of Dry Port Infrastructure

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

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

The critical role that container infrastructure plays in favoring the economic development of a country or region is well established. Infrastructure is the necessary condition for efficient cargo handling operations and adequate infrastructure is needed to avoid congestion, foster trade development as well as securing deep-sea container connectivity for economies heavily dependent on international trade. Container infrastructure, however, needs to be complemented by efficient hinterland transport connections if the port is to fully exploit its potential as growth catalyst and supply chain node (Suykens and van de Voorde 1998). Unfortunately, it is not uncommon for development projects to focus exclusively on enhancing the infrastructural capabilities of the port, without adequate consideration of the hinterland connections. The urgency of looking at port and terminal development in conjunction to their hinterland connectivity is exacerbated by the pressure on container terminals to

increase their performance levels resulting from the rapid growth of containerized cargo traffic flows and their increased variability (Haralambides 2002).

As port capacity cannot be developed as rapidly as increases in demand (Haralambides 2002), any overcapacity is eventually exhausted and episodes of congestion ensue even in the most efficient terminals. This calls for a phased but continuous and well-coordinated effort in expanding container capacity at terminals. Terminal operations are affected not only by the larger number of vessel calls but also by the increased variability of all sizes. As Vessels of over 15000 TEU are becoming increasingly common, despite the fact that they may only be able to access a few large hubs (Cullinane and Khanna 1999). This will concentrate container flows on a few megaports, in turn impacting berth and crane productivity of the terminal and adding pressure on hinterland links, often with adverse effects on congestion and the environment (Yap and Lam 2013).

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proper linkages, the performance of container terminal operation may decline due to congestion and delays (Tongzon and Heng, 2005).

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Effective and efficient transport is predicated on good infrastructure; roads, airports and port. Kenya's transport sector scores poorly in terms of infrastructure. Most road networks are in poor condition. The port of Mombasa, which provides the entry point for sea transport and serves East Africa, the Great Lakes and Sudan, is doing quite well following the reform of the Kenya Port Authority through effective management. However, major corridor highway have not complemented in improvement. Rehabilitation of Mombasa-Nairobi-Malaba Highway, which is the main road artery in the country and a link to the landlocked countries in the neighborhood namely Uganda, Burundi, Rwanda and the Democratic Republic of Congo, has been slow.

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2.2.3 Container handling equipment

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

2.2.4 Port Staff Competence

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

2.2.5 Yard Capacity

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

2.3 Theoretical Review

2.3.1 Queuing Theory

Adedayo *et al*. (2009) stressed that many situations in life require one to line up or queue before being attended to. This lines formed are referred to as waiting lines or queues. According to them queue occurs when the capacity of service provided fall short of the demand for the service. Sanish (2011) in his article on application of queuing to the traffic at New Mangalore Port refers to queuing theory as an analytical techniques accepted as valuable tool for solving congestion problems. According to him the primary inputs to the models are the arrival and service patterns. These patterns are generally described by suitable random distribution. He observed that the arrival rate of ships follows exponential distribution while the service time follows Erlang or Poisson distribution. He observed that queuing theory can be used to predict some important parameters like average waiting time of ships, average queuing length, average number of ships in the port and average berth utilization factor closer to the actual values.

Queues are not an unfamiliar phenomenon and to define it requires specification of the characteristics which describes the system such as the arrival pattern, the service pattern, the queue discipline and the queue capacity Adedayo *et al*. (2013) observed that there are many queuing models that can be formulated. According to them it is essential that the appropriate queuing model is used to analyze problems under study. The arrival pattern: This may be the arrival of an entity at a service point. This process involves a degree of uncertainty concerning the exact arrival times and the number of entities arriving. And to describe this process there are some important attributes such as the sources of the arrivals, the size of each arrivals, the grouping of such an arrival and the inter-arrival times. The service pattern: This may be any kind

of service operation which processes the arriving entities. The major features which must be specified are the number of servers and the duration of the service. The queue discipline: This defines the rules of how the arrivals behave before service occurs.

A contributor to container terminal congestion is the time containers dwell in the storage yard after being delivered to the terminal or unloaded from the ship. Prolonged container dwell time results in high storage yard area occupancy and may create substantial adverse effects on terminal productivity and throughput capacity. With improved management of container flows, additional terminal capacity may be created without investing in costly new equipment and yard capacity improvements, Holgan *et al* (2010). Containers arriving at the port terminals are temporary stored in the terminals yard before being loaded to their next mode of transport. The time period containers stay in the yard is effectd by some factors depending on long term contractual agreements (Merck, 2009).

2.3.2 Modern Theory

The researcher used the modern theory by Roll and Hayuth (2003) which focuses on the single electronic window system. Under the single window system, systems interact with other systems or the outside environment in order to curb the problems and difficulties in effective operations. Some of the features of the single electronic window system include: receiving data from other sources, input data converted into output data and the owner of the cargoes does not need to use the clearing and forwarding agents to clear the goods but ought to clear all the payments online then the cargoes are delivered to the owner. The single electronic window system has help in ensuring fast and reliable information to the owner of the cargoes, government being in the position to get the taxes and revenues through the system thus increasing

performance and effectiveness of all the activities carried out during the clearance of containers. As a growing and leading port in east and central Africa Kenya port authority must continue embracing the use of modern technology systems in streamlining their performance and supply chain in order to add value and be ahead of its competitors. The study analyzes the variables and seeing how they are interacted in order to improve performance of Embakasi internal container Depot

2.3.3 Stakeholder Theory

According to Freeman and Reed (1983), stakeholders refer to any identifiable group or individual who can affect or be affected by the achievement of an organization's objectives. As different stakeholders have different and competing interests, perceptions and ideas (Castro and Nielson 2003), they see their own interest without appreciating what is important to others. Hence, the interests of stakeholder groups constitute diverse sets of expectations, needs and values (Harrison and John 1994). This diversity of interests causes a potential problem: failure to satisfy one particular stakeholder may be detrimental to the others (Freeman 1984) due to resource scarcity and managerial incapability (Mahoney and Pandian 1992). To balance the interest of different stakeholders, stakeholder theory says managers should make decisions by considering the interest of relevant stakeholders (Sternberg 2000). This theory is critically important as contemporary firms must satisfy a variety of stakeholders to survive in a volatile and uncertain environment (Foley, 2005).

The importance of stakeholder orientation comes from several areas: a number of studies suggest stakeholder orientation is positively associated with performance (Freeman 1984; Greenley and Foxall 1997; Clarkson 1995). A stakeholder orientation is a condition for excellence, as stakeholders are not isolated from each other; one stakeholder‘s success is dependent on others (Polonsky 1995). The latest development

initiatives such as the Global Reporting Initiative (GRI) (Hedberg and Malmborg 2003), the Dow Jones Sustainability World Index (DJSI world), the United Nations Global Compact (Kell 2005) and the Ethical Trading Initiative (ETI) (Blowfield 1999) have shown emerging evidence that sustainability is stakeholder orientated. The stakeholder theory implies that all the relevant port stakeholders need to be considered when the port scheme is stipulated.

The theory that informs the study most is stakeholder theory. This is because the stakeholder theory implies that all the relevant port stakeholders need to be considered when the port scheme is stipulated.

2.3.4 Resource Dependence Theory

Resource dependence theory has effectively been used in the strategic operations literature to describe relationships between buyers and suppliers. According to Barney (2002) the resource based view examines the link between a firm's internal characteristics and performance. Resource dependency theory further examines the relationship between organizations and resources they need to operate. Resources can take many dimensions. This includes raw materials, workers, and even funding. If one side maintains the majority of a resource, then another company will become dependent on them in order to operate. Too much dependency creates uncertainty, which leaves organizations subject to risk of external control. External control may be imposed by government or other organizations, and can have a significant effect on operations, such as funding or personnel policies.

The importance of this theory was documented during the 1970s, when authors Jeffrey Pfeffer and Gerald Salancik published the external control of organizations: A Resource Dependency Perspective. Their study discussed where power and

dependence originate, and how organizations may use their power and manage those that are dependent upon them. Managers are constantly seeking advantage to improve partnerships with organizations in order to strengthen their own and strategize business plans in order to lower this risk through cooperation, acquisition and mergers across the industries. Mahoney and Pandian, (1992) claim that a firm does not have a good performance because of better resources, but rather due to the firm's competence to make better use of them, which represents a deeper focus on the basics of the resource based view as proposed in (Penrose ,1990). To put it in another way, a firm that knows how best to make use of its resources will utilize them in a way to maximize productivity. This argumentation is supported by Peteraf, (1993) who states that as resources can be an important ground of a competitive advantage, they should be leveraged further between the resource based view and supply management as argued by (Barney,2012). Consequently, these perspectives have provided only a partial account of firm performance in view of the accumulated evidence of the proliferation and significance of inter-firm alliances in recent years.

2.4 Empirical Review

According to (KPA Audit report, 2012-2013) indicated that various freight stations had failed to move 6,000 containers that had been cleared, increasing the pile-up at the port yard to 18,000 Twenty Foot Equivalent Unit (Tues.) against its capacity of 14,500. If the container freight stations (CFSs) move the cargo that is ready, operations will return to normal, but the stations said that KPA had failed to put its equipment to optimal use even as some of them hold up to 2,300 Tues., two times their capacity. The delays at the port is costing importers huge storage charges with containers taking up to 14 days to move from the port to CFSs where most of the domestic cargo is cleared. Importers and clearing agents blame the delay on in

performance in the freight handling, saying they should be allowed to collect part of the cargo cleared from the port.

According to (Gerald, 2010) the Mombasa Port's facilities are overstretched and under intense pressure leading to complaints from the local clearing and forwarding firms and customers, about Container on effective operations. (Kimani, 2010) reported that KPA unveils new plan to cut red tape at Mombasa port where the commissioner general of KRA blamed the delay to a number of signatures required on the documents which he said were too many and were to be reduced plus port handling equipment breakdown.

According to (Stock *et al*, 2009) for an organization to operate efficiently, "its supply chain activities should flow smoothly to create value to the customers hence it should minimize delays by avoiding poor /outdated equipment's" The operational Audit report of 2011/2012 points out that the current regulatory framework governing operations of the CFSs is not sufficient to ensure quality and standards of services. The pressure to move Containers out of the port area quickly has occasionally led KPA to nominate CFSs without due consideration of their container handling capacities. Most of them are congested not only due to lack of sufficient and reliable equipment but also because their operators do not exhibit proper planning in receiving staking and realizing.

According to (Rushton *et al* 2012), defines Transport as "the activity that facilitates physical movement of goods as well as individuals from one place to another. It supports trade and industry in carrying raw materials to the place of production and distributing finished products for consumption". Transport creates value or place utility. It's a factor in the creation of time utility because it determines how fast and

how consistently products move from one point to another. He states that value chains begin when vessels, materials or products enters an organization hence there should be continuity in transport services for efficient flow of products along the supply chain. The trucks are responsible for the container transfer operations within and from the port; they are required for the purposes of shunting containers from the port in order to ensure timely evacuation.

Stakeholder's workshop, (2012) reported that Conditions of the Road at Miritini in whose vicinity most CFSs are located. Since April 2011, the road has deteriorated so much that the truck turnaround times for a journey of less than 10 km can take as long as 6 hours which means that truck performance and movement of CFS-nominated cargo is severely compromised, trucks that could do five trips at the beginning of 2011 are barely able to move one container a day to day due to poor roads, this in turn leads to more delays in clearing the goods as they are not able to reach the CFSs on time to be cleared. From the Meeting on the Northern corridor trade and transport logistics chain stakeholders consultative forum (2011) the Port and KRA reserve the right to nominate various CFS for effective operations, importers have faced delays exceeding 10 days waiting for cargo to move from the Port to CFS. The Kenya National Highways Authority reports that it expects World Bank Support to fix the road. However, the country cannot wait that long. Local resources should be utilized to dedicate passage for trucks between the Port and CFS to increase off take of container." Kenya is faced with the dilemma of high road construction costs and increasing road maintenance due to overloaded trucks plying its trunk route network, particularly along the Northern corridor (World Bank, 2007).

A study by Bowersox *et al* (2010) reported that activities related to providing customer service requires performing order receipt and processing, deploying inventories, storage and handling and outbound transportation with a channel of distribution. poor transportation causes delays in delivery as the vehicles consumes more time than the required just to deliver items, goods from one place to the required locations. Transport services should be efficient to cope up with organizations activities and services. The primary physical distribution objective is to assist in revenue generation by providing strategically desired customer service levels at the lowest total cost".

Omondi, (2012) on business and finance said off take of container from the Port is delayed by various factors all within the control of agencies operating within the Port and around it. Off take by road is severely constrained by inadequate number of personnel. While the Port has various gates, it has not utilized all of them because of failures of other organizations responsible for effective operations to post sufficient staff to man all the gates or to equip them adequately once posted there. As an urgent measure, all gates should be utilized and personnel posted there, facilitated with adequate equipment. Off take by railway is constrained by inadequate rift valley railways capacity to lift cargo from the port to hinterland destinations.

According to KPAs Annual report (2010) The port of Mombasa is the gateway for surface transport along the Northern corridor region, with an estimated 900 transport vehicles(trucks) exiting each day, on average. Road transport is accompanied by several operational difficulties including weighbridges, police escorts, and road blocks which constitute non-tariff barriers and contribute to delays. Rail transport helps in the movement of bulk cargo dry or wet from an industrial plant in a complete

train load to a seaport. This may be crude oil, phosphate, coal, timber or iron. Observers point to increased cargo volumes last year following a surge in transit business. According to the Star newspaper (2012) Freight forwarders and clearing agents urged the government to improve the railway system to help eradicate delays at the port of Mombasa. They said “better Rail system will end port delays.

The critical role that container infrastructure plays in favoring the economic development of a country or region is well established. Infrastructure is the necessary condition for efficient cargo handling operations and adequate infrastructure is needed to avoid congestion, foster trade development as well as securing deep-sea container connectivity for economies heavily dependent on international trade. Container infrastructure, however, needs to be complemented by efficient hinterland transport connections if the port is to fully exploit its potential as growth catalyst and supply chain node (Suykens and van de Voorde 1998). Unfortunately, it is not uncommon for development projects to focus exclusively on enhancing the infrastructural capabilities of the port, without adequate consideration of the hinterland connections.

The urgency of looking at port and terminal development in conjunction to their hinterland connectivity is exacerbated by the pressure on container terminals to increase their performance levels resulting from the rapid growth of containerized cargo traffic flows and their increased variability (Haralambides 2002).

As port capacity cannot be developed as rapidly as increases in demand (Haralambides 2002), any overcapacity is eventually exhausted and episodes of congestion ensue even in the most efficient terminals. This calls for a phased but continuous and well-coordinated effort in expanding container capacity at terminals. Terminal operations are affected not only by the larger number of vessel calls but also

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The expected increase in transshipment associated with larger vessel size, is likely to effect the terminals not only forcing them to handle higher volumes in the same period of time, but also to reduce the variability of their operations (i.e. increase reliability) in order to guarantee seamless flows of cargo among transshipment ports and/or transshipment port and feeder ports (Gilman 1999). The increases in productivity and reliability at terminals will require more tracking, greater container visibility and more emphasis on environmental and regulatory compliance particularly as terminals now occupy critical positions the supply chain (Notteboom 2008).

Generally, infrastructure is divided into physical and soft elements. Physical infrastructure includes not only the operational facilities such as the number of berths, the number of cranes, yards and tugs and the area of storage space, but also the intermodal transport such as roads and railways (Tongzon and Heng, 2005). Whereas, the soft infrastructure refers to the manpower employed. Maximum deployment of both types will assist in reducing vessel turnaround, thereby increasing the terminal capacity to accommodate more containers. Ships are continually increasing their carrying capacity and container made for large transport units in overseas container transport are under consideration. This scale enlargement requires new and capital-intensive transshipment facilities in gateway ports. Particularly, inter-modality is

essential for the speedy transport of cargoes into and out of a gateway port. Without proper linkages, the performance of container terminal operation may decline due to congestion and delays (Tongzon and Heng, 2005).

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Rail transport is the second most important mode of transport after road and offers the best alternative for transporting bulky produce for both local and export markets. The rail network essentially comprises a single line, overland rail track from Mombasa through Nairobi, Nakuru, Kisumu/Eldoret, Jinja, Kampala to Kasese in western Uganda totaling to 1650km.

The key rail track for transit cargo runs from Mombasa to Kampala via Malaba comprising of 1330 km. Kenya Railways works closely with the Kenya Ports Authority in transportation of bulk commodities. However, the Kenya Railways has not been operating at its full capacity. It is for this reason that the government had embarked on a process of concessioning the railway so that it can be operated more effectively. The concessioning deal being done jointly with the Uganda government was signed early in 2006.

According to Gubbins (2011), size and space is an adequate area required at the container terminal for storage of containers and for ship berthing. Adequate space is required to avoid congestion, mix up and ease of movement of containers. Ship requires immediate space berth to avoid delays in loading and offloading. Space is required to accommodate all materials received within the organization; this can only be done by a continual review of requirements and the adaptation of practical and sensible storage layout and methods.

Delivery on time is a standard purchasing objective but when faced with inadequate space to secure the goods it leads to congestion and delays to deliver goods to the right destination. If goods and materials arrive late or work is not completed at the right time, sales may be lost, production halted and penalty clauses may be dissatisfied customers (Gillngham *et al*, 2013). Kenya shippers' association report (2010) indicates that from the time a ship docks at Mombasa, the long wait begins taking 10 to 14 days for a ship to be allocated a berth at the port because of inadequate space forcing shippers to pay between $10,000 and $12,000 per day as demurrage fees. After securing a berth, it takes some seven days for a container to be discharged from the ship and another 18 days for the container to find its way to the Container

Freight Services (CFS) depot. The port entrance channel is a typical one-way channel for larger vessels, this leads to longer vessel inter-arrival times and thus longer vessel waiting times, in 2009 the average ship waiting time in port days for a containerized vessel was 2-3 days.

The World Bank (2010) followed the complaints concerning delays in clearing of cargo and released this statement report: “The port of Mombasa has exceeded its design capacity yet it is expected to handle growing imports and exports. It is already operating at maximum capacity for both containerized and general cargo and will suffer progressive declines in operational effectiveness unless both capacity and performance issues are urgently addressed”. According to KPAs annual report (2010), the container yard seemed to have difficulties in serving ship and gate traffic at the same time. The result is that the STS cranes often wait for yard tractors, a major actor of low crane productivity and subsequently low berth productivity. Thus the terminal is currently congested and increasingly, there is limited space at the terminal to store containers and other goods as container population increases.

According to KPAs statistics (2010) bulk liquid items, mostly petroleum, oil and lubricants are the single greatest import item by weight. The existing container terminal was designed to handle a throughput of 250,000 TEUs per annum through three berths. The terminal has since surpassed this capacity as evidenced by the fact that 2011 a total of 695,000 TEUs were handled through the terminal. The growth in container traffic has put a strain on the existing facilities and compounded the congestion. Also the port entrance channel is atypical one way channel for larger vessels. The maximum allowable length of vessels calling at the port has been set by KPA at 234metres in addition to the maximum allowable draft of 9.4 meters. This

limitation results in longer inter-arrival times and thus longer vessel waiting times. Maundu (2012) reported that the handling of cargo is hindered by the space capacity at the port, The available berths are not sufficient to handle the vessel entering the port and some berths are small that the big vessels entering cannot fit in them causing congestion as they have to wait for long before being allocated the berths.

For Embakasi Dry Port to meet its future trade growth proper planning, port development and capacity addition to port and marine infrastructure in line with the international trends and demand of the regional growth rate using the port of Mombasa for Import and Export. “Ports are evolving rapidly from being traditional land/sea interfaces to providers of complete logistics networks. This means that ports have had to face many challenges due to unpredictable environmental changes and trends in the shipping, port and logistics industries.” (UN ESCAP, 2014) Growth in regional and international trade opportunities means the port of Mombasa should be in a position to handle a fleet of post-panamax vessels for it to be in a competitive business route and any opportunities for trade containerization will not be a challenge.

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

The quality of access to a dry port and the quality of the road/rail/waterway interface determines the quality of terminal performance therefore it is necessary to have scheduled, reliable, transport by high capacity means to and from seaport (Roso*et al*., 2008). Thus dry ports are used much more consciously than inland terminals with the

aim to improve the situations caused by increased container flows, focus on security and control by use of information and communication systems.

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

Freight forwarders are agents not moving freight themselves play a critical role in organizing supply chains and moving goods on transit corridors (World Bank-United Nations, 2014). The role of freight forwarders is to organize international (or eventually domestic) logistics on behalf of shippers and consignee. This includes organizing transportations with railways or trucking companies, and customs representation activities at the border.

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

According to Tongzon and Heng (2005) reliability means a steady and predictable performance adapted to shipping lines' schedules. If a port authority or port operator always makes delays during operation process due to strikes, equipment breakdown, weather etc, shipping companies and shippers will suffer huge losses due to this kind of unreliability. Supply chain reliability is a major concern for traders and logistics providers alike. In a global environment, consignees require more certainty about

when and how deliveries will take place. This increases the demand for quality in logistics services, posing challenges for private agents and for governments, all of which face pressure to facilitate trade while safeguarding the public against criminal activity, health concerns, or terrorism threats.

2.4.1 Port Infrastructure and Dry Port Performance

The Community Based System, commonly known as the National Single Window System currently on trial & sensitization to stakeholder is due for full implementation soon (2015). Funded by the World Bank, the system is a flexible automated information sharing resource that will eventually link the port community users via electronic means to allow secure exchange of authorized data between partners. The port of Mombasa has been facing major challenges with Kenya Revenue Authority's Cammis System and Kenya Ports Authority's Kwatos System. Kenya's rail corridor is of strategic importance to the region. It is a common knowledge that Standard Gauge Railway (proposed) and launched recently by President Uhuru will handle over 22 Million tonnage of Cargo against the current Single Gauge handling only 1.2 Mil-lion tonnes (Kamau. 2014). Linking the port of Mombasa to Nairobi and continuing onward into Uganda, it is a key conduit for bulk freight, easing pressure and pro-viding additional capacity along the northern corridor. Currently the cargo is mostly transported using the road (97%) and the rail (3%). The gate expansion by KPA has enable trucks hauling export/imports/empty containers within Mombasa de-pots/CFS's faster turnaround than previous. Currently the trucks are able to make 6 trips per day unlike 1trip per day before the gate expansion. This enables the fluid movement of containers from the port and creation of more space for incoming containers.

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

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

A study by Turner *et al*. (2004) purposed to examine the impact of hinterland and maritime accessibilities on performance and Gaur (2005) identified factors that affect the terminal performance, including maritime access and hinterland connectivity. A study was conducted by Ruto and Datche (2015) to determine logistical factors influencing port performance taking Kenya Port Authority as a case study. The study use survey research design and employs descriptive statistics analysis and summaries the causes of poor performance in the port of Mombasa according to the findings are: lengthy customs clearing procedures, rapid growth of container trade, frequent break down of Kenya Revenue Authority (KRA) and Kenya Ports Authority (KPA), IT

Systems, slow gate out process and slow container off-take to Container Freight Station, inadequate yard capacity and lengthy KRA clearing procedures, poor yard planning and in adequate usage of IT in yard planning, poor working corporate culture by the corporate staff and poor hinterland connectivity.

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

According to Gujar (2011) since the land size determines the total storage capacity of a seaport. It is especially important in the peak season. Accordingly, the size of a dry port is taken as one of the factors when we consider its performance.

2.4.2 Human Resource and Dry Port Performance

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

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

2.4.3 Operations and Dry Port Performance

Cargo handling equipment includes equipment used to move cargo to and from marine vessels, on-road trucks and yards. The equipment typically operates at marine terminals or at rail yards and not on public roadways or lands. Kenya Ports Authority inventory on cargo handling equipment includes 7 Ship to Shore Cranes, 57 Terminal Tractor, 5 Mobile cranes, 23 Forklifts among others. Be-side the availability of equipment there are other silent features which have direct correlation with performance, motivation is one among them, and this is evidence by the various ships categories calling at the port of Mombasa, those with Incentives/motivations yield better results than those without incentive from the same operators. Records show that none motivating ships makes 15 moves per hours whereas those with incentives making as high as 40 moves per hour. Ships planning also play an important role in measuring Vessel performance and the features which drives the performance are cargo handling equipment allocation to a particular ships such as the number of SSG, TT etc, this will enable the ship have a well coordinate flow of cargo discharge as well as cargo loading.

With regard to East African ports, it is important to note that the performance of these ports and the entire logistics chain is not wholly dependent on the management structure or ports authorities –There exist a number of public and private sector players who have a role to play in the goods clearance process and the performance with which they execute their obligations plays a critical role in the overall performance of ports. Clearing and forwarding agents, shipping lines, transporters, revenue authorities, standards bodies, the police and inspection agencies among other entities have in one way or another been an impediment to the smooth clearance of goods. Cargo owners are not spared either, as their readiness to effectively and

efficiently engage in international trade transactions has also affected the performance of the goods clearance process (Langat, 2013).

According to Ng (2006) targeting the container ports in Northern Europe, shipping company considered the effectiveness of port, geographical location, and service quality more important than the cost of port. Ng (2006) further proposed that individual groups of port users showed different priority ranks for the importance of the select factors. Besides this, this study points out the fact that the select factors for port depend on the qualitative factors such as reliability, proximity, frequency, security, and reputation and cost factors.

A study was conducted by Ruto and Datche (2015) to determine logistical factors influencing port performance taking Kenya Port Authority as a case study. The study use survey research design and employs descriptive statistics analysis and summaries the causes of poor performance in the port of Mombasa according to the findings are: lengthy customs clearing procedures, rapid growth of container trade, frequent break down of Kenya Revenue Authority (KRA) and Kenya Ports Authority (KPA), IT Systems, slow gate out process and slow container off-take to Container Freight Station, inadequate yard capacity and lengthy KRA clearing procedures, poor yard planning and in adequate usage of IT in yard planning, poor working corporate culture by the corporate staff and poor hinterland connectivity.

Similar to seaports, container handling equipment are used in dry ports, which include rubber-tired gantry cranes, mobile cranes, top handlers, side handlers, reach stackers, forklifts and so forth. Usually container handling equipment are viewed as the main machines for dry ports as well as seaports, and they can greatly affect both the

container handling capacities and, in turn, the performance of the dry port (Gujar,2011).

Handling systems means the mechanism used in moving materials from one point to another with less human effort (Lyons, 2009). Material handling equipment and systems often represents major capital outlays for organization. Like the decisions related to the number, size, and location of warehouses, materials handling decisions can affect many aspects of logistics operations (Lambert *et al*, 2001).

According to (Maundu, 2012), reported that though the corporation has good equipment that can support its quayside operations, these machineries are largely unproductive, raising questions about the capacity of the staff. Importers and clearing agents blame the delay on in performance in the freight handling, saying they should be allowed to collect part of the container cleared from the port's yard. Agents said it took them five days to clear and move containers from the port while it takes more than five days for any CFS to transfer containers in a vessel. According to (Kenya Shippers report 2011/2012), port's facilities are overstretched and under intense pressure.

Cargo handling equipment includes equipment used to move cargo to and from marine vessels, on-road trucks and yards. The equipment typically operates at container terminals or at rail yards and not on public roadways or lands. KPA inventory on cargo handling equipment includes 7 Ship to Shore Cranes, 27 Reach stackers, 57 Terminal Tractor, 5 Mobile cranes, 23 Forklifts among others. Beside the availability of equipment there are other silent features which have direct correlation with performance, motivation is one among them, and this is evidence by the various

ships categories calling at the port of Mombasa, those with incentives yield better results than those without incentive from the same operators.

According to KPA's management report 2011/2012, KPA has been building their capacity to handle increased volumes of cargo but they are let down by poor infrastructure. Ugandan traders decided to revive the Uganda National Trade and Facilitation Forum Fig and form a shippers' council to lobby for the reduction of prohibitive transportation costs emanating from the Northern Corridor. This came about as a ripple effect; delays at Mombasa Port increase their costs and these are passed on to the final customer, resulting in lower sales and profits.

Port service network design and its capacity utilization depends on the balance of power between carriers and shippers (Notteboom; 2011). From the carrier's perspective economies of scale are a critical element in order to reduce costs, which can be achieved by operating larger ships and having fewer ports of call. However, from the shipper's perspective total freight rates, loading and offloading time and service quality delivered by the human personnel, including frequency and flexibility are more critical elements.

A study was carried out by Caldirinaha *et al* (2011) on the effect of characterizing factors on the port performance, using operational, financial and performance indicators. Considering the multidimensional nature of port performance, the study aims to analyze which characterizing factors are relevant and what measure the relationships. The study employed Data Envelopment Analysis (DEA), statistics of factor analysis and linear regression methods based on a sample of 43 European ports and the results of this study indicate the existence of a relationship between performance and several variables that characterize the port. Additionally, they also

confirm the impact of location, governance, size, infrastructure, specialization, logistic integration and maritime services in the ports operational and financial performance and performance.

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

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

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

Port performance measurement is a challenging issue for most ports. The increased use of containerization and supply chains, the development of new production-distribution-consumption systems and increased specialization of the different port markets have all affected port organization management and operation (Notteboom and Rodrigue, 2005). Understanding the levels of performance achieved is at the core of the strategy of port authorities and operators, in order to deploy strategies that address the needs of port users, increase competitiveness, and thus market shares.

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

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

2.4.4 Customer Perception

Stakeholders report (2012) states that it is unfortunate that quite a number of significant interventions that would have eased the delays at the port have been

known for over 30 years. All the major stakeholders agree with the assertion that "Mombasa port facilities are inadequate and in poor condition" and that without substantial investment in equipment, the port is unlikely to handle more traffic. Moreover the existing terminal which is designed to handle a throughput of 250,000TEUs per annum through three berths now handles a total of 695,000TEUs in 2010; this growth in container traffic has put a strain on the existing facilities and compounded the congestion problem.

According to (Bailey et al, 2004), one of the most basic requirements of any organization is to be able to transport or move materials, equipment's and spare parts from one point to another. Material handling is of vital importance and is indicated by the range and high cost of the equipment that each organization have. Handling materials, which is a major activity in storehouse and stockyard is a costly operation and therefore the methods and equipment should be efficient. Poor handling equipment's leads to Shorty work making an organization not to handle the required load on time, causing delays, congestions and inefficiencies along the supply chains.

2.5 Gaps in Literature

The aim of the above literature review was to analyze the studies that was carried out on effective operations with a special focus on, performance, effectiveness, reliability and quality delivery services provided while much has been done on the factors affecting effective operations in port terminals, the available literature concentrated much on handling systems, space capacity, documentation process and transport infrastructure. The absence of manpower with skills to handle the clearing process and the politics in the coast region has left the operation of the port terminals in crisis and difficult situation.

Therefore, the study attempting to establish these relationships is more necessary for developing applications of such relationships and efficient with a close link to port of Mombasa. Container clearance leads to in performance and long dwell time for the clearance of containers. (Brinkerhoff, 2009) identifies three key competitive advantages resulting in high revenues. Advanced technology system put in place, proper transport infrastructure to facilitate fast movement of cargoes from one place to another and well advanced handling equipment that will take the shortest time possible to perform clearing of containers.

(Basheka, 2009) argues that investing in use of advanced technology and information using single electronic window system is the best way to use in clearing the containers in the port terminals leading a big contribute to the success of the economy of the country and increased improved service delivery.

While much has been learnt about the factors affecting effective operations of the port, there are several important areas that need further research. The researcher believes that effective communication amongst stakeholders is very important when it comes to making tariff changes or introduction of regulations such as bay plans and interpreting transaction values which should be made with consultations to reduce delays so that port users are prepared with any new changes implemented. Another area is that KPA should come up with a schedule of the vessels expected to dock at the port in a day, week or months so that enough space to accommodate them is created in time to avoid them queuing for a long time waiting for berths, this will ease the process of containerized cargo clearance.

Effective operations of the port at the port are costing importers huge storage charges with containers taking up to 14 days to move from the port to CFSs where most of the

domestic containers are cleared. This situation makes the port to be competitively unfair as countries are going to the port of Tanzania to have their goods cleared from there; hence this situation calls for combined efforts from the government, stakeholders and the clearing agents to improve on it. Transport infrastructure is an important driver to any organization that serves as the element that creates results to a coordinated effective and efficient supply chain. Therefore, it must be current, accurate, validated, and efficient in order to enable movement of the cargoes fast and easily taking little time thus reducing congestion of the containers at the port terminals.

2.6 Conceptual Framework

The study adopted a conceptual framework that shows the relationship between the independent variables (institutional factors) and dependent variable (performance of dry port) as shown in Figure 2.1.

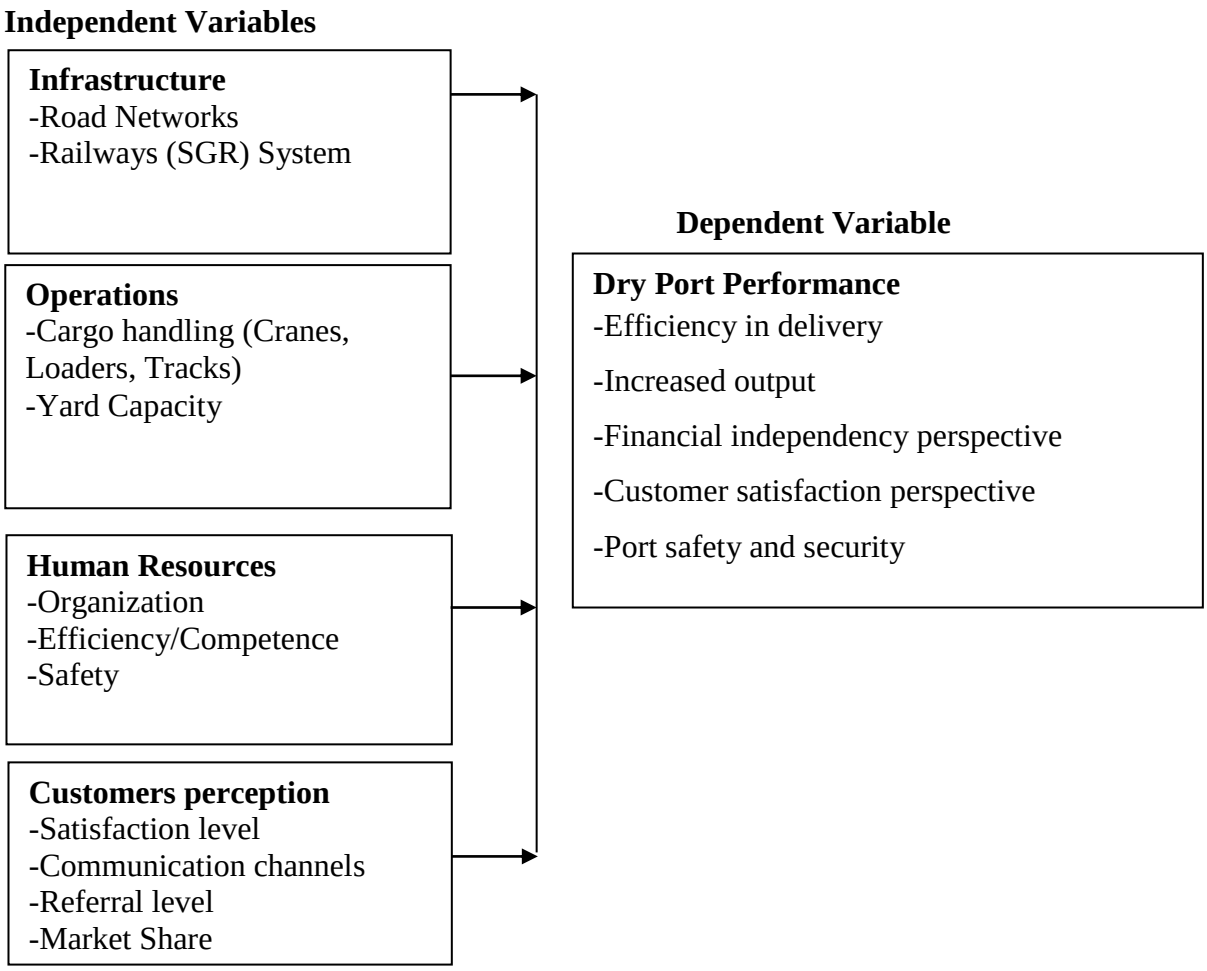


Figure 2.1 Conceptual Framework

Source: Researcher (2021)

In this study, institutional factors are the independent variables measured through container handling equipment, customs operations, qualities of port infrastructure, port staffs and port size. On the other hand, effective dry port performance is the dependent variable and is measured in terms of increase in input (port effectiveness and usage) and increase in output (number of containers). It is conceptualized that determinants indicated by container handling equipment, customs operations, qualities of port infrastructure, port staffs and port size will positively affect dry port performance.

Each of the variables, that is, container handling equipment, customs operations, qualities of port infrastructure, port staffs and port size may lead to performance in cargo delivery, increased port output, improved financial independency perspective, high customer satisfaction perspective and port safety and security.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section gives details of the procedures that were used in conducting the study. It includes the research design, study population, sampling technique and sample size, data collection instruments, data collection procedures and data analysis, finding presentation as well as ethical consideration in the study.

3.2 Research Design

Mugenda, (2003) recorded that research design is a strategy that will be employed in collecting and analyzing the data collected. The plan provides a framework to guide the researcher in preparing the research instruments and provides guidelines of administering the instruments in the area of study. An explanatory research design was adopted for this study. It is the preliminary study into a hypothetical idea. Here an investigator has an idea and seeks to comprehend more about it. An explanatory research project is an effort to lay the foundation leading to future studies, or determines if whatever is being observed would be made clear by a currently existing theory (Kombo & Tromp, 2011), the limitation can be overcome by selecting major and representative subjects for study.

3.3 Target Population

According to Mugenda (2009), the population refers to an entire group of individuals, events or objects having a common observable characteristic. Mugenda and Mugenda, (2009) generalize the findings of a study. The population was chosen to delimit the study and gather sufficient data within the limit and cost. The targeted population in this study was 302 who comprised of 112 container terminal employees, 103

employers in clearing and forwarding and 87 engineering department and other departments. The target population was organized as follows.

Table 3.1 Target Population

Category	Number
Container Terminal department employees	112
Clearing and forwarding employees	103
Engineering department employees and others	87
Total	**302**

3.4 Sampling Design and Procedure

Sampling is the process (Saunders, Lewis and Thomhill, 2003) of selecting a number of individuals for a study from the larger group referred to as the population.

Stratified proportionate random sampling method was applied to choose the respondents. In stratified random sampling subjects were selected in such a manner that the existing sub-groups in the populace are more or less represented in the sample. The method as well involved dividing the populace into a series of applicable strata, which means that the sample was expected to be more representative (Saunders *et al*, 2011).

Sampling is a deliberate choice of a number of people who are to provide the data from which a study draws conclusions about some larger group whom these people represent. The section focused on the sampling size and sampling procedures. The sample size is a subset of the population that is taken to be representatives of the entire population (Kumar, 2011). A sample size of 169 was arrived at by calculating the target population of 302 with a 95% confidence level and an error of 0.05 using the below formula taken from Kumar (2011).

$$n = \frac{Z^2.N.\times.\partial^2\mathrm{p}}{\lfloor(N-1)\rfloor e^2 + \lfloor z^2\,\partial^2\mathrm{p}\rfloor} =$$

Where:

n = Size of the sample,

N = Size of the population and given as 302,

e = Acceptable error and given as 0.05,

∂p = The standard deviation of the population and given as 0.5 where not known,

Z = Standard variate at a confidence level given as 1.96 at 95% confidence level.

$$n = \frac{NZ^2\times.25}{\lfloor d^2\times(N-1)\rfloor+\lfloor z^2\times.25\rfloor} = \frac{302\times1.96^2\times.25}{\lfloor0.05^2\times(302-1)\rfloor+\lfloor1.96^2\times.25\rfloor} = \frac{290.0408}{1.7129} = 169$$

Therefore the sample size is 169 respondents.

The sample size fits within the minimum of 30 proposed by Saunders, Lewis and Thornhill (2012). The study selected the respondents using stratified proportionate random sampling technique. Stratified random sampling is unbiased sampling method of grouping heterogeneous population into homogenous subsets then making a selection within the individual subset to ensure representativeness. The study used simple random sampling to pick the respondents in each stratum.

3.5 Piloting Study

Piloting of the instruments was carried out in Naivasha facility which was in the study area. The instruments were administered in the same port facility two times in a period difference of one week. This was done to ascertain the reliability of the instrument to enable necessary adjustments. Piloting is very useful in checking the length of the instruments and to clarify the instruction.

3.5.1 Reliability of the Research Instrument

The term reliability points to the level of internal consistency or stability over time of a research instrument. A measuring instrument is reliable if it provides consistent results (Kothari, 2011). Therefore, for a research instrument to be reliable; it must be capable of yielding consistent results when used more than once to collect data from two samples drawn randomly from the same population. The questionnaires were assessed for reliability. The test-retest method of assessing reliability was used. Pilot testing of the research instruments was done in the neighboring Naivasha Dry Port. The process was repeated after two weeks to examine the consistency of response between the two tests to ensure that they tested relevant variables.

3.5.2 Validity

Validity was enhanced through appraisal of the questionnaires and verification by the supervisor who is an expert. The questionnaires were subjected to pre-test to detect any deficiencies in it. The necessary improvements were done. The content validity was used to measure the degree to which data collected using the questionnaires represented the specific domain of indicators in the study. The supervisor was consulted to assess the questionnaire to ensure that it measured the concept it was intended to. The pre-test study was geared towards giving questions that accurately represented the concept under the study.

3.6 Data Collection Methods

Data collection methods encompass any measurement procedures that involve asking questions to respondents. Schindler (2011) recommends the use of questionnaires in descriptive studies because self-administered typically cost less than personal interviews and sample accessibility is easy. In this study, a questionnaire was used. A

5 point Likert-type response scale ranging from 5=strongly agree to 1=strongly disagree was used.

3.7 Data Collection Research Instrument

The study used primary data which was collected through questionnaires. According to Kothari (2008), questionnaires are usually free from the interview bias as the answers are in respondents own words. Respondents also have adequate time to give well thought out answers. Questionnaires also save time and information can be collected from a very large sample. The questionnaire choice is therefore based on the fact that questionnaires are free from bias of the interviewer and respondents have adequate time to give well thought out answers, and is appropriate for literate, educated and co-operative respondents where in this case all respondents of the study was considered to meet this requirement. The study used questionnaires because they can ensure anonymity, permit use of standardized questions, and they have uniform procedures, provide time for subject to think about responses and are easy to score. Questionnaire was used in the study because it was easier to complete and the researcher would easily detect a trend just by glancing at the responses (Orodho, 2012).

According to Orodho (2009) many people are willing to communicate orally than in writing and they would provide data more readily and fully than on a questionnaire. A researcher is able to encourage subjects and probe them deeply into a problem.

3.8 Data Collection Procedure

The researcher obtained research approval authorization letter from the university of to facilitate granting of permission from relevant authorities. Once the research proposal was approved, the researcher sought the consent from the university to

conduct the research. After sampling and making all the preliminary preparations, the relevant authorities were informed of the intended study to sensitize them on the whole exercise and enlighten the respondents at least a month in advance. This reduced suspicion and even enhanced cooperation. The researcher personally administered the questionnaire after a prior visit that assisted in refining timings of interviews and distribution of questionnaires. It also provided a rough picture of the respondents' expectations. The researcher agreed with the respondents when the questionnaire were be to be administered and specifically dates of collecting the questionnaires. The respondents were given adequate time to respond to the questions.

3.9 Measurement of Variables

Research Objectives	Type of variable	Indicators	Measuring Scale	Method of Analysis	Tool of analysis
To determine the effect of port infrastructure on dry port performance at Embakasi internal container depot in Kenya.	Independent variable: Infrastructure	-Road Networks -Railways (SGR) System	Nominal Ordinal	Descriptive statistics	-Frequency Mean percentages. Standard deviation
To evaluate the effect of human resources on dry port performance in Kenya.	Independent variable: human resources	-Organization -Efficiency or competence -Safety	Nominal Nominal	-Descriptive statistics -Inferential statistics	Mean and Standard deviation -Pearson's Correlation
To establish the effect of operations on dry port performance at Embakasi internal container depot in Kenya.	Independent variable: Operations	-Cargo handling (Cranes, Loaders, Tracks) -Yard Capacity	Ordinal	Descriptive statistics	Frequency, percentages
To find out the effect on customers/stakeholder perception on Dry ports performance at Embakasi internal container depot in Kenya.	Independent variable: Operations	-Satisfaction level -Communication channels -Referral level -Market Share			
	Dependent variable: Dry Port Performance	-Efficiency in delivery -Increased output	Ordinal Nominal	-Descriptive statistics -Pearson's Correlation	Mean and Standard deviation

3.10 Data Analysis and Presentation

The collected data was analyzed using descriptive and inferential statistics with the help of statistical package for social sciences (SPSS). Descriptive statistics include percentages, frequency distribution and measure of central tendencies (mean). The data was presented in the form of tables, graphs and charts.

The study also used multiple regression analysis to establish the effect of institutional factors on dry ports performance in Kenya. The regression model used in the study was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y = Dry Port Performance
X_1 = Infrastructure,
X_2 = Human Resources,
X_3 = Operations,
X_4 = Customers Perception.

In the model, β_0 = the constant term while the coefficient

$\beta X = 1 \ldots 4$ was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables X_1, X_2, X_3 and X_4,, ε is the error term which captures the unexplained variations in the model (Olusola et al, 2013).

The multiple regression analysis was based on 3 assumptions: normality, multicollinearity and homoskedasticity.

Assumptions of Multiple Linear Regressions

As a component of data analysis and presentation, the study performed different demonstrative tests with perspective of discovering the appropriateness of the study

for regression analysis. These tests were basic in guaranteeing that the study data met the particular assumptions underlying regression analysis. These were as depicted below:

Normality Test

As a part of experimental data analysis, test for normality of distribution of the response variable was performed.

Heteroskedasticity

Heteroskedasticity happens when the variance of the error terms vary crosswise over observations. This test is helpful to look at whether there is contrast in residual variance of the observation time frame to another time of observation (Godfrey, 1996). To test for heteroskedasticity in this investigation. For the Breusch-Pagan/Cook-Weisberg test, the null hypothesis is that the error are for the most part equivalent while the alternative hypothesis is that the error variance are a multiplicative function of at least one factors. For the Breusch-Pagan/Cook-Weisberg test, homoskedasticity is clear when the estimation of "Prob> Chi-squared" is more than 0.05 (Bera and Jarque, 2012). To manage the heteroskedasticity issue whenever identified, the study will attempt to respecify the model or change the variable given that occasionally heteroskedasticity results inappropriate model specification proves by decision of wrong variables whose impacts may not be direct (Garson, 2012).

Multicollinearity

Variance inflation factor (VIF) and Tolerance was used to test multicollinearity in this study. The reciprocal of tolerance known as the variance inflation factor (VIF) shows how much the variance of the coefficient estimate is being inflated by multicollinearity. A VIF for all the independent and dependent variables of

somewhere in the range of 1 and 10 demonstrated no multicollinearity while a VIF of > 10 and < 1 showed multicollinearity (Maddala&Lahiri, 1992). Further, tolerance Statistics values below 0.1 demonstrated a multicollinearity issue (Maddala and Lahiri, To manage the issue of multicollinearity if identified, the study would obtain more data on the variables concerned if possible or ultimately remove the exceedingly correlated variables from the model (Garson, 2012).

3.11 Ethical Considerations

Walliman (2011) defined ethics as the distinction between the right and wrong and the good and bad when conducting a study. The ethical issues are to guide during the research study. The researcher was granted permission from Kenya School of Revenue Administration and National Commission for Science, Technology and Innovation (NACOSTI) in order to carry out the research. Permission was sought from County Director of Education and the management of Embakasi ICD through a letter to undertake the research study. The respondents' participation was voluntary and free. The respondents were assured of confidentiality and anonymity of the information they avail. In addition, the researcher adhered to Moi University and Kenya School of Revenue Administration post graduate research rules and regulations.

3.12 Limitations of the Study

Communication barriers: This included language barrier, level of education by which some of the staff were not able to understand much and thus difficulty in reading and answering the questionnaire. Also age difference and stereotypes affected field study.

It was also noted that some respondents did not fully understand the concept of port performance. Some respondents were unwilling to give accurate information for fear

that the information may be sensitive or confidential bearing in mind the level of importance attached to inventory management. To overcome this, the researcher used introductory letter from Moi University stating that the study was for academic purposes only and any information given was dealt with utmost confidentiality.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

The study results as well as the interpretation and presentation of those results were presented in this chapter. With a view of documenting the results, both inferential and descriptive statistics were employed.

4.1.1 Response Rate

The study sought to determine the response rate and the findings were as shown in Table 4.1.

Table 4.1: Showing Response Rate

	Frequency	**Percentage** (%)
Returned	160	95
Not returned	9	5
Total	**169**	**100**

The finding in Table 4.1 showed that out of 169 questionnaires that were distributed to the respondents; 160 were successfully filled and returned. This represents a response rate of 95%. The response rate was generally good and conforms to Babbie (2015) who asserted that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good while a response rate above 70% is excellent. In this case, the response rate obtained from this study can be classified as excellent and was sufficiently representative of the target population. This response rate was highly capable of producing useful results and make meaningful inferences. The study therefore proceeded.

4.1.2 Reliability Results

Reliability analysis was subsequently done using Cronbach's Alpha which measures the internal consistency by establishing if certain items within a scale measure the same construct. Frankfort-Nachmias and Nachmias (2012) established the Alpha value threshold at 0.7, thus forming the study's benchmark. Cronbach Alpha was established for every objective as indicated in table 4.2

Table 4.2 Reliability Results

Variable	Cronbach's Alpha	Number of Items
Infrastructure	0.761	4
Human resources	0.898	4
Operations	0.784	4
Customer perception	0.777	4
Dry Port Performance	0.717	4

Source: Research Data, (2021)

Values in Table 4.2 of infrastructure $\alpha = 0.761$, human resources $\alpha = 0.898$, operations $\alpha = 0.784$, Customer perception $\alpha = 0.777$ and dry port performance $\alpha = 0.717$, are sufficient confirmation of data reliability for the four independent variables. This indicates that the Alpha value threshold was over 0.7. This illustrates that all the five variables were reliable as their reliability values exceeded the prescribed threshold of 0.7.

4.2 Demographic Analysis

4.2.1 Education Level of the Respondents

The education background of the respondents was also important as it was key in determining whether the respondents understood the topic under study. The response of this item was as shown in Figure 4.1.

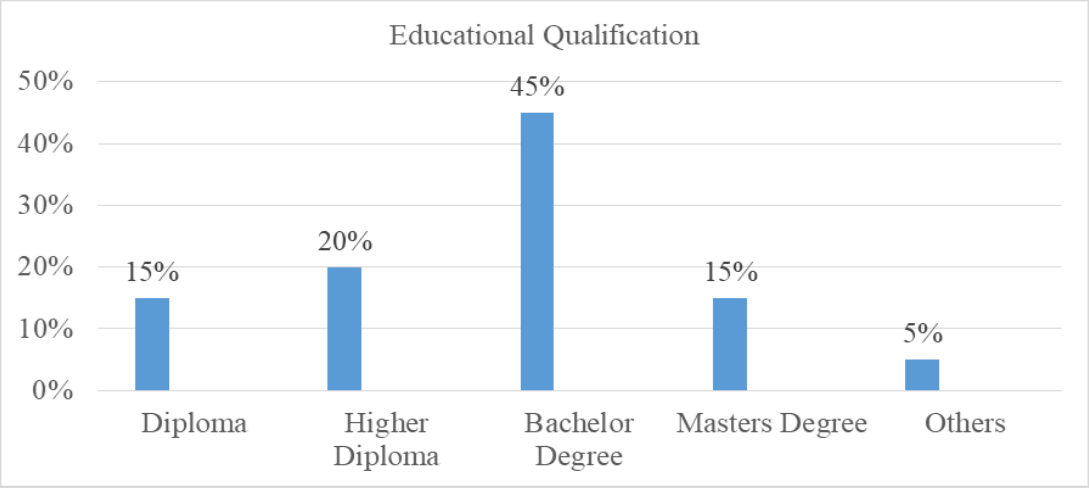


Figure 4.1 Academic Qualifications of the Respondents

Source: Research Data, (2021)

Respondent's level of education was sought and majority (45%) of the respondents indicated that they hold at least degree level of education while sizeable (20%) hold a college/higher diploma level of education, 15% of the respondents have a higher degree at postgraduate level qualification another 13% possess diploma level of education and 5% were holders of other qualifications like CPA. This implies that the majority of the respondents hand minimum level of education that could enable them to give reliable responses concerning institutional factors influencing performance of Dry Ports in Kenya, a case study of Embakasi Internal Container Depot. This means that all the respondents under investigation have undergone formal education with majority of them having attained at least Diploma level of education.

4.2.2 Type of Respondents' Organization they Work with

The study sought to determine the type of organizations the respondents worked at. Figure 4.2 indicates an analysis of respondents' age distribution.

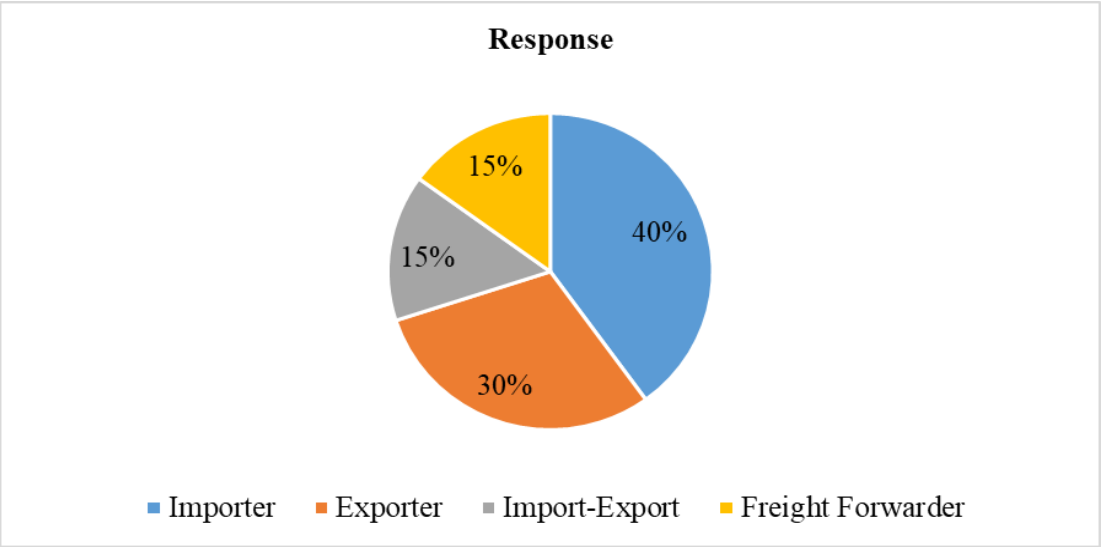


Figure 4.2 Type of Respondents' Organization they work with

Source: Research Data, (2021)

Figure 4.2 showed that 40% of the respondents worked in organizations that are engaged in importation, 30% worked with exporting firms, 15% with import-export firms while another 15% worked with freight forwarding firms. The study findings depicted that the respondents worked with firms engaging in various businesses at the dry port and that importation, exporting, import-export and Freight Forwarding firms were well represented in the study.

4.2.3 Cadre of Management

There was participation of all cadres of employees in this study as indicated in Figure 4.3.

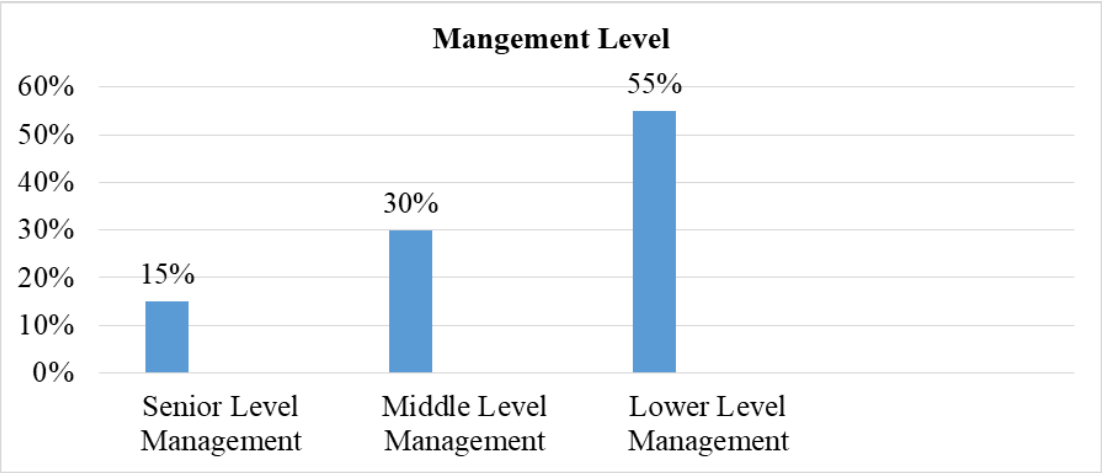


Figure 4.3 Cadre of Management

Source: Research Data, (2021)

Concerning the cadre of management, the results reveal that 15% of the respondents were in senior level management/executive staff members while 30% were in the middle level management. It was further revealed that 55% of them were in lower level management. This implies that the study focused on all the respective management cadres that are crucial in an organization. In addition, they play a critical role in disseminating expertise and skills to the other workers in the industry. These findings concur with Egessa (2005).

4.3 Measures of Port Performance

The study sought to determine the measures of indicators of port performance using balanced score card and the results were as follow. Likert scale of 1 – 5 was used such that 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. The findings were as follows.

Table 4.3 Measures of Port Performance

Statement	Mean	Std. Dev	Min	Max	Skewness	Kurtosis
Service delivery at the Embakasi Internal Container Depot is very efficient	3.88	1.201	.059	.108	-.026	-.193
There is increased output at Embakasi Internal Container Depot	4.21	.913	.064	.113	.276	.546
The Embakasi Internal Container Depot has a strong financial base	4.16	1.105	.061	.106	.273	.522
The Embakasi Internal Container Depot satisfactorily offers its services to its customers	4.07	1.226	0.060	.104	.274	.541
Safety and security of cargo and people is guaranteed at the Embakasi Internal Container Depot	4.086	.823	.060	.104	.272	.531

Source: Research Data, (2021)

Majority of the respondents agreed that service delivery at the Embakasi Internal Container Depot is very efficient as shown by a mean of 3.88 and a standard deviation of 1.201, there is increased output at Embakasi Internal Container Depot as illustrated by a mean of 4.21 and a standard deviation of 0.913, the Embakasi Internal Container Depot has a strong financial base as demonstrated by a mean of 4.16 and a standard deviation of 1.105, the Embakasi Internal Container Depot satisfactorily offers its services to its customers as shown by a mean of 4.07 and a standard deviation of 1.226 and that safety and security of cargo and people is guaranteed at the Embakasi Internal Container Depot as shown by a mean of 4.086 and a standard deviation of 0.823.

On the basis of balanced score card, port performance indicators extend from port financial and operational to environmental, safety, security and trade facilitating

issues, and can also be used for other port services, hinterland (rail and road) connections and trucks. Port performance is an investigation of effectiveness and performance in the accomplishment of a given activity and where the assessment is carried out in relation to how well the objectives have been met in relation to performance, Bichou and Gray (2004)

4.4 Effect of Infrastructure on Dry Port Performance

The study sought to determine the effect of infrastructure on dry port performance at Embakasi Internal Container Depot. Respondents were requested to indicate their level of agreement with each of the following statements relating to infrastructure and dry port performance. Likert scale of 1 – 5 was used such that 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. The results are summarized in Table 4.4.

Table 4.4: Effect of Infrastructure on Dry Port Performance

Statements	Mean	Std Dev.	Min	Max	Skewness	Kurtosis
There are good road networks connecting the port	4.11	0.248	0.036	0.112	0.287	-.930
The construction of railways (SGR)	3.93	.147	0.033	0.019	0.277	.548
System has helped port operations to increase tremendously						
The port has a good communication (ICT) networks connection	4.04	.136	0.038	0.201	0.281	.498

Source: Research Data, (2021)

From the findings, majority of the respondents agreed that good road networks connecting the port helped improve dry port performance at Embakasi Internal Container Depot as illustrated with a mean of 4.11 and a standard deviation of 0.248 and that the construction of railways (SGR) System has helped port operations to increase tremendously as shown by a mean of 4.04 and a standard deviation of 0.136.

The study further showed that the construction of railways (SGR) System has helped port operations to increase tremendously as illustrated by a mean of 3.93 and a standard deviation of 0.147. The findings were similar to that carried out by Balci *et al.* (2014) on the determinants of dry bulk port selection and analyses factors considered by shippers and forwarders in selection of ports using explanatory survey method and the result indicates that physical and technical structure of port, cargo handling speed, handling cost, storage facilities, location, customer relations, port reliability and hinterland connection are found to be important factors in determining the performance of ports.

4.5 Human Resource and Dry Port Performance

Further, the study sought to determine from the respondents on the effect of human resource on dry port performance at Embakasi Internal Container Depot. Likert scale of 1 – 5 was used such that 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. The findings were as follows.

Table 4.5: Effect of Human Resource on Dry Port Performance

Statement	Mean	Std. Dev	Min	Max	Skewness	Kurtosis
There is good organization of human resources at Embakasi Internal Container Depot	4.14	0.219	.065	.108	-.027	-.194
The human resource at Embakasi Internal Container Depot is of high performance and competence	4.27	0.160	.068	.112	.277	.548
Employees at Embakasi Internal Container Depot are well trained on port operations	4.43	0.132	.070	.104	.271	.525
There is adequate employee safety at Embakasi Internal Container Depot	3.56	0.543	.061	.101	.280	.542
Employee wages and salaries are fair and just at Embakasi Internal Container Depot	4.20	0.217	.067	.106	.274	.538

Source: Research Data, (2021)

Majority of the respondents agreed that employees at Embakasi Internal Container Depot are well trained on port operations as shown by a mean of 4.43 and a standard deviation of 0.132, the human resource at Embakasi Internal Container Depot is of high performance and competence as illustrate by a mean of 4.27 and a standard deviation of 0.160, employee wages and salaries are fair and just at Embakasi Internal Container Depot as demonstrated by a mean of 4.2 and a standard deviation of 0.217, there is good organization of human resources at Embakasi Internal Container Depot as shown by a mean of 4.14 and a standard deviation of 0.219 and that ghere is adequate employee safety at Embakasi Internal Container Depot as shown by a mean of 3.56 and a standard deviation of 0.543. The findings were consistent to those of Guar (2011) who indicated that the numbers of staff or the labor costs are considered

as a potential factor that may affect the performance of dry port. The number of employees is usually taken as a critical factor influencing businesses of dry ports as more staffs can handle the inbound and outbound containers or bulk cargos more efficiently especially in peak hours. Dry ports should have sufficient middle-level and front line managers as well as workers to handle the businesses.

4.6 Effect of Operations on Dry Port Performance

The study pursued to evaluate the effect of operations on dry port performance at Embakasi Internal Container Depot. Likert scale of 1 – 5 was used such that 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. The findings were summarized in Table 4.6

Table 4.6: Statements on Effect of Operations on Dry Port Performance

Statement	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Cargo handling (cranes, loaders, and tracks) at Embakasi Internal Container Depot are modern and adequate	3.83	0.147	.039	.109	-.391	.459
Embakasi Internal container Depot work environment is conducive and friendly	3.99	0.128		.121	.282	.548
Service Provision at Embakasi Internal Container Depot is of high quality	2.39	0.455		.098	.274	.538
There is adequate yard capacity at Embakasi Internal container Depot	3.81	0.128		.112	.279	.546

Source: Research Data, (2021)

Majority of the respondents agreed that Embakasi Internal container Depot work environment is conducive and friendly as shown by a mean of 3.99, Cargo handling (cranes, loaders, and tracks) at Embakasi Internal Container Depot are modern and adequate as demonstrated by a mean of 3.83 and that there is adequate yard capacity

at Embakasi Internal container Depot as shown by a mean of 3.81. The respondents agreed that Service Provision at Embakasi Internal Container Depot is of high quality as shown by a mean of 2.39 and a standard deviation of 0.455. container handling equipment are used in dry ports, which include rubber-tired gantry cranes, mobile cranes, top handlers, side handlers, reach stackers, forklifts and so forth. Usually container handling equipment are viewed as the main machines for dry ports as well as seaports, and they can greatly affect both the container handling capacities and, in turn, the performance of the dry port (Gujar,2011).

4.7 Effect of Customer Perception on Dry Port Performance

The respondents were asked to indicate their level of agreement on the effect of customer perception on dry port performance. A Likert scale of 1 – 5 was used such that 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. The findings were as shown in Table 4.7.

Table 4.7 Effect of Customer Perception on dry Port Performance

Statement	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
At Embakasi Internal Container Depot, market share is high	3.90	0.514	.021	.119	-.108	-.434
There is service effectiveness at Embakasi Internal Container Depots	3.83	0.496	.019	.117	.277	.548
Customers complaints are addressed in time	3.88	0.509	.020	.118	.282	.551
I would highly recommend other people to use Embakasi Internal Container Depot because of their services	3.86	0.507	.019	.119	.280	.549

Source: Research Data, (2021)

From the study findings, majority of the respondents agreed that at Embakasi Internal Container Depot, market share is high as shown by a mean of 3.90 and that there is service effectiveness at Embakasi Internal Container Depots is that as illustrated by a mean of 3.83 and a standard deviation of 0.496. Majority of the respondents also agreed that at Embakasi Internal Container Depot, customers complaints are addressed in time as illustrated by a mean of 3.88 and a standard deviation of 0.509. Most consumers would highly recommend other people to use Embakasi Internal Container Depot because of their services as illustrated by a mean of 3.86 and a standard deviation of 0.507. Stakeholders report, (2012) states that it is unfortunate that quite a number of significant interventions that would have eased the delays at the port have been known for over 30 years. All the major stakeholders agree with the assertion that "Mombasa port facilities are inadequate and in poor condition" and that without substantial investment in equipment, the port is unlikely to handle more traffic. Moreover the existing terminal which is designed to handle a throughput of 250,000TEUs per annum through three berths now handles a total of 695,000TEUs in 2010; this growth in container traffic has put a strain on the existing facilities and compounded the congestion problem.

4.8 Test of Assumptions of the Study Variables

When the assumptions of the linear regression model are correct, Ordinary Least Squares (OLS) provides efficient and unbiased estimates of the parameters (Kaiser, 1974). To ensure that there was no violation of the assumptions, this study tested for multicollinearity, homoskedasticity and normality test.

4.8.1 Multicollinearity

Multicollinearity is the undesirable situation where the correlations among the independent variables are strong. In other words, multicollinearity misleadingly bloats

the standard errors. Thus, it makes some variables statistically insignificant while they should be else significant (Martz, 2013). Tolerance of a respective independent variable is calculated from $1-R^2$. The test result for multicollinearity was done, using both the VIF and tolerance. With VIF values being less than 5 (Bera and Jarque, 2012), it was concluded that there was no presence of multicollinearity in this study. The VIF shows us how much the variance of the coefficient estimate is being inflated by multicollinearity. This is indicated in Table 4.8.

Table 4.8: Multicollinearity test results for the study of independent variables

	Collinearity Statistics	
Variables	**Tolerance**	**VIF**
Infrastructure	.920	1.087
Human Resources	.538	1.858
Operations	.799	1.252
Customer perception	.818	.222

Source: Survey Data (2021)

A tolerance with a value close to 1 means there is little multicollinearity, whereas a value close to 0 suggests that multicollinearity may be a threat (Belsley, Kuh & Welsch, 2004). The reciprocal of the tolerance is known as Variance Inflation Factor (VIF). Equally, the VIF measures multicollinearity in the model in such a way that if no two independent variables are correlated, then all the VIF values will be 1, that is, there is no multicollinearity among factors. But if VIF value for one of the variables is around or greater than 5, then there is multicollinearity associated with that variable (Martz, 2013).

From the findings it shows that there was no presence of multicollinearity in this study.

All the values had a tolerance close to 1 means there is little multicollinearity.

4.8.2 Homoscedasticity

Heteroscedasticity in a study usually happens when the variance of the errors varies across observation (Long & Ervin, 1998). Breusch-Pagan and Koenker was used to test the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. Breusch-Pagan and Koenker test the null hypothesis that heteroscedasticity not present (homoscedasticity) if sig-value is less than 0.05, reject the null hypothesis. A large chi-square value greater than 9.22 would indicate the presence of heteroscedasticity (Sazali, Hashida, Jegak & Raduan, 2009). In this study, the chi-square value was 7.585 indicating that heteroscedasticity was not a concern as shown in Table 4.9.

Ho: Constant variance

Variables: Infrastructure, Human Resources, Operations and customer perception

Table 4.9: Breusch-Pagan Test for Heteroscedasticity

Ho	Variables	Chi2(1)	Prob > Chi2
Constant Variance	Infrastructure, Human Resource, Operations and customer perception	7.585	0.108

Source: Survey Data (2021)

4.8.3 Normality Tests

The normality of data distribution was assessed by examining its skewness and kurtosis (Kline, 2005). A variable with an absolute skew-index value greater than 3.0 is extremely skewed while a kurtosis index greater than 8.0 is an extreme kurtosis (Kline, 2005). Cunningham (2008) stated that an index smaller than an absolute value of 2.0 for skewness and an absolute value of 7.0 is the least violation of the assumption of normality. The results of the normality test of the dependent variable

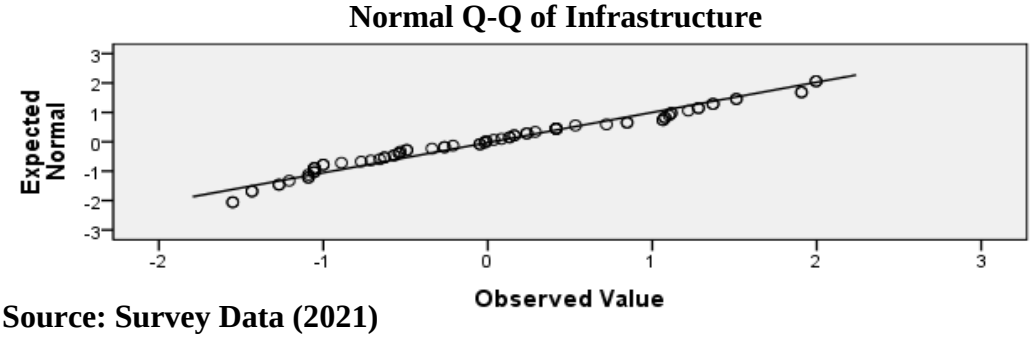
indicated skewness and kurtosis in the range of -1 and +1 as shown in Table 4.9. This implies that the assumption of normality was satisfied.

Table 4.10: Normality Test of the dependent and Independent Variables

Variables		Statistic	Std. Error
Infrastructure	Mean	.026	112
	Std. Deviation	.973	
	Skewness	.287	277
	Kurtosis	-.930	.548
Human resources	Mean	.065	.108
	Std. Deviation	.935	
	Skewness	-.027	.277
	Kurtosis	-.194	.548
Operations	Mean	.039	.109
	Std. Deviation	.945	
	Skewness	-.391	.277
	Kurtosis	.459	.548
Customer perception	Mean	.021	.119
	Std. Deviation	1.035	
	Skewness	-.108	.277
	Kurtosis	-.434	.548
Dry Port performance	Mean	.120	.087
	Std. Deviation	.755	
	Skewness	-.402	277
	Kurtosis	-.252	.548

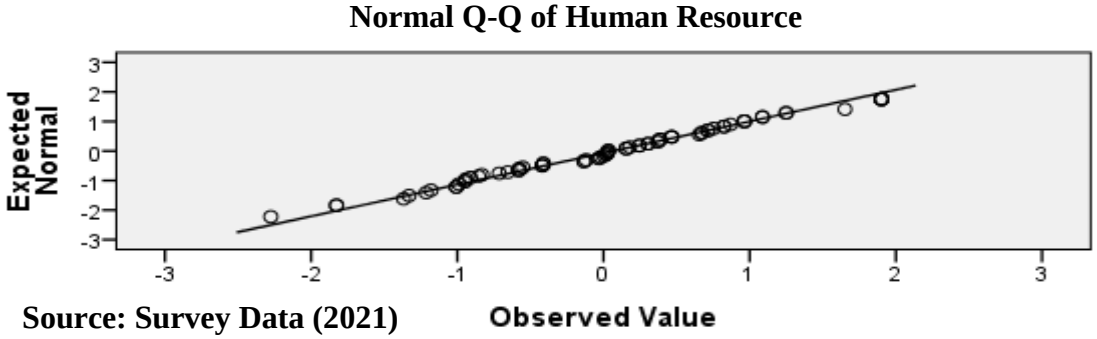
Source: Survey Data (2021)

To corroborate the skewness and kurtosis results, the graphical analysis results showed the line representing the actual data distribution closely follow the diagonal in the normal Q-Q plot as shown in Figures 4.4 to 4.8, suggesting normal distribution (Hair, Tatham, Anderson & Black, 2006). In Q-Q plot, or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, where, a sensibly straight line suggests a normal distribution (Pallant, 2010). By and large, if the points in a Q-Q plot depart from a straight line, then the assumed distribution is called into question (Aas & Haff, 2006).



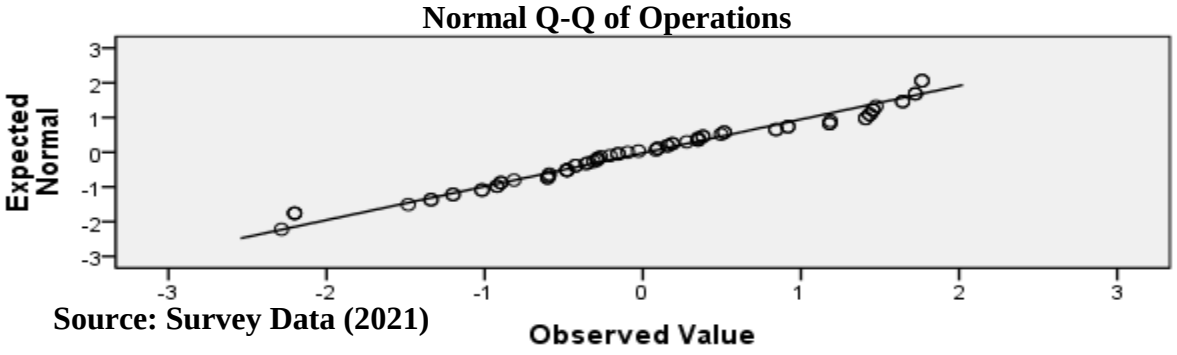
Source: Survey Data (2021)

Figure 4.4: Q-Q plot of Infrastructure



Source: Survey Data (2021)

Figure 4.5: Q-Q plot of Human Resources



Source: Survey Data (2021)

Figure 4.6: Q-Q plot of Operations

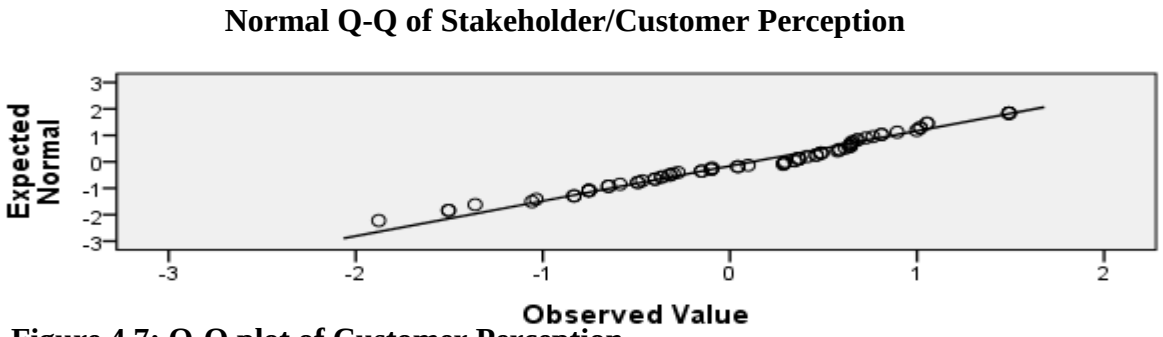


Figure 4.7: Q-Q plot of Customer Perception

Source: Survey Data (2020)

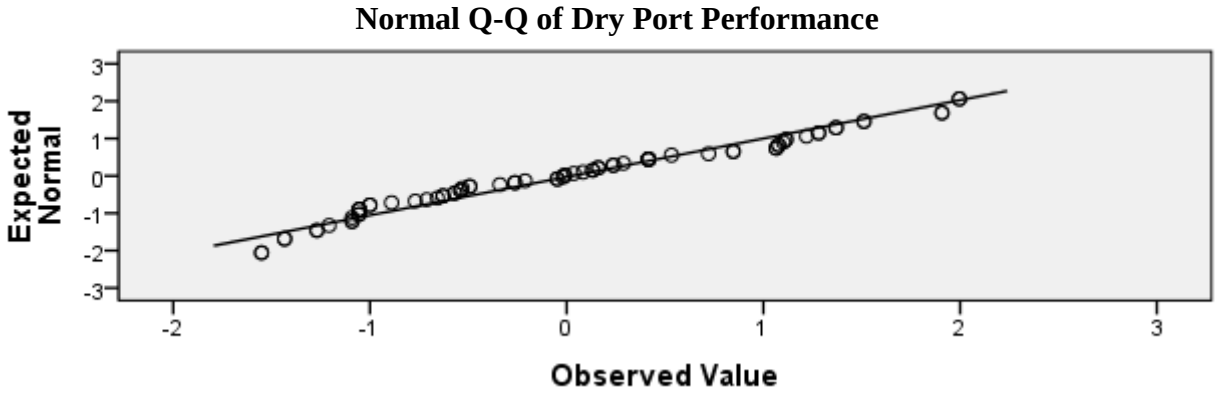


Figure 4.8: Q-Q plot of Dry Port Performance

Source: Survey Data (2021)

4.9 Inferential Statistical Results

4.9.1 Correlation Analysis

The study applied Pearson product moment correlation coefficient which is a measure of the strength of liner association between two variables. It was used to measure the degree of association between variables under consideration. Where Pearson coefficient is less than 0.3, the correlation is weak and 0.5 implies a strong correlation.

Table 4.11 : Correlations Coefficient

		Infrastructure	Human Resources	Operations	Customers Perception	Dry Port Performance
Infrastructure	Pearson Correlation	1				
	Sig. (2-tailed)	146				
Human Resources	Pearson Correlation	.575	1			
	Sig. (2-tailed)	160	160			
Operations	Pearson Correlation	.540	.663**	1		
	Sig. (2-tailed)	160	160	160		
Customers Perception	Pearson Correlation	.527	.677	.540**	1	
	Sig. (2-tailed)	160	160	160	160	
Dry Port Performance	Pearson Correlation	.731**	.786**	.655**	.710**	1
	Sig. (2-tailed)	160	160	160	160	160

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

The correlation analysis to determine the effect of infrastructure on dry port performance shows a significant correlation existed ($r = 0.731$, $p < 0.05$). Pearson's correlations coefficient was higher than 0.5 suggestion a strong relationship existed between the two variables. The study had also sought to determine the effect of human resources on dry port performance. The analysis yielded a Pearson correlation coefficient of $r = 0.786$, $p < 0.05$; indicating that a strong relationship existed between the two variables. The study also sought to determine the effect of operations on dry port performance. The analysis showed ($r = 0.655$, $p<0.05$) to show a strong relationship between the two variables. The study also sought to determine the effect of customers perception on dry port performance. The analysis yielded Pearson correlations coefficient is ($r = 0.710$, $p< 0.05$) to indicate a strong relationship between the two variables. Hence, it is evident that all the independent variables could explain the levels of employee performance. The correlation summary shown in

Table 4.10 therefore indicates that the associations between each of the independent variables and the dependent variable were significant.

4.9.2 Analysis of Variance

This section deals with ANOVA and its interpretation

4.9.3 Multiple Regression Analysis

Multivariate regression analysis was used to determine the significance of the relationship between the dependent variable and all the independent variables pooled together. This analysis indicates how the independent variables effect the dependent variable collectively and to what extent each independent variable effect the dependent variable. The results are indicated in the model summary in Table 4.12.

Table 4.12: Multiple Linear Regression Analysis Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	. 847[a]	.717	.684	.34221

a. Predictors: (Constant), Infrastructure, Human Resources, Operations and Customers Perception

From the findings presented in Table 4.12, R is the correlation coefficient which illustrates the relationship between the study variables, from the findings shown in the table 6 there was a strong positive relationship between the study variables as shown by 0.847.

The adjusted R squared is coefficient of determination which shows the disparity in the dependent variable attributed to variations in the independent variables. The value of adjusted R-squared was 0.684, an indication that there was variation of 68.4% on dry port Effect at Embakasi Internal Container Depot due to changes in infrastructure, human resources, operations and Customers perception at 95 percent confidence

interval. Consistently, Nyema (2014) on a study regarding factors influencing port performance at Mombasa Entry Port revealed that factors such as inadequate cargo handling equipment, reducing berth times and delays of container ships, dwell time, container cargo and truck turnaround time, custom clearance, limited storage capacity, poor multi-modal connections to hinterland and infrastructure directly affected container terminal performance.

4.9.4 Analysis of Variance

The Analysis of Variance (ANOVA) indicates how well the model fits. The data and the results were presented on table 4.13 as shown below.

Table 4.13: Analysis of Variance (ANOVA)

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	35.14	4	8.785	14.765	.011b
Residual	29.75	156	0.595		
Total	64.89	160			

Based on the findings as shown in table 4.13, the population parameters had a significance level of 1.1% which shows that the data is perfect for making inferences on the population's parameter as the value of significance (p-value) is less than 5%. The F critical at 5% level of significance, 4 d.f, was 2.557 while F calculated was 14.765, since F calculated is greater than the F critical (F cal 14.765>F cri = 2.557), this shows that there was a goodness of fit of the model.

Table 4.14: Regression Coefficients results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.011	0.691		5.805	0.012
Infrastructure	0.754	0.175	0.697	4.309	0.013
Human Resources	0.772	0.167	0.711	4.623	0.013
Operations	0.661	0.167	0.616	3.958	0.014
Customers Perception	0.642	0.172	0.537	3.733	0.015

a. Dependent Variable: Dry Port Performance

From the analyzed data in table 4.14 the established regression equation was:

$Y = 4.011 + 0.754X1 + 0.772X2 + 0.661X3 + 0.642X4 + \varepsilon$

From the regression findings presented in Table 4.14 the predicted value of dry port performance at dry port performance holding infrastructure, human resources, operations and Customers perception to a constant zero would be 4.011. Infrastructure has a significance effect on dry port performance as indicated by $\beta1 = 0.754$, $p=0.013 < 0.05$. This implies that a unit increase in infrastructure would lead to an increase in dry port performance by 0.772 units. Human resources had a significance effect on dry port performance as indicated by $\beta1 = 0.772$, $p = 0.013 < 0.05$. This implies that a unit increase in human resources would lead to an increase in dry port performance by 0.772 units. Operations had a significance effect on employee performance as shown by $\beta1 = 0.661$, $p=0.014 < 0.05$. This implied that a unit increase in operations would lead to an increase in dry port performance by 0.661 units. Customers perception has a significance effect on dry port performance as indicated by $\beta1 = 0.642$, $p = 0.015 < 0.05$. This implied that a unit increase in customers' perception would lead to an increase in dry port performance by 0.642 units. At 5% level of significance and 95%

level of confidence, all the variables were significant ($p<0.05$). Therefore it can be deduced that internal factors significantly affect dry port performance.

4.9.5 Discussion of the Key Findings

The predicted value of dry port performance at dry port performance holding infrastructure, human resources, operations and Customers perception to a constant zero would be 4.011. Infrastructure has a significance effect on dry port performance as indicated by $\beta1= 0.754$, $p=0.013< 0.05$. This implies that a unit increase in infrastructure would lead to an increase in dry port performance by 0.772 units. Human resources had a significance effect on dry port performance as indicated by $\beta1= 0.772$, $p= 0.013< 0.05$. This implies that a unit increase in human resources would lead to an increase in dry port performance by 0.772 units. Operations had a significance effect on employee performance as shown by $\beta1= 0.661$, $p=0.014< 0.05$. This implied that a unit increase in operations would lead to an increase in dry port performance by 0.661 units. Customers perception has a significance effect on dry port performance as indicated by $\beta1= 0.642$, $p= 0.015< 0.05$. This implied that a unit increase in Customers perception would lead to an increase in dry port performance by 0.642 units. At 5% level of significance and 95% level of confidence, all the variables were significant ($p<0.05$). Therefore it can be deduced that internal factors significantly affect dry port performance.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the major findings, the conclusions that were drawn from the findings and recommendations gathered from the analysis of the data. It is divided in various sections that include summary of findings, conclusions, and recommendations for improvement.

5.2 Summary of the Study

5.2.1 Infrastructure

From the findings, majority of the respondents agreed that are relatively good road networks connecting the port helped improve dry port performance at Embakasi Internal Container Depot and that the construction of railways (SGR) System has helped port operations to increase tremendously.

5.2.2 Human Resource

Majority of the respondents agreed that employees at Embakasi Internal Container Depot are well trained on port operations as shown by a mean of 4.43 and a standard deviation of 0.132, the human resource at Embakasi Internal Container Depot is of high performance and competence as illustrate by a mean of 4.27 and a standard deviation of 0.160, employee wages and salaries are fair and just at Embakasi Internal Container Depot as demonstrated, there is good organization of human resources at Embakasi Internal Container Depot and that there is adequate employee safety at Embakasi Internal Container Depot.

5.2.3 Operations

Majority of the respondents agreed that Embakasi Internal Container Depot work environment is conducive and friendly as shown by a mean of 3.99, Cargo handling (cranes, loaders, and tracks) at Embakasi Internal Container Depot are modern and adequate as demonstrated by a mean of 3.83 and that there is adequate yard capacity at Embakasi Internal container Depot as shown by a mean of 3.81. The respondents agreed that Service Provision at Embakasi Internal Container Depot is of high quality as shown by a mean of 2.39 and a standard deviation of 0.455. Container handling equipment are used in dry ports, which include rubber-tired gantry cranes, mobile cranes, top handlers, side handlers, reach stackers, forklifts and so forth.

5.2.4 Customers Perception

From the study findings, majority of the respondents agreed that at Embakasi Internal Container Depot, market share is high and that there is service effectiveness at Embakasi Internal Container Depots. Majority of the respondents also agree that at Embakasi Internal Container Depot, customers complaints are addressed in time. Majority of consumers would also recommend other people to use Embakasi Internal Container Depot because of their efficient services.

5.3 Conclusions of the Study

The poor state of transport infrastructure within Kenya ensures that freight costs are high and competitiveness is reduced. Road and rail networks both require regular and constant repairs and upgrades, the single biggest contributor to the cost of transporting along the northern corridor is fixed port charges and time delays at Mombasa port as a consequence of the inadequacies of port infrastructure, burdensome documentation, cargo clearance and bureaucratic customs procedures.

The study concludes that there is relatively good organization of human resources at Embakasi Internal Container Depot, the human resource at the facility in not efficient enough through there is some competence specific sections, employees at Embakasi Internal Container Depot are well trained on port operations but require refresher training due to technological changes and emerging trends, there is adequate employee safety and employee wages and salaries are not fair at Embakasi Internal Container Depot.

The study concluded that cargo handling (cranes, loaders, and tracks) at Embakasi Internal Container Depot are somehow modern and but inadequate, work environment is not very conducive and friendly. Service provision at Embakasi Internal Container Depot is not of high quality and that there is inadequate yard capacity at Embakasi Internal container Depot.

From the study findings, it was concluded that at Embakasi Internal Container Depot, not all customers are well satisfied. Somehow, there is a clear channel of communication at all levels of management and that customers complaints are not addressed in time. Not all the stakeholders can recommend other people to use Embakasi Internal Container Depot because of their services

5.4 Recommendations of the Study

Investment in port infrastructure including on cargo handling equipment will have a significant impact in improving port performance. Therefore, in order to improve the performance of Embakasi Internal Container Depot, the government should invest on port infrastructure.

Reform of customs and other border control procedures is essential as reforms can result in the reduction of delays to trade consignments and accelerate the turnaround of containers in terminals.

Regarding human resources, the port should employ adequate staffs in all sections. Furthermore, it is important for the port to provide training to the port staffs so as to improve their skill and to update them with recent knowledge and technology in the port sector.

5.5 Suggestions for Further Research

Further research should be conducted on the contribution of EPZ in enhancing seaports performance.

A study should be carried out on the role of technology on Containerized Cargo Clearance at Kenya Port Authority.

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APPENDICES

Appendix I: Letter to the Respondents

Dear Respondent,

Consider this letter a request to participate in a study that seeks assess the **Effect of Institutional Factors on Dry Ports Performance at Embakasi Internal Container Depot, Kenya.** Your participation will be extremely important in enabling the researcher in coming up with findings that will help in understanding challenges that the elderly face and ways of addressing challenges faced by dry ports an improve their performance and performance.

Kindly spare part of your time to respond to the questions paused. Each response will be treated with confidentially and used for academic purpose only. Thank you for your co-operation.

Sincerely,

Dennis Saisi

Appendix II: Questionnaire

SECTION A: BIO DATA OF THE RESPONDENTS

I. What is your highest level of education?

1. Primary school [ ]
2. Secondary school [ ]
3. Diploma [ ]
4. First Degree [ ]
5. Master's Degree [ ]
6. Other (specify) ……

II. Indicate the type of your organization

1. Importer [ ]
2. Exporter [ ]
3. Import-Export [ ]
4. Freight Forwarder [ ]

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

1. Senior Level Manager [ ]
2. Middle Level Manager [ ]
3. Lower Level Manager [ ]
4. Other (Specify)……..

SECTION B: INSTITUTIONAL FACTORS AND DRY PORT PERFORMANCE

Port Performance

1. Please indicate your response to the following questions on the measures/indicators of dry port performance based on the balance scorecard

Use the Likert scale: 5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree and 1=Strongly Disagree

1	2	3	4	5	Statement
					Service delivery at the Embakasi Internal Container Depot is very efficient
					There is increased output at Embakasi Internal Container Depot
					The Embakasi Internal Container Depot satisfactorily offers its services to its customers
					Safety and security of cargo and people is guaranteed at the Embakasi Internal Container Depot

Port Infrastructure

2. Please indicate your response to the following questions on infrastructure on dry port performance

Use the Likert scale: 5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree and 1=Strongly Disagree

1	2	3	4	5	Statement
					There are good road networks connecting the Embakasi Internal Container Depot
					The construction of railways (SGR) System has helped Embakasi Internal Container Depot operations to increase tremendously
					The Embakasi Internal Container Depot has a good communication (ICT) networks connection
					There is a good linkage between the software element and hardware parts of the metwork

Human Resources

3. Please indicate your response to the following questions on the effect of human resources on Embakasi Internal Container Depot Performance

Use the Likert scale: 5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree and 1=Strongly Disagree

1	2	3	4	5	Statement
					There is good organization of human resources at Embakasi Internal Container Depot
					The human resource at Embakasi Internal Container Depot is of high performance and competence
					Employees at Embakasi Internal Container Depot are well trained on port operations
					There is adequate employee safety at Embakasi Internal Container Depot

Operations

4. Please indicate your response to the following questions on the effect of port operations on Embakasi Internal Container Depot Performance

Use the Likert scale: 5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree and 1=Strongly Disagree

1	2	3	4	5	Statement
					Cargo handling (cranes, loaders, and tracks) at Embakasi Internal Container Depot are modern and adequate
					Embakasi Internal container Depot work environment is conducive and friendly
					Service Provision at Embakasi Internal Container Depot is of high quality
					There is adequate yard capacity at Embakasi Internal container Depot

Customer perception

5. Please indicate your response to the following questions on customer perception on Embakasi Internal Container Depot Performance

Use the Likert scale: 5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree and 1=Strongly Disagree

1	2	3	4	5	**Statement**
					At Embakasi Internal Container Depot, customers are very satisfied
					At Embakasi Internal Container Depots there is a clear channel of communication at all levels of management
					Customers complaints are addressed in time
					I would highly recommend other people to use Embakasi Internal Container Depot because of their services