

**ECONOMIC ANALYSIS OF MARITIME SECTOR PERFORMANCE IN
ENHANCING ECONOMIC GROWTH IN KENYA**

BY

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**A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND
ECONOMICS, DEPARTMENT OF ECONOMICS IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
DEGREE OF DOCTOR OF PHILOSOPHY IN ECONOMICS**

MOI UNIVERSITY

2022

DECLARATION

Declaration by Candidate

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

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DEDICATION

I dedicate this thesis to my beloved Mother Mwanajuma Kidudu and not forgetting my wife, brothers and sisters for their relentless support, love and prayers throughout this process. May God bless you. To my classmates, this research thesis is dedicated to you. Thank you as well.

ACKNOWLEDGMENTS

This thesis is the result of support from several people and I wish to acknowledge them all. First and foremost, I would like to thank God for seeing me throughout this process.

I would also like to express my sincere thanks to Moi University for giving me the chance to pursue this study.

I also concede with thanks the intellectual effort by my supervisors Dr. Thomas Agak and Dr. Richard Siele for their professional assistance that has resulted to this research thesis. Their immense knowledge, patience and kind support to me assisted a lot during the planning and development of this thesis.

My deepest gratitude and special thanks to my family, Moi University Staff and students and Kenya Ports Authority.

I am also indebted to the Moi University department of Economics and the School of Business and economics defense panels for their valuable and constructive critique and guidance which immensely enriched this thesis all the way to this successful end.

ABSTRACT

Maritime sector remains the backbone of globalized trade and manufacturing supply chain as more than 80 percent of world merchandise trade by volume is carried by sea. Maritime transport in Kenya takes care of 90 percent of Kenya's international trade by volume. Despite the extensive hinterland the port commands, and the recent commencement of SGR Freight services in 2018, the maritime sector performance remains significantly below international standards hindering its vital contribution to the country's economic growth. The objective of this study was to perform an economic analysis of the maritime sector performance in enhancing economic growth in Kenya. The study sought to determine effect of labor productivity, foreign exchange rate and inflation rate on maritime sector performance and the impact of maritime sector performance on economic growth in Kenya. Target population was Kenya Ports Authority and Kenya Ferry Services while Kenya Maritime Authority coordinated implementation of policies relating to maritime affairs. The study was guided by the endogenous growth model, Solow growth model, the production theory and the agency theory. The study adopted explanatory research design using quantitative data. Secondary Panel data was employed using data on annual basis over the period 2000-2019. Multiple regression and Generalized Method of Moments (GMM) Models were utilized. Applying Multiple Regression model, results indicated that coefficient of labor productivity and foreign exchange rate were 1.2723 and 3.5694 respectively, which were positive and significant at 5 % level, $P = 0.000 < 0.05$, implying that every 1% increase in coefficient of labor productivity and 1% foreign exchange rate, output increased by 1.2723% and 3.5694% respectively. Applying GMM, the results indicated that coefficient of labor productivity and foreign exchange rate were positive and significant at 5% level of significance, $P = 0.000 < 0.05$ implying that for every increase in 1% of labor productivity and foreign exchange rate, output production increased by 1.3717% and 3.2744% respectively. Coefficient of contribution of maritime sector to economic growth was, $p = 0.084 > 0.05$, implying that contribution of maritime sector to economic growth was not significant at 5% level of significance. However, at 10% level of significance, coefficient of contribution of maritime sector to economic growth was $p = 0.084 < 0.10$ which was positive and significant, which implied maritime industry enhanced economic growth in Kenya. Results obtained using Multiple Regression and GMM models indicated that effect and direction were the same with slight differences in quantity. The study concluded that labour productivity and foreign exchange rate were key drivers to the performance of the maritime sector in Kenya. Maritime sector contributed significantly to the economic growth at 10% level of significance. The study recommends that Maritime sector managers and administrators should consider improving on policies which enhance labor skills and knowledge in maritime sector including training and motivating staff to pursue higher education in the maritime sector in order to increase labor productivity hence improve the effect on economic growth of maritime sector in Kenya. Monetary policy makers to ensure stability in exchange rates considering that high exchange rate volatility could send conflicting signals to investors thus discouraging production, which could affect volumes of trade which will adversely affect maritime sector performance culminating to adverse contribution on economic growth in Kenya. The study adds to the available literature on the performance of the maritime sector in enhancing economic growth in Kenya.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGMENTS	iv
ABSTRACT.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES	xi
LIST OF FIGURES	xii
ABBREVIATIONS AND ACRONYMS	xiii
OPERATIONAL DEFINITION OF TERMINOLOGIES	xv
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Overview	1
1.2 Background to the Study.....	1
1.2.1 Global Perspective of Maritime Sector	9
1.2.2 Regional Perspective of Maritime Sector.....	12
1.2.3 Local Perspective of the Maritime Sector	18
1.2.4 Kenya Ports Authority.....	22
1.2.5 Kenya Ferry Services	26
1.2.6 Kenya Maritime Authority	28
1.3 Benefits of Maritime Sector.....	31
1.3.1 Economic Growth	31
1.3.2 Trade Facilitation	33
1.3.3 Employment Opportunities	37
1.3.4 Tourism	41
1.3.5 Contribution to Government Revenues.....	43
1.3.6 Impact on Balance of Payments	46
1.4 Statement of the Problem.....	49
1.5 Objective of the Study	54
1.5.1 General Objective.....	54
1.5.2 Specific Objectives.....	54
1.6 Research Hypotheses	55
1.7 Significance of the Study	55

1.8 Scope of the Study	57
1.9 Assumptions of the Study	57
CHAPTER TWO	59
LITERATURE REVIEW	59
2.1 Overview	59
2.2 Theoretical Review	59
2.2.1 Endogenous Growth Theory	59
2.2.2 Solow Growth Model	61
2.2.3 Production Theory	63
2.2.4 Agency theory	66
2.3 Link between Maritime Sector and Economic Growth	68
2.3.1 Ports	70
2.3.2 Shipping	80
2.4 Types of Cargo	88
2.4.1 Containerized Cargo	88
2.4.2 Conventional Cargo	93
2.4.3 Dry Bulk Cargo	95
2.4.4 Liquid Bulk Cargo	98
2.5 Shipping in Mombasa Port	99
2.6 Structure and organization of the Maritime Sector	100
2.6.1 Competition in the Maritime Sector	106
2.7 Controversies of the Maritime Industry Markets	115
2.8 Review of Literature of Study Variables	116
2.8.1 Labor Productivity and Maritime Sector Performance	116
2.8.2 Foreign Exchange Rate and Maritime Sector Performance	120
2.8.3 Inflation rate and Maritime Sector Performance	124
2.8.4 Maritime Sector Performance and Economic Growth	127
2.8.4.1 Data Envelopmental Analysis (DEA)	131
2.8.5 Empirical review	137
2.9 Research Gap	141
2.10 Conceptual Framework	144
CHAPTER THREE	146
RESEARCH METHODOLOGY	146
3.1 Overview	146

3.2 Research Philosophy	146
3.3 Research Design.....	147
3.4 Target Population.....	149
3.5 Data Collection Instruments and Procedures	149
3.6 Data Sources	149
3.7 Maritime Industry and Economic Growth Model.....	150
3.8 Model Specification	153
3.8.1 Multiple Regression Model	153
3.8.2 Generalized Method of Moments.....	154
3.9 Measurement of Variables	157
3.9.1 Maritime Performance.....	157
3.9.2 Labour Productivity.....	157
3.9.3 Foreign Exchange Rate	157
3.9.4 Inflation Rate	158
3.9.5 Gross Domestic Product.....	159
3.9.6 Economic Growth	159
3.10 Diagnostic Tests.....	160
3.10.1 Normality Test.....	160
3.10.2 Joint Significance of Decision Variables	161
3.10.3 Correlation Coefficient.....	161
3.10.4 F-Statistics.....	162
3.10.5 Hausman Test.....	163
3.11 Data Analysis and Presentation	163
3.12 Estimation of Parameters	164
3.12.1 Multiple Regression Model.....	164
3.12.2 GMM Model	165
3.13 Ethical Considerations	165
CHAPTER FOUR.....	166
RESULTS AND DISCUSSION	166
4.1 Overview	166
4.2 Diagnostic Tests.....	166
4.2.1 Unit Root Tests.....	166
4.2.2 Normality Test.....	169
4.2.3 Autocorrelation Test.....	170

4.2.4 Test of Over-Identification.....	171
4.3 Descriptive Statistics.....	171
4.3.1 Summary Statistics.....	171
4.3.2 Output Performance	173
4.3.3 Labor Productivity.....	174
4.3.4 Foreign Exchange Rates.....	175
4.3.5 Inflation Rate Trends.....	175
4.4 Model Selection	177
4.4.1 Hausman Test.....	178
4.5 Multiple Regression Model.....	179
4.5.1 Correlation of Disturbances	179
4.5.2 Regression Estimation of Parameters.....	179
4.6 GMM Model Estimation.....	181
4.7 Impact of Maritime Sector on Economic Growth.....	182
4.8 Hypothesis Testing.....	184
CHAPTER FIVE	188
SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND POLICY	
IMPLICATIONS	188
5.1 Overview	188
5.2 Summary of the Study	188
5.3 Conclusion	190
5.4 Contribution to Knowledge.....	192
5.5 Recommendations.....	193
5.6 Policy Implications	197
5.7 Limitations of the study and areas for further research	197
REFERENCES	199
APPENDICES	211
Appendix I: Introduction Letter from Moi University	211
Appendix II: NACOSTI Research Authorisation Permit.....	212
Appendix III: Kenya Ports Authority Organization Structure	213
Appendix IV: Kenya Ferry Services Organization Structure.....	214
Appendix V: Kenya Ports Authority Performance	215
Appendix VI: Kenya Ferry Services Performance.....	219
Appendix VII: Kenya GDP from 2000-2019.....	220

Appendix VIII: Annual Growth Rate (%)	221
Appendix IX: Annual Foreign Exchange Rate (%)	222
Appendix X: Annual Inflation Rate (%)	223

LIST OF TABLES

Table 1.1: Average Turn-around Time	50
Table 2.1: Container Terminal Performance	135
Table 2.2: Single Input/Single Output Data.....	136
Table 4.1: Unit Root Tests	167
Table 4.2: Skewness and Kurtosis Test for Normality	169
Table 4.3: Durbin-Wu-Hausman Test.....	170
Table 4.4: Test for Establishing Over-Identification	171
Table 4.5: Summary Statistics	172
Table 4.6: Model Selection	177
Table 4.7: Hausman Test	178
Table 4.8: Correlations of Variables, 2000-2019.....	179
Table 4.9: Multiple Regression Results	179
Table 4.10: System GMM Estimation	181
Table 4.11: Ordinary Least Squares Estimates for Maritime Sector in Kenya.....	183

LIST OF FIGURES

Figure 2.1: Economies of scale in Shipbuilding	70
Figure 2.2: Shipping Freight rates	102
Figure 2.3: Levels of short run costs.....	105
Figure 2.4: Relationship between DMUs, Inputs and Outputs (Production Frontier)	134
Figure 2.5: Theoretical Comparison of Efficiencies of Container Terminals Model	137
Figure 2.6: Conceptual Framework	145
Figure 4.1: Maritime Sector in Kenya (2000-2019)	170
Figure 4.2: Output Performance of Maritime Sector in Kenya (2000-2019)	173
Figure 4.3: Labor Productivity (DWT) in Maritime in Kenya	174
Figure 4.4: Trend in Foreign Exchange Rates in Kenya (2000-2019).....	175
Figure 4.5: Trend Analysis of Inflation Rate in Kenya (2000-2019)	176

ABBREVIATIONS AND ACRONYMS

AIS	Automatic Identification System
AfCFTA	African Continental Free Trade Agreement
ASALs	Arid and Semi-arid Lands
BDI	Baltic Dry Index
Brexit	British Exit
CEBR	Center for Economic and Business Research
DEA	Data Envelopmental Analysis
DMU	Decision-making unit of production
DSGE	Dynamic stochastic general equilibrium
DWT	Deadweight tonnage
EAC	East African Community
EU	European Union
GVA	Gross Value Added
ICC	International Chamber of Commerce
IMF	International Monetary Fund
IMO	International Maritime Organisation
ILO	International Labour Organisation
JOC	Journal of Commerce
KFS	Kenya Ferry Services
KIFWA	Kenya International Freight Forwarding Association
KMA	Kenya Maritime Authority

KNLS	Kenya National Shipping Line
KPA	Kenya Ports Authority
KPA SP	Kenya Port Authority Strategic Plan
MSC	Mediterranean Shipping Company
NACOSTI	National Commission for Science, Technology and Innovation
OECD	Organization of Economic Cooperation and Development
PESTEL	Political, Economic, Social-cultural, Environmental, Legal analysis
PMAESA	Port Management Association of Eastern and Southern Africa
PTPR	Presidential Taskforce on Parastatal Reforms
SCEA	Shippers Council of Eastern Africa
SGR	Standard Gauge Rail
SOCs	State Owned Cooperation
SPSS	Statistical Package for Social Sciences
TEUs	Twenty foot Equivalent Units
TFPG	Total Factor Productivity Growth
UNCTAD	United Nations Conference for Trade and Development
VDS	Vessel Delay Surcharge

OPERATIONAL DEFINITION OF TERMINOLOGIES

Operationalization entails conceptualising variables into measurable factors. It defines concepts clearly and ensures they can be measured statistically or numerically (Nachmias, 2004). It means finding a measurable, quantifiable and valid index study variable whether independent, moderating or dependent variables. It also entails finding a way to modify that variable to create multiple levels. It gives meaning to a concept by specifying activities or operations necessary to measure it.

Berth: A berth is a designated location in a port or harbour used for mooring vessels when they are not at sea. Berths offer a vertical front that supports safe and secure mooring to aid the unloading or loading of cargo or people from vessels (Manaadiar, 2018).

Cabotage: the transport of goods or passengers between two points in the same country by a vessel registered in another country. (Rowbowtham, 2014).

Capital: This is the machinery, tools and buildings humans use to produce goods and services. They include hammers, forklifts, conveyer belts, computers, and delivery vans. Capital differs based on the worker and the type of work being done.

Deadweight Tonnage: Refers to the weight that a ship can safely carry – this includes the weight of the cargo on board the ship, the crew, stores, fuel, water, ballast (Manaadiar, 2020).

Foreign exchange rate: The value of a country's currency against that of another country or economic zone. It is a relative price of one currency expressed in terms of another currency. It is the rate at which one currency will be exchanged for another (Chen, 2020).

Economic Growth: An increase in the production of economic goods and services, compared from one period of time to another. It is the increase in aggregate production in an economy (Potters, 2021).

Gross Domestic Product: The total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period (Fernando, 2020).

Inflation: A sustained increase in the general price level in an economy. The weakening of purchasing power of a currency across time. It is the rate at which the value of a currency is falling and consequently the general level of prices for goods and services is rising (Pettinger, 2018).

Labour productivity: A Measure of the hourly output of a country's economy. It's the amount of real GDP produced by an hour of labour (Rasure, 2020).

Liner Conference: a group of two or more vessel operating carriers that offers international liner services for the movement of freight on a given route or routes within specified jurisdictions and which has an agreement or arrangement, whatever its nature, within the framework of which they operate under uniform or common freight rates and any other agreed conditions with respect to the provision of liner services (Haralambides, 2019).

Maritime Economics: Maritime economics is the economics of maritime transportation, i.e., an economic analysis of its users, primary service providers, secondary service providers and resources. As a field of study, maritime economics consists of shipping economics, ship economics and port economics (Talley, 2012).

Port: A port is a geographical area where vessels are brought alongside land to load and unload cargo (Rowbowtham, 2014).

State Corporation: A State Corporation is a body corporate established under Section 3 of the State Corporations Act, Cap 446, or by an act of Parliament, or under the Companies Act, Cap 486 where the Government controls majority or all of the Shares (ISC, 2018).

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter presents the background of the study highlighting on Kenya's economy, the history of maritime sector, that is, Kenya Ports Authority, Kenya Ferry Services and Kenya Maritime Authority, the statement of the problem, objectives and hypotheses of the study. It also provides the scope, significance and assumptions of the study.

1.2 Background to the Study

Economic growth around the world is influenced by international trade, which is driven largely by the maritime sector owing to its cost effectiveness. Tracking economic growth is commonly done through 4 principal ways. The four ways are the engines of an economy; consumers, businesses, government and exports. The speed of any economy depends on the power of all of these engines which can all be monitored in GDP figures (El-Erian, 2013). Increases in capital goods, work force, technology, and human resources can also contribute to economic growth. The major pointers of economic advancement are the financial markets because investors continuously go through millions of new information and data daily. The stock market often signals a shift in the economy ahead of time.

At global level the economy recorded a decelerated growth in real GDP of 2.9% in 2019 compared to a growth of 3.5% in 2018. This slowdown was observed in almost all major economic powers. The USA economy contracted to 2.3% in 2019 from 2.9% in 2018. The slowed down growth was mainly driven by increased tariffs on imported goods, high trade tensions and slowed investment. The European Union

registered a slowed down real GDP growth of 1.2 per cent in 2019 compared to a growth of 1.9 per cent in 2018. The slowdown was attributed to the reduction in external demand, persistent worldwide commerce tensions and prevailing improbability occasioned by Brexit, which adversely impacted exports. China economy grew by 6.1 percent in 2019, a slowed down rate of growth compared to a growth of 6.6% in 2018. The slowed down growth rate was largely attributed to US-China trade tensions, decline in public investment and industrial production.

In 2020, the global economy fell into a recession due to COVID-19 shocks (World Bank, 2020). Responses to the COVID-19 virus such as social distancing and lockdowns are creating a negative supply shock to the global economy. Businesses have closed operations, production, transport and supply chains have been disrupted and consumer demand is suppressed. The global recession echoes adverse effects from COVID-19 in both the advanced, emerging markets and developing economies, including China. World Bank forecasts that the COVID-19 shock will be greater than the global financial crisis in 2009, when global output contracted by 1.7%. The recent collapse in the price of oil is also expected to weigh heavily on the growth of oil exporters. The global economy was projected to remain suppressed in 2020 due to slowdown in industrial output; there was weak business confidence and increased trade tensions, even before the rapid spread of the Coronavirus disease into a worldwide pandemic (KNBS, 2020).

The Sub-Saharan Africa recorded a slowed down economic growth rate of 3.1 % in 2019 compared to a growth of 3.3 % in 2018. The growth was supported by favourable weather conditions which boosted agricultural production and exports, infrastructural investment, recovery of most of the countries from recession and

improved investors' confidence. Current account deficit widened to 4.0 % 2019 compared to 2.5 per cent in 2018. This was due to trade shocks emanating from decline in oil prices which affected the oil producing countries in the region.

Economic growth in Sub-Saharan Africa slipped into its first recession in 25 years in 2020 (World Bank, 2020). Average growth declined from 3.1 percent in 2019 to a range of between -2.1 and -5.1 percent in 2020. However, Sub-Saharan Africa is expected to see moderate but positive growth of 2.7% in 2021, a welcome rebound from the region's first recession. The downward trend reflects deteriorated external demand following a sharp contraction in output growth among the region's key trading partners like China and Europe, a fall in commodity prices for example oil and metals, reduced tourism receipts, as well as the effect of measures taken to contain the spread of COVID-19 pandemic. Prices of crude oil and metals have decreased by about 50 percent and 11 percent, respectively, between December 2019 and March 2020, adversely affecting exports and revenue for Nigeria and Angola, the key oil exporters as well as South Africa, a leading metal exporter. The weakening of growth reflects weak external demand, disrupted supply chains, and falling domestic demand.

In the East African Community region, the real GDP grew by 5.9 per cent in 2019 compared to 6.6 per cent growth in 2018, a slowing down recorded in almost all the countries in the EAC bloc. Tanzania recorded a slowed down growth of real GDP of 6.3% in 2019 compared to a 7.0% growth in 2018. Burundi's real GDP growth improved from 1.6% in 2018 to 1.8% in 2019. In Uganda, real GDP grew by 4.9 % in 2019 compared to a growth of 6.1 % in 2018. Rwanda registered the highest real GDP growth rate of 10.1% in 2019 in the zone, aided by strong progress in the private sector and infrastructure. The East African Community (EAC) is expected to post

significantly slower growth in 2020 due to the Covid-19 pandemic. The combination of a severe external demand shock and domestic demand shocks associated with the public health measure taken to contain the spread of COVID-19 are expected to reduce growth to an average of 3.1 percent in 2020, down from 5.9 percent in 2019.

Kenya's economy has remained buoyant over time, with economic growth rate increasing from 5.7% in 2015 to 5.8% in 2016, 4.9% in 2017, 6.3% in 2018 and 5.4 % in 2019 placing Kenya as one of the fastest growing economies in Sub-Saharan Africa, which recorded 3.0 percent growth (KNBS, 2019). Kenya has seen a sustained growth in economy for a considerable time though in 2019 saw a reduced growth relative to the previous year. The growth was spread across all sectors of the economy but was more pronounced in service-oriented sectors. Agriculture, Forestry and Fishing sector accounted for a sizeable proportion of the slowdown, from 6.0 % growth in 2018 to 3.6 % in 2019. The manufacturing sector grew by 3.2 % in 2019 compared to 4.3 % growth in 2018. Despite most sectors recording decelerated growths, the economy was supported by accelerated growths in Financial and Insurance at 6.6% and Real Estate activities at 5.3% (KNBS, 2020).

Annual average inflation rate rose to 5.20 % in 2019 compared to 4.7 % recorded in 2018. The stock of public debt stood at KSh 5,301.6 billion as at end of June 2019, with external debt accounting for 57.0 % of the total debt stock. Total exports declined by 2.9 % in the value of exports to KSh 596.7 billion, while total imports increased by 2.4 % to KSh 1,806.3 billion, over the same period. As a result, the balance of trade deteriorated by 5.2 % to a deficit of KSh 1,209.7 billion. The total value of trade transactions increased from KSh 2,378.8 billion in 2018 to KSh 2,403.0 billion in 2019. Horticulture; tea; articles of apparel and clothing accessories; coffee;

and iron and steel, remained the leading export earners, collectively accounting for 59.0 % of the total value of domestic exports. On the other hand, major imports included: petroleum products; industrial machineries; iron and steel; road motor vehicles; plastics; and pharmaceutical products, which collectively accounted for 49.5 % of the total import bill.

In 2019, Africa remained the leading destination of Kenya's exports accounting for 37.6 % of the total exports at KSh 224.2 billion, with exports to EAC partner states accounting for 62.6% of the total exports to Africa. Europe was the second leading destination of exports, accounting for 25.4% of the total exports at KSh 151.3 billion. The share of export earnings from European Union (EU) stood at 22.4% of the total export earnings, mainly due to horticultural products. Netherlands, United Kingdom and Germany were the three major export destinations within the EU region in 2019. Asia was the main source of imports in 2019, accounting for 63.8 % of the total value of imports, with China, India, United Arab Emirates (UAE), Japan and Saudi Arabia being the main sources of imports from the region.

A weak global economy is affecting negatively on Kenya's exports, especially horticultural products primarily suppressed external demand and increased costs of production arising from operational challenges. According to World Bank (2020), COVID-19 will have a significantly adverse impact on Kenya's economy. Even prior to COVID-19, the country's growth had dropped. The COVID-19 shock is expected further reduced growth in 2020 with large impacts on services, industry and agriculture whilst assuming that the economy will be able to rebound relatively quickly and return close to its trend growth rate.

Kenya, like most other sub-Saharan countries, has been adversely affected by the covid19 pandemic. The World Bank estimates that Kenya's GDP contracted by 1% in 2020. It forecasts that Kenya's economy will grow by 6.9% in 2021, the fastest in Africa, and a more ambitious forecast than the government's estimate of 6.4%. According to the World Bank economies of other East Africa countries like Tanzania, Rwanda and Uganda, will expand by 5.5%, 5.7% and 2.8% respectively. Larger African economies like Nigeria and South Africa are poised to grow by 1.1% and 3.3% respectively in 2021. Sustained support from international lenders through public health support and funding to the private sector are expected to spur robust growth in Kenya. The economy faces arduous challenges including debt management, public health, and other structural reforms as it strives towards economic recovery in 2021.

Like other economies all over the world, the economy will thus basically be determined by how long life and economic activities are going to be disrupted by COVID-19 (KNBS, 2020). Almost all economic activities have so far been slowed down by restrictions associated with containment and cessation of movements of some sections of the population, the nationwide curfew and suspension of international passenger travel. The first case of COVID-19 in the country was confirmed on the 12th March 2020 and various precautionary and preventives measures have increasingly been implemented to counter the impact of pandemic on the population as well as socioeconomic aspects.

The restriction of movement of population has significantly slowed performance of activities of Transportation and storage, Education, Accommodation and food services. Other sectors whose activities have been restrained, albeit at a lesser degree,

include Manufacturing; Construction; Wholesale and retail trade; Public administration; and Mining and quarrying. Demand for Financial and insurance services, Real estate and other services are also expected to be suppressed due to slowdown in economic activities and declining disposable incomes. However, increasing demand for health services is likely to boost the performance of the Human health and social work sector. Additionally, measures taken to slacken infection rate, including home quarantine, movement restrictions, the closure of institutions and leisure joints, the suspension of public meetings, and a nightly curfew, are expected to affect the economy. Social distancing is for instance very costly to the economy and is aggravated by the presence of a large informal sector, high poverty rate, and unemployed youth population; about 70 percent of the total population is below 30 years old (World Bank, 2020).

Even prior to COVID-19 shock, Kenya's economy had deteriorated. The economy expanded by 5.4 percent in 2019, down from 6.3 percent in 2018. The relaxed growth was linked to underperformance in agriculture (owing to low rainfalls) and private ventures, which slackened due to crowding out from widening fiscal deficits and, relatedly, limited private sector credit growth. Nonetheless, strong output in the services sector helped to mitigate a slowdown in agricultural productivity.

The COVID-19 pandemic has extensively impaired Kenya's real GDP growth in 2020. Economic actions are compromised by a plethora of supply and demand forces emanating from both the external and domestic frontages. On the external side, supply and demand forces are being transmitted via diverse channels: Global supply chains are being unsettled, reducing the availability of intermediate and capital goods, as a result of shutdowns in the source countries, and transport disruptions. Kenya's

monthly imports, notably from China, contracted sharply in the months of January to March 2020. A large share of retail goods in Kenya are shipped in from China and shortages of these goods could raise consumer prices. Kenya's goods exports (horticulture, tea and coffee) are coming under pressure.

Reduced tourism accruing owing to in 2020 tourist arrivals is expected to decline sharply. A reduction in remittance inflows could come under more pressure because of adverse effects on the economies where the Kenyan diaspora work. Kenya recorded remittances of \$2.9bn in 2019 (2.9 percent of GDP), with the bulk of remittances coming from the UK (34 percent) and the US (30 percent). During the start of 2020, Kenya experienced invasion of the desert locusts, mainly in the ASALs, however the government has so far managed to diminish their negative impact on the economy particularly in the agriculture sector.

Over 80% of world merchandise trade is carried by sea thus the maritime sector plays a pivotal role in economic growth. A competitive maritime sector is important to economic growth, since international trade is underpinned by waterborne transport. Maritime activity has a key role to play in the alleviation of extreme poverty and hunger as it provides an important source of income and employment for many developing countries, such as the supply of seagoing personnel and ship recycling, ship-owning and operating, shipbuilding and repair and port services, among others. The sea coast location of a country has been regarded as a critical value for its development and prosperity. A wide scope of economic activities, like shipping and maritime ports, fishing and aquaculture, underwater mining and seacoast tourist activities all require access to the sea. The blue economy integrates an innovative approach to the economic exploitation of the resources of oceans, lakes, rivers and

other bodies of water. The potential linkages between the blue economy, sustainable development and economic growth is recognized in the vision 2030 Agenda for Sustainable Development (Teagrs & Gurning, 2018).

The maritime sector is composed of organizations and operations, including maritime carriage, the naval sector, commercial fishing and aquaculture operations, the cruise and recreational services, sport and commercial docks and marinas, marine energy sources, marine and ocean research and sciences, maritime training academies and training centres, a wide range of professional services around the maritime activities, and professional associations, trade unions and organizations supporting the rights and interests of seafarers and maritime professionals.

It is difficult to quantify the total value of the world maritime industry, and the economic relevance of a sector that affects a wide range of aspects of modern societies and their development. However, the maritime industry is of huge importance in terms of natural resources and energy, trade and industry, sciences and leisure activities.

1.2.1 Global Perspective of Maritime Sector

Maritime sector remains the backbone of globalized trade and the manufacturing supply chain, as more than 80 percent of world merchandise trade by volume is carried by sea (UNCTAD, 2019). Global maritime volumes expanded at a slower pace in 2018, with volumes reaching 11 billion tons. International maritime trade lost momentum in 2018 with Volumes expanding at 2.7 percent, down from 4.1 percent in 2017 (UNCTAD, 2019). The slowdown was broad-based and affected nearly all maritime cargo segments. A range of downside risks that had intensified in 2018 contributed to the slowdown in maritime trade growth. They include trade strains and

protectionism like the heightened trade tensions between China and the US, followed by the decision by the United Kingdom of Great Britain and Northern Ireland to leave the EU (“Brexit”); and supply-side disruptions, such as those occurring in the oil sector (IMF, 2019). The ongoing COVID-19 pandemic has made matters even worse.

Global growth in maritime trade is closely correlated with changes in real GDP as a 1% change in real GDP corresponds to a 1.1% change in maritime trade (UNCTAD, 2017). Maritime transport operations are directly pushed by global economic growth and the need to move goods internationally, and thus they are subject to developments in the global economy. In other words, global economic growth directly influences international trade, which, subsequently, directly affects transport services and therefore the world’s seaborne trade volumes. As demand for both maritime transport services and logistics services derives from global economic growth and the need to carry out international trade, the global shipping industry and maritime transport activities could not escape from performance of the global GDP and international trade volumes (Song & Panayides, 2015).

Rapid growth in South-East Asian ports continued, reflecting positive economic performance in countries of the Association of Southeast Asian Nations (ASEAN). China and Singapore, the economic big two in Asia, are heavily dependent on maritime trade in terms of importation of energy and other natural resources in addition to import/export of manufactured products (Zauch & Matczak, 2018). Concrete advancements in world trade quantities in 2018 raised the cumulative container throughput of the 50 busiest freight ports in the world up 4.6 percent annually to almost half a trillion TEU, based on the JOC Top 50 Container Ports 2018 rankings.

In 2018, the Chinese Port of Shanghai retained its top ranking on the list, posting a 4.4 percent rise in container number to barely over 42 million TEUs, above four times the 9.5 million TEUs moved by the busiest North American port, Los Angeles. Next at position two, the Port of Singapore posted the most growth of the top 20 ports, increasing throughput 8.7 percent to 36.6 million TEU for the year. Joint ventures of PSA International with the shipping lines seem to have benefited the port of Singapore, as its volumes increased by 8.7 %, more than double that of 2017. In 2018, Ocean Network Express (ONE) followed the Mediterranean Shipping Company, CMA CGM, Pacific International Lines and China COSCO Shipping in establishing joint venture terminals in Singapore. Overall, however, Asian container (UNCTAD, 2019).

Global port activity and cargo handling expanded rapidly in 2017, following two years of weak performance. Ports in China reported 4.2 per cent growth in 2018. Lo & Lee (2018) posits that according to official data from China's government, the total production value of China's maritime economy increased from RMB 1068 billion in 2002 to RMB 7761 billion (1.22 trillion U.S. dollars) in 2017, thus contributing to about 10 percent of China's total gross domestic product. Specifically, China's coastal tourism increased from RMB 147.8 billion in 2002 to RMB 1463.6 billion in 2017. Moreover, the evolution of Chinese maritime sector has been and will be driven by that in the tertiary sector, specifically coastal vacation and transit industries. The Port of Shanghai is the busiest port in the world in terms of cargo tonnage and comprises a deep-sea port and a river port, and it is the most important gateway for foreign trade. Shanghai remains the undisputed no. 1 container port in mainland China and the world, with over 42 million TEU in 2018 (+4.4%). The port is considered the world's fastest-growing port.

Singapore hosts a broad range of maritime ventures, with over 5,000 maritime establishments. Overall, the maritime sector contributed some 7 percent to Singapore's gross domestic product (GDP) and 170,000 jobs in 2018. Port of Singapore is currently the world's second-busiest port in terms of total shipping tonnage. According to data, around 80% of the containers that arrive in Singapore are transhipped to other ports. Singapore concluded 2018 with steady maritime output, posting increases in container and cargo quantity and ship cataloguing. Container throughput at the Port rose by 8.7 percent to 36.6 million TEUs in 2018 from 33.7 million TEUs of 2017. Total freight throughput steadied at 630 million tons in 2018, relative to 627.7 million tons of previous year. Additionally, yearly vessel arrival weight reached 2.79 billion gross tons (GT) in 2018, same as 2.8 billion GT realized in 2017.

1.2.2 Regional Perspective of Maritime Sector

The demand for carriage and ports globally is rising, similarly, maritime law, finance, broking and insurance can all benefit from the growing volume of trade. Africa's docking points and hinterland transit web need to aid these endeavours by bolstering infrastructure and services, and strengthening output, to reach international levels. This involves, among others, boosting output levels: the mean output is about 20 moves a crane every hour in West and East Africa, 25-30 in South Africa, and 35-40 in Asia (UNCTAD, 2018).

Shipping network, which substantially impacts transit prices, falls under the global mean in Africa. Africa's shipping links are extensively shaped by their terrain. The best-linked states are those at the continent's peripheries, where global shipping

avenues link to hub docks, notably in Morocco, Egypt and South Africa. Next are sub-regional load points, mainly Djibouti, Togo and Mauritius.

Africa depends extensively on ships and docks to facilitate its intercontinental commerce. While its value is about 2.7% of worldwide trade, the continent adds in much more to global seaborne commerce – 7% and 5% of maritime exports and imports by volume, respectively. Though one-third of African states are landlocked, maritime transit is still the key avenue to the global market. The continent's shipping and docks do not meet global levels. Aside from four container points in Morocco, Egypt and South Africa, none of the continent's ports was included in the 2016 list of Top 100 global container ports.

In 2017, the top 20 global ports handled 9.3 billion tons, up from 8.9 billion tons in 2016 and 752.2 million TEUs were moved at container ports worldwide in 2017 and Africa's ports accounts for 4% of world containerized trade quantity, much of which consists of imports of manufactures (UNCTAD, 2018).

Maritime commerce in Africa is driven by the continent's trading focus and minimal diversification. As such, 40% of goods moved out by water in 2017 constituted crude oil, whereas over two-thirds of those moved in consisted of dry cargoes (dry bulks and containerized goods) with another 20% comprising petroleum products and gas (UNCTAD, 2018). This is paving ways for Africa both as a consumer and a potential manufacturing area, for instance, as attested to by rising apparel manufacturing activity in Ethiopia. The EU is still Africa's key trading ally, despite its share of trade having dropped from approximately half in 1995 to a third in 2017. Recently, the portion of trade with the US has declined while that with China has gone up.

At regional level, there is very little traffic in Africa and is mostly concentrated in the North and South Africa, the countries that has natural resources, an active hinterland and also fall on the main route structure. The sequence of cargo flows is as follows: Far East to Indian sub-continent to Eastern Africa to South Africa to West Africa to Eastern Africa to Indian sub-continent to Far East (Port Master Plan, 2004). This indicates that the major destination and origin of cargo from the East African coast is Far East, Middle East, other African countries and Europe. It is also apparent that a large number of containers through Eastern Africa coast are transshipment containers.

Excellent and efficient gateway docks are usually ones effectively linked to their economic hinterlands by reliable transport routes (Lima and Venables 2001). Docks in the least developed and developing regions, nevertheless, are mostly compromised by unreliable hinterland logistics systems (Limão and Venables 2001). Inadequate logistics infrastructure also makes the cost of production and movement restrictive, resulting in low commerce and lack of competitiveness on the global market. Consequently, these countries continue to experience low economic growth rates (Amjadi and Yates 1995).

Africa presents a classic case of logistics under-capacity and inefficiency, constraining production and distribution charges, and slow economic progression (Amjadi and Yates 1995; AfDB 2010). A number of major factors contribute to this situation.

Firstly, though two-thirds of African states are littoral states, the entire continent is serviced by only 21 key ports, most of which are inefficient, under-funded and of low infrastructure capacity and are unable to handle large freight volumes and large vessels.

Secondly, the continent is home to 16 landlocked countries (the largest number of any other continent), which depend entirely on coastal countries for their international trade. Limao and Venables (2001) show that a land-locked country's transport costs can be up to 55% higher than those of a comparable country. They further aver that, the blend of being land-locked, with poor transit systems and depending on transit regions with equally poor systems, significantly derails commerce. This is a fact in most of Africa's landlocked states, rendering transportation ineffective and expensive.

Thirdly, according to African Development Bank inland connectivity is characterized by a low capacity road network that is largely limited to urban centres (AfDB, 2010), an outdated and fragmented rail infrastructure, and a non-existent inland waterway transit system (despite the present of many pliable waterways) (Ntamutumba, 2010). Consequently, the overall cost of transit and, by extension, transaction in Africa is high compared to other developing areas in, say, South America and Asia (Limão and Venables 2001; Amjadi and Yates 1995). To this end Limao and Venables (2001) conclude that the high costs of transportation in Sub-Saharan Africa accounts for much of the region's poor economic performance.

In order to enhance logistics efficiencies and boost international trade on the continent, governments since the mid-1990s have embarked on formulating strategic reforms, particularly in the ports and inland transportation, in collaboration with lending organizations like the World Bank and the African Development Bank. Some of these have entailed instituting public-private collaborations in the development and administration of diverse features of the logistics networks, including docks, roads, rail lines and waterways (UNCTAD 2003; Tongzon and Heng 2005).

Furthermore, there is a growing view that enhanced inland connectivity, which is capable of providing land-locked countries with effective access to ports, requires the adoption of a holistic trans-border management approach (Ntamutumba 2010). Thus far, a corridor management approach has been embraced for the development, regulation and management of trade and transportation channels between key regional gateway ports and their hinterlands. Under this approach, the development and management of hinterland transportation channels is charged to a regional body that is representative of all the countries involved. It is a strategy that is meant to facilitate greater harmonization of regional transit guidelines, coordinate cross-border infrastructure ventures, and keep open avenues for landlocked states (AfDB 2010; Ntamutumba 2010).

South Africa has 3,924 kms of coastline (Funke, Claassen, Nortje & Meissner, 2016). The country is also positioned on a major shipping route and has eight commercial ports and 44 non-commercial harbours. Located at the southern end of Africa, SA is strategically placed on the South-South Trade Corridor, connecting Asia, Africa and the East Coast of the Americas. Currently, 58% of South Africa's gross domestic product (GDP) is based on trade and 98% of South Africa's trade volume moves by ships. South Africa's maritime transport and marine manufacturing industries contribute around R56.5bn to the economy each year with around 300 million tons of seaborne cargo moving through its ports each year. South Africa ranks among the world's top 20 shipping nations based on tonnage handled. During the 2016/2017 fiscal period, up to 31 March 2017, 10,945 vessels ported at South Africa's eight trading ports. The quantity of cargo processed locally totalled 227.17 million metric tons, whereas containerised luggage totalled 4,466,000 TEUs. From January-

June 2015, there were no locally flagged cargo containers on South Africa's Ship Register, but as at May 2017, there were four merchant containers.

By expanding their economies and allowing easier entry into regional and global forays, Africa can bolster its containerized services and port throughput and come out as an exporter of containerized assets. To realize this commercial guidelines and regional cooperation programmes, like the African Continental Free Trade Agreement (AfCFTA), will not suffice (UNCTAD, 2018).

Maritime transport provides tremendous carrying capacity, while consuming far less energy compared to other modes of transport such as air, truck and rail (Kentucky Association of Riverports, 2008). Developing countries, due to their weak economies, characterized by low value export commodities are heavily dependent on seaports to boost their economies (Francou, 1999). Therefore, the productivity and performance level of port operations impacts on the economy of these countries. It is imperative therefore, for such countries to focus on their ports efficiency if their economies are to rise substantially.

As a substantial utiliser and importer of maritime transit facilities, Africa has for long endeavoured to boost its partaking in the supply of shipping amenities. This is yet to be realised, since the continent's tenure of the world fleet is minimal. Indeed, there was no African state among the Top 35 ship-possessing ones in 2017. This is further attested to when one regards nationally operated fleets. Liberia solely makes the ranks of top flag States, positioned third globally after Panama and Marshall Islands on nationally operated weights (UNCTAD, 2018). Africa depends extensively on containers and docks to run its intercontinental commerce. UNCTAD initiative to change global trade by providing the poorer countries with an independent role in

trade and in transportation realized the Code of Conduct for Liner Conferences saw one of the provisions that transport companies from two trading countries should be allowed to carry equal parts of the trade and leave a limited trade volume to be carried by third parties. This idea later became known as the 40/40/20 rule. The implied result of this rule was that any trading country should thus form its own transport capacity, in order to carry the allotted 40 % of its own trade (Song & Panayides, 2015).

1.2.3 Local Perspective of the Maritime Sector

On a holistic level, the Maritime Sector in Kenya can be disaggregated into shipping, ports, Ferry services and Maritime regulation, which in themselves are formed of numerous individual and distinct activities.

Kenya depends on external trade to sustain its economy through importation of raw materials, equipment and machineries and exportation of agricultural goods thus the importance of an economical mode of transport which maritime sector offers. Maritime sector is indispensable to any country's economy and a vital part of a country's transport infrastructure. In the absence of Maritime transport, Kenya would have been landlocked, and its economy would have been dependent on other littoral states for international trade, as such maritime transport is of significant importance to and greatly influences the development and growth of the Kenya's economy in many ways.

The importance of the maritime transport to the Kenya's economy is seen in the following contribution: Transportation, Facilitation of Trade and commerce, Revenue generation, tourism, Promotion of Tourism, Development of related economic activities, Employment and job opportunities, Enhancement of industrial growth and advancement and Institutional development.

Kenya's territorial waters cover 230,000 square kilometers and a distance of 200 nautical miles offshore and 10,700 square kilometers of inland waters, thus the country's maritime sector has a huge potential to turnaround the economy. However, in 2015 for example, the maritime domain contributed only \$1.83 billion to the GDP. Fisheries account for only about 0.5 % of the Gross Domestic Product and generate employment for around two million Kenyans through fishing, boat building, equipment repair, fish processing, and other ancillary activities. Earnings from fish landings decreased from KSh 25.6 billion in 2018 to KSh 23.7 billion in 2019(KNBS, 2020).

The estimated annual economic value of goods and services in the marine and coastal ecosystem of the blue economy in the Western Indian Ocean is over US\$22 billion with Kenya's share slightly over US\$4.4 billion (20 percent) with the tourism sector taking the lion's share of over US\$4.1 billion, according to the Kenya Maritime Authority estimates. Marine fishing had an annual fish potential of 350,000 metric tons in 2013 worth Ksh90 billion yet the region only yielded a paltry 9,134 metric tons worth Ksh2.3 billion. Therefore, the full economic value of marine assets has not been appropriated, yet Kenya has a maritime area of 230,000 square kilometers and a stretch of 200 nautical miles offshore (UNDP, 2018).

The Blue economy committee, initiated in 2016 to aid the country to locate constraints in the productivity of maritime sector, posits that the 22 agencies supervising the sector do not work concertedly. The term "blue economy" has been used in diverse ways. However, it is known to entail a spectrum of economic segments and related guidelines that together shape the sustainable use of oceanic resources. According to Tegar and Gurning (2018), the Blue Economy Concept

provides an opportunity to develop more economically and environmentally sound investments and businesses, utilize natural resources more efficiently and less environmentally, produces more efficient and cleaner systems, produces greater products and economic value, increase labor absorption, and provide an opportunity to benefit each contributors more fairly. The notion strives to encourage economic advancement, social inclusivity, and the conservation or enhancement of livelihoods while simultaneously guaranteeing the sustainability of water bodies (UNDP, 2013).

The Policy Issues and Challenges of Performance of the state-owned enterprises like KPA has been a matter of on-going concern in an environment of resource scarcity and mounting needs. The critical policy issues and challenges afflicting State corporations especially those in the maritime sector in Kenya, include lack of clarity on the role that State Corporations should play in the economy. This is compounded by the apparent differences in opinion in respect of the exact role of the state in the national development effort; Poor linkage of State Corporations activity with the national development goals; Conflicting definition of what a state corporation is in the Kenyan context compounded by multiple legal and regulatory regimes creating significant ownership and oversight challenges; Inadequate policy and policy coordination leading to poor definition of mandates, conflicts in mandates, as well as fragmentation of mandates that facilitate the proliferation of poorly resourced State Corporations (PTPR, 2013; Mutegi & Ombui 2016).

The scenario above has affected the facilitative role of the state in ensuring effective private sector development that supports the national development effort; Poor governance leading to resource loss and burdening the public purse, including a multitude of legal and institutional frameworks that generate multiple reporting and

accountability lines, compounding the challenge of effectiveness of Boards and Chief Executive Officers; A number of Boards have been weak and/or ineffective, leading to failure to provide strategic direction, facilitating their emasculation; Weak human resource and institutional capacity to attract and retain the skill sets needed to drive performance; Lack of a clear government policy in respect of government linked companies; Lack of clarity and abuse in establishment and dissolution of government owned entities leading to lack of an accurate database on the count of State Corporations; and An inadequate performance management framework that effectively links performance of State corporations to national development goals and fails to adequately link individual performance to institutional performance(Mutegi & Ombui, 2016).

The Government of Kenya has undertaken several initiatives to streamline the public sector to improve service delivery to its citizens. As a result, the public sector reform program (PSRP) was introduced in Kenya in 1991 after international donors supporting Kenya's development strategies tied aid to implementation of policy and sectorial reforms (PTPR, 2013). These efforts however, have still not yielded much result. The Government, through Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya, resolved to establish state corporations in the Maritime industry like Kenya Ports Authority, Kenya Maritime Authority and Kenya Ferry services with a view to: accelerating economic growth and social development, tackle regional economic skews, enhance Kenyan public partaking in the economy, encourage local ventures, and reinforce foreign investments through collaborative ventures.

The Policy envisaged that the nationalized operations would operate efficiently, cover costs and earn profits. This however has not been realized. State Corporations were established for implementation of government policies and programs for socio-economic development (PTPR, 2013).

Maritime sector in Kenya takes care of 92 percent of Kenya's international trade by volume, which is expected to grow as the country seeks to implement the early crude oil exportation project. However, the maritime sector in Kenya have been experiencing redundancies, closure of operations and challenges to the quality of their services (Awuondo *et al*,)

1.2.4 Kenya Ports Authority

Kenya Ports Authority is one of the key state corporations in the Country and a huge facilitator of ocean borne exchange inside the East and Central African countries. Its strategic course is guided by her vision of world-class ports of choice and its mission to provide efficient and competitive port services to facilitate global trade. KPA is mandated to manage and operate the Port of Mombasa and all scheduled seaports along Kenya's coastline that include Lamu, Malindi, Kilifi, Mtwapa, Kiunga, Shimoni, Funzi and Vanga(KPA, 2018). In addition, the Authority manages Inland Waterways as well as Inland Container Depots at Embakasi, Eldoret and Kisumu. Besides, KPA also offers services in the following areas; Marine Operations, Conventional Cargo Operations, Container Terminal Operations, Port logistics and Support Services (Kotu & Mugambi,2012).

The port handles extensive variety of cargoes including dry bulk, for example, grain and liquid bulk like refined and unrefined petroleum and oil items and in addition packed away items like espresso, tea, sugar, among others, break-bulk including iron

and steel, timber, vehicles and containerized traffic. Kenya Ports Authority's key business is to provide safe navigation, pilotage, berthing, mooring, Pollution control, stevedoring and shore handling (KPA Bulletin, 2019).

The Port of Mombasa is the biggest in East Africa and a critical point for inward and outward movement for Kenya and its neighbors. The assets that go through the Port are material to Kenya's economic progress, and to the economic welfare of East Africa. Liquid bulk goods, mainly petroleum, oil and lubricants, are the most imported by tonnage without which Kenya and EAC's economy would suffer (Nyema, 2014).

Kenya ports authority plays an important role in facilitating and promoting national and international trade of East Africa's region including Kenya, Uganda Rwanda, Burundi, the Democratic republic of Congo and South Sudan (KPA Bulletin of statistics, 2017). In this regard, the role and service delivery at the port of Mombasa must be analyzed through logistical elements that a port performance is enhanced.

In 2017, the world commercial fleet consisted of 94,171 Ships, with a combined tonnage of 1.92 billion tons. However, the total number of ships that docked at the Mombasa Port in 2017 were only 1,767. Cargo traffic handled in the port increased from 22.31 million to 30.35 million deadweight tons over the same period. The containerized traffic was 894,000 TEUs in 2013 and grew to 1,189,957 TEUs in 2017 recording a 10 percent growth. The volume of traffic handled at the port of Mombasa in 2017 was 30.35 million tons compared to 27.36 million tons in 2016, an 11 percent increase (KPA Bulletin of Statistics, 2017).

It is estimated that, as a result of issues related to inefficiency, freight costs represent 35-40 percent of import values to the region as compared to 8 percent in European

ports (AfDB, 2010). The demurrage charges levied by Shipping lines and forwarders have a significant net impact on the country's economy, when there is congestion of ships and containers. Ugandan traders decided to revive the Uganda National Trade and Facilitation Forum and form a shippers' council to lobby for the reduction of prohibitive transportation costs emanating from the Northern Corridor. The Delays on clearing the containers at the port is giving the port a bad name and urgent measures ought to be taken to fix the issues. This means that every second of delay quickly translates to a loss big enough to be felt across the Great Lakes region (Onyango et al., 2010).

Competition in cargo handling services has increased especially in the largest ports, but it is still typical to most ports that one stevedoring company holds a monopoly or dominating market position. A report by the Finnish Ports points out that problems emerge from the fact that stevedoring is under ILO Dock Work Convention (No. 137) which is strictly applied by the national trade union and only registered employees are allowed in stevedoring. The port operators have also claimed (in 2004) that work time arrangements and the costs associated with them restrict competition. This latter issue has though somewhat diminished, as nowadays night shift work is considered as regular work time instead of overtime (OECD, 2011).

In 2018, global maritime commerce garnered momentum growing at 4 percent, the fastest rate in five years, as quantities reached 10.7 billion tons (UNCTAD 2018). However, the Port of Mombasa accounted for only about 0.3 percent of the world's international seaborne trade mainly because of its location, higher costs and low trade levels. Becoming a hub port means the port needs to be prepared to compete with other world and regional ports. This means ensuring the port has capacity to handle

large vessels in line with the current world shipping developments, adequately sized and fitted terminals, an economically active hinterland besides efficient container handling and terminal operations and network of infrastructure assets. The port of Mombasa has faced challenges to stack or handle too many inbound containers and not enough space to stack or handle them. The long-standing issue had pushed up costs for importers and caused serious problems to the port Authority (Nyema, 2014).

According to Kenya shipper's council, issue paper no. 3, (2011), the CFS model was used in many ports worldwide to address the problem of port delays and congestion. India, South Africa and Nigeria are some of the countries that have this model. The model provides for all imported cargo to be transferred directly to privately operated inland container depots known as container freight stations (CFS) after discharge from vessel. In Kenya, the first set of CFS were established in 2000 within the port area, mainly to handle de-stuffing of less container load (LCL) cargo with the hope of reducing congestion at the port of Mombasa (Adieri, 2012; KSCEA, 2014). A 472km Standard Gauge Railway line from Mombasa to Nairobi was constructed and its freight operations commenced operation in January 2018 but has done little to help lower cargo and ship congestion, besides enhancing Mombasa's image as a regional logistics hub. It was envisaged SGR will help decongest Mombasa port by hastening the offloading of cargo from ships for onward transportation to Nairobi and other hinterland destinations via the modern high-speed rail network and even make the CFSs irrelevant.

The World Bank, in its annual Doing Business 2019 reports, which ranks economies based on the ease of doing business, rated Kenya low at 61 among 190 economies in the world that were assessed (World Bank, 2019). One of the areas, which the World

Bank beam its searchlight on was the ease of operations at the ports, noting that the excessive document requirements, burdensome customs procedures, inefficient port operations and inadequate infrastructure, led to extra costs and delays for exporters and importers in Kenya (ean, 2011). Kenya's landlocked neighbors had to factor additional costs into their budgets and put up with a heavily congested Mombasa Port, run by the Kenya Ports Authority (KPA) and frequent breakdowns of the IT systems of container clearance run by the Kenya Revenue Authority. Various players operating at Mombasa's port are trading accusations over the congestion that has delayed container clearance, exerting pressure on commodity prices (Stakeholder's meeting, 2012). The delay has resulted in "artificial" shortages, causing prices of various products in the market to skyrocket, including liquefied petroleum gas.

Some shipping lines issued notices to stop accepting any new bookings destined for Mombasa until the crisis at the port eases due to lack of berths/space for the ships to dock. This untenable and costly situation has disrupted businesses as they have no access to supplies for months due to systems failure, infrastructure, cumbersome procedures by port operators and lack of space capacity.

1.2.5 Kenya Ferry Services

Ferry services at Likoni Mombasa started in 1937. The ferries have remained the one and only link to the south coast. The operations are situated on the gateway to the port of Mombasa. The link is crucial to the local users and to those going to Tanzania or further. The carriers at Likoni were at first managed by Kenya Bus Services Ltd., on a contract arrangement with the Municipal Council of Mombasa. The company further ran a network of buses in the coast and in the capital. The earlier processes were undertaken using pontoons operated by motor boats. In 1957, the age of modern

ferries began. The company stayed on for about 32 years until 1989 when it ceased. Then, the Government of Kenya took up the management of the ferries. The state thus acquired all the ferry crafts, such as Pwani, Mvita, St. Michael, Pombo and Mtongwe 1, at a cost of Ksh 10.5m. The workers were also re-inducted at their prevailing terms of service. The state further charged Kenya Ports Authority with the operating of services. KPA changed one of its subsidiary firms, Buntia Estates Ltd., to Kenya Ferry Services Ltd and began operations on 1st November 1989.

In 1990, the state acquired four new ferries, namely Mv. Nyayo, Mv. Harambee, Mv. Kilindini and Mv. Mtongwe 2, at KShs 376 million to boost the then current fleet. With the fiscal aid from KPA and treasury, the company was able to keep its services during its infancy. In 1998, the state formalized the tenure of the firm via a National Assembly Sessional Paper No.3, by reforming the contributions of both the government and KPA into equity. Share capital was henceforth boosted from Shs.2 million-Shs. 500 million. The firm is currently owned 80% by the state and 20% by KPA.

The Kenya Ferry Service was initiated specifically to move people and motors across the Likoni Channel linking the mainland and the Mombasa Island. There are currently seven operating ferries. Mv Nyayo, Mv Harambee, Mv Kilindini, Mv Likoni and Mv Kwale Mv. Safari and Mv.Jambo. The relatively new Mv. Jambo was brought to Service in 2017 while another one MV. Safari is expected to arrive from the manufacturer in Turkey this year. These new Ferries were bought at a price of Ksh. 2 Billion. KFS currently moves over 300,000 travellers and more than 6,000 cars daily across the channel. It hopes the traveller number to hit 500,000 in the next 3 years.

Since the Company's core function is centred within the larger Port section, KFS is classified as a Port facility. As such, it is subject to the International Maritime Organization (IMO) rules on Port facilities safety. The Kenya Maritime Authority (KMA), the local enforcement body, evaluates and accredits KFS' security strategies that are designed and assessed every 4 years as per the International Ship and Port facility Security (ISPS) code.

1.2.6 Kenya Maritime Authority

The Kenya Maritime Authority was established vide Presidential Order in 2004 to oversee the transfer of responsibilities in shipping matters from the Kenya Ports Authority to an autonomous State Corporation. In 2006, it was mainly established under the Kenya Maritime Act No. 5 with its charge being to “regulate, coordinate and oversee maritime affairs” in Kenya. In 2009, the revised Merchant Shipping Act (Merchant Shipping Act 2009) was rolled out, thus instituting a broader and newer legal framework for merchant vessel works in Kenya. The Act offers grounds for dealing with maritime safety, security and induction, and opens opportunities for ventures in waterway sectors.

The KMA is a statutory body founded under the Kenya Maritime Act 2006 (KMA Act). Its core function is to, firstly, control, coordinate and supervise maritime services in Kenya. The International Maritime Organization (IMO) is the United Nations (UN) system's regulatory agency for the maritime sector. Secondly, KMA's other principal function is to administer and enforce the provisions of the Merchant Shipping Act 2009 regulations, International Maritime Conventions, Treaties, Agreements and any other Instruments relating to the Maritime Sector in force. Thirdly, KMA is to advise government on legal and other mechanisms needed for the

roll-out of appropriate international conventions, accords, and agreements that Kenya has signed. Fourthly, KMA's function is to commence and co-ordinate inquiries, investigation, and evaluations in the maritime field, undertake flag State and port State functions in an excellent manner with due regard for international maritime rules. Fifthly, KMA is to initiate, oversee and control a national oil-spill mitigation strategy for both coastal and inland waterways and in so doing is considered the competent oil-spill authority. Lastly, KMA is to address issues of maritime search and rescue and oversee the functions of KPA, the Kenya Navy and any other entities involved during such operations. It also imposes safety of shipping, including conformity to construction requirements, maintenance of safety norms and safe navigation guidelines. Further, it supervises matters of training, hiring and welfare of seafarers, strategizes, monitors and evaluates induction packages to guarantee conformity with norms defined in international maritime frameworks. It further undertakes inquiries into maritime casualties and mishaps.

KMA was instituted in June 2004 as the state body in charge of maritime affairs. It operates within the State Department of Shipping and Maritime of the Ministry of Transport, Infrastructure, Housing and Urban Development. KMA is a semi-autonomous body tasked with regulatory oversight over the Kenyan maritime sector. Maritime safety and security is one of the Authority's core functions. KMA endeavours to bolster national maritime management via promotion of regulatory and institutional capacities for safety and security, boosting effective adoption of international maritime norms and other mandatory instruments on safety & security, promoting maritime training, coordinating search and rescue, eradicating marine pollution and encouraging preservation of the marine ecosystem, along with trade support and maritime ventures.

The adoption of a new Merchant Shipping Act, 2009 has boosted KMA's service delivery in these segments. Foreign vessels docking at the port of Mombasa are checked by KMA in line with Indian Ocean Memorandum of Understanding (IOMOU) on Port State Control to which Kenya is a member. This is to guarantee that ships conform to safety of life and safe manning conditions, sustenance of marine ecosystem norms and those on load line, among others. Further, KMA is tasked with the running of the Regional Maritime Rescue Co-ordination Centre (RMRCC), now also the Mombasa Information Sharing Centre (ISC). ISC is an information centre where seafarers can contact for assistance during distress at sea, across Tanzania, Seychelles and Somalia. It receives and responds to piracy alerts and requests for data or assistance.

KMA also supports maritime preparation and instruction in Kenya. Kenya's recent enlistment into the International Maritime Organization's (IMO) Whitelist status implies the country's maritime training now matches international levels, enabling its seafarers to compete for work on international vessels. Kenya maritime industry is focusing on boosting the reputation of the sector and propping cadet recruitment among the youth. The Authority is further committed to adopting IMO strategies for integration of women in the maritime sector in response to Sustainable Development Goal of "Promoting gender equality and empowerment of women". To this end, KMA hosts the Association of Women in the Maritime Sector in East and Southern Africa (WOMESA), whose goal is to streamline the position of women in the maritime sector.

1.3 Benefits of Maritime Sector

Goodwin (2016) categorizes the impact of maritime sector and shipping into three; direct impact, that is, Freight services, Passenger services, towing & dredging Service and offshore support activities, renting and leasing. Indirect impact e.g. Ship building, Ship repairs, Port services, Insurance, Shipping-related financial and legal services. Induced impact such as food and beverages, other consumer goods, restaurants and recreation services. Igberi and Ogunniyi (2013), further asserted that the economic impact of any industry in an economy is routinely measured in terms of its contribution or value added to GDP of that economy or nation. The indirect impact is the impact on economic sector that the maritime transport industry, can have on other sectors through their demand of those sector's goods and services as input to its own production. The induced effect refers to the demand created in the broader economy through consumer spending of incomes earned by those employed in direct and indirect activities of the maritime transport industry. For instance, a decline in wages in the maritime transport industry, or in one of its suppliers, would result in less spending by employees and therefore a drop in demand for consumer goods from other industries. The induced impact might take a while, say one year, before it works its way through the economy.

1.3.1 Economic Growth

Maritime transit remains the bulwark of globalized trade and the manufacturing supply chain, as more than 80 percent of world merchandise trade by volume is carried by sea (UNCTAD, 2019). One subject that has been hotly debated among maritime economists is the way in which shipping and ports facilitate trade (Song & Panayides, 2015). The economic impact of an industry, even though often measured by the level of economic activity of that industry, in the form of value added to GDP

and employment generation, is not only restricted to these economic activities but also include the impact of these industry on other aspects of the economy. Studies on the importance of maritime sector has divided this industry contribution into several economic impact.

A positive impact of port investment on economic growth could be observed both in Korea and China. Studies have shown that there is a positive relationship between transport investment and economic growth, which is now commonly accepted (Hang, Wan and Li, 2019). The tension on factor prices and productivity is even elevated for sectors with a increased share of imports. In such scenarios, small variations in transport prices can easily determine the viability of export ventures. In advancing states, for labour-intensive manufacturing segments, such as textiles, high transit charges tend to lower remunerations, directly impacting the standard of life of employees and their families.

Port impacts on the economy assess the economic and social impacts (direct, indirect and induced) of ports on their respective countries' economies, or hinterlands or forelands. Ports are economic promoters for the areas they operate in, where the combination of services and activities contributes benefits and wealth. The output of a dock is marked by its ability to create maximum or optimal wealth. However, the gauging of the economic value of a dock is constrained by challenges that are not completely solved, as yet (Danielis & Gregori, 2013).

The cost of transport, especially multimodal transit and logistics services determine to a great extent a countries level partaking in the global economy. According to UNCTAD, a doubling of transport costs leads to a drop in the economic growth rate by more than half a percentage point (UNCTAD, 2003). This is because transport is

the main component of logistics services and its overall share in logistics costs is the highest. Also transport infrastructure is essential for economic and social development. In 2009, a total of 7.8 billion tons of cargo was loaded onto ships worldwide. In addition to this large volume of goods, maritime transport is important in terms of its value. In 2007 the value of globally shipped goods was around \$4.6 trillion. The waterborne freight sector continues to grow significantly.

1.3.2 Trade Facilitation

The growth in global trade volume slowed from an expansion of 3.7 % in 2018 to 1.2 % in 2019(KNBS, 2020). This was largely attributed to continuous policy uncertainty, declines in investment, and a slowdown in labour productivity. Trade tensions between China and USA, and between the European Union (EU) and United Kingdom (UK), slowed down trade with the manufacturing sector being the hardest hit. From the economic point of view, maritime transport has benefited economic growth in the following ways: large capacities of transport ships presenting advantages associated with economies of scale because of the enormous total capacity of the entire transport, low costs and low price of the transport in relation to other transport services, the quality of flexibility to demand, long service life, and the sea as the broad and freeway which does not require big investments in the infrastructure. The merits of maritime transit is the fastness, convenience, safety and the capacity to move heavy traffic assets and people at comparatively low costs (Ahmed, Ahamad & Carlos, 2008). The value of maritime traffic can be the fact that there is almost no country, regardless of its geographical position, which does not use maritime transport in its trade with the rest of the world. For this reasons, maritime transport has a significant economic role (Dora & Eva, 2017).

Maritime transport is a 'derived demand' with the demand for shipping a reflection of trade between countries (Mangan, 2017). This is so since it is demanded not for its sake but for other services it provide for proper functioning of the economy. Therefore any variation in the size of the economy will translate into increased opportunity via possible cargo increase and hence demand for maritime transportation (Kahyarara and Simon, 2017). Transport costs are regarded as important because they affect economic growth through changing trade patterns. The interplay between transport and economic development must target the transport system entirely and the way it is integrated into the processes of production, distribution and consumption. In this much broader perspective of transport is now resuming a new importance as a factor structuring economic development (Wilmsmeier, 2014). Wilmsmeier further posit that it needs to be recognized that transport costs might construct from the use of a sequence of transport modes within these production chains and as such are also related to other elements such as storage, packaging, forwarding, trade finance and insurance which are also part of these chains. Characteristic assumptions in studies of regional activities in New Trade Theory and Geographical Economics are that transport costs are incurred in the goods shipped, they are symmetric irrespective of the shipping direction, they are independent of the spatial organization of the economy and finally that transport costs are exogenous.

Igberi and Ogunniyi (2013) posit that the Maritime Transport industry serves as an input into every other industry in the National economy, it will be noted that there is hardly any segment of an economy that can do without the maritime transportation sector- since it will be needed to help bring in the needed materials for economic activities in a nation. High transport costs penalizes exports because high transport costs push down profits. The proficiency of transport amenities largely determines the

capacity of firms to compete in foreign markets. For a small economy—for which world charges for traded items are largely given—higher costs of movement feed into import and export levies. To remain competitive, exporters that face increased shipping levies must pay reduced wages to staff, acquiesce to lower profits, or increase productivity.

International trade, a vital element of GDP is considered as a necessary element for further development of the national economy. Thus, effective transport can be treated as an accelerator of growth. In an international environment of declining tariffs, trade facilitation has been at the forefront of policy discussions as the next key policy option to diminish trade costs for developing countries. Trade costs can be broadly defined to encompass all costs encountered in getting a final good to a final user – other than the cost of producing the good itself. In general, an exporter or importer incurs trade costs at all stages of the trading process (Wilmsmeier, 2014).

Trade is said to grow almost three times as fast as GDP growth. Trade and GDP growth has a positive linear relationship (Ma, 2004, p.17). After the global recession of 2007, world trade has grown from 8,491 million tons in 2007 to 11,091 million tons in 2016, a growth rate of 30.6 percent (Fan, Zhang & Yin, 2018). Trading is one of the most important applications of maritime transport. A country's prosperity is dependent to a large extent on its ability to trade. Trade is global and mostly, maritime dependent. Millions of shipments are carried through seas and oceans. All the world's economic heavyweights depend on maritime means to trade. The countries that own trade channels reap well from maritime activities. The best thing about maritime trade means is that vessels can move huge asset volumes conveniently. 10 percent increase in transport costs reduces trade volume by 20 percent and doubling shipping costs

slows GDP growth by 0.5 percent thus from a macroeconomic perspective, high logistics costs to GDP are a barrier to trade and foreign direct investment (FDI), and thus to economic growth (Xianghui, 2016).

As observed by Zepeda (2011) maritime transport flow data conforms to generally held assumptions about maritime trade in that it is strongly correlated with GDP and international trade. Zepeda explored the relationship between trade flows and economic growth with regards to Brazil in order to forecast Brazil's potential trade and maritime transport flows. Maritime transport is also cheaper compared to all the other modes of transport. A great merit of maritime transit is its eco-friendly aspect. The rise in fuel-conserving vessels makes maritime transport relatively harmless to environment. The importance of maritime transport in supporting and sustaining today's global society makes it indispensable to the world and to meeting the challenge of the 2030 Agenda for Sustainable Development (Ki Moon, 2016). Developing countries depend on maritime transport for most of their imports and exports. As trade is being liberalized through lower tariffs and quotas, it is the shipping costs that play an ever more important role within global supply chains. The understanding of the determinants of international maritime transport costs has thus become a cornerstone of any analysis of international trade and development (Wilmsmeier, 2014).

The ports sector in Kenya is estimated to contribute about 1.5% of Kenya's total Gross Domestic Product (GDP). KPA generates about KSh 40 billion per annum in revenues, with 7.5% of its pre-tax profits being remitted to the National Treasury as dividends. KPA has also supported trade facilitation, import and export of cargo especially for the manufacturing sector, export of agricultural sector commodities, and

generation of foreign exchange earnings, which contribute to maintaining a favourable balance of payments position (KPA SP, 2018).

1.3.3 Employment Opportunities

In 2019, total new jobs generated in the Kenya's economy were 846.3 thousand of which 78.4 thousand were in the modern sector while 767.9 in the informal sector. Wage employment in the private sector increased by 2.3 from 2017.0 thousand persons in 2018 to 2063.1 thousand persons in 2019. Within the public sector, wage employment increased from 842.9 thousand persons in 2018 to 865.2 thousand persons in 2019 (KNBS, 2020). No single number better captures the health of the economy than the unemployment rate. The unemployment rate is the single best signpost of the economy's health. When the economy reaches full strength, the unemployment reaches its so-called natural rate. (El-Erian, 2013).

According to Igberi *et al.*, (2013) the maritime transport industry generates 10 percent employment both directly-by those actively employed in this industry itself and indirectly by creating a need for employment in its supplier industries. The maritime transport industry also creates employment opportunity in other dependent industries as result of the multiplier effect. OECD (2016) indicate that more than 500 million people are engaged in maritime livelihoods with fulltime shipping employment estimated at over 293,000 workers by 2010.

In this context, the Maritime Sector in Kenya has been defined as consisting of four major component units. These are the port industry, the shipping industry, the Kenya Ferry services and the maritime regulator. Out of these it's the Port industry with the economic impact on the account that the Shipping industry is dominated by foreign ships that visit the country's seaports. This is in sharp contrast to other coastal state in

Africa like South Africa, Nigeria and North African countries. Like in Nigeria the industry took in an about 150,000 workers in 2013 and yielded up to USD15 billion to the economy Igberi & Ogunniyi (2013). These are benefits from economic functions undertaken by Nigerian-run shipping firms; dock terminal workers, shipping reps, clearing and forwarding staff, dock functionaries among others.

According to Igberi and Ogunniyi, (2013), the direct effects of the Marine Transport Industry are obvious. The notion of direct impacts can be demonstrated by an analogy of imported goods coming to Nigeria, which as well applies to Kenya, where lodgement of ship manifest, Port health and Customs clearance, pilotage, stevedoring, shore-handling, clearing and forwarding and transportation are all conducted on that one vessel. The effect of the activity of this one vessel would impact the economy not only by providing income and employment to its own crew but also to the crew of the pilot boat, stevedores, and ship agents. In 2010, the direct GDP impact of the Maritime sector on the Nigerian economy was estimated at 3 percent (Anozie, Umahi, Onuoha, Nwafor and Alozie, 2019).

The maritime sector is of crucial importance to modern societies. Nevertheless, the citizenry has a limited view and value of its influence and role as a crucial factor in terms of social and economic growth, and as a prospective source of worthwhile employment and careers, with several million people today operating in activities and firms directly and indirectly relate to waterways worldwide. The cruise sector has seen a rising process of popularization globally, reaching a level of great value in the global economy, with increasing cruises and recreational vessels departing from various points around the world.

Goodwin (2016) posits that the EU shipping industry is estimated to have directly employed 590,000 people in 2012 and overall contribution of 2.3 million jobs in the EU economy. From the loading to steering the ships, there are many prospective works at every stage. Utilising the broader range of maritime transit yields more jobs. For instances, waiters, entertainers, and many other functionaries are needed on board for tourism vessels. The vessel itself is a complex system that demands professionals to run. As such, utilised effectively by the state, maritime transit can be a key source of employment. According to ILO, an estimated that 253 million jobs worldwide were generated by tourism in 2010. The same may be said of T20 states. Tourism's indirect impact on job creation affirms its value for employment in the tourism sector (vellas, 2011).

As observed by Dwarakish and Salim (2015), in 2010 the Port of Hamburg supported 133,000 jobs in the Free and Hanseatic City of Hamburg and 155,000 jobs in the entire metropolitan region. This is equivalent to 11.8% of the labour force. Approximately every 8th job in Hamburg is generated by economic activities that are in some way related to the Port of Hamburg. Jobs supported by the Port of Hamburg employ about 261,000 people in all of Germany. In 2010 the port generated, directly and indirectly, a gross domestic product of € 12.6 billion which roughly equals 14% of overall gross value creation in Hamburg as per the port development plan to 2025 by the Hamburg port authority.

It is estimated that the Maritime Sector in Scotland directly contributed 41,000 jobs in 2017, with the total level of employment remaining relatively stable since 2010. Across all industries, the share of UK Maritime sector employment directly contributed in Scotland is estimated to be 18.6% in 2017(Cebri, 2019).

In Kenya, Fisheries contributes about 0.5 % of the GDP and generate work for above 2 million people. The approximate yearly economic output of the marine and coastal ecosystem of the blue economy in Kenya slightly over US\$4.4 billion (20 percent) with tourism taking the biggest share of over US\$4.1 billion, according to the KMA estimates. Marine fishing had a yearly fish potential of 350,000 metric tons in 2013 worth Ksh90 billion (KMA) yet the region only supplied a paltry 9,134 metric tons worth Ksh2.3 billion. Therefore, the full economic potential of marine resources has not been exploited (UNDP, 2018).

The Kenya maritime sector in general and the port specifically continue to play a crucial role in employment creation. The Port of Mombasa provides direct employment in the sector as well as indirect and induced jobs created along the industry supply chain. As at December 2017, Kenya Ports Authority directly employed about 7,000 workers at the Port of Mombasa, ICDs, Lamu and small ports actively engaged in port business (KPA Master plan, 2019).

Over 70 percent of the cargo handled at the Port of Mombasa is destined for the Kenyan economy, mostly Nairobi and surrounding areas, which goes to create opportunities for jobs and job creation in the various sectors of the economy. The Port, as mandated by Law, also sources its goods and services from Kenyan producers, who in turn have their own suppliers. This further creates induced employment. Other jobs created in the sector include those employed in transport or transport related activities. Business created in the sector and related industries include Clearing and Forwarding; Banking; Road and Rail; transport services; Insurance; Container Freight stations for cargo storage and warehousing; and hotels and restaurants. These, among others, have created a vibrant economy especially in

the Port City of Mombasa, with trickle down effects to other towns in the country and a boom to economic activities and development.

1.3.4 Tourism

According to OECD (2016), in 2013 global direct value added in marine and coastal tourism was estimated at 390 billion USD with Europe contributing 35%, Asia and Oceania 30% NAFTA 19%, Africa 9% and central and South America 6% with direct employment in marine and coastal tourism at 7 million in full time jobs. Marine and coastal tourism accounted for 5% of global GDP (OECD, 2016). The economic impact of tourism is both direct and indirect.

According to Vellas (2011), direct effects concern expenditure within the tourism sector, based on a list of typical tourism products drawn up by the UNWTO and the OECD. For example, the direct effect comes from the actual money spent by tourists at a destination. When a tourist pays a motel owner USD 100 for a two-night stay, the USD 100 has a direct economic impact. Vellas further reiterate that one vital contribution that tourism makes in economic growth lies in its indirect impacts. These indirect economic yields, which tally with assets purchased and with ventures and public spending created by tourism, are a crucial driver of growth.

Indirect effects concern intermediate consumption to produce goods and services in the tourism sector. These are goods and services that tourism companies purchase from their suppliers, forming the tourism supply chain. For instance, Indirect effects occur as the impact of the original USD 100 is felt on the economy. The motel owner might take the USD 100 and use some of it to pay for food for the restaurant and some of it to pay the wages of the motel's employees. The food supplier, in turn, will pay the farmer for the crops while the employee might buy a pair of shoes. The impact of

the original USD 100 is increased. Indirect effects can be particularly important to produce local products. So-called frontline companies take the initial purchasing decisions that determine what visitors can consume. For example, if a frontline accommodation provider decides to buy local products wherever possible, the tourist will be the originator of the purchase and of the production of goods and services in the host country. Induced effects concern expenditure by employees from wages paid by companies in direct contact with tourists. Induced effects also include the consumption of companies that have benefited directly or indirectly from initial expenditure in the tourism sector.

Tourism contributes to foreign-exchange earnings, generates income and jobs, can improve economic structures and encourages small business development. The direct effect is the actual expenditure by the tourists. Indirect, or secondary, impact is what happens as the money flows through the economy.

In 2019, Kenya tourism earnings grew by 3.9 percent from KSh 157.4 billion in 2018 to KSh 163.6 billion in 2019. During this period, hotel bed-night occupancy expanded by 6.3 percent to 9,160.8 thousand. The number of international visitor arrivals increased by 0.4 percent to 2,035.4 thousand in 2019, which was a slower growth compared to a 14.0 percent rise in 2018. The number of visitors to national parks and game reserves grew by 3.7 percent to 2,975.2 thousand, while the number of visitors to museums, snake parks and historical sites declined slightly by 1.6 per cent to 990.2 thousand in 2019 (KNBS, 2020).

Maritime transit is a key means for tourism and can play a critical function in development. Various countries are reaping money from tourism through maritime activities. As such, tourism can be seen as sustainable source of earning. States that

exploit maritime tourism create revenue and present their good image worldwide. Currently maritime transport has become an efficient way to attract various visiting tourists, and therefore, plays an important role in the development of tourism (Thana, 2013).

World tourism has always been enhanced by the maritime transport industry. In 2005, an estimated 10.5% of total world tourism expenditure was directly related to maritime transport (The Philippine Environmental Governance, 2006). The tourism sector of the maritime transport industry also helps in generating revenue to a nation. Cruise shipping is an area with huge potential, targeting high end tourists. Industry experts say that 400 cruise tourists are equivalent to 4000 tourist by air. Kenya Ships Agents Association estimates that 40 cruise ships calling at the port could translate to US\$ 20 million (Sh2 billion) and there is a positive development with the Kenya Ports Authority (KPA) currently developing a cruise (Marete, 2018).

1.3.5 Contribution to Government Revenues

Kenya Vision 2030, the country's development blueprint, has set ambitious targets of transforming Kenya into a newly industrialized, globally competitive, middle-income country. The long-term agenda, which is being implemented through successive five-year medium-term plans, has three pillars: an economic pillar that aims to achieve GDP growth of 10 percent per annum; a social and environmental pillar that aims to build a society enjoying equitable social development in a clean and secure environment; and a political pillar that aims to build a people-centered, results-oriented, accountable democratic political system (Word bank, 2019). The Government has identified the blue economy as a fundamental pillar of the Vision

2030 agenda. According to UNDP (2018), the annual economic value of goods and services in Kenya's blue economy is estimated to be about US\$4.4 billion.

Maritime sector is an important industry whose activities significantly impact on a country's GDP because it makes a Significant Contribution to Government Revenues. The income generated by the maritime sector gives rise to income and corporate tax payments that considerably boost government revenues. Considering the sector's effect on taxes and benefit payments, it is estimated the product of maritime activities has increased.

As observed by Haralambides (2015), in the US, for every job in the merchant marine, 4.4 extra employments are generated in the economy, and for every dollar of household income in the shipping and by extension ports, 3.4 dollars of additional income is added in the economy. The Maritime Sector in Scotland helps to raise a significant amount of tax revenue each year for the UK Exchequer. It is estimated that the Maritime Sector in Scotland helped to support a total of £19.5 billion in turnover (through business turnover), 155,000 jobs and £5.1 billion through the compensation of employees in 2017. The Sector contributed an estimated total of £900 million in tax revenues in 2017, spread across VAT, Corporation Tax, Income Tax, National Insurance Contributions and Business rates (Cebr, 2019). The Latvian ports handle on average 60 million tons per year. The transportation and storage account for approximately 13% of the Latvian GDP, and the total revenues from transit cargoes account for approximately 4.4% of the GDP and are equal to 27.7% of the volume of the export of services according by Rijkure and Sare (2013).

Kenya's maritime industry contributes insignificantly to the GDP, and this is because 80 to 90 % of vessels that come into the country are foreign vessels. The foreign

vessels owners repatriate the profit accrued from the shipping business in Kenya to their various countries thereby making it difficult for to retain the money in the economy.

Goodwin, (2016) indicated that in 2012, the EU shipping industry was thought to have directly contributed €56 billion to EU GDP while the total GDP contribution of the European shipping industry was about €145 billion. The shipping industry has significant ‘multiplier’ effects across the wider EU economy since it also supported employment for an estimated £2.3 million people contributing to total tax revenues of around £41 billion in 2012. For every £1 million of GDP, shipping creates another 1.6 million is created elsewhere in the economy.

Kenya’s territorial waters cover 230,000 square kilometers and 200 nautical miles offshore and 10,700 square kilometers of inland waters, thus the country’s maritime sector has a huge potential to turnaround the economy. Maritime transport in Kenya takes care of 92 percent of Kenya’s international trade by volume, which is expected to grow as the country seeks to implement the early crude oil exportation project. The Port of Mombasa accounts for about 0.3 percent of the world’s international seaborne trade mainly because of its location, higher costs, and low trade levels. Thus, effective transport can be treated as an accelerator of growth (Zaucha1 and Matczak, 2018). In 2017, the maritime domain contributed Sh. 440 billion which translates to 20 percent of the GDP. The ports sector is estimated to contribute about 1.5% of Kenya’s total Gross Domestic Product. KPA generates about KSh 40 billion per annum in revenues, with 7.5% of its pre-tax profits being remitted to the National Treasury as dividends (KPA SP, 2018). The Blue economy committee was thus created in 2016 to help

Kenya identify challenges in the performance of maritime to address its poor performance (UNCTAD, 2018).

The maritime transport industry, apart from generating revenue and profit for companies under it, also generates revenue to a nation through the form of corporate tax, VAT, and many other ways (Oxford Economics, 2007). The revenue which is realized from these industries are used in providing better welfare for the citizenry by investing more in maritime infrastructures and also investing in other sectors of the economy.

1.3.6 Impact on Balance of Payments

The overall Balance of Payments position in Kenya improved from a surplus of KSh 103.4 billion in 2018 to a surplus of KSh 106.4 billion in 2019, on account of a build-up in official reserves. The current account balance worsened to a deficit of KSh 567.0 billion in 2019 from a deficit of KSh 511.3 billion in 2018. The financial account net inflows declined by 3.9 per cent from a surplus of KSh 662.0 billion in 2018 to a surplus of KSh 636.3 billion in 2019. This was mainly occasioned by declines in net inflows of direct investment and other investment liabilities (KNBS, 2020).

According to economic theory, imbalances in trade flows affect transport prices because (some) carriers have to return without cargo from the low demand region to the high demand region. Therefore, transport prices in the high demand direction have to exceed those in the low demand direction (Wimsmeier, 2014). He further argues that an imbalance in terms of trade volumes between two regions causes the transport price in one direction to exceed the price in the opposite direction when a positive proportion of carriers are required to return without paid cargo. One of the

implications is that *ceteris paribus*, unit shipping costs increase with the relative volume of trade between regions, implying that the transport costs increase with trade.

The Maritime Sector in Scotland is estimated to make a substantive contribution to UK economic activity through the exports of goods and services. A total value of £1.8 billion of goods and services were exported in 2017, equating to 14.6 percent of the UK Maritime sector total.

Inefficient port contributes in increasing total logistic costs which may worsen a country's balance of payments. This is because it may increase the prices of imports and reduce the country's exports competitiveness and therefore earning less foreign exchange. The cost of transport, especially multimodal transport and logistics services determine to a great extent a countries level participation in the global economy. Doubling of transport costs leads to a drop in the economic growth rate by more than half a percentage point (UNCTAD, 2017) because transport is the main component of logistics services and its overall share in logistics costs is the highest. Maritime transport is essential to the world's economy as over 90 percent of the world's trade is carried by sea and it is, by far, the most cost-effective way to move en masse goods and raw materials around the world (IMO, 2019).

The point that ports play an important role in facilitating trade has been made for years. For example, Haralambides and Veenstra (1996) analyse the interaction between ports and the development of trade. They observe that countries' ambitions to follow an export-led growth strategy has resulted in government retrenchment from ports, and port reform, with both negative and positive consequences. On the one hand, ports have become more efficient, largely due to the involvement of international operators, while on the other hand, liberalization in many countries has

resulted in large redundancy programmes for port workers. The authors argue that the efficiency of port operations is not the only relevant indicator, but the entire economic context of a port should be considered: the competitive environment, access infrastructure by land, and the way in which a government or port authority attempts to recoup some of the port reform costs (for the redundancy of port workers, among others) from other parties. Commerce through maritime means reduces the entire business cost. Transport costs robustly and significantly negatively impact agricultural imports, even after controlling for shipping distance (Korinek and Sourdin, 2010). The competitiveness of a country's trade is largely enhanced by low logistics transport costs, of which ports contribute 10% of the total supply chain costs. In Sub Saharan Africa and Oceania, pay 40 to 70 % more on average for the international transport of their imports than developed countries (Kahyarara & Simon, 2017).

According to Wilmsmeier (2014), transport costs are considered a friction to trade. The importance of international transport costs is an influencing factor of international trade and the perception of this importance of international transport costs have changed throughout time. In this respect international transport costs have been considered as important proxies for market access barriers, but until recently have submerged in the discussion of tariff and other non-tariff barriers to trade. The pricing of cargo movements is dependent on the forces of supply and demand, but as Branch (2008) points out potentially more complicated than in the case of other industries.

Transport is a derived demand for all transport modes and therefore impacted by the elasticities of demand of the transported goods. For transport of goods/commodities it can be argued that the rates depend on the context of (Rodrigue 2009), demand

elasticity of goods/commodities transported, ratio of transport costs to the costs of transported goods, the replaceability of maritime transport or of specific route, Enterprises and individuals take decisions about how to route traffic through the transport system, Users have to negotiate or bid for transportation, Conditions (tariffs, salaries, locations, fuel costs) are changing constantly, Costs for gathering information, negotiating, and enforcing contracts and transactions.

The costs of international transport services are a crucial determinant of a developing country's export competitiveness. Shipping costs often represent a more binding constraint to greater participation in international trade than tariffs and other trade barriers. Across economies, an raising of shipping levies is linked with slower yearly growth of over one-half of a percentage unit. Transport charges shape the potential access to outside markets, which, subsequently, accounts for at least 70 percent of differences in states' GDP per capita (World Bank, 2019). The impact of transportation on the economic emancipation of a country cannot be over emphasized. In Nigeria, transport accounts for approximately 3% of the GDP (Olayiwola, 2010). A vibrant, responsive, effective and efficient transport system will enhance Nigeria's economic, developmental and strategic roles in the global economy. For this reason, transportation ought to be accorded high priority in the Nigerian economy.

1.4 Statement of the Problem

Kenya depends quite heavily on external trade for sustaining her economy and for her economic growth and development. Kenya is a net importer thus any imperfections in the market could result in her losing the potential gains from trade since the demand for imports in Kenya is fairly inelastic while the overseas demand for her exports is largely elastic. This is because her imports are essential goods such as machinery,

spare parts and industrial imports vital for basic consumption and for economic development. On the other hand, her exports are mainly agricultural products which have other substitutes or are easily available from other developing countries. Despite the extensive hinterland the port commands, and the recent commencement of SGR Freight services in 2018, the maritime sector performance remains significantly below international standards hindering its vital contribution to the country's economic growth. Kenya Ports Authority, a Maritime State corporation which manages Mombasa port, is underperforming in terms of ship turn-around time and cargo evacuation despite the heavy infrastructural inputs as illustrated in table 1.1.

Table 1.1: Average Turn-around Time

Port	Waiting Time
Mombasa	62.4 hours
Namibia	18 hours
Djibouti	3 hours
Durban	16 hours

Source: KPA (2019)

As depicted in table 1.1, the Mombasa port has one of the longest ships waiting time with turnaround time of an average of 2.6 days compared to Djibouti's 3 hours, Namibia 18 hours and Durban 16 hours. While this can lead to underperforming volumes of cargo handled and consequently reduce the value of contribution to the national gross domestic product, the other fundamental issue is the impact this has on the economy thus the need to conduct an economic analysis of the sector. In terms of competitiveness, Mombasa port is ranked number 114 among the world's best 120 ports that handle container cargo. In Africa, the recent ranking places the Port at 6th spot behind other best performing Ports including Tangier Med Port in Morocco which handled 3.3 million TEUs, Durban (South Africa) 2.6 million TEUs

and Lagos (Nigeria) 1.5 million TEUs in 2017. Africa's other best performing Ports are Alexandria and Port Said both in Egypt (PMAESA, 2017).

Delay in the port and especially for the ships is part of the cost of the freight to the shipper, thus the goods have an added cost while the value remains the same. All this cost is passed on to the consumer and the country, thus affecting the national economy due to rising inflation. Maritime sector performance has an inordinate effect on the overall national economy and development, thus appropriate decisions need to be made by responsible managers to grow the economy. The Inland depots or dry ports remain underutilized. The Government to date has not found a way of ensuring a guaranteed percentage of containers to travel by rail through the Inland Container depots, this would save the country's money spent on transporting these containers by trucks, which charge exorbitantly, while these high transport costs are passed onto the country's national economy. Kenya would save a lot if all the upcountry and hinterland countries' cargo could travel by rail through the ICDs through competitive means because monopolizing the railway transport will not assist intermodal transport.

Commercial shipping in Kenya is mainly undertaken by foreign firms that own vessels and work globally. Shipping services are of great concern to the economy because it is possible for ship owners to overprice their services. This would have the effect of overpricing Kenya's imports and reducing exports earnings and thereby affecting the economy. Since Kenya has no national shipping line and has little control on the foreign owned shipping companies which provide maritime transport for her international trade, she is at serious disadvantages from the point of view of her import prices and earnings from her exports if the practices of these companies

result in monopolistic markets for transport services. This then constrains both the welfare of people and also economic growth and development.

In the absence of a national Shipping Line Kenya has lost the potential of the Maritime sector to contribute over 3 billion U.S. dollars into the country's economy annually. KNSL would also create up to 6,000 jobs within five years of its revival, with the potential to earn the country some Sh300 billion (TMEA, 2018). Its revival will enable Kenya to benefit from the regional and global maritime transport value chain. If the Country manages its own maritime transport services, it will enhance the contribution of the sector to the national economy and, make the cost of goods more competitive. Revival of the national entity will boost the country's quest to own and operate its own vessel in future and join the likes of Ethiopia whose shipping line earns the country over \$40 million (Sh4 billion) annually from its fleet of 18 commercial ships.

Though the maritime sector shows great potential of contributing enormously to the growth of the Kenya's economy the Government has not intensified efforts in capacity building and maritime financing in order to create room for ideal implementation of cabotage. Since the maritime industry has been proven to exhibit great potentials to grow coastal economies, the Government should intensify efforts in capacity building, maritime finance and encourage indigenous participation in the maritime industry. The bottlenecks surrounding the cabotage regime should have not been addressed which has denied the gains to be derived from inland and coastal trade. As it is the indigenous operations is being used by foreigners. In order to improve the maritime sector performance, for the past five years, Kenya government-initiated reforms aimed at modernizing, replacing and

refurbishing equipment at the port of Mombasa, the introduction of the CFS operations, capacity expansion, the commissioning of the Blue economy project and the construction of the standard gauge railway line to Naivasha all aimed at improving the port's performance to enhance economic growth. However, despite these investments, the port of Mombasa has continued to be characterized by ship delays, cargo congestion, low traffic, and emerging stiff competition from other regional ports.

The Kenya Maritime authority has struggled to place Kenya as an important littoral state in the world under its function of Port State control. The country has missed out on opportunities of Kenyan seafarers in shaping the nation's maritime industry and their huge potential to contribute towards the growth of the national economy. Registration/licensing of fishing vessels and creation of incentives to realize establishment of a national fishing fleet would have been a key microeconomic enabler. Kenya must lay a foundation upon which the maritime sector will be built as the next economic frontier because the maritime sector has a huge latent potential, but several challenges stand on its way (KMA, 2019).

The State department of maritime and shipping in the Ministry of Transport Infrastructure, Housing and Urban Development has not keenly addressed issues of under qualified staff and appropriate strategies to take in order to fully incorporate the maritime activities in the country's National Development activities. This critical move involves the country to accelerate development of the Bandari Maritime academy into a Centre of Excellence in maritime training, research and skill development in the Maritime industry which will make it to become a top supplier of world class seafarers for shipping lines across the globe like is the case with the

republic of Philippines. Transformation of the college into a centre of excellence in maritime training and research will facilitate the country's quest to reap maximum benefits from the blue economy sector, an agenda that the President has given undivided attention. Although there are huge opportunities for Kenyans to serve in foreign ships, Kenyans have for long lacked opportunities to get sea time, a prerequisite for serving on ships. The academy will be instrumental in bridging the global shortage of seafarers which is estimated to be more than 83,900 officers and 450,000 subordinates, cutting across cargo vessels, cruise ships among others and provide employment to Kenyans to enable them to participate in economic growth.

In view of the foregoing, coupled with the limited literature, this study sought to make an economic analysis of the factors influencing maritime sector performance with the aim of establishing the impact on economic growth in Kenya.

1.5 Objective of the Study

1.5.1 General Objective

The general objective of the investigation was to make an economic analysis of the maritime sector performance in enhancing economic growth in Kenya.

1.5.2 Specific Objectives

Specifically, the study sought to achieve the following objectives:

1. To establish the effect of labor productivity on maritime sector performance in Kenya.
2. To analyze the influence of foreign exchange rate on maritime sector performance in Kenya.
3. To investigate the effect of inflation rate on maritime sector performance in Kenya.

4. To establish the impact of maritime sector performance on economic growth in Kenya.

1.6 Research Hypotheses

The study postulated the following hypotheses:

- H₀₁:** There is no significant effect of labor productivity on maritime sector performance in Kenya.
- H₀₂:** There is no significant influence of foreign exchange rate on maritime sector performance in Kenya.
- H₀₃:** There is no significant effect of inflation rate development on maritime sector performance in Kenya.
- H₀₄:** There is no significant impact of maritime sector performance on economic growth in Kenya.

1.7 Significance of the Study

Maritime transport accounts for over 80 percent of the country's external trade (Helu, 2007). It plays a significant role in economic development through development of maritime related industries, creating employment and attracting foreign direct investments. KMA and KPA create the interface between maritime transport and the inland transport system facilitating regional and international trade. Consequently, the port is a crucial facilitator for the attainment of Kenya's Vision 2030 of a globally competitive and prosperous nation.

Policy makers in Kenya are laying emphasis on the competitiveness of the economy. It is a reality that the competitiveness of Kenya is inextricably linked to the

productivity and competitiveness of its key sectors. This requires that industries are facilitated to become competitive internationally. Port Congestion and delays undermine the competitiveness of these key sectors in the country, by increasing shipping costs through direct costs such as vessel delay surcharge and indirect costs such as inventory, idle ships and trucks. Kenya needs an efficient transport system to maintain the momentum of the current economic recovery, especially in the light of Vision 2030, where Kenya hopes to attain the status of a middle-level income economy.

The maritime industry is also an extremely competitive one as there are only two main considerations why businesses will prefer one shipping company over another; the price and speed at which their goods are delivered to their destination. This has made it difficult for companies to differentiate themselves and demand a higher premium for their services.

Kenya developed public sector performance contracting system which is supposed to improve efficiency and accountability within the Mombasa Port. Further, the vision 2030 articulates government's commitment to facilitating public sector growth through enhanced good governance within all governmental units, including state-owned corporations. This study would be important in determining the extent to which the government has achieved its deliverables with respect to performance within the state-owned corporations in the maritime sector. Therefore, it is hoped that the study results should have vital policy implications for Kenyan maritime sector.

The regulatory bodies like KMA that are responsible for the licensing, regulation and supervision of operators in the maritime sector, including policy formulation, monitoring and evaluation, could make informed decisions on the basis of the

findings of the study. Africa, as a continent with most nations having state-owned corporations/ being coastal states, should also benefit from this study, by helping investors interested in this continent to make justified decisions. The study, in addition, makes a significant contribution to the growing body of research on maritime sector performance and its contribution to the economy, especially in the public sector and a nation considered to be less developed. Out of the envisaged publications, the findings may also be used as a source of reference for other researchers.

1.8 Scope of the Study

This study provided a thorough and comprehensive examination of the role of the Maritime Sector in Kenya. It presented a range of analyses demonstrating different aspects of the value contributed by the Maritime Sector, including direct contributions to GDP and employment, indirect and induced multiplier impacts and the Maritime Sector's contribution to the Exchequer through tax revenues raised. The study was carried out in KPA, KMA and KFS in Kenya covering a period from 2000 to 2019.

1.9 Assumptions of the Study

First, the assumption of rational expectations by the partners of maritime sector in Kenya was expected to exist. This is where the member partners, KPA, KFS and KMA, make their best forecasts of the future based on all data currently available rather than having to learn and catch up to the prevailing situation. Every member partner is envisioning and modifying its hopes and aspirations for the future. With evidence-based projections, mistakes in estimations happen only arbitrarily and in isolation.

Secondly, it was assumed that variables under investigation were normally distributed in the population. Thirdly, it was assumed that all secondary data entries in the study were independent and identically distributed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter examined the existing literature on the evolution of the maritime sector and its importance. It also examines theories supporting the study, macroeconomic variables, Solow Growth Model and link between maritime sector performance and economic growth. Lastly, the chapter provides an empirical review of current research and the knowledge gaps in those studies.

2.2 Theoretical Review

The study was anchored on four theories, that is, endogenous growth model, Solow growth model, production theory and agency theory.

2.2.1 Endogenous Growth Theory

Lucas (1988) and Romer (1989) were the key players in the development of the endogenous model. This theory presumed that the growth speed of a Nation is Endogenous and is determined within the model and gave much focus on productivity, efficiency, and improvement in Technology. The school of thought of Endogenous growth believed that the Steady-state growth rate of a Nation is affected or assumed by the rate of Factors of Production which are accumulated over time with the constant return to scale in which steady-state will be influenced by the factors which are accumulated. The theory viewed that Economic actors and government policy will be able to affect the growth rate in the long run. In this regard, the Endogenous growth rate is seen among the countries that have a different level of savings rate and Investment in what is known as Conditional Convergence.

Kalecki (1956) emphasized that Investments are the major contributor to Economic Growth to achieve a steady state in the Long run. Endogenous Growth theories viewed the rate of technological growth is affected by resources allocated to research and development thus Foreign Direct Investment inflows of a Nation influences development and Infrastructure level which promotes growth.

Romer (1990) viewed that for a country to achieve Economic Growth, human capital is laid much emphasis through Foreign Direct Investment most specifically through Research and Development which would increase productivity. Rana and Dowling (1988) argued that Foreign Investment Inflows increases Capital Inflow and Growth which enhances Technology transfer in one Country and eventually makes Sustainable Economic Growth and Performance. This has not always been the case According to Krugman, most developing countries may not experience the growth because more international companies have more capital than the local firms hence Privatization is always advocated. This indeed will reduce the multiplier effect in the host country since more profits are taken away from the host country as income reduces.

In the Endogenous Model, the capital was not limited to physical capital only but also included skills, knowledge, and experience as well as labour input. Economic Growth was considered as a human capital in terms of physical capital as well as health and education implying that labor was a factor of economic growth. Shultz (1961) articulated the model to include Education, Training, and Health as Human Capital Investments in Economic Growth. Arrow (1962) gave much emphasis on the relevance of Human Capital in Economic Growth. Furthermore, Mushkin (1962), Fuchs (1966) and Becker (1964) indicated and argued health as a capital for Human

Capital and Lucas (1988) viewed it as a factor in the production equation. It gained more momentum and Grossman (1972) extended the idea and in which health was viewed as human capital and a capital good. Madsen (2002), Barro and Sala-i-Martin (1992) considered health as a major contributor to Economic Growth and a component of human capital. Lopez-Casasnovas *et al.*, (2005) suggested that due to increased human capital due to better education and learning processes and optimal health leads to sustainable growth.

Individual health stock improves the health status of a Nation as a great part of Human Capital and indeed Health was given much attention in Economic Growth. Improving health leads to higher labour productivity which encourages the government and the people to invest in human capital (Madsen, 2012). Barro and Sala-i-martin (1992) introduced health as a major source of Economic growth. Health Status can lead to Improvements in Nutrition status and Life Expectancy as the stock of human capital through Investment in Health. More studies have been conducted using Life Expectancy and Nutrition status to determine Economic Growth.

Many researchers have shown that those countries with good nutrition usually their population have a long-life expectancy. Hence better nutrition provides a better incentive to human capital accumulation. Arcand (2001) compared Economic growth and Nutrition status and argued that malnutrition is a humanitarian crisis for Economic development. For any population in social investment in education and knowledge, in the long run, it will improve the Life Expectancy of the nation.

2.2.2 Solow Growth Model

The neoclassical growth theory (Solow-Swan Model) is grounded on the production functions with strict neoclassical assumptions including constant returns to scale,

diminishing returns to inputs and the perfect competition assumption. Only two factors, capital, and labor, were considered in the production function. According to this model economic growth performance of a country was influenced by exogenous factors, namely, technology and population growth (Solow 1956).

According to Solow (1956) time was the only variable that affected the level of productivity. More specifically, he used the following aggregate production function:

$$Y = A_t F(K, L)$$

Where Y is the level of aggregate output, K is the level of the capital stock, L is the size of the labor force, A is total factor productivity and t is time. The most important prediction of the neoclassical theory was that the poor countries would eventually converge to the per capita income levels of the rich countries. But in reality the gap between the rich and some poor countries in the world has increased. Moreover, Acemoğlu (2008) has also pointed out that there was divergence in incomes.

According to Tue et al (2014) in the Solow growth model nearly 60 percent of the differences in GDP per capita are caused by the differences in capital per worker and labour effectiveness. The Solow Model identifies the capital level per worker and the effectiveness of labor both as the ability to create permanent growth in the per capita stock per labor of the economy. As for the exogenous factors, the Solow model argued that savings and capital accumulation affect growth in the evolution period and neglects human capital as an input in the model. It recognizes technology in the growth period that will lead to development and technology is exogenous in the Solow model. The Solow model gave much importance to savings and population as key in determining per capita income in different countries and higher savings lead to higher income per capita.

Solow exhibited that the saving rate is exogenous which is established outside the model. This model assumed that aspects of production Capital and Labour are a substitute for one another, and households accumulate savings by reducing their consumption which indeed makes the economy be in a stable state in the long-term. In this model foreign direct Investments through the inflow of Capitals from a developed nation to poor countries should aid developing nations to catch up with the rich nations as a return to capital is high which will enhance growth. The Solow model did provide sufficient evidence of how economic growth occurred even when the model was expanded to include human capital as an exogenous variable to the production function. Lucas (1990) argued that the inflow of capital should be from the developed nation but on the ground that was not happening instead capital was being channelled from developing countries to rich countries.

2.2.3 Production Theory

The Production theory explains the principles by which a business firm decides how much of each commodity that it sells (its “outputs” or “products”) it will produce. Additionally, the amount of each kind of labor, raw material, fixed capital good, etc., that it employs (its “inputs” or “factors of production”) it will use (Agarwal,P. 2017). This theory ordinarily presents the producers as successful optimizers by maximizing production, minimizing cost, and maximizing profits. Econometric techniques build on the basis to estimate production/cost/profit function parameters using regression techniques where deviations of observed choices from optimal ones were modeled as statistical noise (Furková, 2013). Therefore, econometric estimation techniques should allow for the fact that deviations of observed choices from optimal ones are due to two factors: by either failure to optimize i.e., inefficiency or due to random shocks.

Production Theory also known as Stochastic frontier analysis (SFA) is one method of economic modeling pioneered by Aigner, et. al (1977) and Meeusen and Van de Broeck (1977). SFA refers to a body of statistical analysis techniques used to estimate production or cost functions in economics while explicitly accounting for the existence of firm inefficiency. This implies that producers may behave sub optimally in their decisions to optimise a given objective function. Frontier production functions are useful in giving an insight into the relationship between the measure of output and inputs of production with a given level of technology. Several studies have applied stochastic frontier models in agricultural production such as Battese and Tessema (1993), Battese, et. al (1993), Tran, et. al (1993), Ajibefun, et. al (1996), Battese and Broca (1997), Abdulai and Huffman (1998), Mengist (2007), Korir (2011), and Njeru (2010).

In its simplest form a production frontier model without a random component term can be presented as:

$$Y_i = f(x_i; \beta) \cdot TE_i \dots\dots\dots 2.1$$

Where Y_i is the observed output of producer i ; x_i is a vector of N inputs used by producer i ; $f(x_i; \beta)$ is the production frontier; β is a vector of technology parameters to be estimated; TE_i denotes the technical efficiency.

Technical efficiency is defined as the ratio of observed output to maximum feasible output. If $TE_i = 1$, then it shows that the i^{th} producer obtains the maximum feasible output while if TE_i is less than one it provides a measure of the shortfall of the observed output from the maximum feasible output. This relationship can be presented mathematically as:

$$TE_i = \frac{Y_i}{f(x_i; \beta)} \dots\dots\dots 2.2$$

However, in real life situations there is always a stochastic component that affects the production process thus accounting for the variance between actual realized production and maximum feasible output. These shocks may not be directly attributable to the producer, or the technology employed. They are external and may arise from weather changes, economic adversities, market imperfections, natural disasters or pure random luck. These shocks are not uniform to all producers and thus each producer will face a different shock. The assumption though is that these shocks are random, and they are described by a common distribution. When we add the stochastic component the production function model will take the form:

$$Y_i = f(x_i; \beta).TE_i.\exp\{v_i\} \dots\dots\dots 2.3$$

Where v_i is a two-sided ($-\infty < v < \infty$) normally distributed white noise component $N[0, \sigma_v^2]$. The advantage of this stochastic form function is that it can separate the white noise effects from the contribution of variation in technical efficiency (Tewodros 2001). Given this form of a stochastic function, equation 2.3 becomes:

$$TE_i = \frac{Y_i}{f(x_i; \beta).\exp\{v_i\}} \dots\dots\dots 2.4$$

The white noise component v_i is assumed to be independently and identically distributed (iid) and symmetric, distributed independently of u_i . Thus the error term $\varepsilon_i = v_i - u_i$ is not symmetric since $u_i \geq 0$. Assuming that v_i and u_i are distributed independently of x_i , estimation of (2.13) by OLS provides consistent estimates of the parameters except β_0 , since $E(\varepsilon_i) = -E(u_i) \leq 0$. OLS estimates also do not provide

estimates of producer-specific technical efficiency. According to Tewodros (2001), in addition to obtaining estimates of the production technology parameters β in $f(x_i; \beta)$, the producer-specific inefficiency u_i is the ultimate objective of the estimation. To achieve this objective, it is required that separate estimates of statistical white noise v_i are extracted from estimates of ε_i for each producer. Stochastic frontier approach has an advantage over other parametric frontier measures because its allowance for stochastic errors due to statistical noise or measurement errors.

2.2.4 Agency theory

The Agency theory was concocted by Jensen and Meckling (1976). This theory in its modern form can be traced back to the administrative guidelines of Max Weber (1922) (Reardon, 2015). The agency theory discusses the problems that surface in organizations due to the separation of owners and managers and emphasizes on the reduction of this problem. This theory helps in implementing the various governance mechanisms to control the agents' action in the jointly held corporations (Panda & Leepsa, 2017). Agency theory is used to understand the relationships between agents and principals due to the fact that agents and principals always have very different motivations and that conflicts can easily arise because of those differing goals (Teeboom, 2018).

The different interests of principals and agents may become a source of conflict, as some agents may not perfectly act in the principal's best interests. The resulting miscommunication and disagreement may result in various problems and discord within companies. Mishra (2018) argues that the agency problems manifest themselves on a regular basis in service settings the fundamental problem in an agency relationship starts from information asymmetry or a situation where one party

to the exchange such as the agent has more information than the principal. Incompatible desires may drive a wedge between each stakeholder and result to poor performance. According to Mwithi (2016), the agency theory portends that most organizations operate under conditions of incomplete information and uncertainty which expose businesses to two agency problems, adverse selection and moral hazard, where the principal cannot find out whether an agent precisely represents his or her ability to do the work and the principal is not sure if the agent has put utmost effort, respectively.

Corporate governance essentially arose from the agency and Principal problems that were created by the separation of ownership and control which promotes a dominant management team and powerless shareholders a fact corroborated by Adam Smith in 1776 where he identified the divergent interest between managers and owners which being the main reasons for dismal corporate performance (Njeri, 2017). The agency theory promotes for the setting up of rules and incentives to align the behavior of managers to the desires of owners and associates good governance with people of integrity (Mwithi, 2016). Carpenter and Westpal (2001) argue that the agency theory is mainly applied by boards of profit-making organizations to align the interests of management with those of shareholders. Through the Agency theory, Corporate Governance practices have over the years advanced to watch the actions of the allegedly self-centered managers [agents] against demoting the principals interest, the Agency problem continues to exist in the State corporations because of the vagueness in who precisely represents the Principal (Mbo, 2017). Agency theory can be used in State corporations to design incentives appropriately by considering what interests motivate the agent to act.

This study was anchored on the above four theories but ultimately settled on two theories: the Solow growth theory and the production theory. The Solow growth model relevance was based on the fact that being an economic model of long-run economic growth, it fairly attempted to explain long-run economic growth by looking at labor and increases in productivity. It is exogenous model of economic growth that analyzes changes in economic output over time the focus of this work. These two theories explained and guided the investigation as interlinked and converging on the main variables of the study. The Solow growth theory for example states that short-term equilibrium results from varying amounts of labor and capital in the production function. The theory outlines the three factors necessary for a growing economy. These are labor, capital, and technology which are also discussed in the production theory, my other theory.

2.3 Link between Maritime Sector and Economic Growth

In the maritime industry different types of economies play a role. According to Wilmsmeier (2014), in business, economies of scale are usually considered in relation to specific areas of the production process, which may be technical, managerial, marketing, finance, and risk. Two types of economies of scale can be identified directly related to shipping. External economies of scale, where the unit cost depends on the size of the shipping company (or the trade volumes), and internal economies of scales where the unit costs depend on the size of the individual transporting unit (ship, container, port, shipment). In both cases economies of scale occur when long-run average production costs decrease as output increases. The high capital costs of ships are spread across a greater number of units (container) as more containers can be transported. If output increased by a factor of two, for example, the cost of production would increase by less than a factor of two. A further possible source lies in the

domestic trade infrastructure built up by each country. Ports (and the internal road or rail system necessary to reach them) tend to be large lumpy investments. If the fixed costs are large enough, increased trade scale will benefit the investing country directly and perhaps some of its trade partners, through lowered shipping costs. Finally, scale economies may also operate at the level of the country pair and the trade route. The capacity of a modern ocean-going liner vessel is large relative to the quantities shipped by most exporters. Thus, economies of scale may derive for shippers based on their volume of shipment.

Port container throughput has been considered as an appropriate variable to measure economies of scale and port production (Wang, Cullinane and Song 2005). Economies of scale are also presented at port level. Larger volumes of containerized cargo loaded and unloaded at a port will enable the shipping lines to use larger container ships, as well as permitting the terminal operator to optimize the use of terminal equipment, infrastructure and stevedoring shifts. A more effective terminal can be expected to induce lower unit transport costs (Wilmsmeier, 2016).

According to Haralambides (2019), Economies of Scale refer to a situation where unit costs (i.e. cost/dwt or cost/slot), in other words the costs relevant to pricing and competitiveness, decline as ship size increases. This decline is more pronounced in the case of shipbuilding costs, manning costs and fuel costs. Simply put, you don't need twice the amount of steel to build a ship twice the size, nor twice the crew to sail it, or fuel to move it.

Thirty years ago, the largest containership would just pass through the Miraflores locks of the Panama Canal, having a size of roughly 4,500 TEU (known as a

Panamax-size ship). Today, the size of the largest containership is five times that big, i.e. about 22,000 TEU.

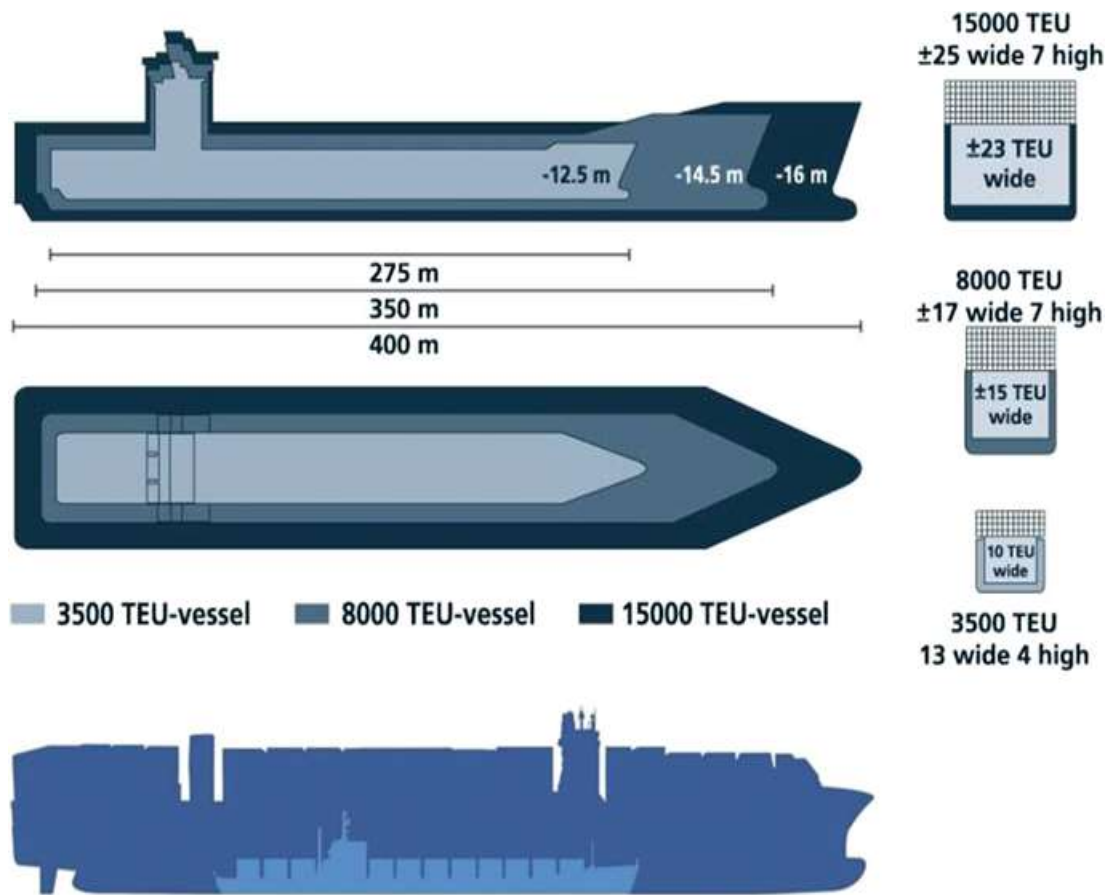


Figure 2.3: Economies of scale in Shipbuilding

Author; Haralambides (2019)

2.3.1 Ports

In our globalised world, firms look to expand their businesses abroad through export strategies. As a result, a country's GDP is substantially affected by the ability of companies to export their goods and services globally. Convenient, efficient ports have the potential to significantly increase economic growth and success of nations (Sleeper, 2012). Maritime transport has historically underpinned international trade and contributed to global economic growth. Waterborne transport is facilitated by

ports, which provide a fundamental role in linking navigable water and surface transport. As is the case for most transport services, demand for port services is a derived demand that depends ultimately on the demand for freight at a destination and the demand for travel by passengers. Ports are therefore only one component in a chain of services that deliver the outcome of the movement of people and goods (OECD, 2011).

As a result of intense competition in the port industry, the container shipping industry has changed significantly. Major shipping conglomerates have attempted to globalize their services through joint ventures, mergers, etc., facing slimmer profit margins. Concurrent with this movement has been an increase in deployment of larger vessels in order to enhance cost efficiencies through economies of scale. Ports continue to play an important role in the economic status of a country, and their effectiveness can lead to significant economic benefits or failures. Additionally, any country that wishes to increase its global economic footprint faces the challenge of constructing large, efficient ports for export purposes (Dwarakish and Salim, 2015).

No marine cargo management system can operate without considering the port, its structure and its purpose. Ports have developed according to the needs of the economic community, as well as the nature of the shipping business, and to this extent, there is no such object as a typical port. Each port is developed according to the trade needs of the region and the types of vessel it is designed to accommodate, as the port is the interface between land and sea (Rowbowtham, 2014). Port structure has changed over the decades, with the original docks and basins having been abandoned in favour of long, riverside terminals with space for several large container vessels, as well as distant jetties and terminals for the purpose of accommodating bulk carriers or

tankers, each terminal with its own dedicated equipment purpose-designed for the loading and unloading of such cargoes.

Ports are complex organizations where multiple services are provided by a large variety of agents, hence their complexity in production, market structure and demand. Dwarakish and Salim (2015) postulates that Ports continue to play an important role in the economic status of a country, and their effectiveness can lead to significant economic benefits or failures. Additionally, any country that wishes to increase its global economic footprint faces the challenge of constructing large, efficient ports for export purposes as exports have a profound effect on a country's GDP. Port efficiency, which ultimately affects total exports, is important when attempting to increase GDP thus Countries with more efficient and/or numerous ports also tend to have higher overall GDP.

Ports worldwide handle over 80 percent of global merchandise trade in volume and more than two thirds of its value. As key nodes in global transport chains that provide access to markets, support supply chains and link consumers and producers, ports are under constant pressure to adapt to changes in the economic, institutional, regulatory and operating landscape (UNCTAD, 2017). The importance of well-functioning seaports for industrial activity, merchandise trade, globalized production processes and economic growth cannot be overemphasized. The demand for port services is thus a derived demand, in that it depends on the demand for transport as a whole.

According to Stopford, (2011) Ports and terminals earn income by charging ships for the use of their facilities. Leaving aside competitive factors, port charges must cover unit costs, and these have a fixed and variable element. The shipowner may be charged in two ways, an 'all-in' rate where, apart from some minor ancillary services,

everything is included; or an ‘add-on’ rate where the ship-owner pays a basic charge to which extras are added for the various services used by the ship during its visit to the port.

Ports like shipping are complimentary to each other are the mother of seaborne trade. The growth and economic prosperity of many cities of the world are courtesy of shipping and ports. These include most of the prosperous regions of the world, from Lebanon, Greece, Italy (Rome), Spain, The Netherlands, North America, Japan and Korea. The most remarkable insight is that, even a country like Lebanon, with a poor arid hinterland, could prosper due to the sea trade (Chai, 2005). Perhaps, the significance of a seaport and shipping to economic development will be appreciated if the need for trade is understood. The importance of seaports and shipping in this scheme of things is the ability of shipping to provide cheap and fast transport of the goods produced and exchanged, and seaports to facilitate that transfer of the goods from sea to land. Seaports and Shipping acts as catalyst of economic development.

Global port operations and cargo management grew rapidly in 2017, following two years of weak output. In 2017, the top 20 global ports managed 9.3 billion tons, rising from 8.9 billion tons of 2016 (UNCTAD, 2018). 752.2 million TEUs were transited at container docks globally in 2017. Contingent on continued friendly trends in the global growth, UNCTAD projects a 3.8 percent compound yearly rise from 2018-2023(UNCTAD, 2018).

Khandelwal, (2000) and Chee (2016) argue that Shipping Lines alliances and vessel expansion have made the link of container shipping channels and docks more intricate and have generated new mechanisms where channels have much room and impact. Vessel size raises and the rise of mega networks have strengthened the need for docks

to adjust. While liner shipping setups seem to have reaped from efficiency accruing from consolidation and alliance restructuring, the outcomes for ports have not changed at the same stride. This is further convoluted by the shipping lines tending to be involved in dock operations, which could restructure approaches to terminal concessions.

Global seaborne trade volumes reached 10.7 billion tons in 2017 with the top 20 global ports handling 9.3 billion tons, up from 8.9 billion tons in 2016. However, Magala and Sammons, (2008), argue that Ports can no longer expect to attract cargo simply because they are natural gateways to rich hinterlands. Major Port clients are now likely to choose ports not simply on their efficiency and location advantages but rather on the quality and reliability of the entire supply chain. The successful functioning of ports is indistinguishable from the successful functioning of the entire supply chain. For shippers, port choice becomes more a function of the overall network performance and ports are chosen on the basis of faster, better and more cost-effective access to the markets in which shippers compete for profit (Mugambi and Kotut, 2012). For ports to be successful they have to think along with the customer, and figure out what his needs are, not only in the port but throughout the supply chains and networks.

With the exception of Durban, cargo dwell times—the amount of time cargo spends in the port—average about 20 days in African ports, compared with 3 to 4 days in most other international ports. Yet neither of the solutions seems to be working. Adding additional berths has not brought down the dwell times. Except for Durban and Mombasa, all major ports are already run by private container terminal operators. UNCTAD has developed a set of indicators for assessing port performance, which are

broadly designated into financial and operational performance categories. The financial performance category relates to the costs and revenue of port operations, wherein a port is considered to be efficient and competitive if revenue outweighs the costs. Operational performance category, which is of more central and direct concern to the port management, and of great interest to port clients, includes key indicators such as vessel arrival rates, waiting and turnaround time, and berth occupancy and cargo dwell time. These indicators are developed to represent operational performance, which could then be measured and compared against industry standards or benchmarks (World Bank, 2012 & UNCTAD, 2018).

According to Wilmsmeier (2016), Ports can be categorized as: a) a service port, if the port authority is responsible for the provision of all port facilities and services; b) a tool port if the public port authority provides the infrastructure and superstructure, while the provision of services is licensed to private operators; c) a landlord port, in which the domain of the port authority is restricted to the provision of the infrastructure, while investment in the superstructures and port operation is the responsibility of licensed private companies; and d) a private port if the provision of all of the facilities and services is left to the private sector. The public sector has been an important port organizer in the past, but private participation in port operations and infrastructure could make ports significantly more competitive. What is clear, however, is that there is a clear measurable impact on international maritime transport costs. Increases in port infrastructure and private sector participation, too, lead to reduced maritime transport costs. Inter-port connectivity also reduces transport costs, most likely because it allows for economies of scale, and also more competition among carriers. The elasticity for port efficiency is higher than the elasticity for distance; in fact, it is the highest of all the variables included in their research. Unlike

distance, port efficiency can be influenced by policy makers. Doubling port efficiency at both ends has the same effect on international maritime transport costs as would a 'move' of the two ports 50 % closer to each other, i.e. reducing the distance between them by half.

Magala and Sammons (2008) argue that port choice is to be considered as a by-product of a choice of a logistics pathway. Port choice becomes more a function of the overall network cost and performance. Shippers make decisions about which ports to use on the basis of factors such as efficiency, proximity, service and reliability: 'customers want speedy access to ports, to deliver goods just in time'. Good inland transport links and proximity to major conurbations and distribution centers are further reasons to use specific ports. The cause for concern depends upon both the likelihood and potential impact of severe disruption to ports.

It is importance to analyse efficiency in three key dimensions that might affect the pricing of ports and in return international maritime transport costs: Allocative efficiency (relative input usage), may be affected because the goals of the governing entity (authorities or cities) may not coincide with economic efficiency. In the port context, inefficiencies arise because inputs are used out of proportion to their relative costs. Technical efficiency (overall cost minimization), concerns arise because the governing entity may not minimize costs given output. The rate of technical change or cost of innovation concerns arise because the form of governance may affect the rapidity with which ports respond to changing conditions in the shipping industry. Wang et al. (2005, p. 7) compare technical and allocative efficiency at it reveals the relationship between productivity growth and technical change. While allocative efficiency might be relatively high, as it maximizes the use of existing infra- and

superstructures, the rate of technical change in the region is slow and has resulted in the prevalent technological gap in ports (see Wilmsmeier et al. 2013).

Song and Panayides, (2015) argue that Port efficiency is a measure for the quality of transport infrastructure. Customs environment measures direct customs-related costs and transparency of customs as well. Regulatory environment measures a country's approach to regulation and the service sector infrastructure measures the level of national business service level. Their operations are globally inter-connected with each other and the activities of one may inevitably affect the activities and performance of another; as a result, this may have an impact on the performance of an entire logistics system and supply chain. For example, unforeseen delays in loading cargoes in Busan Port – cargoes which are supposed to be moved to Sydney Port – may cause unavoidable delays in shipping and freight forwarding operations, which in turn results in the decline in performance of the entire logistics flows by delaying delivery of the product to the final customer.

Infrastructure gaps as well as high transport costs are critical factors hindering growth and poverty reduction in Sub-Saharan Africa. Although an efficient and low-cost transport system will not guarantee export success, it is a prerequisite for African countries to become competitive in the global market (World Bank, 2012).

According to UUNCTAD (2015), Port infrastructure endowment can be described by variables such as: number of cranes, maximum draught and storage area at origin and destination ports. The interaction of these variables is decisive. By way of example a post Panamax gantry crane will not contribute fully to efficiency if the port access channel is too shallow for port Panamax ships. The interaction of these variables is decisive. Installing ship-to-shore gantries, for example, may well lead to higher port

charges to the shipping line. The line may still achieve an overall saving, because its ships spend less time in the port, or because it can change from geared to gearless vessels. This, in turn, will also lead to lower freight rates. However, a Post-Panamax gantry crane will not contribute fully to efficiency if the port access channel is too shallow for Post-Panamax ships. Better port infrastructure may improve efficiency, but this may be at a cost, i.e. it might actually increase port charges and consequently also the overall transport costs.

Port infrastructure endowment is one important part that contributes to port productivity and major works have investigated issues such as optimal berth length and utilization of quay cranes. However, it should be kept in mind that development of port infrastructure is only worthwhile if the entire transport system benefits and not if only bottlenecks are shifted to another element within the system. Factors influencing productivity are physical, institutional, and organizational. Physical limiting factors include the area, shape and layout of the terminal, the amount and type of equipment available, and the type and characteristics of the vessels using the terminal. Lack of cranes, insufficient land, odd-shaped container yards, inadequate berthage, inadequate gate facilities, and difficult road access are all physical limiting factors. Productivity must be considered in a system perspective for it to be of maximum value to industry (Wilmsmeier, 2016).

According to Tovar, Trujillo and Diaz (2007), cargo handling requires special attention as it accounts for more than 80 % of the bill of a vessel that arrives at a port for loading and/or unloading. This has made shipping lines to evaluate the attractiveness of the ports on the time taken to offload/load their ships, as this affects their costs, revenue base and marketing efforts. It has hence become very important

for ports to invest in better equipment and employ sophisticated management to improve performance. These translate to Microeconomic factors of production of capital and labor, hence the use of productivity as a performance measurement.

The optimal utilization of the port terminal is difficult to deal with in situations where port is full to capacity at the peak period. Cargo delays adversely affects all operators namely the carriers, terminal operators and road haulers. Northern European ports within the range of Le Havre and Hamburg serve important and growing hinterlands. They have efficiently capitalized on economies of scale and compete in southern European hinterland ports (for example, Italy, France). Some Mediterranean ports have emerged as intermediary transshipment hubs that connect other continents with northern European ports (Notteboom, 2010).

Results of the various reports from ports around the world clearly put forth the idea that ports are a vital part of a country's economy. The growth of ports will unerringly boost the country's economy. The growth and development of ports leads to greater trade activity, increased supply, greater foreign reserves and reduced prices for commodities as a whole. Improvement in the port infrastructure has shown very good reflections in the GDP (Dwarakish and Salim, 2015).

Port labour is arranged in well-defined tasks and systems. Port labour system refers to the way labour is organized in the port to achieve goals such as cargo loading and off-loading. It determines practical arrangement on the work floor, labour pools and qualifications required for such work. Port labour systems are necessitated by a need for improvement in performance. This is more conceptual and may be tailored to realize competitiveness of a dock and its related firms as exemplified in Australia and Taiwan (Chu, 2007). The labour system is to further improve labour productivity over

the period they have undergone several reforms. The key issues that could possibly often appear in port labour system relate to the definition of dock work, the legal status of the dockworker, the functioning of labour pools, practical arrangements at the work floor and the categorization and qualification of dock workers.

The principal areas of interest for port labour include but are not limited to: Stable and fulfilling employment; Reasonable incomes; Decent working conditions; Social security and pension provision; Education and vocational training; Health; safety; and the environment; Workplace democracy; Freedom from discrimination on the basis of race, religion, social status, or gender; Freedom from corruption and coercion. The success of any enterprise-the port being no exception- is hugely reliant on its human resource or human capital despite the growing application of technology. However, human resource particularly port labour is also known to be the most difficult resource to manage especially in enterprises where constant work is not guaranteed as used to be the case in the port sector. It is now possible to fairly estimate the arrival of ships, but technological advancement requires that the labour force is also highly skilled (Aryee, 2012). The flexibility, productivity, quality and cost efficiency of dock workers contribute to the competitiveness of port-related and logistics companies and the wider economy (Notteboom, 2010).

2.3.2 Shipping

The state of the world Shipping fleet according to ship type, indicates the bulkers as leading with 44 percent followed by the tanker fleet (oil, chemicals, liquefied gas) with 35.4%, containers with 13.5 percent general cargo fleet (conventional, special, car transport, frigo, RORO) with 6.7 percent and passenger ships (passenger and

cruise ships and RO/passenger) with 0.4 percent (Factors influencing the formation of freight rates on maritime shipping markets (Jugović, Komadina & Hadžić1, 2015).

According to Song and Panayides (2012), Liner shipping involves Ships carrying passengers and cargo on a route with a fixed schedule. Its major advantage is the regularity and organization at a wide range of ports regardless of the existence of cargoes. Liner shipping is used for general cargo on fixed trade routes and on a fixed timetable. UNCTAD noted that access to high-frequency, reliable and low-cost liner shipping services largely determines a country's connectivity to overseas markets and thus its competitiveness globally. The development of liner shipping networks is primarily driven by the demand for containerized transport. Similar to other markets, dynamic changes in supply and demand in the shipping market can pose a variety of problems. For example, when transport capacity exceeds trade needs, the freight rate will decline; stakeholders must respond quickly to reduce losses, and they may reduce the number of fleet in operation by laying up vessels, reducing new orders or scrapping old ships (Fan *et al.*, 2018).

The routing of containerized trade flows depends on the strategies of shipping companies and the demand of the shippers for specific service characteristics. As such, the location of a port or a region within the global liner shipping network is determined by the density of trade flows to and from a specific port or region. Shipping lines will determine their calling patterns and services structures in a region based on trade and port specific characteristics. The determinants considered are the number and dispersion of origins and final destinations, the density of cargo flows to and from these inland destinations and the existence of trade imbalances. Based on these determinants, the service frequency (including the fixed days/ hours of the week

for departure/arrival), loading capacity of the transport equipment used, number of port calls per roundtrip and stops at intermediate terminals will all be determined. Different types of complex bundling networks (i.e. line-bundling, hub-and-spoke, triangular, pendulum and butterfly) are used as an alternative to direct point-to-point container services. The advantages of complex bundling are higher load factors and/or the use of larger vessels in terms of TEU capacity and/or higher frequencies and/or more destinations served (Wilmsmeier, 2016).

International trade is made up of commercial transactions between buyers and sellers. The commercial transaction determines the specification of the goods, the price and the number of goods. The transaction usually also contains Maritime Transport and Logistics as an arrangement of who takes responsibility of the shipment of the goods. For this purpose, the International Chamber of Commerce has established some standard trade terms that divide the responsibilities of transportation, ownership and insurance between buyer and seller.

Container shipping lines operated in an increasingly competitive and market-driven environment caused by global tendencies of market concentration in the maritime industry. Therefore, besides lowering shipping costs, container carriers enhance services to increase quality. Such factors for service enhancement include high sailing frequencies, reduction of shipping time, and a high level of reliability. This aims to satisfy shippers' interests in the minimization of shipping and inventory costs and high reliability.

Due to the growth in demand for shipping transportation after the financial crisis in 2008, a lot of vessels have been built and delivered to the market leading to oversupply because of the abrupt decrease in transportation demand. Along with the

significant increase in world trade, shipping capacity has grown rapidly. The global shipping fleet increased by 71 percent in million deadweight tons from 2007 to 2016, in spite of the 2008 financial crisis (Fan *et al.*, 2018).

Supply of shipping capacity is a function of the overall volume of trade, thus, only if certain levels of trade volumes are reached, technological economies of scale can be reached and makes the use of bigger ships economically sensible. Further, any transport entity, whether ship, train or truck only operates economically efficiently if a certain level of capacity utilization is used otherwise diseconomies of scale might result in higher transport costs. Further, from a logistics point of view smaller entities might not allow for significant economies of scale, but for higher levels of service frequency, which might be as or even more relevant in terms of market access, especially when thinking of trade in perishable food products (Wilmsmeier, 2014).

In an environment where shipping lines are actively seeking out ways to reduce their costs, particularly by aiming for economies of scale and scope, this process results in a continued change in the structure of maritime industry and thus competitive conditions. Economies of scale at vessel level could also apply from technological advancements in the market. Typical port selection criteria relate to: the port's physical and technical infrastructure (e.g. nautical access, terminal infrastructure and equipment, hinterland accessibility profile); geographical location; port efficiency (e.g. port turnaround time, cost efficiency); interconnectivity of the port such as sailing frequency of deep-sea and feeder shipping services; reliability, capacity, frequency and costs of inland transport services; efficiency and costs of port management and administration; availability, quality and costs of logistic value-

added activities; and strategic considerations of the shipping line concerned such as market entry, strategies of alliance structure.

Shipping companies provide global shipping services to meet the demand for sea transport; i.e., the demand for shipping transportation is derived from the world trade. Shipping companies must make ship investment decisions according to the transportation demand. When the world economy is booming, the transportation demand is increasing. If the capacity supply cannot satisfy with the demand, the freight rate will increase. This will motivate the shipping companies to place new orders for new ship investment. Because of the construction lags, when the new buildings are delivered to the market, the market situation may have changed, which determines the new freight level. The uncertain transportation demand plus this shipbuilding lag makes the freight market volatile (Fan et al., 2018).

Analysis of transport costs shows that economies of scale are present in maritime transport (Wilmsmeier 2003, Wilmsmeier 2009). An analysis at shipments level for different product groups and modes illustrates that the greatest economies of scales are realized in transport products that are usually transported in bulk ships (Wilmsmeier, 2014). The pricing behaviour of shipping conferences has been investigated by Bryan (1974). Private practices exercise a significant influence on maritime transport prices. They observe the impact of price fixing agreements and show that these are more decisive than co-operative working agreements.

Customs authorities tend to use ship manifest data for their initial risk assessment. Countries differ in the time at which they require this information to be submitted. The United States and Europe require this type of data to be submitted before departure from the origin country, and in Europe more or less the same data needs to

be submitted again a few days before arrival in the port of destination. Other countries receive this data shortly before arrival of the ship or use it to verify imports and exports after loading and unloading has taken place. This formal obligation means that shipping lines and their agents have had to set up a process to gather this data at the right time from their clients or the clients' agents. To indicate that this imposes costs on the logistics chain, shipping lines charge US\$ 25 for submitting pre-departure declarations to European customs authorities in destination countries for every container.

Another potential bottleneck is the different ways in which shipping companies facilitate their agents in different countries. In some countries, the information exchange between customers' agents and the shipping lines' agents is fully digitized, while in some countries, the information exchange is still with paper documents. The latter is not only a problem for that country, but also for all the other countries to which the ships are sailing to unload cargo. All errors and other problems related to paper-based information exchange are transferred to these destination countries as well.

Many shipping companies in Africa today don't own ships thus depend on vessel charter to move their allocated cargoes. For instance, of the 6,081 ships that called to Nigerian Ports between 1977/78 and 1979/80 only 10% was local and this carried only 11% of the total freight revenues. Of the Naira 1.66 billion paid by Nigeria per year from 1971 to 1991, National Carriers earned only N240m representing a meagre 14.4% of the total earnings from maritime services (Nze & Okeudo, 2019). In Nigeria, of the 2,739 ships that entered the country in 1985 less than 10% were national carries.

Regarding Kenya, Shipping business is not well developed. The government is making major inroads into the revival of the Kenya National Shipping Line which will generate jobs, cut on the high import bill and see the country gain access to more ports across the world (Igadwah, 2019). This comes as the quest to tap into the little exploited blue economy. Mismanagement sent the Kenya National Shipping Line, which was established in 1987, into debt and loss of business in an untapped Sh304 billion business potential that is the amount Kenyan importers pay as freight charges to foreign firms. In 2017, the country's annual demurrage on national oil imports averaged \$23 million (Sh2.3 billion). This is a charge payable to the owner of a chartered ship on failure to load or discharge the ship within the agreed time (Mwita & Otieno, 2019).

There was initially the East African National Shipping Line which dates back to 1966, when Kenya, Tanzania, Uganda and Zambia jointly formed the entity, which, at its highest throughput, held a market share of approximately 11 percent. It was however dissolved in 1980. The revival of the Kenya National Shipping Line will enable Kenya to benefit from the regional and global maritime transport value chain. Taking part in its own maritime transport services will enhance the contribution of the sector to the national economy and, make the cost of goods more competitive.

KNSL was established as a national carrier to handle containerised exports and imports freight cargo, to and from the ports of Kenya, a key institution noting that about 90 % of Kenya's foreign trade is dependent on maritime transport. Revival of the national entity will boost the country's quest to own and operate its own vessel in future. It will create immense employment and training opportunities for Kenyans, as it holds the potential to create about 3,000 jobs in its first year of operation with about

10,000 jobs being created in the medium term. By doing this Kenya will join the likes of Ethiopia whose shipping line earns the country over \$40 million (Sh4 billion) annually from its fleet of 18 commercial ships.

According to Tubei (2019), Kenya is losing about Sh100 billion yearly in freight charges for imported cargo, which is paid to foreign shipping lines docking at the Port of Mombasa. In 2018, the port made handled 1.3 million containers leading to a freight payment of Sh78 billion. Each of the standard containers is paid a minimum freight rate of \$500 (Sh50, 000). Also every year, the port receives about 130,000 units of second-hand vehicles which attract freight charges of Sh10.4 billion, all of which is repatriated back to foreign countries where the shipping lines ferrying them are registered. The reason Kenyan is not getting a share of this huge amount of cash is because the country does not have a national shipping carrier that would enable it to benefit from the charges levied on imported cargo. Such a local carrier will be to shipping what Kenya Airways is to the aviation industry. To address this situation, cargo importers and other players are calling on the Kenyan government to introduce the Cabotage law to save them from paying billions to foreign firms. Cabotage laws apply to merchant ships in most countries that have a coastline, to protect the domestic shipping industry from foreign competition, preserve domestically owned shipping infrastructure for national security purposes, and ensure safety in congested territorial waters.

A national shipping carrier will be instrumental in reducing the cost of goods. This is because cheaper freight rates will end up reducing the cost of imported goods and it will in time reduce the cost of doing business. The shipping line will provide stiff competition for foreign vessels, pushing them to lower their freight charges.

Competition by a national carrier will compel the foreign vessels to bring the rates down.

Locally owned national shipping carrier with a well-funded government programme will save Kenyan importers billions. It must have several vessels to fulfil the demand of the imports and exports in the country.

To protect its waters the Government created the Kenya Coast Guard Service launched in 2019, tasked with securing Kenya's territorial waters and protect the country from threats emanating from the sea. The KCGS will safeguard the country from Illegal, Unreported and Unregulated Fishing by foreign trawlers, smuggling of contrabands, trafficking, and degradation of the marine ecosystem among other threats.

2.4 Types of Cargo

The shipping industry can be classified according to the types of cargo transported. It needs to be mentioned here that it is necessary to differentiate between bulk, RoRo and container shipping markets, particularly because each one operates under different market conditions and within different frameworks (Wilmsmeier, 2014). There are four broad categories under which cargo is grouped. These are: containerized cargo, conventional cargo, dry bulk cargo and liquid bulk cargo. These four categories of cargo have given rise to the evolution of four types of carrier ships respectively known as containerized carriers, conventional cargo carriers, dry bulk carriers and liquid bulk carriers.

2.4.1 Containerized Cargo

Containers can be used for most cargoes that are not in bulk form, although certain semi-bulk cargoes such as timber and chemicals can be transported by container, with

liquids and hazardous or dangerous goods transported in dedicated containers solely used for that purpose. Containers are carried by dedicated container ships, although containers can also be loaded aboard general cargo vessels and even Ro-Ro vessels where required. They are classified in two forms – the 20' container (1 TEU) and the 40' container (2 TEU), and are designed in such a way as to be carried on a road-based container chassis and on a container vessel, either stacked above deck or slotted into cells below deck (Rowbowtham, 2014).

Embarking on a modern intermodal transport system needed transport devices which followed international standards. Although various transport devices were already developed like transport containers and trailers, the pioneer who introduced the container connected with today's internationally standardized containers was Malcolm McLean, who was president of a trucking company. Containerization has produced standard units in terms of size, nevertheless the requirements for transporting goods vary and thus different types of containers exist to satisfy these demands. Transport of refrigerated cargo has certain implications. The capacity to transport refrigerated or temperature-controlled cargo depends on the number of plugs available on board a ship. Further, temperature-controlled cargoes need a higher level of supervision on the journey, because a failure would result in the loss of the cargo. The dimensions of containers generally used today are the 8 ft width by 8 ft height by 8.5/20/40 ft length container.

The most important benefit of containerization is in the reduction of terminal costs. Machine loading and unloading by gantry crane and straddle carrier has become possible by standardizing the size of the container. Manpower was greatly reduced and loading, and unloading was converted from a labour-intensive industry to a

capital-intensive industry. Therefore, dockworkers were deeply affected by unemployment. The cellular structure of container ship has been designed to accommodate and load/unload the containers. It takes about one day to complete loading and unloading with the gantry crane, compared to about one week in a traditional cargo vessel. Economies of scale have dictated an upward trend in sizes of container ships. Containerships have the lowest turnaround times. In 2018, a given ship spent a median of 23.5 hours in ports, i.e. 0.97 days. Dry bulk carriers spent typically 2.05 days during a port call, while container ships spent on average the least amount of time (0.7 days) (UNCTAD, 2019). With containerized shipping, maritime transport has changed profoundly. Among other things, it has shifted from labor-intensive to more capital-intensive activities, including larger specialized ships that require substantial investments in port infrastructure and equipment. Integrated transport chains have reduced transport costs so much that a shipper may find a distant port cheaper than a closer one. Modern ports must be competitive on times and prices for their services. Seaports must be integrated within logistical chains to serve their many functions. An efficient seaport requires infrastructure, superstructure, equipment, adequate connections to other modes of transport, a well-motivated management, and qualified employees (Trujillo, 2015).

Containerisation has brought a complexity of issues concerning cargo movement and management. It has brought significant advantages, such as: a door-to-door service from the factory production location to the distributor's warehouse; full unit loads (FCLs) or consolidated groupage loads (LCLs); a reduction in intermediate handling at terminal trans-shipment points, namely rail/road depots or seaports; reduced risk of cargo damage and pilferage; less packing requirements; more efficient use of maritime container vessels; faster transit time; simplified documentation; simplified

INCOTERMS; the provision of through door-to-door freight rates, either as a consolidation rate or as a full box rate; reliability of transit and movement; and dedicated port container facilities (Rowbowtham, 2014).

Container shipping lines generally own the containers in which goods are shipped and needs to provide these containers to the shippers who want to ship cargo. This mechanism is fraught with problems. The containers need to be available for the shipper. A shipper does not want to wait too long and wants a container that is suitable for its needs. There are different types of containers: 20-foot containers, 40-foot containers, 40-foot-high cube containers, 45-foot containers, open-top containers, flat beds, foldable containers, refrigerated containers. All these containers conform to the ISO 668 2013 (revised) standard. In addition, commercially, containers may have a five-step scale of cleanliness. The highest level, so-called food grade containers, is the only level that is acceptable for the transportation of food products (Song & Panayides).

Customs authorities consider containers to be packing material that requires, in many countries, some type of temporary import licence. This licence may restrict the time the empty containers can stay in a country. If the container stay too long, VAT and other levies may become payable. After delivering a container to a destination country, the shipping line would like to return a container as quickly as possible to a paying customer. For this purpose, the shipping lines all charge fees if the receiver of goods takes too long to pick up the full container or deliver the empty container back. The first fee is called demurrage (not to be confused with demurrage in bulk shipping), and the second fee is called detention. These two fees are in the range of a few euros per day to as much as 75 euros per day, chargeable after a so-

called free period of several days. Of course, the fees and free days are negotiable, so no shipping line's customer will pay the same as another customer. How the demurrage and detention fees are established will depend on the party who books the transport, and their negotiating power. For transport, this can be either the buyer or the seller.

Because of the need to keep track of containers in countries, formal obligations to report unloaded containers to customs authorities in the destination countries, and the need to only provide the goods in the container to the rightful owner, the shipping line maintains an administrative process in ports in which some fees need to be paid, information for the party who will pick up the container is exchanged, and the empty depot in which the container needs to be returned is recorded. The buyer's agent needs to track a terminal's website to find the unloading confirmation of the container, and then verify all relevant information, take care of payments, and book transport. The degree to which this process is supported with IT – usually a port community system – differs strongly from port to port and from shipping line to shipping line.

Demand for containerized transport also affects the development of liner shipping networks. The routing of containerized trade flows depends on the strategies of shipping companies and demand of shippers for specific service characteristics. As such, the location of a port or a region within the global liner shipping network is determined by the density of trade flows to and from a specific port or region (Song & Panayides).

Wilmsmeier (2014) posits that the container rate structure falls into two divisions. In general container rates are negotiated between the shipper and the shipping line and

reflect the trade, type of container, origin and destination, nature of cargo and potential volume discounts to shippers. A number of additional charges (Stopford 2009) might also apply CAF, BAF, port congestion charges, THC, terminal security charges (ISPS related) etc (for details see Stopford 2009; Branch 2008, p. 189). These charges are referred to as FCL. In the case where cargo from various shippers is consolidated in one container, usually negotiated through an agent, these rates are referred to as LCL.

Container ports serve as important nodes in facilitating the efficient flow of containerized cargoes. Specifically, they provide the primary interface for demand and supply forces to interact, and function as important marketplaces where the physical exchange between buyers and sellers of containerized shipping capacity can be consolidated and realized. The container port can be further distinguished by its function, which consists of serving primarily as a gateway port that acts as an interface between hinterland and deep-sea routings of containerized cargoes, or of serving primarily as a transshipment port that acts as an interface for interchange between deep-sea routings of containerized cargoes (Notteboom & Yap, 2012).

2.4.2 Conventional Cargo

In shipping, Conventional cargo or break bulk cargo or general cargo are goods that must be loaded individually, and not in intermodal containers nor in bulk as with oil or grain. Break bulk cargo is transported in bags, boxes, crates, drums, or barrels. Ships that carry this sort of cargo are called general cargo ships. General cargo vessels carry packaged items like chemicals, foods, furniture, machinery, motor- and military vehicles, footwear and garments. These ships have their own built-in cranes for loading and unloading operations at ports. The term break bulk derives from the

phrase breaking bulk—the extraction of a portion of the cargo of a ship or the beginning of the unloading process from the ship's holds. These goods may not be in shipping containers. Break bulk cargo is transported in bags, boxes, crates, drums, or barrels. Unit loads of items secured to a pallet or skid are also used.

A general or conventional cargo ship is extremely adaptable and can be used to transport virtually every form of dry non-bulk cargo, from railway lines to agricultural machinery. A distinct feature of general cargo ships is that they normally have their own gear, which means that these versatile ships can trade to smaller ports and terminals that do not have shore-side loading and unloading equipment. And while these ships are often employed with abnormal loads that other ships could not accommodate, in lean times general cargo ships can easily turn their hand to carrying containers, bulk or bagged cargo.

Although largely replaced by bulk and container carriers, general cargo vessels still operate throughout the world. Cargo is usually in the form of pallets or bags and is known as break-bulk. There may be specialised handling facilities for such cargo, but usually loading and unloading is carried out using cranes and straps (for boxes) or slings (for bags). Loose or irregular cargo is also carried, in this case the vessel's crew and port stevedores will pack the cargo to minimise damage and maximise the utilisation of space.

The Port of Mombasa handles the following conventional cargo; Bagged cargo like Fertilizer and Grain Break bulk like Steel Billets, Reinforcement Bars, Coils, Beams, Tin Plates Project Cargoes like Ferries, Rail, Transformers, Generator sets, various kind of equipment and general Cargoes assorted.

2.4.3 Dry Bulk Cargo

The globalization of economic activities has led to a profound mutation in the dry bulk trade. The long-haul trade of raw materials in support of East Asia's economic growth has created a demand for tonnage additions in the world bulk carrier fleet with new buildings entering the fleet being large units with an average size of 66,500(Song & Panayides). From grains to coal and from sugar to cocoa, dry bulk cargoes cover a range of produce and raw materials that have two features in common: they are unpacked and are homogeneous. These two properties make it easier for dry bulk cargoes to be dropped or poured into the hold of a bulk carrier.

Dry bulk trade underpinned by marine output is a key element in the supply chain for metallurgical producers, steel plants, aluminum industries and agro-food businesses. The understanding of dry bulk logistics is underpinned by key salient features. Bulk commodities have a low value/weight (or volume) ratio implying that the efficiency of land and marine transport has an impact on value added.

Bulk Grain Handling at the Port of Mombasa is done either through Grain Bulk Handlers Limited (GBHL) via conveyor belt from the Port to silos located outside the Port or Conventional bagging via grabs onto bagging plants alongside ship and onto trucks. The Port has dedicated Berth 3, Berth 9, Mbaraki Wharf, Base Titanium, as specialized terminals for the express handling of Bulk Grains, Bulk Soda Ash, Bulk Clinker, Coal and Titanium respectively (KPA, 2019). The handling conditions of dry bulk materials are influenced by a wide range of factors (size, weight, water content, surface adhesion, ease of flow, extent of compaction). Handling equipment is often custom designed for specific dry bulk commodity. Bulk commodities are often

located far from demand locations. The maritime transport of bulk commodities is inevitable as it offers the lowest cost per ton-mile.

The dry bulk fleet generally falls into three main categories: specialized carriers, combination carriers and all-round bulk carriers (Branch, 2007). Specialized bulk carriers consist of different types of vessels essentially built for special bulk cargo such as gypsum, bauxite/aluminum, potash, Sulphur construction materials, sugar and salt. The combination carriers were designed with separated section holds to take advantage of two-cargo options between voyages such as ore/oil, bulk/ oil, car/bulk or container/bulk. All-round bulk carriers suitable for different bulk products vary in size and facilities. Vessels can be divided in two types: geared and non-geared. Ships with cargo gear are relatively small vessels, dedicated to minor bulk, essentially over short distances. Gearless ships are larger vessels, suited for major cargoes (iron ore and coal) with a view to covering long-distances trades.

The commercial structure of the transport of bulk commodities is varied (Collins, 2001). Some commodities are transported in ships owned by the industrial plant, others by ships on 'time charter' to the industrial plant. In time charter the ship- owner still manages the vessel, but the charterer, often a third-party ship operator, selects the ports and the routes. A third segment of commodities are moved on contract of 'affreightment' or 'trip charter'. The ship owner agrees to carry the charterer's bulk commodity in his vessel or gives to the charterer the use of the cargo-carrying capacity of the ship for the carriage of a given product on a specific voyage or a given period. A fourth group is 'bareboat charter' where shipping companies lease their vessels for long periods.

Suppliers who trade bulk commodities for overseas markets secure terminals where bulk products can be handled and shipped in the consignment sizes required by the customers. This process of distribution involves ports where terminal operators have made important investment in highly mechanized handling facilities. Terminal operators have invested in automated operations embracing computer-controlled conveyor systems with a view to increasing the utilization rate of facilities. Given the magnitude of investments in specialized equipment, the pattern of dry bulk movement reveals a concentration of both origin and destination at specialized ports.

Dry bulk cargo is solid but bulky homogeneous cargo such as grain, cement, iron ore, coal and soda ash. This type of cargo is usually loaded in bulk into a vessel. The dry bulk vessel normally carries a full shipload of a single commodity, from one port to another, without making any stops in intermediate ports on its route. Usually, this cargo comes from a single consignor to a single consignee. The dry bulk vessels are usually chartered through centres such as the Baltic Exchange in London and other exchanges in Tokyo, New York and Hong Kong. Some dry bulk vessels operate on owner carriage basis. This happens mainly with mining companies who use their own ships to transport raw materials from the mining regions to processing areas when the two are located in different parts and long sea transportation is necessary. It is quite common with iron ore and other extractive industries such as rubber, where the raw material is purchased or produced by multinational companies in the developing countries and is sent for processing in the industrialized countries. This is a familiar practice with American Steel and tyre makers and for many European and Japanese companies. When a dry bulk vessel is on a charter it charges its freight for the voyage if it is on voyage charter or charges per period if it is on time charter. Effectively it is the cargo owner who pays for the transport service provided by the vessel. Handling

of dry bulk vessels ranges from the use of highly automated systems such as those used in the grain and ore ports in the U.S.A. to labor, intensive methods as those used for loading and discharging in African and Indian ports.

The Port of Mombasa has dedicated berth 3, berth 9, Mbaraki Wharf, Base Titanium, Shimanzi Oil Terminal, Kipevu Oil Terminal and AGOL as specialized terminals for the express handling of Bulk Grains, Bulk Soda Ash, Bulk Clinker and Coal, and Titanium. Bulk Grain Handling at the Port of Mombasa is done either through; Grain Bulk Handlers Limited via conveyor belt from the Port to silos located outside the Port (KPA bulletin, 2018).

2.4.4 Liquid Bulk Cargo

Liquid bulk cargo is liquid cargo in large quantities which require special types of vessels. Nonedible and dangerous liquids include hazardous chemicals like Petroleum, Gasoline, Liquefied natural gas (LNG) and Liquid nitrogen. Liquid edibles and non-dangerous liquids include cooking oil, Fruit juices and vegetable oils.

The popular bulk liquid cargoes include crude oil, refined petroleum oils, industrial acids, palm oil and liquified gases; These free-flowing liquid cargoes, which also include crude oil, liquefied natural gas and chemicals, are not boxed, bagged or hand stowed. Instead, they are poured into and sucked out of large tank spaces, known as the holds, of a Parcel Tanker. Major types of tank ship include the oil tanker, the chemical tanker, and gas carrier. Tankers also carry commodities such as vegetable oils, molasses and wine. Liquid bulk carriers carry full loads of cargo mainly between two ports without making any calls in intermediate ports on their route. They are also chartered or carry cargo on own carrier basis. The main own carriers are the oil companies. Chartering of bulk liquid carriers is done from the various exchanges just

like in dry bulk cargo carriers. The liquid bulk carriage is dominated by oil tankers owned either by the oil companies or by private chartering groups known as the "independents". The independents make the tankers available for use in carrying oil through voyage or time charters. Liquid bulk cargoes are handled in ports through specialized terminals. The handling is usually highly automated with the liquids being p-umped out or into ships through pipelines to or from their storage areas respectively.

The Port has dedicated Shimanzi Oil Terminal, Kipevu Oil Terminal and AGOL as specialized terminals for the express handling Bulk Liquid & Gas Cargo respectively (KPA, 2019).

2.5 Shipping in Mombasa Port

The port of Mombasa has facilities for handling all the above-mentioned types of cargo. There are sixteen dry general cargo berths, while dry bulk cargoes are handled at the Mbaraki Wharves composed of the cement wharf and two other dry bulk handling wharves. Liquid bulk cargoes are handled through two specialized terminals, one for crude oils and the other for refined oils and other bulk liquids. For the transportation of dry general cargo, Kenya is connected to various trading zones such as Europe, North America, Indian Subcontinent, Far East and Australasia by regular liner services provided by various shipping lines. Most of the trade with South America is conducted by transshipment either through North American or European ports. Dry bulk carriage is irregular in nature and depends on where dry bulk cargoes originate or are consigned to. Most of it is conducted through chartered vessels. The liquid bulk cargoes are dominated by crude oil. Kenya's crude oil originates primarily from the Persian Gulf and is owner' carried by major oil companies or by chartered

vessels for the' smaller ones. Other bulk oils and bulk liquids originate from various sources and are also transported on owner carriage basis or in chartered vessels.

To exploit the country's maritime sector and the global ocean waters, the government has entered into a partnership with global logistics firm, Mediterranean Shipping Company (MSC), to revive the defunct Kenya National Shipping Line. In the latest move, the Kenyan government has also entered into a strategic agreement with MSC to run the second container terminal at the Port of Mombasa. The partnership is expected to facilitate growth of traffic throughput at the container terminal located at the Port of Mombasa to over one million TEUs, create 2,000 seafarer jobs and 1,500 sea-time training opportunities annually. The Mediterranean Shipping Company has also committed to create training opportunities for the youth and to provide about 3,000 jobs per year; and provide 1,500 sea time slots for Kenyan youth.

2.6 Structure and organization of the Maritime Sector

Firms sell goods and services under different market conditions, which is generally referred to as market structures. A market structure describes the key traits of a market, including the number of firms, the similarity of the products they sell, and the ease of entry into and exit from the market. The business sector of an economy is constituted by firms operating in different market structures. The four major market structures are Perfect competition, Monopoly, Monopolistic competition and Oligopoly (Uzonwanne & Ezenekwe, 2018). In the maritime transport, the commodity sold is the transport service. The sellers are the ship-owners, and the buyers are the shippers. The interaction of ship-owners and shippers under various circumstances determines the type of market under which maritime transport services are provided (Maeti, 1985). Under perfect competition it is assumed that there is a

large number of buyers and sellers, products are homogeneous, there is free entry and exit of firms, firms' objective is profit maximization, no government interference, perfect mobility of factors of production and perfect knowledge about the market by all buyers and sellers. Few if any markets for shipping services in the world fulfill all the above conditions simultaneously.

The pricing behaviour of a firm gives an indication on the competitiveness of the market in which it operates. The question to ask is therefore how competitive is, therefore, container shipping as an industry; Have conferences been able to abuse their price setting privilege, discriminate, and charge prices well above costs? Do alliances manage capacity and are their practices compliant with competition law? At first sight the answer should be *no* in both cases (Haralambides, 2019).

On the other hand, given some of the key features of ports, particularly their nature as limited capacity infrastructure, ports appear susceptible to possessing market power. Some may be found to have captive hinterlands, where transport through the port has a lower generalised transport cost than any alternative. Where market power exists, there are typically several competition concerns relating to potential abuses of that power. These abuses can lead to various types of consumer harm, but fundamentally there is a net welfare detriment, which can arise from higher prices, reduced output, reduced service quality, reduced innovation or other factors. Given the scale of port activities, and the scale of the maritime industry more generally, any harm from anti-competitive practices in the industry could have a large impact on end-users and in turn an impact on the wider economy (OECD, 2011).

Figure 2.4 shows that between 1968 to 2003, real tariffs in the Pacific had dropped by 75%. This, therefore, legitimately means that even if liner conferences did have some

monopoly power over their freight rates, they had been quite unsuccessful in exercising it. The counter argument was of course that the decline in rates had been the result of the economies of scale of the larger ships and that, as a result, in the absence of conference-pricing, rates could have declined even more.

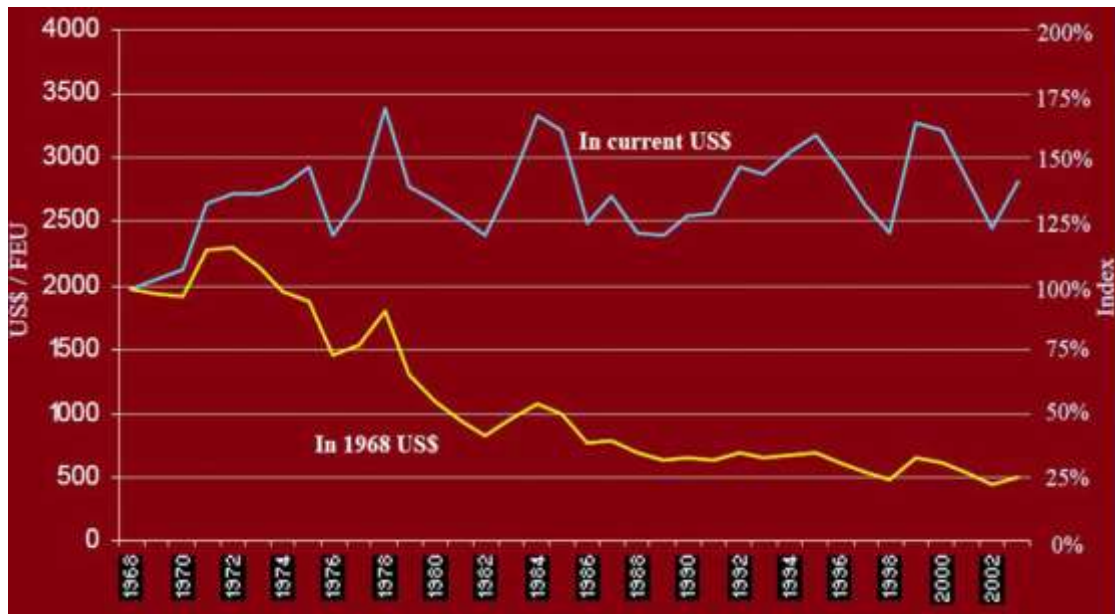


Figure 2.4: Shipping Freight rates

Author: OECD

According to Wilmsmeier, (2014), freight rate setting is subject to a competitive pressure. Sea transport is affected by two types of competition; competition between carriers and competition between substitutes or alternatives for the particular product transported. Since shipping is a facilitator to global trade a ship owner on the one hand faces competition from other carriers on any particular routes and on the other hand also from shipping lines providing services to alternative supply regions of a same commodity. On certain routes there might also be competition from rail, truck or air transport services. However, such competition is highly dependent on the product structure and the related modal affinity of a product, but also on the infrastructure endowment for any particular mode. The non-rigidity of demand for shipping

amenities shifts from one item to another. Under normal market conditions the cost of sea transit in connection to the market charges of goods is decisive.

Under pure monopoly there is a single seller and many buyers with no close substitutes for the commodity and complete barriers to new entry. The biggest hindrance to entry into the shipping sector has been capital, considering this is a capital-intensive area. Marx (1953) observed that in a liner shipping consisted of a pure monopoly condition is rarely found and could be found in relatively unimportant trades or where government restrictions assisted monopoly in avoiding the invigorating breath of some competition. In liner trades except for a few cases were basically oligopolistic structures.

In the dry bulk and liquid bulk trades, Pace (1979), advanced the notion that the market functions under conditions, almost similar to those of perfect competition because information on freight charges is easily available from the agents of the shippers and shipowners.

Shipping alliances have emerged to exploit both Economies of Scale and economies of scope among otherwise competing carriers. Alliances are technical cooperation agreements among carriers that, contrary to conferences, do not engage in price-fixing. Marketing is thus carried out independently and competitively, while carriers cooperate in pooling and sharing resources (ships, equipment, terminals, and networks). In a way, one might say that, under conferences, profit maximization is pursued through price-setting, while, under alliances, the same objective is pursued through better cost control. By pooling and sharing resources, merging their individual service networks and jointly scheduling their fleets on a global scale, alliances reduce redundancies in shipping capacities, increase productivity and lower

unit costs through better capacity utilization. Moreover, in view of the significant capital investments required for ships and equipment, alliances mitigate market risk by being able to better predict and coordinate capacity requirements (Haralambides, 2019).

One of the most notable characteristics of liner shipping is its high fixed costs. For example, in order to keep to its pre-advertised time-schedule, a ship must leave port regardless of whether it is full or not. Her costs thus become fixed, i.e., independent of the amount of cargo carried. The only variable costs in this regard are Terminal Handling Charges. For example, minutes before the ship sets sail, an unexpected customer arrives at the port with one container to ship. If the vessel has spare capacity, which is often the case in liner shipping, since it is a declining costs industry, or an industry of increasing returns to scale (IRS), her operator might be tempted to accept the extra container at a price as low as merely the extra (marginal) cargo handling costs involved in taking the container aboard. However, if this were to become common practice among carriers, competition among them could become destructive competition, pushing prices down to the level of short-run marginal costs. Consequently, liner services would not be sustainable in the long run, as operators would not be able to recover costs in full, most importantly capital costs, such as depreciation allowances, for the eventual replacement of the ship as depicted in figure 2.3.

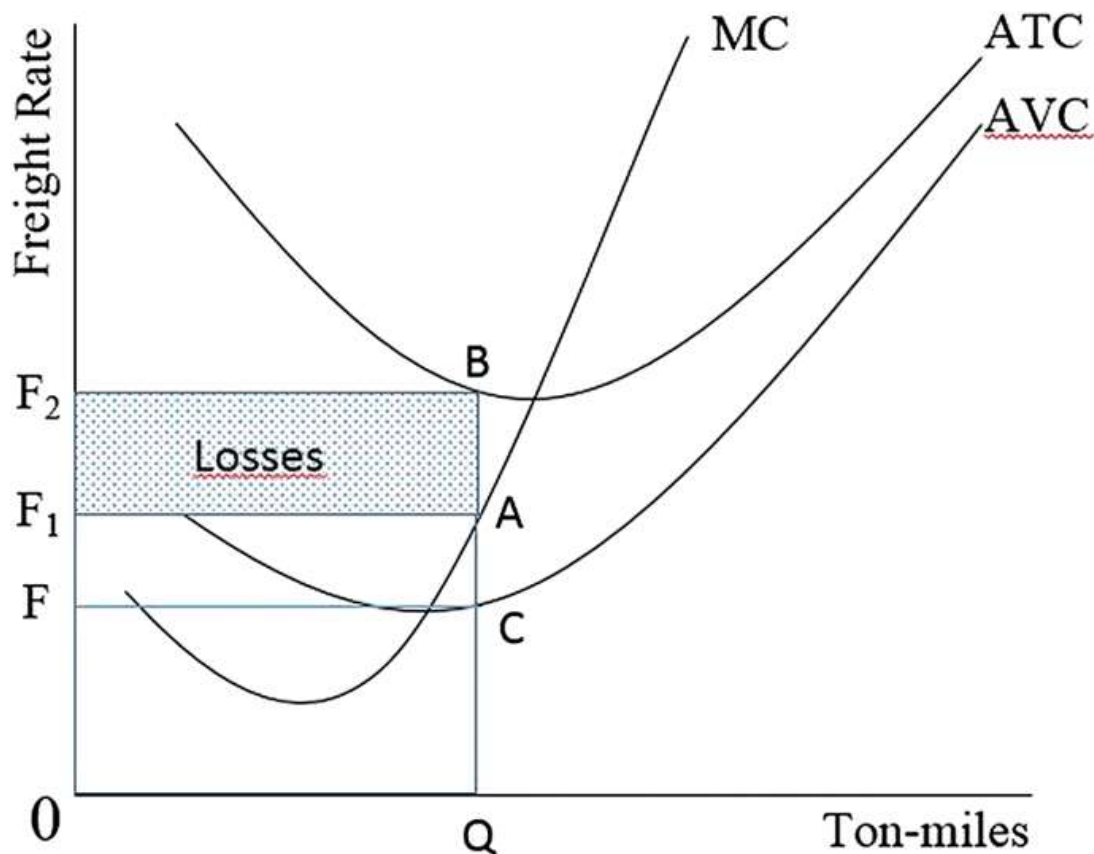


Figure 2.5: Levels of short run costs

Author (2020).

In declining cost industries, marginal costs (MC) are always lower than average total costs (ATC) and, with a production of $0Q$, marginal cost pricing at F_1 would generate losses equal to F_1ABF_2 . At that level of output, the company covers its variable costs ($0QCF$), but only part ($FCAF_1$) of its total fixed costs ($FCBF_2$).

The dry general cargo carriage is dominated by liner shipping where shipping alliances play a very large part. However, global shipping alliances have proven to be unstable coalitions, being in constant reshuffling for years. This fact alone does not entice individual carriers to undertake the required long-term commitments, something that defeats the very same rationale of alliances. Mergers and acquisitions are thus becoming more appealing to carriers, and it won't be long before we see liner trade carried by a handful of mega-carriers. Today, we just have three alliances

carrying 80% of world trade in containers [2M: (MSC, Maersk, HMM), *Ocean Alliance*: (CMA-CGM, Cosco Group, OOCL and Evergreen), and *THE Alliance*: (Hapag Lloyd, NYK, Yang Ming, MOL, K-Line)], while the top 20 carriers, the same companies and household names for decades, have been reduced to 12 through mergers and acquisitions.

2.6.1 Competition in the Maritime Sector

Tariff escalation between China and the United States dominated the headlines in 2018 and early 2019. Nearly 2 percent of world maritime trade volume is estimated to be affected by tariff hikes applied in September 2018 and June 2019. In addition to reducing trade flows, tariffs are generating winners and losers, given product and supplier substitution and trade diversion effects (UNCTAD, 2019). Chong et al. (2004) asserts that Market competition is one of the external factors that comprise the organization's environment. Product and service market competition results in improvement of efficiency in firms (de Bettignies, 2006).

Waeru et al. (2004) posits that Market competition influences innovation and productivity, the economic efficiency of the firm as well as drives out inefficient producers. Companies are generally faced with different degrees of market competitions. Globalization has exposed companies in developing countries to face strong competition. Most of them now must cope with the declining market share while several others have been forced out of the market. Firms nowadays must differentiate themselves and strive to remain on top of the competitors in the market so as to survive in the business (Warraich et al., 2013). Business success depends on the ability to gain some advantage over its competitors. Warraich *et al.*, (2013) further stipulate that accomplishing this competitive advantage is a strategic objective and

that performance excellence will inevitably result from competitive advantage in the market. Market differentiation, according to Chadwick (2006), is a promotional method that creates a robust presence in a specific market.

Transport costs can be divided into fixed and variable costs (Wilmsmeier, 2104; Rodrigue, 2009). In the liner trade, once the decision to operate a liner shipping service has been taken the major proportion of costs are fixed for example ship insurance, flagging, maintenance, crew wages, administration, port dues and fuel costs. The critical division is between port time and sea time. All cost items for the time a ship spends in port can enter into marginal costs; no cost items for sea time can enter marginal cost. The division of total costs between those incurred in port and those incurred at sea is of the order of 60:40 in liner services. Fixed costs vary in relation to route structure, but not in relation to the cargo carried. The variable costs are chiefly those which vary with the amount and composition of cargo handled. This includes cargo handling costs, cargo insurance, and other port costs beyond the GRT related ones. Heaver (2006) refers to Thorburn (1960) who states Biles (1923) findings that transport costs per ton and mile vary depending on the vessel size, speed and cargo loading and unloading rate (Wilmsmeier, 2016).

According to Haralambides(2019), Liner shipping has been subject to destructive competition. It is a fact that all national high fixed—low variable cost industries, ranging from agriculture, pharmaceuticals to steel, aviation, railroads and shipbuilding, have historically enjoyed some degree of protection from price competition. However, shipping being largely an international industry therefore no national laws could possibly apply to regulate competition. Arising from the foregoing, it has thus been considered that price competition should be limited

through a self-regulating mechanism, allowing carriers to charge on the basis of long-run average costs, to the benefit of a sustainable, regular, frequent and reliable service, according to the requirements of demand (i.e., the shippers themselves).

Moreover, the freight rate instability that would otherwise ensue as a result of unlimited competition has always been abhorred by shippers, who have consistently argued in favour of stable and predictable prices (transport costs). This rate-stabilizing mechanism was found in the face of conferences. These are price-setting cooperative schemes among carriers, aiming at the limitation of price competition and at the setting of tariffs at “minimum common denominator”, namely, at a level covering the long-run average cost of the most inefficient member of the scheme. This allows a sustainable service in the long run, to the benefit of the shipper who, as stated, requires stable and predictable transport costs.

The pricing of cargo movements in the maritime industry is dependent on the forces of supply and demand, but potentially more complicated than in the case of other industries. Transport is a derived demand for all transport modes and therefore affected by the elasticity of demand of the transported goods (Wilmsmeier, 2016). For transport of goods/commodities it can be argued that the rates depend on; demand elasticity of goods/commodities transported; ratio of transport costs to the costs of transported goods. Enterprises and individuals take decisions about how to route traffic through the transport system; Users have to negotiate or bid for transportation; Conditions (tariffs, salaries, locations, fuel costs) are changing constantly; Costs for gathering information, negotiating, and enforcing contracts and transactions.

In addition to ordering or demolishing vessels, shipping companies can also control the actual fleet capacity by various supply side flexibility tactics, such as laying of

vessels, slow steaming, and rescheduling routes. However, these tactics are effective in the short run for individual participants. In the long run, the investment and disinvestment are more strategically important (Fan, Zhang & Yin, 2018). Núñez-Sánchez and Millan (2011) investigated the determinants of demand for international maritime transport with reference to Spain. The findings revealed that the demand for maritime transport services is inelastic with respect to the price of the goods for both imports and exports and that Maritime transport demand is inelastic with respect to the maritime transport price, with low long-term values corresponding to a service that cannot be replaced easily in the case of imports and exports.

As regards the pricing structure of container shipping, apart from a base transport tariff, shipping companies may charge a bunker adjustment factor (BAF), a currency adjustment factor (CAF), port congestion charges, piracy risk charges, terminal handling charges, war risks, security surcharges, winter surcharges, dangerous goods and refrigeration surcharges, and document fees (Lee & Meng, 2015). Cariou and Wolff (2006) looked into the BAFs and the underlying bunker price developments and found that these charges do not accurately reflect the underlying cost development. In other words, some of these surcharges are used to raise the price for transport. These surcharges can easily raise the total transport bill by 50 % or more, and they make the transport cost for ocean shipping complex and difficult to interpret. The chosen Incoterms determine which party books ocean transport. This can also have an effect on the height of certain charges, as well as the basic transport tariff (Song & Panayides, 2015).

Over the past 20 years, consolidation has led to the establishment of a de-facto oligopoly among the main deep-sea shipping carriers. However, the wake the

coronavirus disease 2019 (COVID-19) pandemic is triggering a new normal in the shipping industry. The development seen over the past three months shows that the carriers for the first time are showing their newfound strength. Despite sharp drops in both cargo volumes and fuel prices, freight rates have essentially remained stable. Decades of upscaling vessel sizes as well as consolidation into ever-larger carriers have created a landscape where the barriers of entry into the main deep-sea trades are now so high that it is next to impossible for any newcomer to truly break into these trades on a material scale. This is poised to be characterized by a higher degree of stability as the resultant oligopoly reduces the likelihood of price wars (Jensen, 2020). According to Wang (2004), dock markets have conventionally been considered monopolistic or oligopolistic owing to the exclusive and immobile physical location of the dock and the inevitable build-up of port traffic. Prior to containerization, rivalry among ports was relatively minimal. The advent of hub-and-spoke frameworks and the fast growth of intermodal transit have nonetheless radically shifted this situation. Two inclinations, namely concentration and deconcentration of port traffic, are noted in the port industry. First, the concept of fewer ports of call on liner shipping services has led to the emergence of superlarge container docks that serve as regional load points. Second, the desire to be a regional hub intensely inspires the expansion of container docks and, this, the leading role played by large docking points is often contested. The knock-on effect of larger ships, fewer ports of call and improved logistics systems and infrastructure have forced previously non-competing ports into head-to-head competition as their hinterlands increasingly overlap. Ports, therefore, are continuously challenged, both physically and operationally.

The management structure of the port, elasticity of demand for port service and the source of port funding determines the method used for port pricing (Mchizwa, 2014).

Different types of container port competition can be expected to have implications on maritime transport and its costs. In this work inter-port and intra-port competition are taken into consideration. Inter-port competition can be understood as the competition among different ports. The principal criteria to define inter-port competition is if they serve the same or overlapping hinterland e.g. the port of Mombasa and Dar es Salaam).

According to Haralambides (2019), when port traffic was captive in the 1990, one could easily calculate the optimum size of a port, based on the country's trade, population and growth data. Today, with expanding hinterlands and competition among ports, they would have to take a forecast. Notteboom and Yap (2012), argue that Port competition was not a well-defined concept, partly because of its complex nature. Hence, the nature and characteristics of competition depended among other things upon the type of port involved (e.g. gateway port, local port, transshipment port) and the commodity (e.g. containers and liquid bulk). This type of competition was necessarily related to port ownership and administration, because if a port was under the control of a public authority essentially no competition existed.

Scaramelli (2010) stated that there were three levels or types of Port competition. The first level of competition was between port operators in the same port for each of the traffic category that composed the traffic structure of any given port. This level of competition is known as Intra-Port Competition at the operator level. The competitive arena included all aspects of the containerized trade, such as the traffic routings, shippers and shipping lines concerned. For instance, competition could be focused on enticing major shipping lines and shippers to hub their operations at the terminal or targeted at specific services operated by specific shipping lines in order to strengthen

the level of connectivity on particular trade routes and to particular regions. Important shippers do not necessarily choose a port, but a logistics chain solution in which a port is merely a node (Notteboom & Yap, 2012).

At a second level there is competition between operators from different ports, in the same traffic category. This type of competition takes place in ports that are located in the same range and that serve an overlapping hinterland. It is defined as Inter-Port Competition at the operator level. Termed "inter-port competition," this can be played out at the national and regional levels. Finally, the third level of competition is the Inter-Port Competition at the port authority level. Here, port authorities compete with each other. Inter-port competition at this level, Notteboom and Yap (2012), described it as between terminal operators located in different port ranges, that is, geographically defined areas with a number of ports that possess largely overlapping hinterlands and thus serve mostly the same customers. As noted by Notteboom and Yap (2012) the configuration of liner services exerted a direct and immediate effect on inter-container port competition.

As opposed to Competition, port competitiveness was related to the performance of a given port in providing value added goods and services to its customers; in so doing, ports not only pursued economic values, such as profit maximisation, but also non-economic values, such as increasing the quality of services offered to secure customer loyalty (Scaramelli, 2010). The competitive position of a container port was determined by its competitive offering to the host of shippers and shipping lines for specific trade routes, geographical regions and other ports to which the container port was connected. Broadly, the competitiveness of a container port was determined by

the range of competitive advantages that were acquired or created by the port over time (Notteboom and Yap, 2012).

According to Notteboom and Yap (2012), a competitive Port possessed the following characteristics: enjoyed proximity to key centers of production and consumption, and major trade lanes; possessed excellent maritime and hinterland access and offered superior connectivity to markets; was able to reduce port costs for users through higher productivity; was able to persuade and entrench carriers and shippers in relation to their cargo routings by adding value to the business pursuits of these entities; was able to expand capacity in time to meet demand and has sufficient space to cater to future development and capacity extensions; enabled users to compete effectively with other transport modes; was able to cope with challenges posed by the new logistics business environment; was able to capitalize on the complementary and reinforcing effects of the port cluster; has greater involvement from the private sector at the level of terminal operations; was perceived to be a key driver of the local economy; and enjoys a long tradition of support from key stakeholders in the port area and the wider community.

Seaport efficiency was an important determinant for transport costs. From their analysis, they also concluded that transport costs were potentially a barrier to trade and needed to be considered by policy makers. Theoretical considerations on the relationship between trade and shipping in maritime economics could be traced back to Koopmans (1939), who observed that without the analysis of seaborne trade, the analysis of shipping markets could not succeed. He also introduces the notion that seaborne trade is inelastic to prices in shipping (Song and Panayides, 2015)

Since it was possible for ports or providers of port services to have market power, there was a risk that they will abuse this power to the detriment of their customers. The main form of abuse of dominance was through excessive pricing and/or refusal to supply. However, under certain conditions, tying and bundling could also constitute a form of abuse of dominance (OECD, 2011). When examining market power in the ports industry, four features were of pertinent. The first had to do with rivalry between different modes of transit: if the fee of port services goes up, users may switch to other means. The second had to do with competition between various docks: if costs go up at port A, clients may turn to port B. Third, where clients had the capacity to choose, they might engage in countervailing buyer power to keep levies minimal. Finally, where substitution of various modes of transit or variety of ports was minimised, and clients did not have countervailing buyer power, ports could be seen as essential amenities—an extreme form of market power.

According to OECD (2011), the issue of whether buyer power existed in practice was addressed in the EU's submission. Shipping companies were often organized into conferences and consortia, increasing their scale and potentially giving them considerable buyer power. However, the European Commission had not found this to be a convincing argument because conferences regulate only the prices charged for shipping services; they did not interfere with shipping operators' decisions about routes and ports of call. The Commission was also doubtful that consortia facilitated substantial buyer power because consortia members actually compete with each other on both price and end-to-end service. Thus, the Commission was of the view that, although shipping companies can be large and conferences and consortia can increase concentration, buyer power may still be limited in the maritime sector.

2.7 Controversies of the Maritime Industry Markets

There are varied opinions among scholars over the nature of the markets of the maritime industry and consequently its contributions and consequently the economic impacts which maritime transport has on countries whose trade it carries. According to Walters and Bailey (2013), the sector presents an instance of a highly globalised industry, driven largely by the dictates of the free market and, at the same time, in certain key respects remains both disjointed and narrow.

Goss (1976) postulated that perfect competition exists in maritime transport thus the overriding endeavor is the reduction in ships operating costs which will benefit both the shipper and the ship-owner. He asserts that the critical objective in the study of maritime transport ought to be on the costs the of ship-owners and how to reduce them since freight rates will in turn be favourably affected. He argued that conferences were useful since they reduced wasteful competition.

Marx (1953) indicated that there was no perfect competition in maritime transport and argues that conferences are cartels. He observed that shipping conferences are among the earliest cartels in international trade. Shipping conferences are treaties by shipping lines to constrain or eliminate rivalry, regulate and make fair sailing shifts and docks of call and to arrange for pooling cargo freight monies or other net earnings.

Some of the earliest reactions to the dominance of the developed countries in maritime transport can be traced in Latin America. This was mainly through the Latin American Free Trade Association (LAFTA). The LAFTA countries advanced the following reasons justifying their wishes to increase their participation in maritime transportation by expanding their shipping capacity. Firstly, acquisition of leverage in the determination of freight rates which were fixed by ocean conferences composed of

foreign-owned shipping interests. Secondly, aiding of balance of payments by conserving foreign exchange. Thirdly, assurance of adequate and regular services in the maritime transportation. Fourthly, promotion of exports in general and lastly, National defense which was to ensure uninterrupted shipping services in times of emergencies such as during hostilities when merchant ships of the traditional maritime nations are diverted for other uses.

According to Maeti(1985) carriage of dry bulk cargoes, such as grain iron ore, bauxite, cement and others, the charter markets such as the Baltic Exchange have conditions nearing perfect competition. Charterers and the ship-owners have full knowledge on the charter markets and that there are large numbers of ships available for charter. It is thus contentious to say that the dry bulk market for sea transport is described by perfect competition.

2.8 Review of Literature of Study Variables

Several empirical studies on economic analysis of the maritime sector performance in enhancing economic growth in Kenya are presented in this section.

2.8.1 Labor Productivity and Maritime Sector Performance

Labour productivity is a critical economic signal that is closely associated with growth, competitiveness, and living standards. It comprises the entire output (measured by GDP) generated for every unit of work (measured by the count of workers) over a duration (ILO, 2020). The indicator allows data users to assess GDP-to-labour input levels and growth rates over time, thus providing general information about the efficiency and quality of human capital in the production process for a given economic and social context, including other complementary inputs and innovations used in production. Numerous factors determine a country's success. Long-term

economic growth of a country depends on population and labour productivity. A growing population is the source of future workers, and the more productive those workers are, the richer they become. It takes investment in both capital and ideas to raise productivity. Countries growth rests on two building blocks: population and productivity. Population determines how many workers a country will have while Productivity, or output per worker, determines how much each worker earns (El-Erian, 2013). Inflation and interest rates, consumer spending, and business confidence are important in the short run. In the long run, though, a country becomes rich or stagnates depending on whether it has the right mix of people.

Labour productivity is particularly important in the economic and statistical analysis of a country. Labour productivity is a revealing indicator of several economic indicators as it offers a dynamic measure of economic growth, competitiveness, and living standards within an economy. It is the measure of labour productivity which helps explain the principal economic foundations that are necessary for both economic growth and social development (OECD, 2008). Labor productivity dictates the hourly output of a country's economy.

The advent of advance tools has altered how jobs are done, thus enhanced staff output, lessened effort and task time (Imran, 2014). The manufacturing sector real value added increased by 3.2 per cent, which was a slower growth compared to 4.3 per cent recorded in 2018. The volume of output for the sector rose by 2.0 per cent in 2019. This was considered a result of increased output of automobiles, animal and vegetables fats and oils and pharmaceuticals sub-sectors. The value of output of the sector increased by 6.6 per cent from KSh 2.4 trillion in 2018 2.6 trillion in 2019 (KNBS, 2020). The World Bank's Investment Climate Assessment shows that despite

manufacturing value enriched labor output of Kenya being comparable to that of China and India, it has been marked by more elevated capital intensity (World Bank 2008). This suggests that the level as well as quality of skills development will need to improve to be competitive globally. In addition, the growth ratio of Total Factor Productivity (TFP) which also explains capital utilization, went up only by a mean of 4 percent yearly rate over the past 4 years, mainly because of use of existing capacity instead of new ventures (WB 2008).

Freeman (2008) holds that there exist both merits and shortcomings linked with the various input measures utilised in the estimation of labour output. It is widely understood that the sum of hours worked is the most suitable measure of labour input since a simple headcount of employees can exclude variations in average hours worked, caused by the evolution of part-time service or the effect of variations in overtime, absence from work or shifts in normal hours. However, the quality of hours-worked estimates is not always clear. In particular, statistical establishment and household surveys are difficult to use because of their varying quality of hours-worked estimates and their varying degree of international comparability.

Port labour is arranged in well-defined tasks and systems. Port labour system refers to the way labour is organized in the port to achieve goals such as cargo loading and off-loading. It determines practical arrangement on the work floor, labour pools and qualifications required for such work. Port labour systems are necessitated by a need for improvement in performance. The labour system is to further improve labour productivity over the period they have undergone several reforms. The key issues that could possibly often appear in port labour system relate to the definition of dock work, the legal status of the dock worker, the functioning of labour pools, practical

arrangements at the work floor and the categorization and qualification of dock workers.

The principal areas of interest for port labour include but are not limited to: Stable and fulfilling employment; Reasonable incomes; Decent working conditions; Social security and pension provision; Education and vocational training; Health; safety; and the environment; Workplace democracy; Freedom from discrimination on the basis of race, religion, social status, or gender; Freedom from corruption and coercion. The success of any enterprise-the port being no exception- is hugely reliant on its human resource or human capital despite the growing application of technology. Nevertheless, human resource, especially port workforce is the most difficult resource to manage particularly in enterprises where constant work is not certain. It is now possible to fairly evaluate the arrival of vessels, but technological advancement requires that the labour force is also highly competent (Aryee, 2012). The flexibility, productivity, quality and cost efficiency of dock workers contribute to the competitiveness of port-related and logistics companies and the wider economy (Notteboom, 2010).

Labour force is of great importance especially in the systems where the degree of automation is low. This is valid for more than ninety per-cent of all maritime container terminals in the world. Gross labour productivity is more important than the net labour productivity. The net labour productivity contains only man-working hours only while the gross takes care of the idle and unproductive time. It has been acknowledged that, where terminals are operated under difficult labour conditions and more restrictive regulatory frameworks, this has a direct impact on a lower productivity or throughput per terminal space (Beskovnik, 2008). Work and safety

rules, workforce motivation, training and handling equipment characteristics directly influence gross labour productivity; thus there is need to balance labour wellbeing and productivity.

2.8.2 Foreign Exchange Rate and Maritime Sector Performance

In 1971, the link between the dollar and gold and the other currencies to the dollar was suspended marking the end of the Bretton Woods System. The dollar was delinked from gold and allowed to float freely thus several nations followed suit with their own currencies (Doganay, 2014). Exchange rate risk is a significant factor in the determination of corporate performance. In the maritime sector, such risk is exacerbated by freight rates fixed in US dollars which must then be converted into numerous other currencies (Akatsuka & Leggate, 2001).

The importance in the linkage between foreign exchange rates and firm value can be traced from the fall of the Bretton Woods institution in the 1970's. It is largely believed that exchange rate fluctuations is a major source of macroeconomic uncertainty that should have significant impact on firm value. As Exchange rate changes, the cash flow volatility of the firm increases. Hence, firms are expected to face an underinvestment problem. However, experiential tests of the sensitivity of firm value to exchange rate movements have produced mixed results with some authors finding no significant exposure and others finding better proof for its existence. There exist many different ways to measure an exchange rate. The most commonly method is to measure a bilateral exchange rate, which is the value of one currency relative to another. Bilateral exchange rates are mainly cited against the US dollar, as it is the most traded currency. Businesses are exposed to them whenever

they buy inputs to production from other states and enter agreements to export their goods and services elsewhere.

According to Muhire (2018), less developed economies are mainly agrarian and are more dependent on foreign trade for economic growth than the developed countries. Studies suggest that income elasticity of demand of primary goods and their Price elasticity tend to be inelastic, thus any shifts in demand or supply curves can cause large and volatile price fluctuations. Interest rate, inflation and the state of politics and economics influence exchange rate in every country.

Exchange rate is a source of uncertainty which tends to impact on risk-averse traders or exporters, thus reducing or increasing exports. High exchange rate volatility sends conflicting signals to investors as it creates uncertainty about their profits thus discouraging production, and this affects volumes of trade leading to adverse effects on economic growth. The Exchange rate fluctuation is mainly a concern for firms that are linked to international markets. These unexpected losses caused by exchange rate fluctuation result in decreased production, affected volumes of trade which further, affects international price competitiveness of exports leading to resource reallocations, which has a negative impact on economic efficiency. Revenue from exports not only depend on the quantity traded abroad but also on its value, thus exchange rate volatility affects international price competitiveness of exports leading to resource reallocations, which has a bearing on economic efficiency.

Exchange rate volatility can seriously influence the firms market of the overall industry position as to its rivals, the company's future cash flows, and the firms value. Any exchange that opens the firm to foreign exchange risk additionally uncovered the firm monetarily, yet monetary presentation can be brought on by different business

exercises and speculations which may not be negligible global exchanges, for example, future cash flows from settled resources. Exchange rate instability influences multinationals and medium-sized businesses including the individuals who just work in their nation of origin (Sibte, 2017). Central banks can focus on the role of the effects of exchange rates on real economic activity when determining their interest rate policy. Ozcelebi(2018), employed a theoretical construct, a type of DSGE framework, to evaluate the impact of real exchange rate uncertainty on business cycles. Output volatility went up by at least 22% as the share of foreign run credit went up from 0 to 100%.

Afful(2016), states that the shipping industry requires the use of different currencies in its daily business transactions because of the international nature of the shipping industry which exposes the ship owner's cash-flow transactions to involve different foreign currencies. The revenue of the ship-owner is in US dollars and a majority of the operating expenses of the vessel is usually in other denominations which require the conversion of the USD. The conversion of USD to the other foreign currency has an impact on the cost and revenue of the ship-owner thereby affecting the profit margin of the ship owner. Changing from one exchange rate regime to another could cause several damaging factors such as trade fluctuations and uncertainties. The fluctuations of the exchange rates between these currencies have a tremendous impact on the business performance of the ship-owner in terms of the effect on the cash-flow. Foreign exchange rates are prone to changes in the market which may result in the appreciation or depreciation of the total cost hence economic impact of exchange rate regimes and exchange rate volatility.

Lucky and Okorite (2017), evaluated interest rate, inflation rate, exchange rate against Economic Performance. The finding suggested that notwithstanding the short run influx of the spill over volatility of Interest rate and inflation rate, there exist no long run volatility influence of interest rate on Economic Performance in Nigeria.

According to Maity(2015), stability in exchange rates – through a fixed rate is the main driver for bilateral maritime trade flows. For example, Kenya's Foreign Exchange Rate against Euro was reported at 114.667 KES/EUR in Mar 2020. This records an increase from the previous number of 109.937 KES/EUR for Feb 2020. On the other hand Kenya's Exchange Rate against USD averaged 103.740 (KES/USD) in Mar 2020, compared with 100.795 KES/USD in the previous month. Aponjokusun and Ojo, (2019) investigated the effects of foreign exchange rate fluctuations on port terminal operators in Nigeria. The result showed that an increase in foreign exchange rate leads to decrease in profit of terminal operators, increase in foreign exchange rate leads to increase in operational cost and the level of unemployment.

Scholars who have researched on this subject include Ivanova (2015) who posits that roughly half of a firm's exposures, 49 percent, and 40 percent are statistically significant at the 10 and 5 percent levels respectively, suggesting that a major part of the firm experiences significant changes in their value responding to fluctuations in exchange rates. Other studies that document higher percentages of significant exchange rate are Huffman et al (2010), whose findings indicate that 38.5% of the study sample, had significant exposure at the 5% level. According to Huffman, not only internationally involved firms are affected by exchange rate exposure but also applicable to the domestic firms.

2.8.3 Inflation rate and Maritime Sector Performance

There are two competing schools of thought on the cause of inflation. The monetarist school blames the money supply with too much money chasing too few goods, while the New Keynesian School blames a combination of excess spending. Inflationary psychology argues that when the demand for all goods and services runs ahead of the supply (i.e., potential output), inflation rises while When demand falls short of potential, inflation falls. High inflation is destabilizing and corrosive; deflation can be destructive.

The best inflation is not too high nor too low: from 1 to 3 % seems about right (El-Erian, 2013). Most countries try to keep inflation somewhere around 2-3 percent per year. That is too low to cause any problems for the businesses and households. At the same time, it is comfortably away from negative inflation, i.e., from deflation. Of course, this target is often missed. The World Bank provides data for Kenya from 1960 to 2018. The average value for Kenya during that period was 10.1 percent with a minimum of -0.2 percent in 1969 and a maximum of 46 percent in 1993. The latest value from 2018 is 4.7 percent. For comparison, the world average in 2018 based on 142 countries is 3.4 percent. (World Bank, 2018).

The inflation rate across the globe eased from 2.3 % in 2018 to 2.0 percent in 2019, mainly attributable to decline in energy prices; reduction in world trade prices of food and agricultural raw materials; and modest wage levels in most countries (KNBS, 2020). The developed economies were 1.4 % while the developing economies recorded an inflation rate of 5.0%.

Consistent with the softening of energy prices and the moderation in growth, consumer price inflation is expected to average 1.5 percent this year in advanced

economies, down from 2.0 percent in 2018. With the US economy operating above potential, core consumer price inflation is projected at about 2.6 percent in 2020–21, above its medium-term value of 2.2 percent (IMF, 2020).

According to Verschuure(2018), port tariffs are currently largely fixed due to the prevailing regulatory and contractual regimes. In some countries, regulation of port tariffs is in place. The Baltic Dry Index (BDI) is an assessment of the average price to ship raw materials (such as coal, iron ore, cement and grains) on a number of shipping routes and by ship size. It is thus an indicator of the cost paid to ship raw materials on global markets and an important Value of Goods Low High Non-Significant Decline A – Basic Goods B – Discretionary Goods C – Durable Goods D – Capital Equipment E – Luxury Goods Consumption Non-Significant Decline 1 – Futures Indexes 2 – Production 3 – Container Volumes 4 – Value of Trade Trade and Production Severity Sequence 11 component of input costs. As such, the index is considered as a leading indicator (forward looking) of economic activity since it involves events taking place at the earlier stages of global commodity chains. A high BDI is an indication of a tight shipping supply and is likely to create inflationary pressures along supply chains. A sudden and sharp decline of the BDI is likely to foretell a recession since producers have substantially curtailed their demand leaving shippers to substantially reduce their rates as maritime capacity cannot be rapidly reduced. Between mid-2005 and mid 2008 the BDI grew by a factor of about 5.5 times, reflecting an almost surreal surge in global trade and expectations of additional growth, mainly fuelled by a Chinese economy hungry for raw materials and energy. The shipping industry was increasingly facing limited extra capacity and port congestion or the expectation of congestion. The existing capacity shortages in vessels and terminals pushed rates up to unparalleled heights.

Inflation has economic costs which include, a decline in value of savings, uncertainty for business leading to less investment and decline in the competitiveness of exports. In maritime sector, a rising inflation will mean port operators will have to worry about who will pick up the bill of the increased operating costs of the terminal. Higher service levels and less available capacity make the liners more willing to pay a premium. In addition, the level of competition between terminals, regional supply-demand balances, and the quality of the infrastructure and landside connections will all influence the position.

Inflation in Kenya and other countries is usually calculated as the percent change in the Consumer Price Index (CPI) from one year to the next. The CPI represents the prices paid by the average urban consumer in each respective country. Inflation can also be calculated with other price indexes such as the Produce Price Index or the so-called GDP deflator.

In the first quarter of 2020, inflation rate was considerably higher compared to the same quarter of 2019 on account of higher food and beverage prices. The situation is expected to be replicated for some of the remaining months. Fall in oil prices and a reduction in Value Added Tax (VAT) rate are likely to be helpful of low inflation as well as mitigate the consumers from rising cost of living to a certain extent. However, the weakening of Kenya Shilling against the US Dollar will probably result to rise in prices of imports and contribute to the rise in inflation (KNBS, 2020).

The annual inflation rate dropped to 6.06 percent in March of 2020 from 6.37 percent in the previous month. The country rebased the year it uses to calculate inflation to February 2019 from February 2009, in order to better reflect changing consumer trends. In Kenya, the Consumer Price Index (CPI) is based on expenditures of both

urban and rural households. The critical aspects in the CPI are Food and Non-Alcoholic Beverages (36 percent of total weight); Housing, Water, Electricity, Gas and other Fuels (18.3 percent) and Transport (8.7 percent). Clothing and Footwear account for 7.4 percent of total index and Furnishings, Household Equipment and Routine Household Maintenance for 6.2 percent. Restaurants and Hotels represent 4.5 percent as well as Miscellaneous Goods and Services (4.5 percent). Communication accounts for 3.8 percent of total weight, Health for 3.1 percent and Education for 3.1 percent. Recreation and Culture represent 2.3 percent and Alcoholic Beverages, Tobacco and Narcotics the remaining 2.1 percent (Trading Economics, 2020).

2.8.4 Maritime Sector Performance and Economic Growth

Assessment of Performance of a firm or an industry is very important as it shows the results achieved over a time period. Firm performance should rely on the Micro-economic variables which are the internal firm specific variables that Management is able to control them (Hunjra, Chani, Javed, Naeem, & Ijaz, 2014). This study has focused on both the micro-economic and macro-economic.

Globalisation of complex industrial production processes has increased the importance of seaports in the global supply chain. Thus the investment in quality improvement of port infrastructure and its contribution to economy though often questioned by politicians, investors and general public, leading to higher seaborne trade, yielding higher economic growth. However, this association weakens as the developing countries become richer (Munim & Schramm, 2018).

Organizational performance has been the focus of thorough research in recent times (Muogbo, 2013). Organization performance is a pertinent concept in microeconomics studies worldwide and a commonly used dependent variable. (Rummler and Brache,

2013) posits that there are three levels of performance in an organization: the organizational level, Process level and job/performer level. The organization level emphasizes on the organization's relationship with its market and the basic skeleton of the function that comprise the organization. The process level looks at how the work gets done. The performer/job level looks at variables like job responsibilities, and standards, feedback, training, and rewards.

There is an array of performance measurements ranging from profitability performance, growth performance, market value performance of the firm, customer satisfaction, employee satisfaction, environmental audit performance, corporate governance performance and social performance (Selvam, Jayapal, Vinayagamoorthi & Kasilingam, 2017). Monday, Aladeraji & Awolowo (2015) argue that Performance measurement in organizations can adopt the financial and non-financial approach. The financial methods include profits, return on assets, return on investment and sales, while the non-financial measures focus on issues concerning customer's satisfaction and customer's referral rates, delivery time, waiting time and employee's turnover.

Wadongo (2010) states that a firm's operational performance should not be measured by financial performance but also operational and market indicators. Financial Performance for this research was measured using profitability, growth in sales while non-financial indicators was service quality, customer satisfaction and market share.

Meaningful performance measurement goes way beyond application of formulae or the mere computation of numbers. Notwithstanding its importance, there is no unanimity about its definition, scope and measurement, which restricts developments in many research (Selvam *et.al.*, 2017). In this regard, what is important for managers

is that it should be possible to measure expectations and undertakings and produce results that will help their corporations to make the right decisions regarding continuous improvement of performance (Richard, 2016). The quest for better service delivery under new public management in public organizations in Kenya necessitates the need for public organizations to have proper financial standing to run operations (Adongo & Jagongo, 2013).

The measurement of port or terminal efficiency is of particular importance because they are vital to the economy of the country and to the success and welfare of its industries and citizens (Esmer, 20018). Chen, Zhang, Ma and Wang (2015), Posit that quantitative measurement Port performance is of great importance for re-searchers to design and optimize port operation, such as berth allocation, quay crane assignment, ship scheduling, and shipping line optimization. According to existing literature, the key performance indicators of container ports are directly related to the container handling events at terminals, especially the number of container ships arrived at terminals and the number of containers handled by terminal facilities. However, they have introduced an automatic, low-cost, and more accessible approach to derive the key performance indicators of container ports, including ship traffic, container throughput, berth utilization, and terminal productivity by identifying the container handling events of a ship from its GPS traces extracted from the AIS database, including when the ship arrives at the terminal and how long it stays there.

Dwarakish and Salim (2015) states that Common ways of measuring economic impacts are the quantity of jobs, sales, and tax receipts associated with an activity. These metrics are often reported as evidence that the welfare of a community will be (or is being) enhanced by a policy decision. Common measures of economic impacts

are employment, wages, output or revenue, and tax revenues. While the methodologies that are used to estimate these impacts vary widely in sophistication and detail, the metrics that are reported tend to be consistent. This is because economic impact studies in the maritime realm often employ input-output (I/O) models derived from I/O economics.

Chen et al, (2015) argues that in most studies on the Maritime sector with regards to Port performance, the following key performance indicators are commonly used. Firstly, the Ship traffic, which measures the number of ships arrived at a port during a period of time. This indicator is employed by many port authorities to evaluate the regional competitiveness of the port secondly Container throughput, which is the number of containers handled in a port during a period. This indicator is considered one of the most important measurement of port competency and determinants of the future development, and thus has been intensively studied. Thirdly Facility utilization, which measures how intensively the terminal facilities are being occupied, especially for berth occupancy. This indicator is widely used to evaluate berth allocation strategies and assist berth planning. Finally, Operation productivity, which evaluates the efficiency of terminal facilities, especially quay cranes that are used to handle containers at terminal. This indicator is often a major concern of both port operators.

Clark, Dollar and Micco (2002) measured efficiency relating it to maritime transport costs. Their result indicated seaport efficiency as an important determinant of maritime transport costs. They found port efficiency to be positively influenced by infrastructure and regulations and negatively influenced by organized crime.

Chen *et al.*, (2015) suggests that UNCTAD came up with two categories of port performance indicators: macro performance indicators quantifying aggregate port

economic impacts on economic activity, and micro performance indicators evaluating port operation efficiency.

Esmer (2008) argued that traditionally, the performance of ports had been variously evaluated by calculating cargo-handling productivity at berth, by measuring a single factor productivity or by comparing actual with optimum throughput over a specific time period. He observed that significant progress had been made concerning the measurement of efficiency in relation to productive activities. In this vein, two more complex, yet more appropriately holistic approaches, named Data Envelopment Analysis and Stochastic Frontier Analysis had been increasingly utilized to analyze port production and performance.

2.8.4.1 Data Envelopmental Analysis (DEA)

Data Envelopment Analysis (DEA) is an extensively influential data analytic tool, which is universally applied in the research and practitioner communities to determine the relative efficiencies of the Decision-Making Unit of production-DMU, (Omar, 2014). It is a broadly applied methodology, which generally aims at studying economic efficiency of ports by evaluating decision units. It compares the relative levels of efficiency of different ports and terminals with regard to the relationship between the resources employed and the output produced (Scaramelli, 2010). It uses the concept of a reference group of efficient decision-making units that produce a similar output (Toma *et al*, 2017). DEA is an appropriate non-parametric method for evaluating the relative efficiency of a set of (homogeneous) peer entities. These entities are known as DMUs, whose performance is characterised by a set of multiple performance measures (Elferjani, 2015).

According to Nyema (2014), the complexity of factors affecting seaport efficiency, it is difficult to determine the efficiency and the extent to which a seaport's resources are fully exploited in achieving the goals. The distance between each DMU and its related best point is a measure of the inefficiency, that is, how much it is possible to expand the output given the input or how much it is possible to reduce the input given the output. The DEA method is applied by adopting two different approaches that are both based on the concept of technical efficiency, defined as the ability of the DMU given the existing technology, to produce the highest level of outputs from a given combination of inputs (output model- oriented), or alternatively, to use the least possible number of inputs to obtain a given output (model input-oriented). Therefore, this methodology provides guidance on how the inefficient production units could become efficient, using the concept of reference group of efficient decision-making units that produce a similar output.

The basic efficiency measure utilized in DEA is the ratio of output to input, but this measure is only applicable to cases of a single input and output. This analysis requires two-dimensional data where all DMUs are plotted on a two-axis graph and an efficient frontier constructed. All units that lie on the efficient frontier are defined as efficient units (i.e., they have a 100% efficiency score), while all those that do not lie on the frontier are defined as inefficient units. Their locations from the efficient frontier are then used to calculate their efficiency scores. The frontier thus “envelops” the whole data (Aldamak A., Zolfaghari, S. 2017).

In the case of multiple input and/or multiple out, DEA constructs a piecewise linear convex frontier connecting the set of best practice observations. It envelopes input and output data, relative to which costs are minimized or profit/revenue is maximized.

Efficiency scores are then calculated from the frontiers generated by a sequence of linear programs. These fractional programs are defined by external optimization of the ratio of weighted sum of outputs to weighted multiple input, subject to the constraints of non-decreasing weights and efficiency measure less than or equal to one (Iršová Z., Havránek, T. 2010).

The DEA method allows for the calculation of the relative efficiency of the data and does not provide any information on the absolute efficiency. The most useful DMUs are those located on the frontier, the others can reach this site if: They limit the inputs, while steadying a constant output; they raise the outputs, while steadying the inputs; and they perform a combination of the above two solutions (Toma, P. et al. 2017). Vincová, (2005) posits that in nonparametric models, n productive units are evaluated, DMUs, where each DMU takes m different inputs to produce s different outputs. The suggested gauging of the efficiency of any DMU is gotten as the maximum of a ratio of weighted outputs to weighted inputs determined by the condition that the similar ratios for every DMU be less than or equal to unity.

The models must include all characteristics considered, i.e. the weights of all inputs and outputs must be greater than zero. Such a model is defined as a linear divisive programming model:

$$\begin{aligned} \text{Maximize } h_o = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \quad (6) \quad \text{Subject to: } \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1; j=1, 2, \dots, n; u_r, v_i > 0; r=1, \dots, s; i=1, \dots, m. \end{aligned} \quad (1)$$

Here the y_{rj} , x_{ij} (all positive) are the known outputs and inputs attached to each j th DMU and the u_r , $v_i > 0$ are the variable weights to be determined by the solution of this problem e.g., by the data on all of the DMU's which are being used as a reference set.

A unit will be efficient if and only if this ratio equals one, otherwise it will be considered as relatively inefficient.

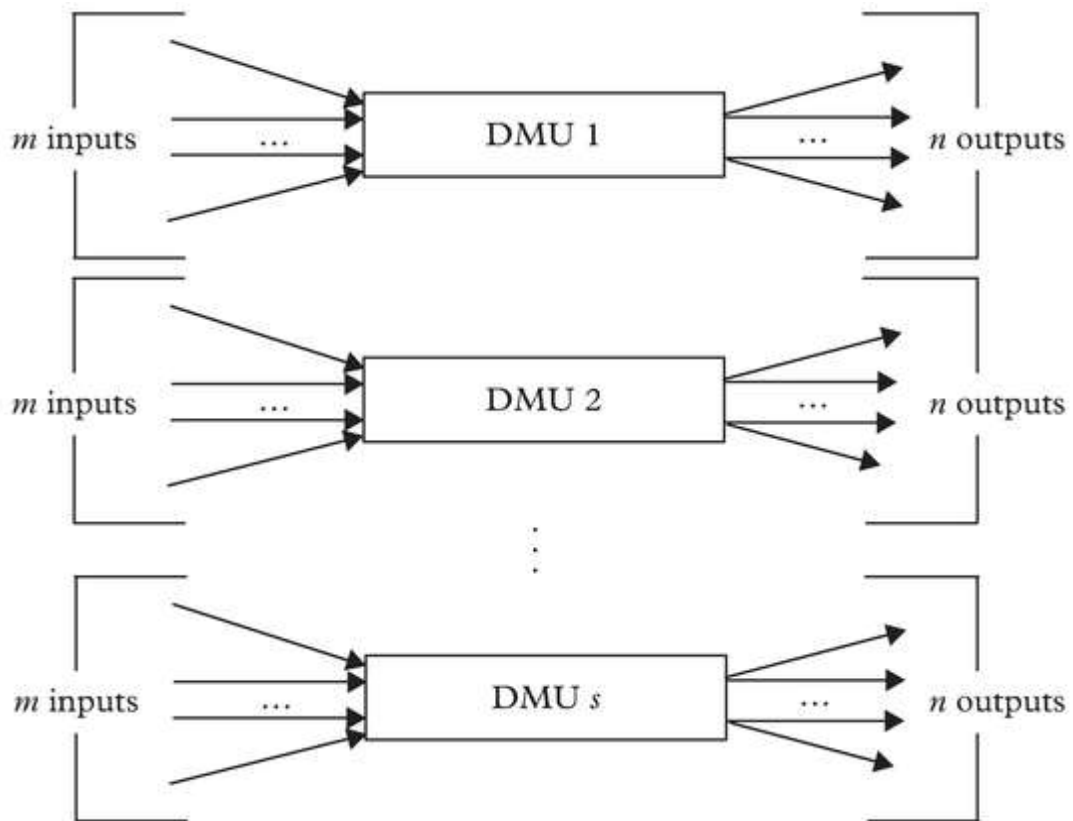


Figure 2.1: Relationship between DMUs, Inputs and Outputs (Production Frontier)

Source: Cullinane (2012)

In the context of Kenya Ports, for example, DEA will be applied to compare the relative efficiency of the KPA container terminal one berths 16, 17 18/19 to a set of the other container terminal 2 berth 21 where the common output will be defined in terms of an annual throughput measured in TEU per berth. Correspondingly, in this case, the common inputs will be the annual financial costs incurred in the provision of capital, land and labour or, alternatively, physical alternatives for these factor inputs such as total length of berths (Length overall), container stacking capacity, number of gantry cranes, number of employees/gangs and total land available. The input and

output figures for figure 2 can be conveyed in terms of matrixes symbolized by X and Y as shown below, where the element x_{ij} in the matrix X refers to the i^{th} input data item of DMU j , whereas the element y_{ij} represents the i^{th} output data item of DMU j . In X , there are m input variables and in Y , there are n output variables. In both input and output matrices, there are s DMUs measured.

Table 2.1: Container Terminal Performance

TERMINAL	CT1	CT2
CTN MOVES	900K	300K
GANGS	10	3
CTN MOVES/GANG	90K	100K

Source: KPA Bulletin of statistics (2019)

$$X = \begin{pmatrix} x_{11} & x_{12} & \cdots & x_{1s} \\ x_{21} & x_{22} & \cdots & x_{2s} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{ms} \end{pmatrix}$$

$$Y = \begin{pmatrix} y_{11} & y_{12} & \cdots & y_{1s} \\ y_{21} & y_{22} & \cdots & y_{2s} \\ \vdots & \vdots & \ddots & \vdots \\ y_{n1} & y_{n2} & \cdots & y_{ns} \end{pmatrix}$$

The basic approach to utilising DEA to measure the relative efficiencies of DMUs can be explained by the following example. Table 2.2 presents some basic production statistics for eight hypothetical container terminals. The “Throughput/stevedore” in Table 2.2 can be interpreted as a standard productivity measure. In an extremely

simplistic sense that is useful for the purpose of illustrating the basic approach to DEA, this productivity measure can be employed to determine a simplistic and concise form of “relative efficiency” by comparing all DMUs against the best in the sample.

From Figure 2.3 it is clear that in terms of the particular relationship between inputs and outputs that we are looking at here (i.e. throughput/stevedore), *T2* is the most efficient container terminal compared with the others (as represented by the other points on the graph). The straight line from the origin that passes through *T2* can be termed an “efficient frontier” since all points along it have the maximum observed productivity measurement of one for throughput per stevedore. All the other points are inefficient compared with *T2* and are “enveloped” by the efficient frontier. Within the context of DEA, the relative efficiencies of these other container terminals, as shown in the bottom line of Table 2.2, are measured by comparing the productivity measure (i.e. in this case throughput/stevedore) for each of these “inefficient” container terminals with that of *T2*. The term “Data Envelopment Analysis” stems from the fact that the efficient frontier “envelops” the inefficient observations and that they, in turn, are “enveloped” by the frontier.

Table 2.2: Single Input/Single Output Data

Terminal	T1	T2	T3	T4	T5	T6	T7	T8
Stevedores	10	20	30	40	50	50	60	80
Throughput	10	40	30	60	80	40	60	100
Throughput/ stevedore	1	2	1	1.5	1.6	0.8	1	1.25
Relative efficiency	50%	100%	50%	75%	80%	40%	50%	62.5%

Source: KPA Bulletin of Statistics (2019)

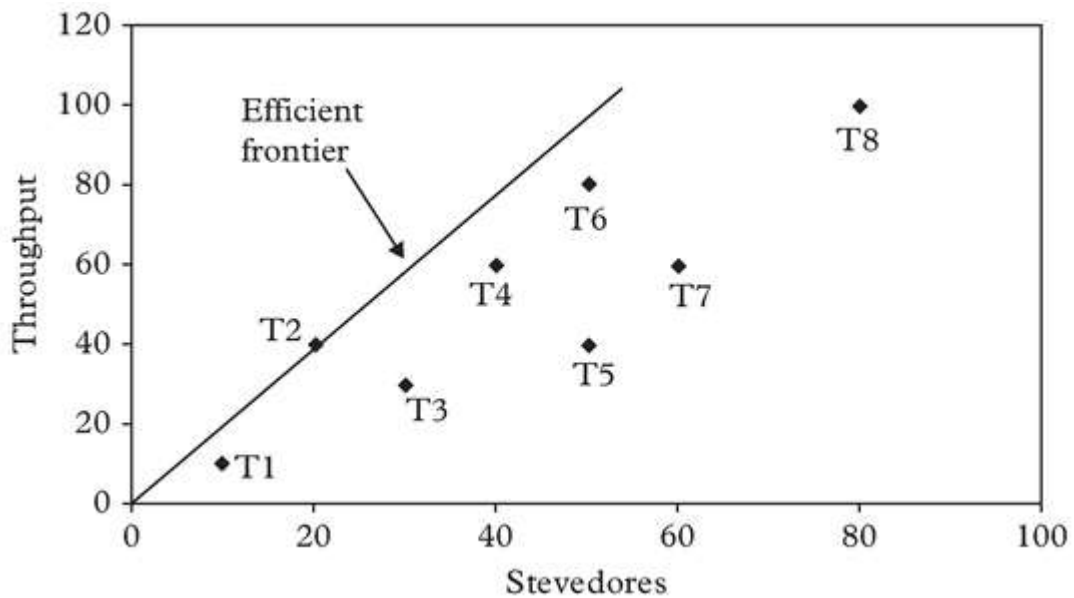


Figure 2.2: Theoretical Comparison of Efficiencies of Container Terminals Model

Source; Cullinane (2012).

2.8.5 Empirical review

Previous international and local studies investigating the impact of economic factors on the Performance of State corporations in the maritime sector include; Gonzalez and Trujillo, 2007, Israel, Kim and Sachish (1986), Dasanayaka (2006) and Estache, Gonzalez & Trujillo (2002).

Igberi & Ogunniyi (2013), studied the effect of the Nigerian maritime sector on the growth of the Nigerian economy. The result of the regression analysis showed that the maritime transport sector has a negative relationship, though not significant on the economic growth of the nation and also on industrialization of the Nigerian economy. The study concluded that for the sector to have a positive and meaningful impact on growth, the state should design programs to encourage real foreign and private participations in the maritime sector of the economy.

Dasanayaka (2006) analyzed the scale of operation of the port of Colombo using a Cobb Douglas production function, capital employed in book value and wages. Estache, Gonzalez & Trujillo (2002), studied on efficiency of Mexican ports, Trujillo and Trovar (2007) on European ports efficiency, Ahmed *et al.*, (2008) on efficiency of Middle East and East African seaports and Cullinane *et al.*, (2004) on efficiency of several container ports, using panel data sets to measure productivity and efficiency of ports.

Ahmed *et al.*, (2008) evaluated the efficiency and scale of operation of 22 seaports in the Middle East and East Africa using berth length, storage and handling equipment as the inputs and ship calls and throughput in tons as the output. They found the port of Mombasa to be below average on scale efficiency and to be experiencing decrease in returns to scale.

Munim and Schramm (2018), studied the impacts of port infrastructure and logistics performance on economic growth through the mediating role of seaborne trade and found out that the results reveal that it is vital for developing countries to continuously improve the quality of port infrastructure as it contributes to better logistics performance, leading to higher seaborne trade, yielding higher economic growth. Nevertheless, this association weakens as the developing countries become richer.

Dwarakish and Salim (2015) reviewed the Role of Ports in the Development of a nation and the results of the various reports from ports around the world clearly put forth the idea that ports are a vital part of a country's economy. The growth of ports will unerringly boost the country's economy. The growth and development of ports leads to greater trade activity, increased supply, greater foreign reserves and reduced

prices for commodities as a whole. Improvement in the port infrastructure has shown very good reflections in the GDP.

Dasanayaka (2006) analyzed the scale of operation of the port of Colombo using a Cobb Douglas production function, with capital employed in book value and wages in salaries as the inputs and gross port revenue as the output and found increasing returns to scale in the Colombo seaport when the technological proxy was dropped, and with decreasing returns to scale with the technology proxy. The returns to scale were largely dependent on the change in demand and the development to cope with demand.

Peretomode (2014), investigated the Role of the Maritime Industry and Vocational and Technical Education and Training in the Economic Development of Nigeria. The study concluded that a robust and virile maritime industry and quality Vo-tech education will no doubt have positive impact on the economic development of Nigeria. The maritime industry is a key sector in the Nigerian economy.

Tongzon (1995) based on a sample of 23 international ports developed a model of assessing the factors influencing port performance and efficiency as well as providing an empirical basis for the crucial role of terminal efficiency relative to other factors. Clark, Dollar and Micco (2002) measured efficiency relating it to maritime transport costs. Their result indicated seaport efficiency as an important determinant of maritime transport costs. They found port efficiency to be positively influenced by infrastructure and regulations and negatively influenced by organized crime. However, they used an aggregated measure of port efficiency consisting of one to seven indices from the Global Competitiveness report.

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Hunjra *et al.*, (2014) studied the Impact of Micro Economic Variables on Firms Performance with a bias on factors which affect Performance of the cement sector focusing particularly on the Pakistani firms. The study variables included size on performance, the relationship between age of the firm and firm performance, the effect of growth on firm's performance and the impact of leverage on performance of the firm. The result showed that micro economic variables do have an impact on the performance of the cement sector. Size, age, growth, and leverage have a positive impact on the performance of the firm when ROA is considered as the performance measure. Size, age, and growth have a positive impact on return on equity (ROE) while leverage has a negative impact. Attention should be put paid towards these micro economic variables in order to improve the performance of the cement sector and reach an appropriate outcome.

Limao and Venables (2001), argue that successful and efficient gateway ports are often those that are effectively connected to their economic hinterlands by adequate and effective transport corridors. Notteboom and winklemans (2001), as cited by De Langen (2008), observes in the paper *structural changes in logistics: How will Port Authorities Face the Challenge* that port competition has moved between ports to competition between transport chains. A port would therefore leverage on the

competencies of its transport chain corridor to enhance its effectiveness and improvement on key performance indicators.

2.9 Research Gap

Economic literature on State corporations in the Maritime industry and their impact on GDP has been skewed towards macroeconomic effects of privatization, empirical studies on Microeconomic factors influencing performance of Maritime State corporations are in the minority. In addition, studies on the impact of microeconomic factors largely have not captured developing countries issues. This study contributes to a developing country analysis within both the macroeconomic and the microeconomic domains (Quartey, 2019).

International and local studies investigating the impact of maritime sector on the economic Performance of a country include; Gonzalez and Trujillo (2007), Israel, Kim and Sachish (1986), Dasanayaka (2006), Hunjra *et al.*, (2014), Estache *et al.*, (2002), Ahmed *et al.*, (2008).

Other scholars have used different methods of assessing port performance. Tongzon (1995) based on a sample of 23 international ports developed a model of assessing the factors influencing port performance and efficiency as well as providing an empirical basis for the crucial role of terminal efficiency relative to other factors. However, this method only used cranes efficiency, a partial productivity analysis.

Estache *et al.*, (2002)., studied on efficiency of Mexican ports, Trujillo and Trovar (2007) on European ports efficiency, Ahmed *et al.*, (2008) on efficiency of Middle East and East African seaports and Cullinane *et al.*, (2004) on efficiency of several container ports, used panel data sets to measure productivity and efficiency of ports. Data from the port of Ashdod in Israel, Kim and Sachish (1986) found the technical

change to have been saving labour and using capital and TFP to have been growing at an annual average rate of 0.11. The analyses were done using a translog cost function, total cargo loaded and unloaded as output, labour and capital as the factors of production. They also found TFP to have declined negatively when the port experienced severe labour strikes. Ahmed *et al.*, (2014) studied the factors that affect performance of the cement sector focusing particularly on Pakistani firms. The study concluded that four variables of Size, age and growth have a positive impact on return on equity and have significant impact on the performance of the firm.

Clark, Dollar and Micco (2002) measured efficiency relating it to maritime transport costs. Their result indicated seaport efficiency as an important determinant of maritime transport costs. They found port efficiency to be positively influenced by infrastructure and regulations and negatively influenced by organized crime. However, they used an aggregated measure of port efficiency consisting of one to seven indices from the Global Competitiveness report.

Most of the studies by Estache *et al.*, (2002) on efficiency of Mexican ports, Trujillo and Trovar (2007) on European ports efficiency, Ahmed *et al.*, (2008) on efficiency of Middle East and East African seaports and Cullinane *et al.*, (2004) on efficiency of several container ports, used panel data sets to measure productivity and efficiency of ports. However, critics of this technique argue that because ports are of different sizes and face different traffic and traffic mix, the use of cross-sectional or even panel data may produce misleading results and fail to capture basic differences among various ports (Mundlak, 1961).

Local scholars that have investigated the relationship between economic determinants and performance include; Munyoki(2015) studied the role of organizational autonomy

and positioning on the relationship between competitive strategies and performance of Kenyan State Corporations. The results indicated that competitive strategies had statistically significant effects on the performance of Kenyan state corporations. The results further indicated that though positioning is an important strategy, it did not mediate between competitive strategies and performance of the Kenyan state corporations, but organizational autonomy moderated between competitive strategies and the Kenyan state corporations.

Tongzon (1995), based on a sample of 23 international ports, developed a model of assessing the factors influencing port performance and efficiency as well as providing an empirical basis for the crucial role of terminal efficiency relative to other factors. However, this method only used cranes efficiency, a partial productivity analysis. Most of the studies have analyzed the performance of a port by assessing the relative efficiency such as Ahmed *et al.*, (2008). However, efficiency measure only gives the performance of the port relative to other ports in the analysis and does not tell how the port has performed over time. This means that the level of efficiency determined is greatly affected by the other ports in the study and may not necessarily reflect the actual performance of the port.

The existing studies are outdated in view with the constantly changing maritime environment. Most of the studies were done pre-2011 and thus needs new and current analysis that will provide basis for decision-making in the contemporary situation. The studies are also mostly strategic management in nature and not purely economics. Most studies have employed partial productivity indicators and engineering approaches that use simulations and queuing theory expressed (Gonzalez and Trujillo, 2007), and the TFP approach which uses both mathematical programming and

econometric approaches. There are very few empirical studies on Maritime sector performance that use time series data, the production functions, the DEA and SFA analysis on port performance. There is infact no study on the economic factors that have for a longtime influenced the performance of the Maritime sector. This study seeks to fill this gap in order to provide more appropriate knowledge.

2.10 Conceptual Framework

A conceptual framework, according to Imenda(2014), is an end result of bringing together a number of related concepts to explain or predict a given event, or give a broader understanding of the phenomenon of a research problem. In this research, concepts of labor productivity, foreign exchange rate and inflation rate were analysed, aligned and joined to tell a bigger map of their possible relationship on maritime performance and ultimately economic growth. The conceptual framework below sums up the link among the three variables using theory of Solow model, endogenous growth theory, production theory and agency theory. The conceptual framework in figure 2.6 shows that economic growth is a function of the performance of the maritime sector which is affected directly by labour productivity, foreign exchange rate and inflation rate. The conceptual framework indicating the relationship between economic determinants and performance of Maritime sector on economic growth in Kenya is depicted in figure 2.4.

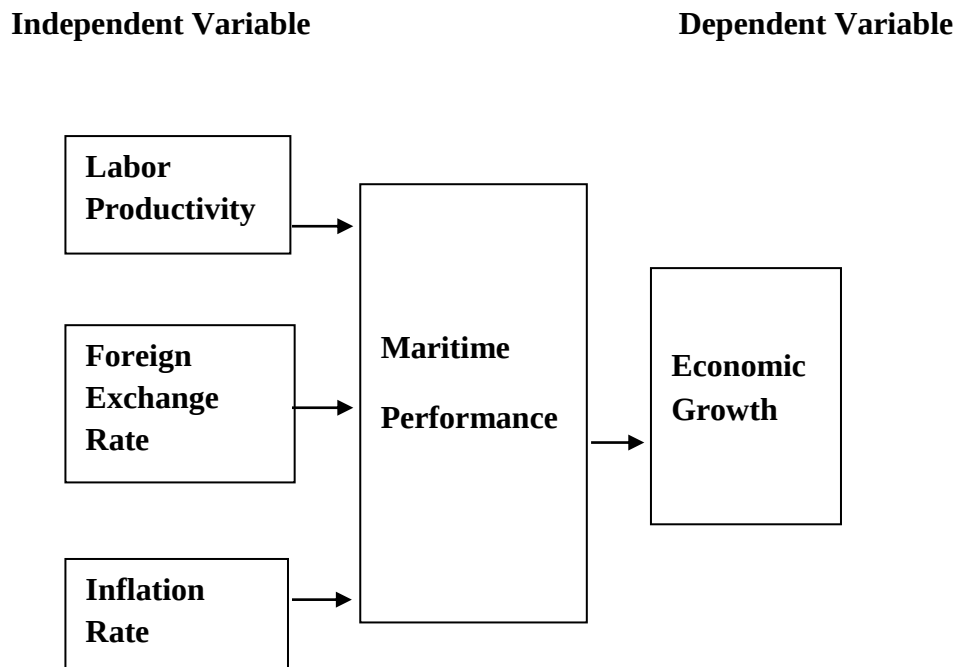


Figure 2.3: Conceptual Framework

Source: Author (2020)

Several factors have been listed in the literature review as being the determinants of maritime performance. Most of the variables were state related which have been named by Kindleberger (1962) and Brown (1969) including physical characteristics of cargo, packing, stowage, competition, sources of supply, port facilities, port location and possibility of getting return cargoes. In this study, the independent variables used were labor productivity, foreign exchange rate and inflation rate. The dependent variable was maritime performance which in turn would influence the economic growth in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the research design, study location, Research Philosophy, Model Specification, target population, description of the sample and sampling procedures, description of the data collection instruments, validity and reliability of the research instruments, data collection procedures, data analysis procedures and ethical considerations.

3.2 Research Philosophy

There are two main philosophies that inform how people come to know what they know. Ontology is the philosophical examination of the nature of being, becoming, existence, or reality, as well as the basic categories of being and their relations (Harvey, 2006). It deals with inquiries on what entities exist or can be perceived as existing, and how such entities may be categorised, linked in a hierarchy, and split based on similarities and variations (Saunders, Lewis and Thornhill, 2007).

Epistemology on the other hand is interested in the nature and scope of knowledge and is also referred to as theory of knowledge. It examines knowledge, its essence and its acquisition, and the measure of how knowledge of something may be apprehended (Harvey, 2006). The fundamental question in any field of study concerns what constitutes acceptable knowledge in that field. This is the focus of epistemology whose main concern is how knowledge develops.

Research philosophy relates to the development of knowledge and nature of that knowledge and contains important assumptions about the way in which researchers view the world (Saunders, et al, 2007). There exist two major epistemological

research philosophies that underpin research in social sciences. These are positivism and interpretivism. Positivism rests on the assumption that the observer is separate from what is being observed and measurement should be through objective criterion while interpretivism on the other hand deals with subjectivism and is focused more on understanding rather than explaining (Mugenda and Mugenda, 2003). It rests on real facts, neutrality, measurement and validity of results.

Since this study emphasize objectivism while investigating the hypothesized casual explanations, hence positivistic philosophical research orientation will be adopted. A positivist stance on epistemology perceives research as objective and value free observer who analyzes the determinants, that is, labor productivity, foreign exchange and inflation rates affecting Kenyan maritime performance and its influence in enhancing economic growth. Positivists use existing theory to develop hypotheses which are tested and confirmed, whole or part or refuted, thus informing and guiding further development of theory that may be tested by further research. Phenomenology which is the other epistemological philosophy is perceptual as it looks at the qualities and phenomena that are subjective. It focuses on the immediate experience and starts from the known to the unknown (Nachmias and Nachmias, 2004; Saunders et al, 2007; Mugenda, 2008). This study was anchored in the positivism paradigm because it sought to objectively establish facts by empirically establishing relationships among variables.

3.3 Research Design

The study used explanatory research design which used panel data to make an economic assessment of the maritime sector performance in enhancing economic advancement in Kenya. Panel data is a single set that rails a given sample of subjects

for a given duration, and thus supplies multiple observations on each individual in the sample (Hsiao, 2003). With panel data, variations across maritime sectors and time periods are accounted for. The treatment of panel data is a topic of one among the most lively and progressive writings in econometrics; the reason is that this type of data provides a rich context for the establishment of approximation techniques and theoretical outcomes. Studies have been able to use panel data, that is, time-series cross-sectional data to examine issues that could not be studied in either cross-sectional or time-series settings alone.

With panel data, it was easy to control for unobserved heterogeneity. This was upheld by Ben-Porath (1973) who observed that at a certain point in time, in a cohort of women, 50 percent may appear to be working. It was ambiguous whether this finding implied that, in this cohort, one half of the women on average would be working or that the same one-half would be working in every period. These had very different implications for policy and for the interpretation of any statistical results. Cross-sectional data alone could never explain much on the issue. The main value of a panel data set compared to a cross-section was that it permitted the researcher sufficient power in defining differences in behavior across variables the subject under study.

According to Hsiao *et al.*, (1995) observed that in empirical studies investigators often encounter problems of shortage of degrees of freedom and multi-collinearity. That is, the information provided by the sample is not rich enough to meet the requirement of the specified model. To narrow this gap, investigators either often have to impose ad hoc prior restrictions. Exploratory research is used to develop a better understanding (Hair *et al.*, 2003) and provides useful information for a proper understanding of an issue or circumstance.

3.4 Target Population

A population refers to an entire group of persons or elements that have at least one thing in common (Kombo and Tromp 2006). The target population was the maritime sector in Kenya which included KPA, KFS and KMA.

3.5 Data Collection Instruments and Procedures

The researcher used Secondary data on port of Mombasa, Kenya Ferry Services and Kenya Maritime Authority between 2000 and 2019. An introductory letter from Moi University, School of Business and Economics, was received. This letter assisted in getting permission to access the KPA, KMA and KFS offices in Kenya to meet the respective CEOs with a view to confirming the veracity of the secondary data collected. A research permit from NACOSTI was obtained authorizing data collection from institutions.

3.6 Data Sources

The data was sourced from KPA and KFS websites, annual bulletin of statistics, journals and economic surveys among other sources for the analyses. The GDP per capita and exchange rate data for the correlation test was sourced from the Kenya Bureau of statistics website and personal visit to the headquarters. The period of analyses was from 2000 whereby in 1978, KPA was established after the collapse of the East African Community in 1977. From political independence in 1963 to 1977, the port of Mombasa was part of the East African Harbors and Railways Corporation with headquarters in Dar-es-Salaam. The study used net book value of cargo handling equipment as capital. The net book value of cargo handling equipment was adjusted for price effects by deflating using the commercial loans interest rates to get the capital inputs.

The study was limited to investigating the effect of labor productivity, foreign exchange rate and inflation rate on the performance of Maritime Sector in Kenya in enhancing economic growth. The study focused on the services offered by the port of Mombasa and did not attempt to assess the performance of other agencies that operate in the port such as Kenya Revenue Authority and Kenya Bureau of Standards. The study considered, labor productivity, foreign exchange rate and inflation rate.

3.7 Maritime Industry and Economic Growth Model

This study is like any other sectoral impact analysis. However, one major difference that comes with the consideration of the maritime sector is the fact that the maritime sector could have linkages with other sectors of the economy besides contributing directly to economic growth. Lin *et al.* (1999), Henrichsmeyer and Witzke (2000), Rolfe *et al.*, (2011) developed input-output method which could be used in analyzing sectoral impact, the amount and nature of data involved usually turn out to be the constraints that stand in the way of research in that manner. Considering in a narrative manner, buttressed with a mathematical summary, the impact of the maritime sector on economic growth in Kenya.

To develop this theoretical framework, consider just two sectors of the economy, that is, the maritime sector and all other sectors. Assume that the maritime sector produces output Q_1 with the inputs: capital from domestic sources, capital from international sources and domestic labor K_1, K_2 and L respectively. With these definitions, maritime sector is faced with the production of output given its constraints and hence to obtain the maximum output permissible given the cost relations we have the following problem:

$$Max(Q_1): Q_1 = Af(K_1, K_2, L_1) \dots\dots\dots 3.1$$

Subject to the constraints

$$C_1 = \beta_1 K_1 + \beta_2 K_2 + \beta_3 L_1 \dots\dots\dots 3.2$$

On obtaining the optimal value of output corresponding to the cost constraint we have the following:

$$Q_1 = Q_1(A, \beta_1, \beta_2, \beta_3, C_1) \dots\dots\dots 3.3$$

And from this equation we obtain the cost function which is an inverse function of function represented in the equation 3.4 as follows:

$$C_1 = C_1(A, \beta_1, \beta_2, \beta_3, Q_1) \dots\dots\dots 3.4$$

On assuming that the objective of the maritime sector is to maximize profits at the market price P_1 then the unconstrained optimization problem becomes:

$$Max(\pi_1): \pi_1 = P_1 Q_1 - C_1(A, \beta_1, \beta_2, \beta_3, Q_1) \dots\dots\dots 3.5$$

And on obtaining the critical value(s) of Q_1 that maximizes profit can be represented by the following equation:

$$Q_1 = Q_1(A, \beta_1, \beta_2, \beta_3, P_1) \dots\dots\dots 3.6$$

However for the case of other sectors, assumption was made that the presence of linkages from the maritime sector to other sectors of the economy which made a portion of the output of the maritime sector output come into the production function Q_2 and cost relation C_2 of the other sectors as an input. Therefore, for the other sectors of the economy combined the profit maximization problem would be:

$$Max(Q_2): Q_2 = Af(K_3, K_4, L_2) \dots \dots \dots 3.7$$

Subject to the constraints

$$C_2 = \alpha_1 K_3 + \alpha_2 K_4 + \alpha_3 L_2 \dots \dots \dots 3.8$$

Upon solving the above for its critical values and obtaining the maximum output obtainable given the constraint function the following is obtained:

$$Q_2 = Q_2(A, \alpha_1, \alpha_2, \alpha_3, C_2) \dots \dots \dots 3.9$$

and on obtaining the cost function which the inverse of the equation 3.9 to give the following equation:

$$C_2 = C_2(A, \alpha_1, \alpha_2, \alpha_3, Q_2) \dots \dots \dots 3.10$$

However, at the market price p_2 for other sectors of the economy and with the above cost function the unconstrained profit maximization problem will be:

$$Max(\pi_2): \pi_2 = P_2 Q_2 - C_2(A, \alpha_1, \alpha_2, \alpha_3, Q_2) \dots \dots \dots 3.11$$

The critical value(s) of Q_2 that maximizes the profit function can be represented by:

$$Q_2 = Q_2(A, \alpha_1, \alpha_2, \alpha_3, P_2) \dots \dots \dots 3.12$$

The total output in the economy is given by: $Q = Q_1 + Q_2$ which can be represented by adding up equation 3.6 and equation 3.12 to give the following:

$$Q = Q(A, \beta_1, \beta_2, \beta_3, P_1, \alpha_1, \alpha_2, \alpha_3, P_2) \dots \dots \dots 3.13$$

From the model equations 3.12 and equation 3.13, the impact of the maritime sector on growth can be felt via the cost of intermediate sales to the other segments of the economy owing to the linkages from the maritime sector to the other sectors of the economy. Therefore, if maritime services are produced significantly given the level of demand there is the tendency for a decline in the price of maritime services and hence the output of other sectors which have significant linkages with the maritime sector would expand and grow the entire economy.

3.8 Model Specification

This research utilized two models, namely Multiple Regression Model and Dynamic Stochastic General Equilibrium (DSGE) employing Generalized Method of Moments (GMM) modeling. Multiple Regression Model and GMM were used in analyzing the factors of maritime sector performance in Kenya and their impact on the economic advancement.

3.8.1 Multiple Regression Model

Regression analysis is used to find the relationship between one dependent variable and one or more independent variables and has become popular in many research areas. Regression is another way to determine the association between variables; this is similar to bivariate correlation as it assumes that there is a link between the dependent and independent variable (Zikmund, 2003).

Regression analysis is called simple regression analysis where a single independent variable exists and is multiple regressions where two or more independent variables are at play (Robson, Pemberton & McGrane, 2008). Multiple regression analysis is more complex than correlation and is used to find the ability of a set of independent variables in predicting the dependent variable (Pallant, 2007).

In this study multiple regression analysis was used because there was more than one independent variable. To know how good the estimated regression equation is, R^2 was found, which simply the square of correlation coefficient. This measure is also called the coefficient of determination of a regression equation and it takes value between 0 and 1(both values inclusive). It would indicate the exploratory power of the regression model. The test for the significance of R^2 was carried out using the F statistics.

3.8.2 Generalized Method of Moments

The moment condition for OLS regression is $E(xu)=0$, where x , the list of instruments, is the same as the list of regressors in the model. In the command, residual term, u , was defined inside parentheses by using a substitutable expression; because linear combinations declared in substitutable expressions do not include a constant term, (b_0) was included. The GMM model in this case was used because the time variable has $T > 3$. The system GMM estimator, proposed by Arellano and Bover (1995) and Blundell and Bond (1998), has become a popular method for estimating panel data models. The conventional system GMM estimator assumes that the slope coefficients are constant over time, a restriction that typically results in a large number of over-identifying restrictions. The null hypothesis underlying the Sargan-Hansen test is that all over-identifying restrictions, including those arising from assuming time constant coefficients, are valid. Hence, if the slope coefficients are in fact time varying, so that (some of) the over-identifying restrictions do not hold, the Sargan-Hansen test will tend to indicate that the model is mis-specified.

The GMM is a method for designing estimators, analogous to maximum likelihood (ML). GMM uses assumptions regarding exact moments of the random variables rather than those about the whole distribution, which makes it more accurate than ML

at the cost of some efficiency. These assumptions are known as moment conditions. It generalizes the method of moments (MM) by allowing the number of moment conditions to be higher than the number of parameters. Using these extra moment conditions makes GMM more useful than MM. When there are more moment conditions than parameters, the estimator is said to be over-identified. GMM can efficiently bring together the moment conditions when the estimator is over-identified. It rests on the notions of anticipated values and sample means. Moment conditions are anticipated values that delineate the model parameters in terms of the true moments. The sample moment conditions are the sample equivalents to the moment conditions. GMM finds the parameter values that are closest to satisfying the sample moment conditions. The expanding regional disparities from the time of economic reforms in the late 1970s has driven many analysts to explore the various features and variations impacting regional disparities.

In order to analyze the effect of the determinants influencing maritime performance in Kenya, this research utilized Dynamic Stochastic General Equilibrium (DSGE) employing Generalized Method of Moments (GMM) modeling. This model was chosen considering that it works very well for data with short period.

In a method of moments, a population moment condition is that a vector of observed variables, v_t , and unknown parameter vector θ with true value θ_0 which satisfy a $k \times 1$ element vector of conditions:

$$E[f(v_t, \theta)] = 0 \text{ for all } t \dots\dots\dots 3.17$$

The method of moment estimator θ_T^* is used to solve the analogous sample moment conditions given as:

$$g_T(\theta_T^*) = T^{-1} \sum f(v_t, \theta_T^*) = 0 \dots\dots\dots 3.18$$

Where T is the size of the sample.

Consequently, under the usual regularity conditions, $\theta_T^* \xrightarrow{T} \theta_0$, where θ_0 is the solution for equation 3.2, in which there are k unknowns and k equations leading to unique solution. Suppose that f is a $q \times 1$ vector and $q > k$ meaning there are k unknowns and q equations implying that there is no unique solution.

GMM picks a value for θ such that it approaches closest to satisfy equation 3.18. The closeness can be defined by the following criterion function:

$$Q_T(\theta) = [T^{-1} \sum f(v_t, \theta)]' W_T [T^{-1} \sum f(v_t, \theta)] = g_T(\theta)' W_T g_T(\theta) \dots\dots\dots 3.19$$

Where W_T is the weighting matrix, converges to a positive definite matrix W as T grows large.

The GMM estimator depends on the weight matrix $Q_{GMM}(W_T)$ which becomes the GMM estimator of θ_0 (true value) given as $\hat{\theta}$ can be obtained by finding argument of the minimum (argmin) of equation 3.17 as follows:

$$Q_{GMM}(W_T) = \hat{\theta} = \arg \min Q_T(\theta) \dots\dots\dots 3.20$$

In applying the GMM approach, there are pertinent advantages including the requirement is a moment condition in which there is no need to log-linearize any variable. Further, while non-linearities is not a problem when utilizing GMM approach, GMM is robust to heteroskedasticity and distributional assumptions.

The Generalized Method of Moments (GMM) of estimation of DSGE model was employed in analysis of determinants of maritime output which were labor productivity, foreign exchange rate and inflation in maritime sector in Kenya as depicted by equation 3.21.

$$Y_t = \beta_0 + \phi_1 Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 FOREX_t + \beta_4 INFLRATE_t + \varepsilon_t \dots\dots\dots 3.21$$

Where $Y_t, Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 Inf_t + \beta_4 Forex + \varepsilon_t$ represents output, lagged output, labor productivity, foreign exchange rate, inflation rate and the random error term respectively.

3.9 Measurement of Variables

This section provides description, unit of measurement, expected signs and measurement of economic growth, labor productivity, foreign exchange rate and inflation rate.

3.9.1 Maritime Performance

DWT Output

3.9.2 Labour Productivity

Labour Productivity represents the total volume of output per unit of labour during a given time reference period. Labour productivity is given by the throughput in DWT per unit of labour.

3.9.3 Foreign Exchange Rate

The most popular way is to gauge a bilateral exchange rate. A bilateral exchange rate entails the value of a currency compared to another. Bilateral exchange rates are typically quoted against the US dollar, as it is the most traded currency globally. The

exchange rate exposure is measured through a regression of the returns and changes in an exchange rate factor.

Exchange Rate = Starting Amount (Original Currency) / Ending Amount (New Currency)

3.9.4 Inflation Rate

Inflation measures how much more expensive a set of goods and services has become over a certain period. Consumer Price Index (CPI) is widely employed as the key estimation of inflation rate.

$$CPI = \left[\left(\frac{I_n}{I_{n-12}} \right) - 1 \right] \dots\dots\dots 3.23$$

Where I_n is the current price or cost; I_{n-12} is the previous year price or cost

CPI is a key macroeconomic indicator used by many organizations including the government, international agencies, business community including investors, researchers and non-governmental organizations that wish to monitor changes in price movements and how this affects their policy decisions. Empirical literature indicates that average annual inflation, considers price movements within the whole year and is too unresponsive to the current price situation and much of the measured inflation is due to past developments and too little is attributed to the present. The 3-months annualized or quarterly inflation, which is essentially three-month measure, gives the latest developments in prices.

3.9.5 Gross Domestic Product

The GDP is equal to the total expenditures for all final goods and services produced within the country in a stipulated period. The Gross Domestic Product (GDP) measurements in Kenya for the period under review are as given in the Appendix VII.

3.9.6 Economic Growth

Our main interest is to understand the extent in which maritime performance in Kenya influence economic growth in the Kenyan Economy and ignoring the spatial interaction factor. Economic Growth was measured using per capita income in percentage, that is, GDP by the population size as shown in equation 3.22.

$$PerCapitaIncome = \frac{GDP}{Population} \times 100\% \dots\dots\dots 3.22$$

The GDP in Kenya was at 95.50 billion US dollars as of 2019, according to official data from the World Bank (2019). The GDP value of Kenya represents 0.08 percent of the world economy. GDP measures of national income and output for a given country's economy. It is equal to the total expenditures for all items produced within the state in a stipulated duration. The GDP per capita was 1,062.44 USD (KNBS, 2020). Agricultural sector was the main contributor with 35, 139.7 M USD while the transport sector contributed 8,431M USD. GDP annual growth rate figures from year 2000 to 2019 are given in appendix IX. The unit measurement of GDP was in US dollars.

3.10 Diagnostic Tests

Diagnostic checks relating to the properties of data to be used in cross-sectional data modelling need to be implemented in empirical research. In econometric modelling and cross-sectional data, it is essential to diagnose the following tests for multiple regression models.

3.10.1 Normality Test

The multiple linear regression analysis requires that the errors between observed and predicted values (that is, the residuals of the regression) should be normally distributed. This assumption may be checked by looking at a histogram or a Q-Q plot. Normality can also be checked with a goodness of fit test (that is, the Kolmogorov-Smirnov test).

To test the normality assumption the following Jarque-Bera test was used:

$$\chi_n^2(2) = n \left[\frac{1}{6} b_1 + \frac{1}{24} (b_2 - 3)^2 \right] \dots\dots\dots 3.24$$

$$\text{Skewness} = \sqrt{b_1} = \frac{m^3}{m_2^{3/2}} \quad ; \quad \text{Kurtosis} = \frac{m_4}{m_2^2} \quad ; \quad m_k = \sum_t^n (x_t - \hat{x})^{k/n} \quad \text{where } k=1,2,3$$

According to Diebold (2004), the Jarque-Bera test is a common test that includes both skewness and kurtosis to produce an overall test for normality. When the data is normally distributed the value of kurtosis is 3 while the value of skewness is zero. The Jarque-Bera statistics follows the chi-squares distribution with 2 degrees of freedom. Equation 3.22 can be re-written as follows:

$$\chi_n^2(2) = n \left[\frac{u_3^2}{6u_2^3} + \frac{1}{24} \left(\frac{u_4}{u_2^2} - 3 \right)^2 \right] + n \left[\frac{3u_1^2}{2u_2} - \frac{u_3 u_1}{u_2^2} \right] \dots\dots\dots 3.25$$

$$\text{Where } u_k = \sum e_t^k / n.$$

3.10.2 Joint Significance of Decision Variables

The joint significance test for multiple regression model is like an F-test for the maximum likelihood estimation Park (2009), Long (1997) and Maddala (1983). Following Greene (2007) the objective in maximum likelihood estimation, is to maximize the likelihood, instead of minimizing, that is, the least square. Therefore, the larger the better. However, the likelihood is a negative number thus the likelihood of the unrestricted model; L_r will be larger than the restricted model, L_{ur} . The model form that was estimated was as follows.

$$LR = -2[\ln L_r - \ln L_{ur}] \dots\dots\dots 3.26$$

Therefore, in this model specification the inside bracket will be negative, and LR will be positive. If LR is a large number (if there is a significant difference in L_r and L_{ur}), then the additional variables in the unrestricted model are jointly significant (Cameron and Trivedi, 2005 and Cameron and Trivedi, 2009)

3.10.3 Correlation Coefficient

The correlation coefficient can inform whether determinants of output in maritime sector in Kenya are correlated or not; the more symmetric as indicated by positive correlations, the more feasible it becomes (Kandil and Trabelsi, 2010). Cross-sectional correlations between the variables enable determination on whether their combined influenced of output would result in a significant relationship between KPA and KFS.

The greater the absolute value of the correlation coefficient, the stronger the relationship. The extreme values of -1 and 1 indicate a perfectly linear relationship where a change in one variable is accompanied by a perfectly consistent change in the other. For these relationships, all of the data points fall on a line.

Positive coefficients indicate that when the value of one variable increases, the value of the other variable also tends to increase. Positive relationships produce an upward slope on a scatterplot. Negative coefficients represent cases when the value of one variable increases, the value of the other variable tends to decrease. Negative relationships produce a downward slope.

3.10.4 F-Statistics

The *F*-test was used in regression analysis to test the hypothesis that all model parameters were zero. This is a joint test and is based on a statistic that has an *F* distribution. F-test could also be used in statistical analysis when comparing statistical models that have been fitted using the same underlying factors and data set to determine the model with the best fit.

Given a multiple regression model:

$$Y = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \mu_{it} \dots\dots\dots 3.27$$

Where Y is dependent variable; X_i are independent variables; β_i are the parameter coefficients to be estimated.

To test for F-statistics, the following null hypothesis was performed:

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0 \text{ for at least one parameter}$$

A general rule of thumb that is often used in regression analysis is that if $p < 0.05$, then null hypothesis was rejected and would conclude that there will be at least one parameter value that was nonzero.

3.10.5 Hausman Test

The Hausman test is used to test the presence of the endogeneity problem or the correlation between a regressor and the error term. The null hypothesis is $H_0: \text{cov}(x;e)=0$ and the alternative hypothesis is $H_A : \text{cov}(x;e) \neq 0$ where x is the explanatory variable and e is the error term (with the assumption that the error term e is not autocorrelated or autocorrelation is not present).

3.11 Data Analysis and Presentation

After data collection, analysis was carried out using Stata 13.0 software. Various diagnostic tests were carried out. Quantitative techniques such as descriptive statistics and inferential statistics were used to understand relationships between different variables. Qualitative data analyzed using content analysis based on meanings and implications emanating from the data.

The use of descriptive statistics for the variables under study were preferred method to describe the demographic characteristics and also to explain the interaction and relationship between the variables. The Pearson product-moment correlation helped the researcher to determine whether there was a significant relationship or association between two variables. A Pearson correlation coefficient was used when working with continuous data, in other words, data on the interval or ratio level of measurement.

Multiple linear regressions is a parametric statistic used since the data adhere to the following assumptions or parameters (Field, 2009): data must be on interval level, a

linear relationship must exist (can be indicated by means of a scatter plot), the distributions must be similar (thus, if they are skewed, they must be skewed in the same direction), but preferably normal, outliers must be identified and omitted from the computation and determine homoscedasticity of the data. The study used Pearson product moment correlation, multiple regressions were used to establish the relationship between independent and dependent variables.

3.12 Estimation of Parameters

Shamoo and Resnik (2003) noted that data analysis is the process of systematically applying statistical and or logical techniques to describe and illustrate, condense and recap, and evaluate data. This section presents the specification used to estimate the determinants of maritime performance and impact of economic growth in using GMM model.

3.12.1 Multiple Regression Model

The Multiple Regression Model was employed in analysis of determinants of maritime output which were labor productivity, foreign exchange rate and inflation in maritime sector in Kenya as depicted by equation 3.29.

$$Y_t = \beta_0 + \phi_1 Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 FOREX_t + \beta_4 INFLRATE_t + \varepsilon_t \dots\dots\dots 3.29$$

Where $Y_t, Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 Inf_t + \beta_4 Forex + \varepsilon_t$ represents output, lagged output, labor productivity, foreign exchange rate, inflation rate and the random error term respectively.

3.12.2 GMM Model

The following equation was investigated:

$$Y_t = \beta_0 + \phi_1 Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 Inf_t + \beta_4 Forex + \varepsilon_t \dots\dots\dots 3.30$$

Where $Y_t, Y_{(t-1)} + \beta_2 Lbr_t + \beta_3 Inf_t + \beta_4 Forex + \varepsilon_t$ represents output, lagged output, labor productivity, foreign exchange rate, inflation rate and the random error term respectively.

3.13 Ethical Considerations

In carrying out this study, formal approval was carried out for mutual interest between the researcher and the participants. Consequently, the following approvals were obtained prior to commencement of the study:

- a) Obtained a written introduction letter from Moi University, School of Business and Economics through Economics Department (Appendix I).
- b) Acquired research permit from National Council for Science and Technology-Kenya (Appendix II).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

The study employed different statistical techniques aided by STATA version 13.0 to make an economic analysis of the maritime sector performance in enhancing economic growth in Kenya. This chapter describes the diagnostic tests performed, descriptive statistics, model selection and analysis of macroeconomic variables, impact of maritime trade on economic growth and the results of hypothesis testing.

4.2 Diagnostic Tests

The diagnostic tests performed were normality test, test of first order autocorrelation, over-identification test, heteroskedasticity and multicollinearity.

4.2.1 Unit Root Tests

The unit root tests were carried out for the three variables to be used in assessing maritime performance: labor productivity (LBR), Foreign Exchange Rate (FOREX) and Inflation rate (INLRATE). The test for the null hypothesis was that the variable had no stationarity (presence of unit root), against an alternative hypothesis that there was unit root. If the test statistic is greater than the 5% critical value, then the null hypothesis is rejected and infers the absence of a unit root, that is, when $p < 0.05$, then we reject the null hypothesis and accept that there is stationarity. When a unit root is present, then in order to remove it, the first difference is taken. Augmented Dickey-Fuller test for stationarity is presented in Table 4.1.

Table 4.1: Unit Root Tests

		Initial	D1	D2_	D8
InOutput (<i>InOPT</i>)	z(t)	-0.1264		-2.6722	
	5% critical value	-0.6729		-0.6729	
	p-value for z(t)	0.4497		0.0038	
InLabor (<i>InLBR</i>)	z(t)	-0.5724		-1.7404	
	5% critical value	-0.6729		-0.6729	
	p-value for z(t)	0.2818		0.0409	
InForeign Exchange Rate (<i>InFOREX</i>)	z(t)	1.0584		2.9115	
	5% critical value	0.6729		0.6729	
	p-value for z(t)	0.8551		0.0018	
InInflation Rate (<i>InINFLRATE</i>)	z(t)	-3.5367			
	5% critical value	-0.6729			
	p-value for z(t)	0.0002			

Source: Author (2020)

The results showed that the test statistics for KPA and KFS, that is, -0.1264, was less than the 5% critical value of -0.6729 (-1.96) with a p-value for the z(t), 0.4497, which was greater than 0.05 indicating that with regard to the Inoutput (*InOPT*), there was a presence of a unit root. The first difference of the Inoutput (*InOPT*) was taken and the unit root test carried out on it. The findings of the first difference showed that the test statistic was still less than the 5% critical value with a p-value for the z(t) greater than 0.05 in all the panels thus indicating that the first difference of the Inoutput (*InOPT*) still had unit root among the panels. On performing the second difference, the difference showed that all the test statistics, -2.6722, greater than the 5 percentage critical value, -0.6729 (-1.96), with a p-value for the z(t), 0.0038, was less than $p = 0.0038 < 0.05$ indicating that the second difference of the Inoutput (*InOPT*) had no unit root among all the panels. This meant that the second difference of the Inoutput (*InOPT*) would be used in the multivariate regression modeling.

The Augmented Dickey-Fuller unit root test on the Inlabor (*InLBRT*) showed that all the test statistics, -0.5724, was less than the 5% critical value, -0.6729 (-1.96), for all the panels indicating that there was a unit root in the Inlabor (*InLBRT*). To correct for a unit root, the first difference of the variable was performed. Therefore, the test for the unit root on the first differenced variable was carried out. The unit root test on the first differenced Inlabor (*InLBRT*) showed that the test statistics, -1.7404, was greater than the 5% critical value of -0.6729 (-1.96) with the p-value for the $z(t)$ being 0.0409 which was less than 0.05. This indicating that the first difference of the Inlabor (*InLBRT*) had no unit root among all the panels. This meant that the first difference of the Inlabor (*InLBRT*) would be used in the multiple regression modeling.

As regards the Inforeign exchange rate, (*InFOREX*), the test statistics was, 1.0584, which was greater than the 5% critical value of 0.6729 (1.96) with a p-value for the $z(t)$, 0.8551, which was greater than 0.05. This indicating that with regard to the foreign exchange rate, (*InFOREX*), there was a presence of a unit root. The first, second, third up to the seventh difference of the Inforeign exchange rate, (*InFOREX*), were taken and the unit root test carried out on it. The findings showed that the test statistic was still less than the 5% critical value with a p-value for the $z(t)$ greater than 0.05 in all the panels thus indicating that the first upto the seventh differences of the Inforeign exchange rate, (*InFOREX*), still had unit root among the panels. On performing the eighth difference, the difference showed that the test statistics was, -2.9115, greater than the 5% critical value, -0.6729 (-1.96), with a p-value for the $z(t)$, $p = 0.0018 < 0.05$, was less than 0.05. This implied that the eighth difference of the Inforeign exchange rate, (*InFOREX*), had no unit root among all the panels. This meant that the eighth difference of the Inforeign exchange rate, (*InFOREX*), would be used in the analysis.

Finally, the findings for the unit root for InInflrate (*InINFLRATE*) showed that all the test statistics, -3.5567, were greater than the 5% critical value of -0.6729 (-1.96) with the p-value, $p = 0.000 < 0.05$. This meant that there was no unit root present in InInflrate (*InINFLRATE*) for all the panels and implied that the InInflrate (*InINFLRATE*) would be used in the analysis.

4.2.2 Normality Test

For the normal distribution there should a symmetric distribution with well-behaved tails whereby the skewness of 0.03 and kurtosis of 3 is required. In this study, the normality test was conducted on the regression residuals and the skewness and kurtosis were observed. The null hypothesis for the normality test was that the data was normally distributed. The findings of normality test are presented in table 4.2.

Table 4.2: Skewness and Kurtosis Test for Normality

Variable	Obs	Skewness	Kurtosis	Joint	
		Coef.	Coef.	Z	P>Z
InOutput (<i>InOPT</i>)	40	0.0760	0.4056	4.04	0.1329
InLabor Productivity (<i>InLBR</i>)	40	0.1575	0.0612	5.31	0.0702
InForeign Exchange Rate (<i>InFOREX</i>)	40	0.6807	0.8252	0.22	0.8967
InInflation Rate (<i>InINFLRATE</i>)	40	0.3363	0.0982	3.89	0.1428

Source: Author (2020)

The findings indicated that the variables did not violate the normality assumption since all individual p-values for skewness and kurtosis for all the variables were greater than 0.05.

Using graphical approach, the results was presented in figure 4.1.

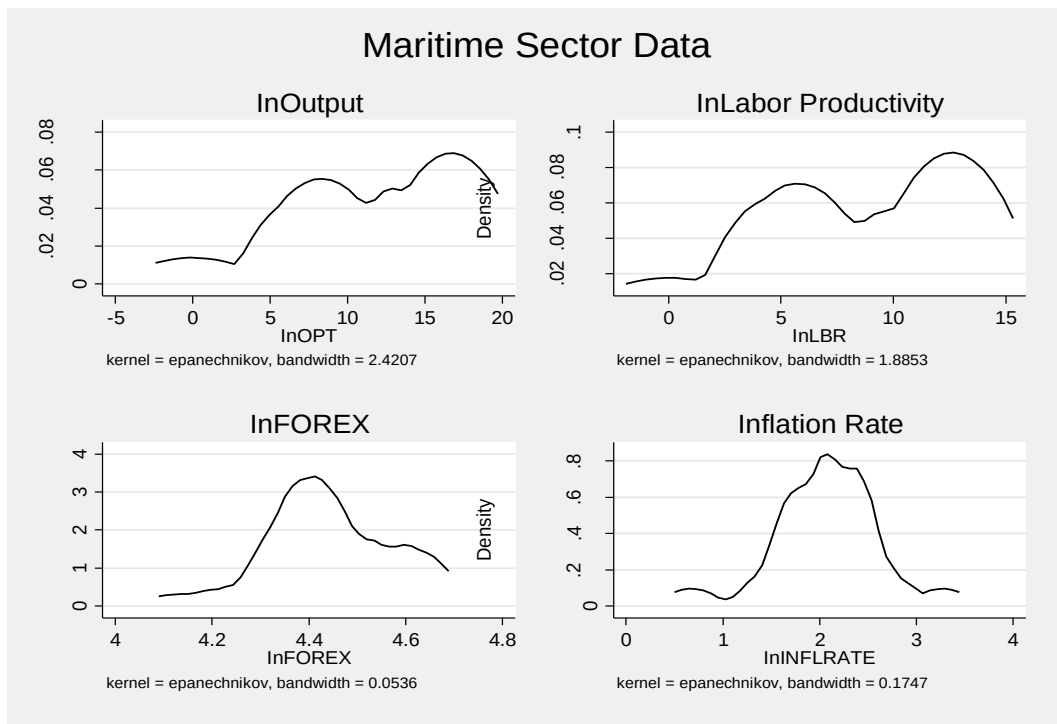


Figure 4. 1: Maritime Sector in Kenya (2000-2019)

Source: Author (2020)

The results showed that data for all the variables used in the analysis depicted that they did not violate normality assumption.

4.2.3 Autocorrelation Test

The test of suitability of instruments is presented in table 4.3.

Table 4. 3: Durbin-Wu-Hausman Test

Output	Coeff.	Std. Err.	Z	P> Z
Inflation	-1100.701	546.92	-2.01	-2172.65
Labor Productivity	1.5147	0.1575	0.0612	0.0702
Cons	7296.70	5359.44	1.36	-3207.61
Durbin				0.0017
Wu-Hausman				0.0016

Source: Author (2020)

The results indicated that the significance value of p-value of Durbin-Wu-Hausman chi-square test was 0.0017 which was significant at 5% level. This implied that

autocorrelation was not present and hence the choice of instrumental variables was perfect. This statistic should always be statistically significant.

4.2.4 Test of Over-Identification

In addition to the requirement that instrumental variables be correlated with the endogenous regressors, the instruments must also be uncorrelated with the structural error term. The null hypothesis was that there was no over-identification while the alternative hypothesis was that there was over-identification. The result for establishing whether there was over-identification test is presented in table 4.4.

Table 4. 4: Test for Establishing Over-Identification

Output	Coeff.	Std. Err.	Z	P> Z
Inflation	-1100.701	546.92	-2.01	0.044
Labor Productivity	1.5147	0.0964	15.71	0.000
Cons	7296.70	5359.44	1.36	0.173
Overall				0.000

Source: Author (2020)

The results showed that the significance value of p was 0.000 indicating that there was no over-identification in the instruments. This implied that the test of over-identification could be performed. This implied that the model was not overidentified, meaning that the number of additional instruments did not exceed the number of endogenous regressors.

4.3 Descriptive Statistics

In this section, descriptive statistics are discussed.

4.3.1 Summary Statistics

The summary statistics by company based on the clustered years of 2000 to 2019 giving 20 observations for each company is presented in Table 4.5.

Table 4.5: Summary Statistics

	Variable	Mean	Std. Dev.	Min	Max
Kenya Ports Authority	InOPT	16.6918	0.3946	16.0049	17.2761
	InLBR	12.5999	0.3353	12.1397	13.4394
	InFOREX	4.4407	0.1285	4.1437	4.6347
	InINFLRATE	2.0650	0.5444	0.6736	3.2673
Kenya Ferry Services	InOPT	6.6400	3.4069	0	8.3710
	InLBR	4.6001	2.3672	0	6.0544
	InFOREX	4.4407	0.1285	4.1431	4.6347
	InINFLRATE	2.0650	0.5444	0.6736	3.2673

Source: Author (2020)

Where *Opt* is the total output; *Lbr* is the labor; *Forex* is the Foreign Exchange Rate and *Inflrate* is the Inflation Rate.

As shown in table 4.5, average output is higher for Kenya Ports Authority (17,748,295 DWT) compared with that of Kenya Ferry Services (765 DWT) during the period 2000–2019, however with disparities, varying from a minimum of 8,929.759 DWT to a maximum of 31,835,736 DWT in KPA while in KFS., a minimum of zero units to a maximum of 4,320 DWT per year. Average labor productivity was also higher for KPA (296,529 DWT) compared to KFS with average labor productivity of 99 DWT.

The average foreign exchange rate was 85.5 percent while the minimum was 63 percent with the maximum being 103 percent under the period of study, that is, between the year 2000 and 2019.

Inflation was not volatile in Kenya with an average value, 7.9 percent, which was below double digit with a standard deviation (SD) of 1.7 percent with minimum inflation rate being 1.96 percent while the maximum of 26.2 was for the year 2008.

4.3.2 Output Performance

Figure 4.2 presents output productivity. The annual time in years is on the horizontal axis while units per labor is on the vertical axis.

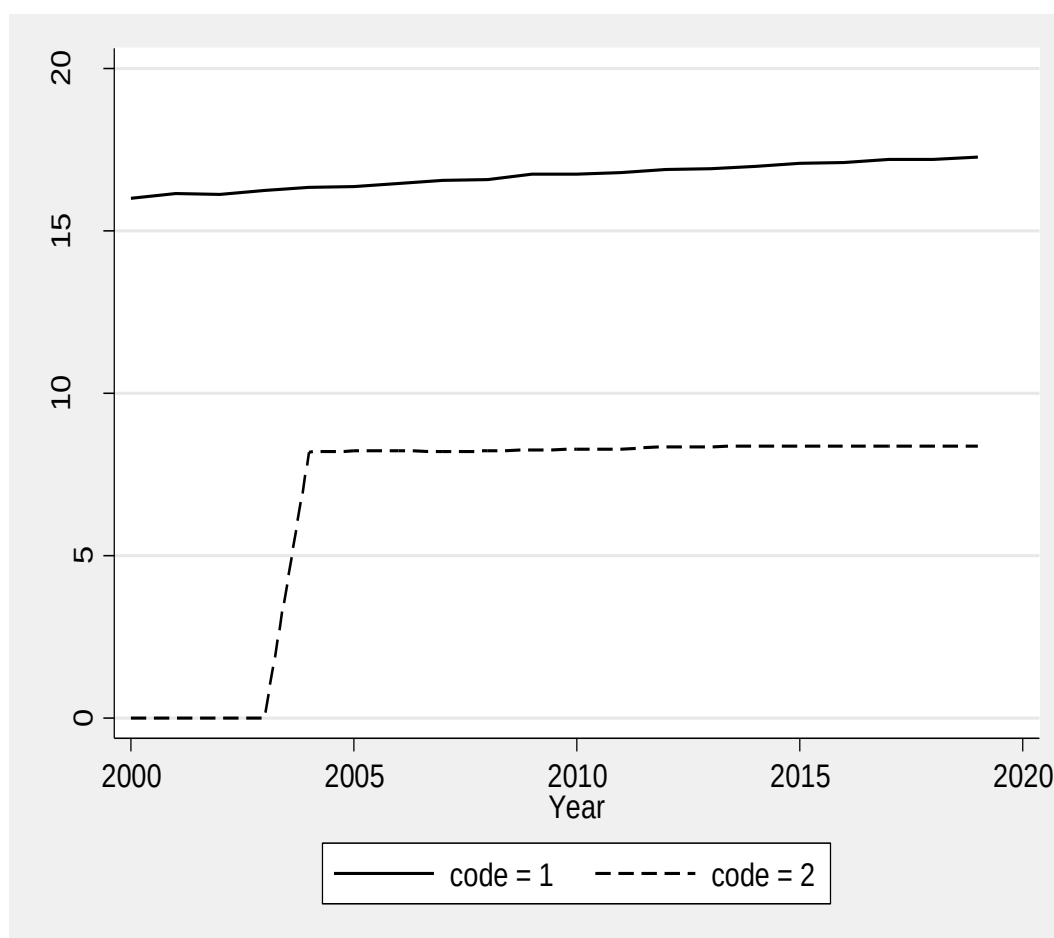


Figure 4.2: Output Performance of Maritime Sector in Kenya (2000-2019)

Key: Code 1 is KPA while Code 2 is KFS.

Source: Author (2020)

The results indicated that output performance for KPA and KFS were increasing on annual basis. KPA had almost an average output performance of *In*16 (8,886,111) DWT while KFS which began its production in the year 2004, started producing an average output performance of approximately 2,981 DWT.

4.3.3 Labor Productivity

In figure 4.3, results for labor productivity in DWT is presented.

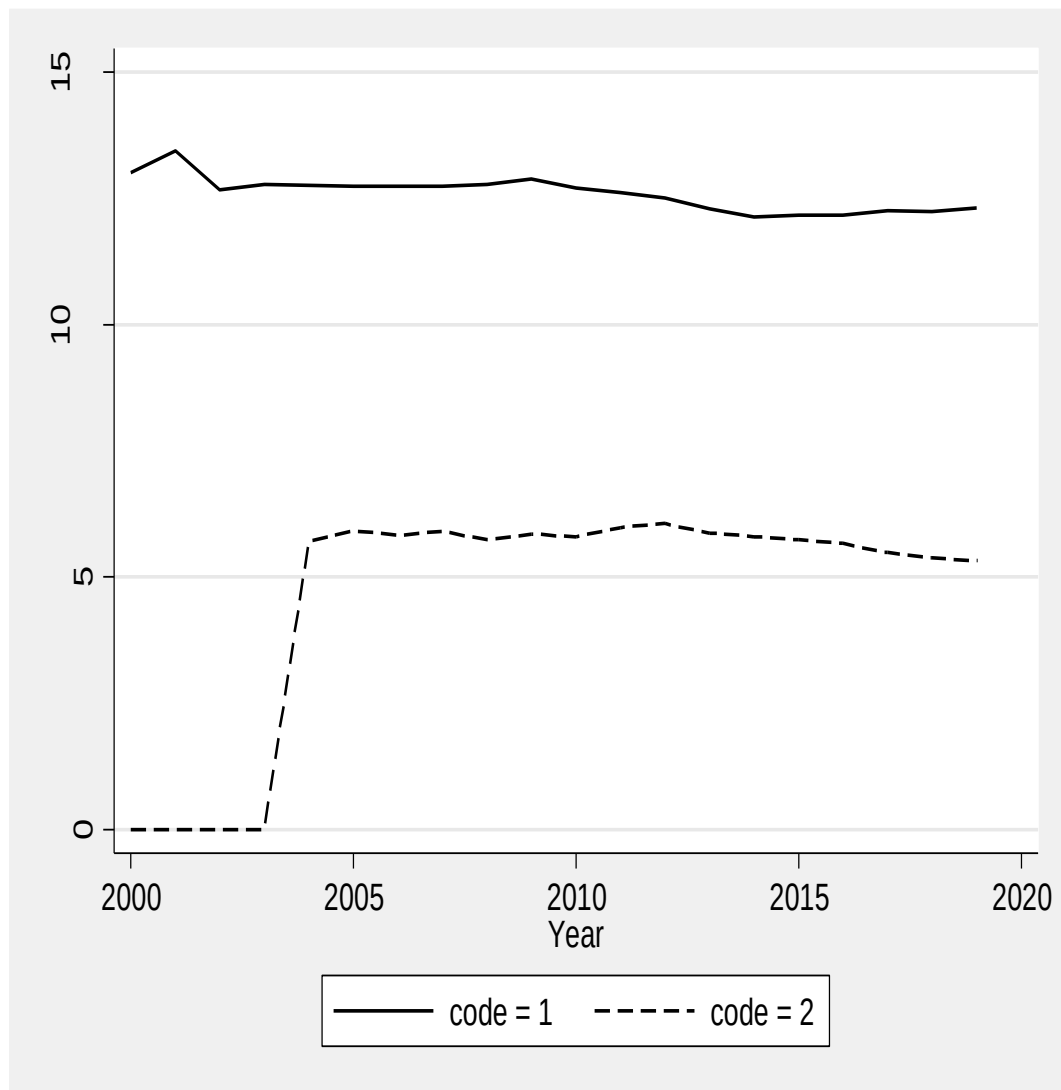


Figure 4.3: Labor Productivity (DWT) in Maritime in Kenya

Source: Author (2020)

The results indicated that KPA (Code 1) had a higher labor productivity compared to KFS (Code2) throughout the entire period of study, that is, between the year 2000 and 2019. The average labor productivity in KPA was approximately 268,337 DWT. KFS started its output in the year 2004 whereby its labor productivity, on average, throughout the period of study was approximately 403 DWT.

4.3.4 Foreign Exchange Rates

Figure 4.4 presents the trend of the foreign exchange rates in Kenya from 2000 to 2019. The annual time in years is on the horizontal axis while the real exchange rate (RER) is on the vertical axis.

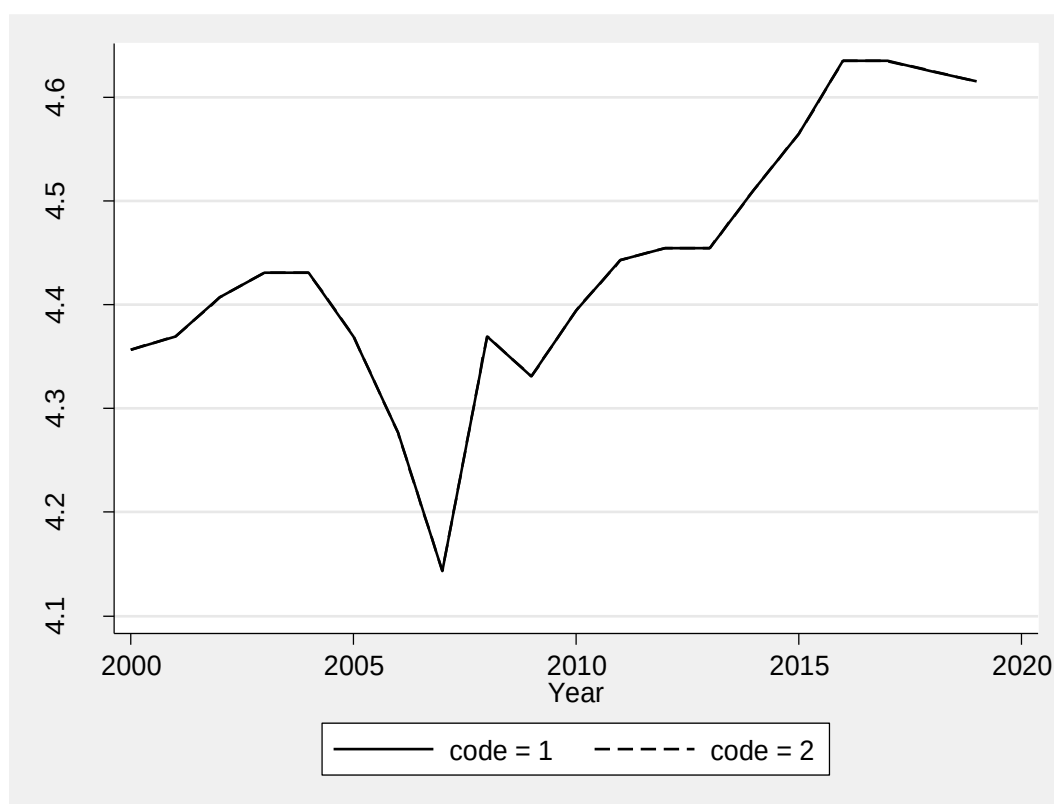


Figure 4.4: Trend in Foreign Exchange Rates in Kenya (2000-2019)

Source: Author (2020)

The findings indicated that in the year 2007, there was a drastic drop to approximately 62 percent in foreign exchange rates Kenya. Thereafter, foreign exchange rate started to increase up to the year 2016 with the highest rate being approximately 102 percent.

4.3.5 Inflation Rate Trends

Figure 4.5 presents the trend of the inflation rates in percentage in Kenya from 2000 to 2019. The annual time in years is on the horizontal axis while the inflation rate is on the vertical axis.

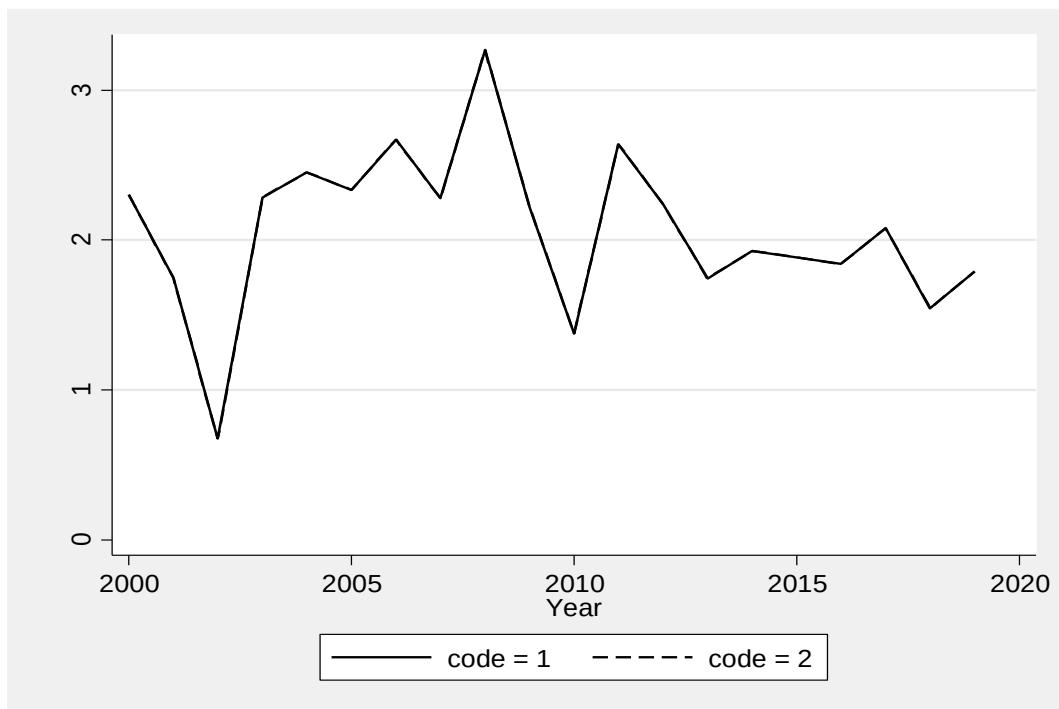


Figure 4.5: Trend Analysis of Inflation Rate in Kenya (2000-2019)

Source: Author (2020)

The results showed that between 2000 and 2003 the inflation rate was slightly increasing in Kenya. However, in the year 2003, inflation rate started to drop from 10 percent up to approximately 2 percent in the year 2003. Thereafter, inflation rate started to increase drastically with the highest inflation rate being approximately 26 percent in the year 2008. Again inflation rates started to drop down to 4 percent in the year 2010. A slight increase was evidenced from year 2010 when it was 4 percent to 13 percent in the year 2011. Thereafter, there was an average flat inflation rates of approximately 6.5 percent from the year 2013 up to 2019.

4.4 Model Selection

Model selection indicating results of FE and RE regression is presented in table 4.6.

Table 4. 6: Model Selection

	FE (within) model		RE GLS model	
	Betas	SE	Betas	SE
_cons	-6.6935*	1.2702	-6.7142*	1.3410
Independent variables				
In Labor (<i>InLBR</i>)	1.3719*	0.0473	1.2723*	0.0184
In Foreign Exchange Rate (<i>InFOREX</i>)	3.4065*	0.6375	3.5694*	0.6688
In Inflation Rate (<i>InINFLRATE</i>)	0.0739	0.1550	0.1616	0.1585
Model diagnostics				
R-squared	0.9926		0.9927	
Corr(u_i, Xb)	-0.9210			
sigma_u	0.2832			
sigma_e	0.2062		0.2062	
Rho	0.6536			
Hausman				
chi2			318.90	
Sig.			0.000	

Source: Author (2020)

With regard to the fixed effects model, the findings showed that the estimated coefficients for *In LBR* (1.3719) and *In FOREX* (3.4065) were positive and significant at 5 percent level of significance, that is, $p < 0.05$, while *In INFLRATE* (0.0739) was not significant in terms of their effect on output, all $p > 0.05$. The R-squared value was 0.9926 indicating that 99.26 percent of the variation in output was accounted for by the variables in the model.

Assessment of the random effects model showed that *In LBR* (1.2723) and *In FOREX* (3.5694) had significant effects on output, all $p < 0.05$. The coefficient of *In INFLRATE* was not significant at 5 percent level of significance. The R-squared valued was 0.9927 implying that 99.27 percentage of the variation in the output was accounted for by the variables in the model.

The Hausman test compares an estimator that is known to be consistent/ unbiased with an estimator that is known to be efficient (that is, fixed and random models) under the assumption being tested. Here, it was testing whether the fixed effects estimates were the same as the random effects estimates. If the estimates do not significantly differ, then the random effects estimator is preferable because its standard errors are lower.

4.4.1 Hausman Test

The Hausman test was used to compare the fixed effects model with a random effects model that controls for several of the time-invariant variables. The null hypothesis was that fixed-effects was superior to random effects. The results for Hausman test is presented in table 4.7.

Table 4. 7: Hausman Test

	FE (within) model	RE GLS model	Difference	S.E
	Betas	Betas	Betas	
Independent variables				
Log Labor (InLBR)	1.3719	1.2723	0.0996	0.0436
Log Foreign Exchange Rate (InFOREX)	3.4065	3.5694	-0.1629	-
Log Inflation Rate (InINFLRATE)	0.0739	0.1616	-0.0877	-
Chi2	5.22			
P-value	0.1562			

Source: Author (2020)

The Hausman test was used to test among the two models which was superior, and the findings showed that the random effects model was better, $\chi^2=5.22$, $p = 0.1562$. The random effects model in this case was used as a generalized least squares model that allowed for correcting for serial correlation or autocorrelation of the variables.

4.5 Multiple Regression Model

This section presents the results and discussions of the examination of the determinants of output produced by maritime sector in Kenya using the Multiple Regression approach. More specifically, to establish the influence of labor productivity, foreign exchange rate and inflation rate on the output produced by maritime sector in Kenya.

4.5.1 Correlation of Disturbances

The results for correlation of coefficients is presented in table 4.8.

Table 4.8: Correlations of Variables, 2000-2019

	InOPT	InLBR	InFOREX	InINFLRATE
InOPT	1	0	0	0
InLBR	0.9934	1	0	0
InFOREX	0.0881	0.0127	1	0
InINFLRATE	0.0816	0.0928	-0.3205	1

Source: Author (2020)

The results indicated that with exception of In LBR, all the other variables had a minimal, that is, less than 0.5 correlation coefficient indicating weak relationships.

4.5.2 Regression Estimation of Parameters

The result for the Multiple Regression estimation is shown in table 4.9.

Table 4.9: Multiple Regression Results

In Output (<i>InOPT</i>)	Coeff.	Std. Error	Z-Value	P > Z	[95% Conf. Inter.]	
<i>In Labor Productivity (InLBR)</i>	1.2723	0.0184	69.08	0.000	1.2349	1.3096
<i>In Foreign Exchange Rate (InFOREX)</i>	3.5694	0.6688	5.34	0.000	2.2129	4.9258
<i>In Inflation Rate (InINFLRATE)</i>	0.1616	0.1585	1.02	0.315	-0.1599	0.4830
Intercept	-15.4600	3.0878	-5.01	0.000	-21.7224	-9.1976

Source: Author (2020)

The results showed that the intercept coefficient was positive and significantly ($P = 0.000 < 0.05$) determined the output in the maritime sector in Kenya during the period under study. From the above regression equation, it was revealed that holding labor productivity, foreign exchange rate and inflation rate to a constant zero; the intercept coefficient indicated that output produced in maritime sector in Kenya 5,178,365 DWT. Everitt (2002) posited that when the intercept coefficient is negative and significant, that meant that the study accounted for most of the determinants of output produced in maritime sector in Kenya.

With the use of bootstrap which is used to obtain improved estimates and confidence intervals in statistics, the results indicated the range in which the parameter coefficients are normal based on the 95 percent confidence interval. This implied that the coefficient of *InLBR*, 1.2723 was within the normal based on 95 percentage confidence intervals of 1.2349-1.3096. Coefficient of *InFOREX*, 3.5694, was within the normal-based confidence interval of 2.2129-4.9258. Finally, the results depicted that the coefficient of *InINFLRATE* of 0.1616 was within the normal based of 95 percentage confidence interval of -0.1599-0.4830.

In general, transformed models where the dependent variable and independent variables are transformed, a coefficient represent elasticity. The results in this study, the coefficient of labor productivity, 1.2723 was positive and significant at 5 percent level, $p = 0.000 < 0.05$. This implied that every one percent increase in labor productivity, output increased by about 1.2723 percent.

The results indicated that the coefficient of foreign exchange rate was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. This implied that for

every one percent increase in foreign exchange rate could increase the output by 3.5694 percent.

The results indicated that the coefficient of inflation rate was not significant at 5 percent level of significance, $p = 0.315 > 0.05$. This implied that inflation rate did not influence the output in maritime sector in Kenya.

4.6 GMM Model Estimation

This section presents the results and discussions of the examination of the effects of labor productivity, inflation rate and foreign exchange rate on performance of maritime sector using the GMM approach. The results for the system GMM estimation is shown in Table 4.10.

Table 4.10: System GMM Estimation

	GMM			Ivregress_GMM			Arellano-Bond		
	Betas	SE	P	Betas	SE	P	Betas	SE	P
_cons				-6.7142	1.3410	0.000	-13.7809	2.0519	0.000
Indept. Variables									
<i>In Labor (InLBR)</i>				1.2723	0.0184	0.000	1.2533	0.0656	0.000
<i>In Foreign Exchange Rate (InFOREX)</i>				3.5684	0.6688	0.000	2.9817	0.4146	0.000
<i>Inflation Rate (InINFLRATE)</i>				0.1616	0.1585	0.308	0.1095	0.0985	0.266
Instrumental Variables									
β_0	-14.852	1.5385	0.000						
β_1	1.3717	0.0282	0.000						
β_2	3.2744	0.3346	0.000						
β_3	0.0875	0.0824	0.288						
Model Diagnostics									
R-squared				0.9927					
Wald chi2				318.90					
							458.76		
Sig.				0.000			0.000		

Source: Author (2020)

From the findings, the results showed that the coefficient of labor productivity was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. This implied that for every increase in one percent of labor productivity (β_1), output production increased by 1.3717 percent in the maritime sector in Kenya. In addition, the findings on the second estimated sample moment indicated that the coefficient of foreign exchange rate was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. The indicated that for every increase in one percent in foreign exchange rate, output produced in maritime sector in Kenya increased by 3.2744 percent.

As regards inflation rate, the coefficient was not significant at 5 percent level of significance implying inflation rate did not influence output production in maritime sector in Kenya.

The second model involves the instrumental variable regression based on the GMM model and the findings showed that the findings were similar to the estimated moments in the GMM model with the only slight differences in the estimated standard errors and values of the coefficients of the independent variables. However, the directions of the coefficients were on the same direction. The value of the R-squared was 0.9927 which indicated that 99.27 percent of the variation in output produced in maritime sector in Kenya was accounted for by the model variables.

4.7 Impact of Maritime Sector on Economic Growth

The third objective was to establish the impact of maritime performance on economic growth in Kenya. In analyzing the impact of trade on economic growth, the total output from the maritime sector was used. The results of the impact of maritime sector on economic growth in Kenya is presented in table 4.11.

Table 4.11: Ordinary Least Squares Estimates for Maritime Sector in Kenya

Maritime Sector in Kenya		
Dependent Variable	$\ln(PCI)_t$	
	Coef. (SE)	Sig.
Independent Variables		
$\ln(PCI)_{t-1}$	0.0858 (0.2407)	0.726
$\ln\left(\frac{M}{Y}\right)$	1.2183 (0.6623)	0.084
_Const.	0.4625 (0.1595)	0.010
Model Statistics		
F	2.5132	
Prob > F	0.1124	
R-squared	0.2391	
Adj. R-squared	0.1125	

Y is the real GDP; M is the contribution of maritime sector; PCI is the per capita income based on the GDP at a given period;

Source: Author (2020)

The model depicted R-squared value of 0.2391 indicating that the model accounted for 23.91% of the variation in the contribution of maritime sector in Kenya.

The coefficient of interest was $\ln\left(\frac{M}{Y}\right)$, coefficient of contribution of maritime sector to the Gross Domestic Product (GDP), which was not significant at 5 percent level, $p = 0.084 > 0.05$. This implied that contribution of maritime sector did not influence economic growth in Kenya at 5 percent level of significance. Kenya's maritime industry contributes insignificantly to the GDP and this was because 80 to 90 % of vessels that come into the country were foreign vessels. The foreign vessels owners repatriated the profit accrued from the shipping business in Kenya to their various countries thereby making it difficult to retain the money in the economy.

4.8 Hypothesis Testing

Applying Multiple Regression Approach, the stated hypotheses were tested in various sections in this study and the summary of the results were as follows:

H₀₁: There is no effect of labor productivity on the performance of maritime state corporations in Kenya.

The observed test statistic, $P = 0.000 < 0.05$ for the coefficient of labor productivity implying that labor productivity influenced the performance of Maritime Sector in Kenya at 5 percent level of significance. Therefore, the null hypothesis relating to labor productivity was rejected at the 5 percent level of significance.

H₀₂: There is no influence of foreign exchange rate on the performance of maritime state corporations in Kenya.

The observed test statistic, $P = 0.000 < 0.05$ for the coefficient of foreign exchange rate implying that foreign exchange rate influenced the performance of Maritime Sector in Kenya at 5 percent level of significance. Therefore, the null hypothesis relating to labor productivity was rejected at the 5 percent level of significance.

H₀₃: There is no effect of inflation rate development on maritime sector performance in Kenya.

The test statistic $P = 0.315 > 0.05$ for the coefficients of inflation rate implying that inflation rates did not influence performance of maritime sector in Kenya under the period of study, that is, between the year 2000 and 2019. Therefore, the null hypothesis was not rejected at the 5% level of significance.

H₀₄: There is no impact of maritime performance on economic growth in Kenya.

The coefficient of contribution of maritime sector to the Gross Domestic Product, $\ln\left(\frac{M}{Y}\right)$, was not significant at 5 percent level, $p = 0.084 > 0.05$.

This implied that contribution of maritime sector to GDP did not influence economic growth in Kenya at 5 percent level of significance.

Applying Multiple Regression and GMM models, the two models indicated that labor productivity and foreign exchange rate were positive and significant at 5 percent level while inflation rate was not significant at 5 percent level. The intercept term depicted a negative and significant at 5 percent level upon applying the Multiple Regression and GMM models.

This implied that the two models portrayed the same results for the parameter estimates at 5 percent level of significance.

Applying Generalized Method of Moments Approach, the stated hypotheses were tested in various sections in this study and the summary of the results were as follows:

H₀₁: There is no effect of labor productivity on the performance of maritime state corporations in Kenya.

The observed test statistic, $P = 0.000 < 0.05$ for the coefficient of labor productivity implying that labor productivity influenced the performance of Maritime Sector in Kenya at 5 percent level of significance.

Therefore the null hypothesis relating to labor productivity was rejected at the 5 percent level of significance.

H02: There is no influence of foreign exchange rate on the performance of maritime state corporations in Kenya.

The observed test statistic, $P = 0.000 < 0.05$ for the coefficient of foreign exchange rate implying that foreign exchange rate influenced the performance of Maritime Sector in Kenya at 5 percent level of significance.

Therefore, the null hypothesis relating to foreign exchange rate was rejected at the 5 percent level of significance.

H03: There is no effect of inflation rate development on the performance of maritime state corporations in Kenya.

The test statistic $P = 0.308 > 0.05$ for the coefficients of inflation rate implying that inflation rates did not influenced performance of maritime sector in Kenya under the period of study, that is, between the year 2000 and 2019. Therefore, the null hypothesis was not rejected at the 5 percentage level of significance.

H04: There is no impact of maritime performance on economic growth in Kenya.

The coefficient of contribution of maritime sector to the Gross Domestic Product, $\ln\left(\frac{M}{Y}\right)$, was not significant at 5 percent level, $p = 0.084 > 0.05$.

This implied that contribution of maritime sector to GDP did not influence economic growth in Kenya at 5 percent level of significance.

Applying Multiple Regression and GMM models, the two models indicated that labor productivity and foreign exchange rate were positive and significant

at 5 percent level while inflation rate was not significant at 5 percent level. The intercept term depicted a negative and significant at 5 percent level upon applying the Multiple Regression and GMM models.

This implied that the two models portrayed the same results for the parameter estimates at 5 percent level of significance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND POLICY

IMPLICATIONS

5.1 Overview

This section of the thesis deals with the following: Section 5.2 describes the summary of the research findings; Section 5.3 presents the conclusions from the study, Section 5.4 provides the policy implications and Section 5.5 displays the contributions to knowledge. Owing to the scope and limitations of the study, Section 5.6 gives suggestions for further research.

5.2 Summary of the Study

The overall objective of this study was to make an economic analysis of the maritime performance in enhancing economic growth in Kenya. To achieve this objective, the study used the following major techniques: first, descriptive analysis of the socioeconomic background was conducted followed by extensive review of the theoretical foundations and the empirical studies of the economic growth. Secondly, Multiple Regression Approach and GMM were used to examine the impacts of determinants on maritime performance and impact of maritime sector on economic growth in Kenya.

The output is higher for Kenya Ports Authority (17,748,295 DWT) compared with that of Kenya Ferry Services though with disparities, varying from a minimum of 8,929.759 DWT to a maximum of 31,835,736 DWT in KPA while in KFS, a minimum of zero units to a maximum of 4,320 DWT. Average labor productivity was also higher for KPA (296,529 DWT) compared to KFS with average labor productivity of 99 DWT.

The average foreign exchange rate was 85.5 percent while the minimum was 63 percent with the maximum being 103 percent under the period of study, that is, between the year 2000 and 2019.

Inflation was not volatile in Kenya with an average value, 7.9 percent, which was below double digit with a standard deviation (SD) of 1.7 percent with minimum inflation rate being 1.96 percent while the maximum of 26.2 was for the year 2008.

Applying Multiple Regression Approach, the observed test statistic, $P = 0.000 < 0.05$, for the coefficient of labor productivity, which was 1.2723, implying that labor productivity was positive and significant at 5 percent level of significance. This implied that every one percent increase in labor productivity, output increased by about 1.2723 percent. The results indicated that the coefficient of foreign exchange rate was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. This implied that for every one percent increase in foreign exchange rate could increase the output by 3.5694 percent.

Utilizing GMM, the results showed that the coefficient of labor productivity was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. This implied that for every increase in one percent of labor productivity (β_1), output production increased by 1.3717 percent in the maritime sector in Kenya. In addition, the findings on the second estimated sample moment indicated that the coefficient of foreign exchange rate was positive and significant at 5 percent level of significance, $p = 0.000 < 0.05$. The indicated that for every increase in one percent in foreign exchange rate, output produced in maritime sector in Kenya increased by 3.2744 percent. The coefficient of contribution of maritime sector to economic growth in

Kenya was not significant at 5 percent level, $p = 0.514 > 0.05$. This implied that contribution of maritime sector did not influence economic growth in Kenya at 5 percent level of significance.

Comparison of results using Multiple Regression and GMM models, the two models indicated that labor productivity and foreign exchange rate were positive and significant at 5 percent level while inflation rate was not significant at 5 percent level. The intercept term depicted a negative and significant at 5 percent level upon applying both Multiple Regression and GMM models. This implied that the two models portrayed the same results for the parameter estimates at 5 percent level of significance.

5.3 Conclusion

Multiple Regression Approach and GMM were used to examine the impact of economic determinants on maritime performance and impact of maritime sector on economic growth in Kenya.

Applying Multiple Regression Approach, the observed test statistic, $P = 0.000 < 0.05$, for the coefficient of labor productivity, which was 1.2723, implying that labor productivity was positive and significant at 5 percent level of significance. This implied that every one percent increase in labor productivity, output increased by 1.2723 percent. The results also indicated that the coefficient of foreign exchange rate was 3.5694 and was positive and significant at 5 percent level of significance, $P = 0.000 < 0.05$. This implied that for every one percent increase in foreign exchange rate output increased by 3.5694 percent.

Utilizing GMM, the results showed that the coefficient of labor productivity was positive and significant at 5 percent level of significance, $P = 0.000 < 0.05$. This

implied that for every increase in one percent of labor productivity (β_1), output increased by 1.3717 percent. In addition, the findings on the second estimated sample moment indicated that the coefficient of foreign exchange rate was positive and significant at 5 percent level of significance, $P = 0.000 < 0.05$. This indicated that for every increase in one percent in foreign exchange rate, output produced in maritime sector in Kenya increased by 3.2744 percent. Coefficient of contribution of maritime sector to economic growth was, $p = 0.084 > 0.05$, implying that contribution of maritime sector to economic growth was not significant at 5% level of significance. However, at 10% level of significance, coefficient of contribution of maritime sector to economic growth was $P=0.084 < 0.10$ which was positive and significant, which implied maritime industry enhanced economic growth in Kenya.

Comparison of results using Multiple Regression and GMM models, the two models indicated that labor productivity and foreign exchange rate were positive and significant at 5 percent level while inflation rate was not significant at 5 percent level. The intercept term depicted a negative and significant at 5 percent level upon applying both Multiple Regression and GMM models. This implied that the two models portrayed the same results for the parameter estimates at 5 percent level of significance. Maritime sector in Kenya did not contribute significantly to economic growth at 5 percent level of significance but was significant at 10% level of significant.

The researcher concludes that foreign exchange rate is a very vital determinant of maritime sector performance and economic growth in Kenya. This is because Kenya is a net importer which implies that it imports more than it exports which is in foreign currency. This therefore means that imported goods and services heavily rely on the

prevailing rates of foreign exchange. As such it is imperative that the foreign exchange rate stability is maintained to boost investor confidence which will increase international trade of which will surge the performance of the maritime sector and enhance economic growth.

With regards to labour productivity, the researcher concluded that in the long run, a country becomes rich or stagnates depending on whether it has the right mix of people. Labour productivity is particularly important in the economic and statistical analysis of a country. The introduction of advance technology has changed the way of performing jobs thus has improved the employee performance as well as diminished the employee working effort and task completion time. The state of technology in any organization has a significant influence on the quality and quantity of production of its goods or services. This suggests that the level as well as quality of skills development will need to improve to be competitive. Labour force is of great importance especially in the systems where the degree of automation is low. Therefore work and safety rules, workforce motivation, training and handling equipment characteristics directly influence gross labour productivity and significantly influence economic growth.

5.4 Contribution to Knowledge

This study was different compared to previous studies in three ways: This study utilized current data for a period (2000-2019) on annual basis to determine the effect of labor productivity, foreign exchange and inflation rate on maritime sector in Kenya and; the impact of maritime sector on economic growth in Kenya. Rationally, more recent data was necessary for the analysis in order to capture the maritime sector performance in enhancing economic growth in Kenya.

Secondly, analysis of the determinants of maritime sector performance in Kenya was carried out using GMM model which has become the most preferred method used in estimating Dynamic Stochastic General Equilibrium. DSGE models anchored in rich micro-foundations have become a preferred methodology used to analyze maritime sector and economic growth in recent years (Tovar, 2008).

Thirdly, apart from analyzing influence of labor productivity, foreign exchange rate and inflation rate; impact of trade on economic growth in the maritime sector in Kenya was analyzed.

5.5 Recommendations

The performance of the maritime sector in Kenya is key as it endeavors to grow the economy, realize its vision 2030 and attain the big four agenda. This study makes several recommendations to stakeholders in the public sector including the government and the policy makers. Based on the findings of the study and as per the specific objectives, the study recommends as follows:

Kenya has to kick off plans to revive the Kenya National Shipping Line which according to TMEA (2018), has the potential to contribute over 3 billion U.S. dollars into the country's economy annually. KNSL is expected to create up to 6,000 jobs within five years of its revival, with the potential to earn the country some Sh300 billion. The national entity has been dormant for about 22 years. Mismanagement sent the entity, which was established in 1987, into debt and loss of business. Its revival will enable Kenya to benefit from the regional and global maritime transport value chain. If the Country manages its own maritime transport services, it will enhance the contribution of the sector to the national economy and, make the cost of goods more competitive. Revival of the national entity will boost the country's quest to own and

operate its own vessel in future. Kenya will join the likes of Ethiopia whose shipping line earns the country over \$40 million (Sh4 billion) annually from its fleet of 18 commercial ships. The national shipping line can charter vessels for trade and have its own in future.

It can be cheaper to buy secondhand ships due to the increasing number of ships laid up but the problem is whether such ships will be able to operate at a profit. Sometimes shipping has been found to be a drain to a country's hard-earned resources if the country has to keep protecting and subsidising it over a long time. Some other options of playing a part in carriage of maritime trade without owning vessels could be to start by slot chartering until the country has enough trained crew to man her own ships and also until such a time that it will be found possible to own ships and operate them economically. Though this is happening at the moment but it's on a small scale.

A joint venture between Kenya and other established shipping companies in the world could be another good alternative, especially if the company could then form consortium with other companies. It should be pointed out that although it may be a good idea to form a joint venture with the developed countries. This has to be done with due care though. This is because the partners tend to pass their obsolete ships which they have no use for except to lay up. There should be proper expert advice on legal, technical, operational, managerial and financial matters, so that each of the parties is clear on what is happening.

Such ventures are expected to facilitate growth of traffic throughput create seafarer jobs and time training opportunities annually. Since KNSL is owned 55 % by the state and 45 % by MSC, which is the second largest shipping company in the world and the only one that owns both cargo and cruise ships, this opportunity is readily available. It

is important to note that the partnership with the MSC, the Kenya National Shipping Line will gain access to over 500 ports across the world. MSC remains the second largest shipping company in the world after the Danish AP Moeller Maersk Line, but MSC is the only one that owns both cargo and cruise ships. Through this reinvigorated partnership, Kenya can quickly grow the shipping capacity by riding on its wings. This will also enable the national shipping line to strengthen the cruise shipping sector, jump start tourism and coastal agriculture and agro-processing.

The port of Mombasa should be able to meet the challenges in development in world trade and to be able to cope with it if it has to handle the goods faster and efficiently. Delay in the port and especially for the ships is part of the cost of the freight to the shipper, thus the goods have an added cost while the value remains the same. All this cost is passed on to the consumer and the country, thus affecting the national economy. Port management has an inordinate effect on the overall national economy and development, thus more emphasis should be put on training the managers since they have important decisions to make, which would affect the national development.

The port need to initiate some awareness programs through its marketing strategies, for the use of the Inland Container Depots which have of late been being underutilized. The Government also should find a way of ensuring that the stipulated percentage of containers to travel by rail through the ICDs do so to save the country's money spent on transporting these containers by trucks, which charge exorbitantly, while these high transport costs have to be passed onto the country's national economy. Kenya would save a lot if all of the upcountry and hinterland countries cargo could travel by rail through the ICDs. This however calls for improved rail

services and purchase of more rolling stock to cope with the goods which have been increasing at a rapid rate.

The already developed State department of maritime and Shipping in the Ministry of Transport Infrastructure, Housing and Urban Development should keenly look at issues of under qualified staff, look at all the maritime development and advice the government as to the strategies to take in order to fully incorporate the maritime activities in the country's National Development activities. This critical move involves the country to accelerate development of the Bandari Maritime academy into a Centre of Excellence in maritime training, research and skill development in the Maritime industry. This will make it to become a top supplier of world class seafarers for shipping lines all over the world. Transformation of the college into a centre of excellence in maritime training and research will facilitate the country's quest to reap maximum benefits from the blue economy sector, an agenda that the President has given undivided attention. While there are huge opportunities for Kenyans to serve in foreign ships, Kenyans have for long lacked opportunities to get sea time, a prerequisite for serving on ships. To enhance skills and ensure they meet the highest possible standards, the Bandari Maritime Academy should partner with the local maritime and tourism colleges and establish twinning engagements with the MSC Training Academies. The academy will be instrumental in bridging the global shortage of seafarers which is estimated to be in excess of 83,900 officers and 450,000 subordinates, cutting across cargo vessels, cruise ships among others.

Though the maritime sector shows great potential of contributing enormously to the growth of the maritime industry and the Kenya's economy this study recommends that the Government should intensify efforts in capacity building and maritime

financing to create room for optimal implementation of cabotage. Since the maritime industry has been proven to exhibit great potentials, the Government should intensify efforts in capacity building, maritime finance and encourage indigenous participation in the maritime industry. The bottlenecks surrounding the cabotage regime should be addressed in order to gain the full benefits derived from inland and coastal trade. The indigenous operations should avoid being used by foreigners.

5.6 Policy Implications

The empirical findings of this study could provide a significant contribution and information to the policy makers who have been working towards performance and impact of maritime sector in Kenya.

Considering that there is no considerable monopoly in maritime sector in Kenya, the government could still consider reducing the existing monopoly in most of the regions being charged by maritime sector in Kenya.

Applying Multiple Regression and GMM models, evidence from the results indicated that coefficient of labor productivity influenced positively the performance of maritime sector in Kenya. This was an indication that for improvement of performance of maritime sector, labor productivity needs to be enhanced to attain higher productivity. The Kenya government could consider improving on policies which could improve labor skills and knowledge such as training, seminars, and motivating staff to pursue higher education since this could increase productivity in maritime sector in Kenya.

5.7 Limitations of the study and areas for further research

This study was successfully undertaken but not without a few limitations. One such limitation was that the researcher did not include in the modeling part any variable

related to politics. However, the study merely focused on the determinants of maritime sector with a view of obtaining impact of economic growth in Kenya.

Another limitation was that there quite a number of macroeconomic variables which could have been included in the analysis of maritime sector performance in Kenya. These include capital which was not utilized in this study.

Existing work on container port performance measurement and comparison mainly rely on statistical data published by port authorities and shipping companies in the absence of industry standards of performance measurement. Different port authorities and shipping companies often use different, proprietary measures and timescales to produce their statistical data, making it difficult to conduct comprehensive performance analysis and comparison on a global scale.

There is a wide scope for research in the subject of maritime transport in Kenya and on a regional basis. Other scholars could consider comparing the economic impacts of those maritime sectors in different regions.

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APPENDICES

Appendix I: Introduction Letter from Moi University


MOI UNIVERSITY
POST GRADUATE OFFICE
SCHOOL OF BUSINESS AND ECONOMICS

Tel: (0521) 43420 Box 3900
Fax No: (0521) 43360 Eldoret
Telex No. 32947 MOIYARSHY KENYA

RE: SBE/DE/303/2016 DATE: 7th May, 2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: SUDI AMANI MWASINAGO- SBE/DE/303/2016

The above named is a bonafide student of Moi University in the School of Business and Economics, undertaking a Doctor of Philosophy degree programme in Economics. He has completed coursework, defended his proposal, and he is proceeding to the field to collect data for his research topic titled "*Effect of Microeconomic Factors on the Performance of States Corporations in the Maritime Industry in Kenya.*"

Any assistance accorded to him will be highly appreciated.

Yours faithfully,

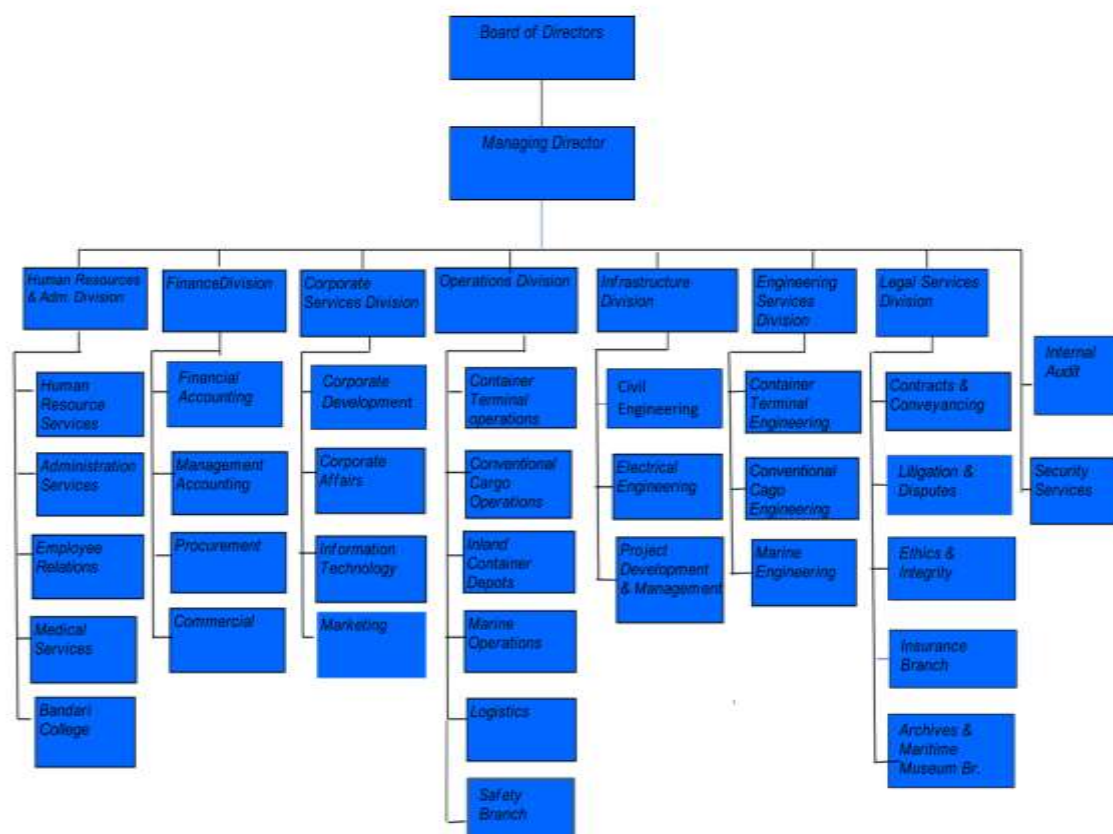
DR. JOEL K. TENAI
AR DEAN SCHOOL OF BUSINESS & ECONOMICS

Appendix II: NACOSTI Research Authorisation Permit

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 305805	Date of Issue: 05/August/2021
RESEARCH LICENSE	
	
This is to Certify that Mr. XUDI MWASINAGO of Moi University, has been licensed to conduct research in Mombasa on the topic: MARKET STRUCTURE, DETERMINANTS AND IMPACT OF MARITIME PERFORMANCE ON ECONOMIC GROWTH IN KENYA for the period ending : 05/August/2021.	
License No: NACOSTI/P/20/5801	
305805 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code
	
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Appendix III: Kenya Ports Authority Organization Structure

ORGANIZATIONAL STRUCTURE KENYA PORTS AUTHORITY



Appendix IV: Kenya Ferry Services Organization Structure

1.5. Organizational structure of the company

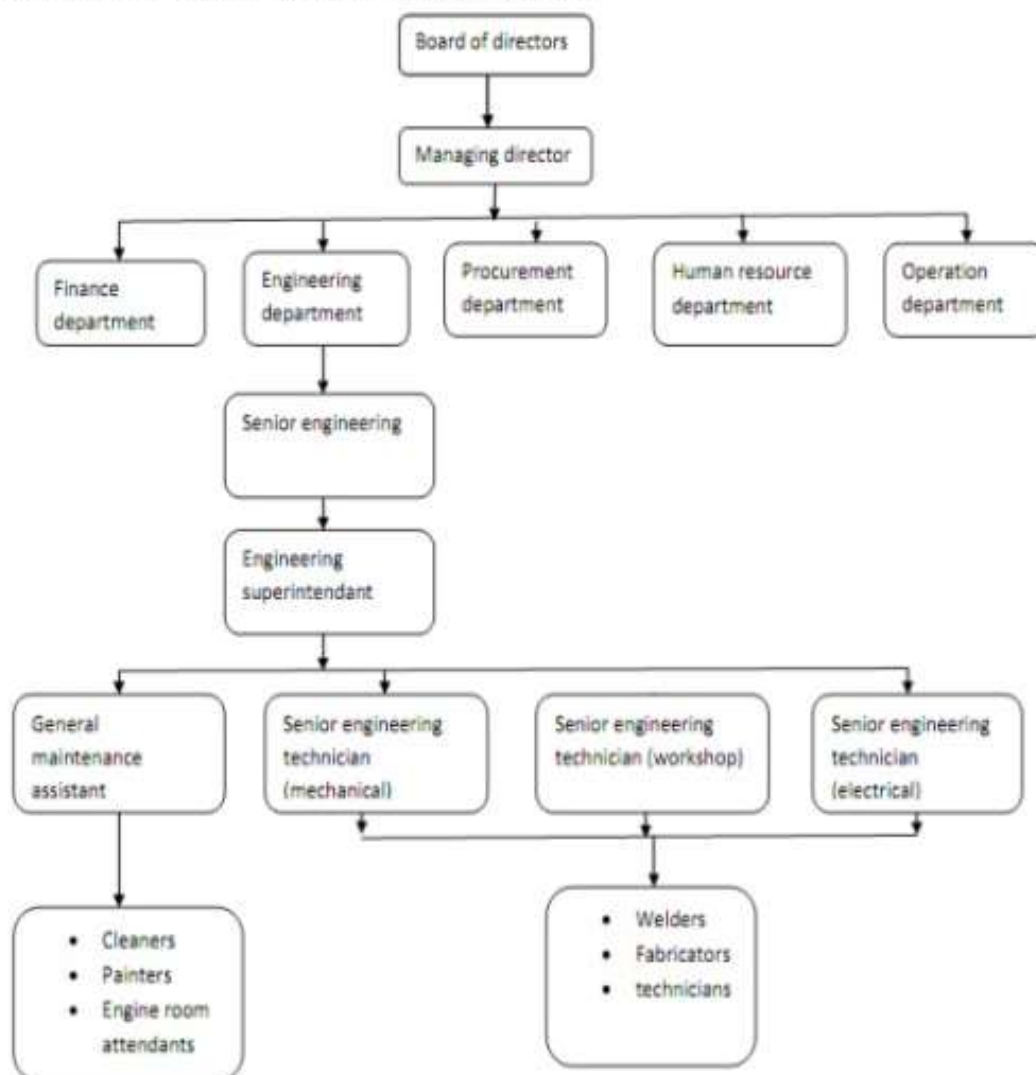


Figure 1 showing the organizational structure of the company

1.6 Aims and objectives of industrial attachment

- It provided a practical blend of content learned in class and its application.
- It facilitates understanding the working principles of machines.
- It gives base for industrial attachment preparation.
- It facilitated fulfillment of the degree course.

Appendix V: Kenya Ports Authority Performance

	KENYA PORTS AUTHORITY PROFITABILITY INDEX FROM 1970's TO DATE								
	in KSHS MILLIONS								
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
REVENUE	732	678	931	980	1,000	1,055	1,237	1,353	1,332
EXPENDITURE	445	467	568	778	847	823	965	1,137	973
PROFIT	287	211	363	202	153	232	272	216	359
THRO'PUT (DWT)	6,071,290	5,940,694	7,511,253	8,435,944	6,572,125	6,494,182	6,548,051	6,389,000	6,928,000
	<u>1987/88</u>	<u>1988/89</u>	<u>1989/90</u>	<u>1990/91</u>	<u>1991/92</u>	<u>1992/93</u>	<u>1993/94</u>	<u>1994/95</u>	<u>1995/96</u>
REVENUE	1,368	1,350	1,765	2,754	2,905	4,313	6,744	6,341	7,078
EXPENDITURE	1,326	1,292	1,630	2,393	1,968	3,635	3,422	5,851	5,851
PROFIT	42	58	135	361	937	678	3,322	490	1,227
THRO'PUT (DWT)	6,919,000	6,673,000	7,239,000	7,525,000	7,145,000	7,991,000	7,990,000	8,331,000	7,973,000
	<u>1996/97</u>	<u>1997/98</u>	<u>1998/99</u>	<u>1999/00</u>	<u>2000/01</u>	<u>2001/02</u>	<u>2002/03</u>	<u>2003/04</u>	<u>2004/05</u>
REVENUE	6,993	7,765	7,157	7,564	8,415	8,864	9,187	10,282	13,670
EXPENDITURE	6,918	7,406	8,163	6,473	6,350	7,183	7,744	8,400	10,554
PROFIT	75	359	(1,006)	1,091	2,065	1,681	1,443	1,882	3,116
THRO'PUT (DWT)	8,694,000	8,442,000	8,561,000	8,188,000	9,126,000	10,601,000	10,564,000	11,930,540	13,280,747
	<u>2005/06</u>	<u>2006/07</u>	<u>2007/08</u>	<u>2008/09</u>	<u>2009/10</u>	<u>2010/11</u>	<u>2011/12</u>	<u>2012/13</u>	<u>2013/14</u>
REVENUE	12,775	13,185	13,890	18,373	18,719	21,169	28,040	27,854	30,725
EXPENDITURE	9,654	10,561	10,816	12,410	14,306	15,619	17,974	20,900	25,557
PROFIT	3,121	2,624	3,074	5,963	4,413	5,550	10,066	6,954	5,168
THRO'PUT (DWT)	14,418,937	15,961,802							
	0.24	0.20	0.22	0.32	0.24	0.26	0.36	0.25	0.17

KENYA PORTS AUTHORITY <u>PROFITABILITY INDEX FROM</u> <u>1970's TO DATE</u>									
	in KSHS MILLIONS								
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
REVENUE	732	678	931	980	1,000	1,055	1,237	1,353	1,332
EXPENDITURE	445	467	568	778	847	823	965	1,137	973
PROFIT THRO'PUT (DWT)	287	211	363	202	153	232	272	216	359
	6,071,290	5,940,694	7,511,253	8,435,944	6,572,125	6,494,182	6,548,051	6,389,000	6,928,000
	<u>1987/88</u>	<u>1988/89</u>	<u>1989/90</u>	<u>1990/91</u>	<u>1991/92</u>	<u>1992/93</u>	<u>1993/94</u>	<u>1994/95</u>	<u>1995/96</u>
REVENUE	1,368	1,350	1,765	2,754	2,905	4,313	6,744	6,341	7,078
EXPENDITURE	1,326	1,292	1,630	2,393	1,968	3,635	3,422	5,851	5,851
PROFIT THRO'PUT (DWT)	42	58	135	361	937	678	3,322	490	1,227
	6,919,000	6,673,000	7,239,000	7,525,000	7,145,000	7,991,000	7,990,000	8,331,000	7,973,000
	<u>1996/97</u>	<u>1997/98</u>	<u>1998/99</u>	<u>1999/00</u>	<u>2000/01</u>	<u>2001/02</u>	<u>2002/03</u>	<u>2003/04</u>	<u>2004/05</u>
REVENUE	6,993	7,765	7,157	7,564	8,415	8,864	9,187	10,282	13,670
EXPENDITURE	6,918	7,406	8,163	6,473	6,350	7,183	7,744	8,400	10,554
PROFIT THRO'PUT (DWT)	75	359	(1,006)	1,091	2,065	1,681	1,443	1,882	3,116
	8,694,000	8,442,000	8,561,000	8,188,000	9,126,000	10,601,000	10,564,000	11,930,540	13,280,747
					0.25	0.19	0.16	0.18	0.23
	<u>2005/06</u>	<u>2006/07</u>	<u>2007/08</u>	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
REVENUE	12,775	13,185	13,890	18,373	18,719	21,169	28,040	27,854	30,725
EXPENDITURE	9,654	10,561	10,816	12,410	14,306	15,619	17,974	20,900	25,557
PROFIT THRO'PUT (DWT)	3,121	2,624	3,074	5,963	4,413	5,550	10,066	6,954	5,168
	14,418,937	15,961,802							
	0.24	0.20	0.22	0.32	0.24	0.26	0.36	0.25	0.17

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
REVENUE	35,553	40,618	41,564	45,352	55,448	52,151	53,519
EXPENDITURE	28,149	30,149	30,458	33,387	40,443	40,703	41,320
PROFIT THRO'PUT (DWT)	7,404	10,469	11,106	11,965	15,005	11,448	12,199
	0.21	0.26	0.27	0.26	0.27	0.22	0.23
<u>COMMENTS</u>							
Whereas Revenue moved steadily from Kshs. 732million at KPA's inception in 1978 to over Kshs.1 billion in the fifth year, Traffic (throughput) recorded a slower growth_ remaining within the 6million DWTs bracket for longer periods save for years 1980 and 1981 when it peaked at 7 and 8million DWTs. These can be remembered as the years of food aid (grain imports) to the country and the region.							
In 1989/90 traffic growth changed permanently to the 7million DWTs figures bringing a revenue change of close to Kshs. 500million (half a billion).							
The 1990's saw Revenue move from the usual Kshs.1billion range of the 70's and 80's to Kshs.6 billion mark.							
Traffic had also recorded a billion plus DWTs increase during the same period.							
The Revenue continued improving, reaching Kshs.7billion mark in 1997/98 improving to Kshs. 9billion in the year 2002/03.							
A marked improvement occurred in the following year 2003/04 when Kshs. 10billion mark was attained with a corresponding throughput of 11million DWTs.							
The growth trend has continued to date where the latest Final Accounts 2006/07 shows a Revenue turnover of Kshs.13.185billion with a similarly impressive throughput of DWTs of 15.96million.							

Source: Kenya Ports Authority (2019)

Appendix VI: Kenya Ferry Services Performance

KENYA FERRY SERVICES LTD

VEHICULAR TRAFFIC/REVENUE DATA SHEET

YEAR	TOLL REVENUE Kshs '000'	MOTOR VEHICLES No. '000'
1999/2000	0	0
2000/2001	0	0
2001/2002	0	0
2002/2003	101,540	0
2003/2004	103,530	0
2004/2005	111,765	1,150
2005/2006	136,697	1,165
2006/2007	138,987	1,050
2007/2008	145,828	1,170
2008/2009	136,307	1,200
2009/2010	230,051	1,295
2010/2011	314,551	1,850
2011/2012	344,233	2,000
2012/2013	341,031	2,100
2013/2014	411,046	2,170
2014/2015	441,442	1,698
2015/2016	388,753	1,628
2016/2017	417,908	1,757
2017/2018	492,452	1,974
2018/2019	565,177	1,991

Source: KFSL audited financial statements

Source: Kenya Ferry Services (2019)

Appendix VII: Kenya GDP from 2000-2019

YEAR	NOMINAL GDP (Ksh. Million)	GDP Growth Rate	REAL GDP (Ksh. Million)
2000	967,838	0.00	982,855
2001	1,020,022	3.80	1,020,111
2002	1,035,374	0.50	1,025,583
2003	1,131,783	2.90	1,055,658
2004	1,274,328	5.10	1,109,338
2005	1,415,823	5.70	1,172,784
2006	1,622,565	6.50	1,249,470
2007	1,833,511	6.90	1,336,849
2008	2,107,589	1.50	1,357,262
2009	2,863,690	2.70	2,863,689
2010	3,169,300	8.40	3,104,303
2011	3,725,918	6.10	3,294,026
2012	4,261,370	4.60	3,444,339
2013	4,745,090	5.90	3,646,821
2014	5,402,647	5.40	3,842,186
2015	6,284,185	5.70	4,061,901
2016	7,022,963	5.90	4,300,699
2017	8,165,842	4.80	4,507,377
2018	8,892,111	6.30	4,792,174
2019	9,740,360	5.40	5,049,686

Kenya GDP (2000-2019)

Source: Central Bank of Kenya (2020)

Appendix VIII: Annual Growth Rate (%)

Year	GDPKenya	GDP Grow
1999	1.6412E+12	
2000	1.9412E+12	0.599695
2001	2.0651E+12	3.779906
2002	2.0665E+12	0.54686
2003	2.0902E+12	2.932476
2004	2.1927E+12	5.1043
2005	2.3309E+12	5.906666
2006	2.5247E+12	6.472494
2007	2.6698E+12	6.85073
2008	2.6961E+12	0.232283
2009	2.8637E+12	3.30694
2010	3.0679E+12	8.405699
2011	3.2148E+12	6.108264
2012	3.428E+12	4.563209
2013	3.6143E+12	5.878681
2014	3.7817E+12	5.357126
2015	4.0213E+12	5.718507
2016	4.2671E+12	5.878949
2017	4.5062E+12	4.862538
2018	4.8158E+12	6.319781
2019	5.7158E+12	6.219781

Source: World Bank (2019)

Appendix IX: Annual Foreign Exchange Rate (%)

Kenya's Foreign Exchange Rate	
Year	Forex (%)
2000	78
2001	79
2002	82
2003	84
2004	84
2005	79
2006	72
2007	63
2008	79
2009	76
2010	81
2011	85
2012	86
2013	86
2014	91
2015	96
2016	103
2017	103
2018	102
2019	101

Source: Central Bank of Kenya (2019)

Appendix X: Annual Inflation Rate (%)

Country Name	Kenya
Country Code	KEN
Indicator Name	Inflation (annual %)
1999	5.742001095
2000	9.980025154
2001	5.738598143
2002	1.961308217
2003	9.81569063
2004	11.62403554
2005	10.31277836
2006	14.45373421
2007	9.75888023
2008	26.23981664
2009	9.234125924
2010	3.961388891
2011	14.02249396
2012	9.377767482
2013	5.71749357
2014	6.878154993
2015	6.582174403
2016	6.297157525
2017	8.005722791
2018	4.689819761
2019	9.980025154

Source: World Bank Outlook (2019)