

**OPERATIONAL OPTIMIZATION PRACTICES AND LOGISTICS
PERFORMANCE IN KENYA: A CASE STUDY OF KENYA PORTS
AUTHORITY, MOMBASA COUNTY.**

EDWARD WAMBUA LENGAH

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DECLARATION

This proposal is my original work and has not been presented for the award in any other university or institution. No part of this research should be reproduced without the author’s consent or that of the Management University of Africa.

Signature..... Date.....

Edward Wambua Lengah

CLT/AD/10/00045/1/23

This proposal has been submitted for examination with my approval as

University Supervisor

Signature..... Date.....

Prof. Peter Kithae PhD.

The Management University of Africa

DEDICATION

This proposal is a tribute to my family, whose constant love and encouragement have served as an inspiration for me.

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TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
ABBREVIATIONS AND ACRONYMS.....	ix
OPERATIONAL DEFINITION OF TERMS	x
ABSTRACT	xi
CHAPTER ONE.....	1
INTRODUCTION	1
1.0 Introduction	1
1.1 Background of the Study	1
1.2 Statement of the Problem	7
1.3 Objectives.....	7
1.4 Research Questions	8
1.5 Justification of the Study	8
1.6 Scope of the Study.....	9
1.7 Chapter Summary	10
CHAPTER TWO.....	11
LITERATURE REVIEW.....	11
2.0 Introduction	11
2.1 Theoretical Literature Review	11
2.2 Empirical Review.....	14
2.3 Summary and Research gaps	23
2.4 Conceptual Framework.....	29
2.5 Operationalization of Variables	30
2.6 Chapter Summary	31
CHAPTER THREE.....	32
RESEARCH DESIGN AND METHODOLOGY.....	32
3.0 Introduction	32
3.1. Research Design	32
3.2 Target Population	32
3.3 Sample and Sampling Technique	33

3.4 Instruments	35
3.5 Pilot Study	36
3.6 Data Analysis and Presentation.....	37
3.7 Ethical Considerations.....	37
3.8 Chapter Summary	40
REFERENCES.....	41
APPENDICES	49
APPENDIX I: Introduction Letter
APPENDIX II: Questionnaire.....
APPENDIX III: Time Schedule
APPENDIX IV: Research Study Budget
APPENDIX V: Plagiarism Report

LIST OF TABLES

Table 1: Summary of Research gaps	24
Table 2: Operationalization of Variables	30
Table 3: Target Population.....	33
Table 4: Sample Size of Each Stratum	35

LIST OF FIGURES

Figure 1:Conceptual Framework.....	29
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ABBREVIATIONS AND ACRONYMS

CPFR:	Collaborative Planning, Forecasting, and Replenishment
EOQ:	Economic Order Quantity
JKIA:	Jomo Kenyatta International Airport
KPA:	Kenya Ports Authority
SIPG:	Shanghai International Port Group
TAM:	Technology Acceptance Model
TEUs:	Twenty-Foot Equivalent Units
UNCTAD:	United Nations Conference on Trade and Development
UNECA:	United Nations Economic Commission for Africa
VICS:	Voluntary Inter-Industry Commerce Standards

OPERATIONAL DEFINITION OF TERMS

Demand forecasting:	The process of forecasting future demand for logistical services and activities linked with shipping and port operations in Kenya.
Inventory Optimization:	Describes the strategic management of port and logistics operations' inventory levels and procedures in order to increase overall productivity, lower costs, and provide higher-quality services.
Transport Optimization:	Involves improving port transportation operations and related logistics procedures through strategic management.
Automation Integration:	Refers to the process of improving efficiency, accuracy, and overall performance of port and logistics operations through the integration of automated systems and technologies.
Logistics Performance:	Means the effectiveness and efficiency of the procedures used to organize and control the flow of products, services, data, and other resources from their source to their ultimate consumer or user.

ABSTRACT

The aim of the study is to explore the consequence of operational optimization acts on logistics success at Kenya Ports Authority. The investigation also sought to examine the effect of demand forecasting, inventory optimization, transportation optimization and automation integration on Logistics Performance at Kenya Ports Authority. The research will be grounded on Economic Order Quantity (EOQ), Technology Acceptance Model, and Collaborative Planning, Forecasting, and Replenishment theories. Expressive review investigate plan will be used for the study. The researcher targeted 620 employees from the Operations Division for the operations at Kenya Ports Authority. Fishers et al., (1998) method was utilized to arrive at an example scope of 96 participants. Stratified random sampling method of collecting data will be employed. The survey would involve questionnaires. For the pilot study, the researcher will distribute 10 questionnaires drawn from Kenya Ports Authority from which individuals will be chosen using simple random sampling technique. The 10 individuals selected shall not take part in the main study. The data will be edited, coded, classified, and tabulated. Finally, the data will be analyzed using SPSS version 25 statistical software. The extracted data will be quantified and tabulated to make it easier to interpret. The study will be beneficial to various stakeholders who will include port authorities and management, government and policymakers, logistics companies and freight forwarders, trade and industry associations and academic and research institutions

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The section offers the contextual evidence on the research, the concerns being tackled, aims of the study, and the query questions. This also establishes a basis for doing the research. Moreover, this scope limits the areas in which the study shall provide evidence, resulting to logic conclusions and suitable answers.

1.1 Background of the Study

Operational Transportation and supply chain efficiency rely heavily on operational optimisation practices and logistics performance. According to the work of Smith et al. (2018), "operational optimisation" is the process of maximising efficiency, minimising expenses, and increasing productivity throughout an organization's many processes and activities. However, logistics performance is defined as "a comprehensive evaluation of the efficacy and efficiency of logistics activities and services" (Jones & Stevens, 2019). Operation optimization may include many different approaches under this field, including "the theory of logistics" and "supply chain management." For instance, it may involve aspects such as demand planning, inventory management, resource allocation, process simplifications and technology deployment (Wang et al., 2020). The primary aim of these techniques was to reduce wastage, enhance efficiency, minimize costs, and improve overall customer services.

Operational optimisation and logistics efficiency are especially important for Kenya given the country's central role in regional commerce and logistics. Key to East African commerce, the Port of Mombasa requires expert operational optimisation to handle rising cargo volumes (Kenya Ports Authority, 2021). For the Port of Mombasa to remain competitive, increase commerce, and run smoothly for all parties involved, it is essential that logistics performance be evaluated and improved (Wanyoike et al., 2021). Operation of optimization practices coupled with strong logistical operations are pivotal for managing movement of goods and services. Apart from enabling economic development at the local level and trade promotion, the processes have significant effects at the corporate level.

In a global context, trade and the international economy benefit greatly from efforts to improve operational practices and logistical performance inside ports. It is stated that

as per UNCTAD, at least eighty percent of world trade is carried out by marine transport, while the value amounts to seventy percent. There is an increased demand for the smooth operations of transcontinental ports as global trade becomes larger. Worldwide, ports are updating their infrastructure and using cutting-edge technology to speed up and improve cargo operations. In the national and regional economy of the United States and Europe, ports are crucial. Due to its large coastline, the United States is dependent on its seaports to facilitate both internal and international commerce. It is clear that marine transport and logistics are crucial to the success of the United States' \$5.6 trillion international commerce in 2019 (U.S. Census Bureau, 2020). Rotterdam, Antwerp, and Hamburg are similarly important European ports for commerce. The Port of Hamburg, for instance, processed approximately 8.5 million TEUs in 2020 (Port of Hamburg Marketing, 2021). In light of these numbers, it is clear that operational optimisation practices are vital to maintaining logistical performance and facilitating global trade. Rotterdam, a major European port, has invested heavily in updating its digital systems to increase efficiency, decrease wait times, and better use berthing slots (Port of Rotterdam, 2021).

As a prominent operator of global commerce, Asia has an important effect on the effectiveness and efficacy of the management of supply chains. Some of the busiest ports in the world are located in this area, and they include Shanghai, Singapore, and Hong Kong. These ports process a high volume of containers, which improves the region's logistical efficiency. For instance, in 2020, the Port of Shanghai, the busiest vessel port in the world, processed over 43.5 million TEUs (twenty-foot equivalent units; Shanghai International Port Group, 2021). Similarly, more than 36 million TEUs of containers passed through Singapore's Port, a significant transshipment centre, in the same year (Maritime and Port Authority of Singapore, 2021). To facilitate the ever-increasing volume of international trade, Asian ports must place a premium on optimising their operations.

Optimising African ports' operating practices and logistical performance is crucial to the continent's economic development and integration into global trade networks. Africa has an increasing significance in international commerce, and effective port operations are crucial for enabling trade between the continent and the rest of the globe. From \$411 billion in 2009 to \$760 billion in 2019, the value of Africa's product exports has more than doubled, according to the UNECA, (2019). African nations

with major ports include Nigeria, Morocco, Tanzania, and South Africa. Example: every year, millions of TEUs pass through the Port of Durban in South Africa, making it the busiest and biggest container port in Africa (Transnet Port Terminals, 2021).

Nigeria is the largest economy in West Africa, and it depends largely on commerce via its ports. Both the Lagos Port Complex and the Tin Can Island Port in Lagos play pivotal roles in enabling a sizable share of Nigeria's total commerce volume. Maintaining smooth port operations is crucial for accommodating the influx of goods. Morocco is a major role in North Africa because of Tangier Med Port. With cutting-edge technology and cutting-edge logistical solutions, Tangier Med Port has become a top container port in Africa and the Mediterranean (Tanger Med, 2021). Tanzania's ports, particularly Dar es Salaam, serve the East African region and perform an important role in supporting regional trade and interconnectivity.

Locally, operational optimisation practices and logistical performance inside ports are crucial for economic development, trade facilitation, and regional connection. Among Kenya's many major ports is the strategic Port of Mombasa, which facilitates commerce not just for Kenya but also for its landlocked neighbors. The Port of Mombasa processed approximately 1.4 million TEUs of container traffic in 2020, as reported by the Kenya Ports Authority (KPA) (Kenya Ports Authority, 2021). Successful port operations are essential for sustaining commerce within the nation and the East African region in light of rising cargo volumes.

At the county level, Mombasa County is important since it is home to the Port of Mombasa. The county's economy, job prospects, and enterprises all benefit from a well-operating port. The Mombasa County Government has an interest in seeing to it that the port's operations are optimised so as to boost the local economy, entice new investment, and provide residents with new prospects for long-term growth and improvement in their standard of living (Mombasa County Government, 2021). Furthermore, the neighbouring counties, such as Kilifi and Kwale, also benefit from the logistical activities and job possibilities provided by the port operations (Mwamfupe, 2019).

1.1.1 Demand Forecasting

To estimate future demand for a product or service, a business must engage in demand forecasting, a methodical process that involves analysing historical data,

market trends, economic indicators, consumer preferences, and other pertinent aspects. Its fundamental goal is to coordinate production and operations with customers' wants and requirements in the future, allowing for a more rapid and effective reaction to changes in the market. The value of accurate demand forecasting is difficult to overestimate. It plays a crucial role in strategic planning, directing resource allocation, effective inventory management, and financial planning. Market trends forecasting allows businesses to adjust their long-term strategy and promotional efforts in response to anticipated changes. Precision forecasts enable the optimal utilisation of factors such as labour, cash and plant material. Also, forecasting correctly means more efficient inventory control and less overheads plus stock outs hence improved customer experience (Babu, 2023).

According to Abdul and Chong (2019), demand forecasting helps businesses save money by allowing them to produce just what they expect customers to buy and reducing waste from stockpiling unnecessary items. When things are readily accessible when consumers need them, customer happiness skyrockets. Responding quickly to consumer needs builds trust and goodwill with your brand. Accurate demand forecasting gives organisations with a competitive edge in the market, as those that can predict and satisfy client requests gain a major advantage over competitors (Nurrahman(2022)).

1.1.2 Inventory Optimization

Inventory optimisation entails proactively managing a company's stock levels to find the correct balance between serving customer demand and minimising surplus inventory expenditures. Businesses strive for optimal resource allocation, reduced carrying costs, and streamlined operations by employing strategies such as demand forecasting, ABC analysis, Just-In-Time inventory, Economic Order Quantity calculations, safety stock optimisation, supplier collaboration, and leveraging technology. Adjusting inventory strategy, responding to changes in the market, and maintaining appropriate stock levels need constant monitoring, analysis, and cross-departmental cooperation (Waters, 2022).

1.1.3 Transport Optimization

The term "transport optimisation," often known as "transport optimisation," refers to the process of discovering the best way to convey goods or people between two sites

while taking into consideration a variety of constraints and intended results. In order to maximize efficiency, cut down on waste, and save money, this procedure is essential for logistics, supply chain management, and transportation companies (Cristopher, 2019).

Ballou and Pazer (2019) state that, optimization in logistics transportation is important for enhanced logistics performance. The transport element remains a key aspect in ensuring that logistical systems successfully operate between production sites up to the consumer end. There is a close relationship between transportation efficiency and logistical effectiveness. Saving money, delivering on time, making customers happy, and boosting the efficiency of logistics operations all depend on transportation systems that are both efficient and properly optimised.

Improving KPA's logistics efficiency is a primary goal of transport optimisation. This is accomplished by cutting down on the time and money spent transporting products inside and around the port. This has a beneficial effect on regional commerce and economic activity because of the improved freight handling and logistics that result.

1.1.4 Automation Integration

When discussing logistics and operations, the term "automation integration" refers to the synchronization and assimilation of automated systems, processes, and technologies into an already established or newly developed operational framework. Efficiency, accuracy, speed, and productivity may all be improved at different points in a process or system by using automated solutions. This integration frequently covers numerous domains, including manufacturing, supply chain management, transportation, and more, to simplify operations and optimize performance (Waters, 2022).

Automation integration entails combining different automated systems, technologies, and software inside the operations of the Kenya Ports Authority. Digital technologies such as computers, robots etc., IoT, Artificial Intelligence, can provide significant automation improvement in areas of cargo handling, paper work, schedule, stock management, communication among others. The Kenya Ports Authority is using modern technology in an attempt to improve logistics performance such as serving the different players in the logistic sector and the shipping industry well.

1.1.5 Logistics Performance

Logistics performance describes a supply chain's capacity to coordinate and regulate the movement of items and services from the source to the destination point. It also includes logistics management practices such as warehousing, inventory, order processing, transportation, communication, administration, customer service, distribution, and environmental concerns. Logistic performance seeks to provide delivery at specified time, cost, and the expected quality, in order to satisfy customers (Getenga, 2022).

Logistics performance, in its core, is concerned with simplifying and optimising supply chain operations to fulfil customer needs, decrease operating costs, shorten lead times, and boost an organization's competitiveness and efficiency. To accomplish smooth logistical operations, one must use strategic planning, efficient coordination, and cutting-edge technology. To pinpoint problem areas and guarantee the supply chain process is constantly improved, monitoring and analysis of performance indicators are crucial components of logistics performance (Park and Cho, 2021). The success of KPA's logistics operations is essential to the port's ability to facilitate the smooth flow of products, save costs, delight customers, and remain competitive in the global trade arena.

1.1.6 Kenya Ports Authority

The Kenya Ports Authority, a statutory organisation, was established by an act of parliament in January 1978. The Kenya Ports Authority, or KPA, monitors and operates Kenya's scheduled ports and inland waters. This covers a variety of items, with dry substances like grain, manures, cement, and soda ash; fluid bulks like crude and other oil products; and packaged goods such as coffee, tea, and sugar, among others. The Authority's obligation is to manage, improve, and monitor all planned port activities in Kenya's coastal region. Other ports include Lamu, Malindi, Kilifi, Mtwapa, Kiunga, Shimoni, Funzi, and Vanga. While Mombasa's port is the only one in the region that has been significantly developed and has contemporary infrastructure, it may be termed the area's principal port because everything else is secondary to it. These include port management for operations such as harmless navigation, piloting, docking, anchorage, contamination regulation, stevedoring, shore management, and storage, which are the basis of Kenyan Port Authority at Mombasa.

1.2 Statement of the Problem

The efficiency and efficacy of port operations and logistics performance are crucial for promoting international commerce and economic development. Timely cargo handling, faster turnaround times, lower costs, and increased customer satisfaction are just a few of the many benefits that come from implementing best practices in operations at Kenya Ports Authority (KPA) in Mombasa County. Trade and investment are boosted, and the economy as a whole benefits, when logistical operations run smoothly. Despite the benefits of streamlined logistics, the Kenya Ports Authority is up against significant obstacles to achieving peak performance. The port's congestion and limited handling capacity are two major obstacles. Based to the Kenya Ports Authority, the port of Mombasa handled over 34.4 million tonnes of cargo in 2019, representing a 4.1% increase over 2018. However, congestion occurs due to the infrastructure's limited ability to handle incoming goods, which negatively impacts both cargo flow and port efficiency (Kenya Ports Authority, 2020). Also, in 2019, the average cargo stay time was about 4.9 days due to insufficient operating practices (Kenya Ports Authority, 2020). Given these statistics, it's clear that addressing operational inefficiencies is essential.

The port industry's logistical and operational practices have been the subject of several previous studies. Notable study by Akenga and Waititu (2018) studied the influence of technology integration on the port operations of Mombasa, emphasising the potential advantages of modernised systems. Odera et al. (2017) conducted research on the effects of cargo dwell time on logistics performance and customer satisfaction; their findings highlight the need of streamlining cargo-handling procedures. This study aims to address the gaps identified by previous research. While past studies have providing appreciated visions into the trials met by the KPA, they have often failed to comprehensively examine the synergistic effects of operational inefficiencies, administrative bottlenecks, and infrastructure limitations. Moreover, previous studies have often lacked a holistic approach in analyzing the interplay of technological advancements, administrative practices, and infrastructure development, which are crucial aspects for optimal operational performance. Therefore, this study aims to address these gaps by taking an integral perspective and assessing those essential factors as part of one framework that outlines ways of improving logistics operation at Kenya Ports Authority.

1.3 Objectives

1.3.1 General Objective

The main objective of the study is to investigate the effect of operational optimization practices on logistics performance at Kenya Ports Authority.

1.3.2 Specific Objectives

- i) To examine the effect of demand forecasting on Logistics Performance at Kenya Ports Authority.
- ii) To investigate the effect of inventory optimization on Logistics Performance at Kenya Ports Authority.
- iii) To assess the effect of transportation optimization on Logistics Performance at Kenya Ports Authority.
- iv) To evaluate the effect of automation Integration on Logistics Performance at Kenya Ports Authority.

1.4 Research Questions

The research will seek to answer these questions;

- i) How does demand forecasting affect Logistics Performance at Kenya Ports Authority?
- ii) What is the effect of inventory optimization on Logistics Performance at Kenya Ports Authority?
- iii) How does transportation optimization affect Logistics Performance at Kenya Ports Authority?
- iv) How does automation integration affect Logistics Performance at Kenya Ports Authority?

1.5 Justification of the Study

Several stakeholders might benefit from a research examining the current state of operational optimisation practices and logistics output at Kenya Ports Authority in Mombasa County. Some of these parties involved are:

1.5.1 Port Authorities and Management

By receiving insights into operational inefficiencies and opportunities for development, port authorities and management teams will profit. The efficiency, effectiveness, and convenience of logistics operations may all be enhanced by adopting best practices.

1.5.2 Government and Policymakers

Policymakers and governing bodies may utilise the study's findings to guide infrastructure investment, trade facilitation, and rule making. The study's findings have policy implications that might improve economic growth and the nation's capability to compete in global commerce.

1.5.3 Logistics Companies and Freight Forwarders

Enhanced operational efficiency would benefit logistics companies and freight forwarders operating in or through the Kenya Ports, resulting in reduced expenses, simplified procedures, and better service delivery. This, in turn, might increase their competitiveness and the level of pleasure among their clientele.

1.5.4 Trade and Industry Associations

The research will be useful for trade and industry associations to use in their push for improved logistics services and facilities. This research may give empirical support for advocacy efforts to get changes that enhance the efficiency of trade for the group's constituents.

1.5.5 Academic and Research Institutions

These results can also help support education and research in logistics, supply chain management, and optimization of operations. This study provides the basis for future study in the subject.

1.5.6 Environmental and Sustainability Organizations

The study's emphasis on optimising operations to decrease environmental effect will be useful to environmental and sustainability organisations. The results may be used to stimulate dialogue and guide strategy development for environmentally responsible logistics practices.

1.5.7 Local Communities and Residents

Indirectly, the research may help the residents who live in Mombasa County, where the port is located. The surrounding community stands to benefit from more efficient port operations in the form of better air quality, less traffic congestion, and maybe even more economic growth and job prospects.

1.6 Scope of the Study

This investigation is primarily intended to assess the impact that performance enhancing techniques have on the operational efficiency of Kenyan Ports Authority. The dependent variable is logistics performance which includes; accuracy of demand

forecasts, accuracy of inventory counts, efficiency of transportation, and integration of automation technologies. The study period shall be in October and November 2023 with an estimated cost of Ksh 24,200.

1.7 Chapter Summary

This section defined key concepts and provided background information for the rest of the study, including its problem, its gap, its objectives, its purpose, its significance, and the various parties who stand to gain from it.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The segment presents the theory that will guide this study. The conceptual framework is also provided along with a summary of other studies and the reviewed papers. Finally, it describes the variables operationalisation.

2.1 Theoretical Literature Review

Theoretical work analysis involves summarising systematically past research studies focusing on one main issue. Researchers use this information to understand how the key assumptions, theories, and ideas shaped this study.. For the purposes of a thorough examination of the present understanding, a theoretical literature review should consider all previously conducted studies on the topic. Additionally, it should highlight unresolved issues or those that are unspecific, and formulate a theory upon which the study will be built. (Vinz, 2022).The theories of Economic Order Quantity (EOQ), Technology Acceptance Model, and Collaborative Planning, Forecasting, and Replenishment served as the theoretical foundations for this study.

2.2.1 Collaborative Planning, Forecasting, and Replenishment (CPFR) Theory

The term "Common Practise for Financial Reporting" (CPFR) was first used in 1998 when it was trademarked by the worldwide group Voluntary Inter-Industry Commerce Standards (VICS). CPFR was developed to help businesses better serve their clients by decreasing stock on hand. Wal-Mart and Warner-Lambert were among the first to deploy CPFR in 1998, with a focus on Listerine products; this resulted in a considerable drop in stock levels and an increase in sales.

CPFR is a method that encourages supply chain participants to coordinate their planning, forecasting, and replenishment activities in tandem. Better demand and supply synchronisation is achieved via CPFR's facilitation of coordination between production schedulers, suppliers, distributors, and consumers in the context of chemical manufacturing (Stoll,2020).

In the words of Hollmann et al., (2020)CPFR entails exchanging vital data and insights across supply chain partners to boost forecast accuracy, optimise inventory levels, and improve customer service levels. The CPFR model's main functions are planning, forecasting, and replenishment, and they are supported by the front-end agreement, shared business planning, sales and order forecasting, exception

management, and collaborative replenishment. During the preparation phase, supply chain partners should work to overcome cultural differences and build trust with one another, according to Sadler and Hines (2022). Collaboration is fundamental to CPFR because it allows partners to work together to better understand and meet customer demand. Collaborating with consumers and vendors is one example; working with rivals and non-competitors is another. In CPFR, projections are shared to increase accuracy and profitability, in line with the theory that collaborative problem solving and information sharing boost supply chain efficiency. Collaborative replenishment extends the scope of the replenishment process, which in turn boosts service quality, lowers stock on hand, and better coordinates production capacity. According to (Yue, Liu, 2022).

Transparency, trust, and collaborative decision-making are the cornerstones of CPFR. It acknowledges the interconnectedness of supply chain partners and promotes an overarching perspective of the supply chain to maximise benefits for all parties involved. Collaboration improves supply chain responsiveness, adaptability, and efficiency, which is consistent with the theory (Kim, et al, 2020). The goals of demand forecasting, transport management optimisation, and logistics performance are all directly supported by the CPFR Theory, which offers a systematic framework for joint efforts in planning, forecasting, and replenishment. Improved predictions, better coordination, and more streamlined logistics operations are all results of CPFR's collaborative and information-sharing features. Logistics may be optimised via CPFR's joint planning and coordination, which saves money. This consists of effective transportation planning, shorter lead times, and lower storage fees. These savings will be of great assistance to the Kenya Ports Authority and will help boost the efficiency of their logistical operations as a whole. CPFR helps to save expenses by improving inventory management. The Kenya Ports Authority can save money on logistics by reducing the amount of time goods are held in storage, the number of times they run out of stock, and the number of times they need to restock. The total efficiency of logistics is enhanced as a result of these decreased expenses.

2.2.2 Economic Order Quantity (EOQ) Theory

Ford Wilson Harris (1913) proposed the Economic Order Quantity theory, which was then reviewed by Bovis, (2016) and developed in further detail. EOQ refers to an order quantity that leads to lowest inventories expenses for a company. The principle

EOQ is applied to perform inventory management, i.e. control over a firm's stock by means of ordering, storage, and consuming it. Inventory management involves deciding on the number of items that must be included into inventory with every batch ordering so as to minimize the total cost of those items (Erlenkotter, 2020).

The main goal of this model is to make sure that just the right amount of stock is acquired in each batch so as to minimize the level of ordering frequently and having excess stocks. This means that there is a mutual relationship between inventory establish costs, and inventory holding costs. Minimizing both of them simultaneously generates the lowest total inventory costs. The main goal of this model is to make sure that just the right amount of stock is acquired in each batch so as to minimize the level of ordering frequently and having excess stocks. This means that there is a mutual relationship between inventory establish costs, and inventory holding costs. Minimizing both of them simultaneously generates the lowest total inventory costs.

Erickson and Kovalainen(2019) state that E.O.Q. is based on given assumptions. These include the following: constant and known time period, cost of holding inventory, lead price per unit, place-order cost, instantaneous replenishment, constant and known rate of demand, no stock-outs, and full batches without any partial deliveries at a time. A certain threshold is considered before quantity discounts become active. However, no consideration is taken for buffer stocks which were meant to even out variations pertaining to demand, and lead time and use of such is hard (Chalotra, 2019).Korir,Kaitany, and Sang (2021) argue that Economic Order Quantity helps businesses determine how often they should restock their shelves and how often they should place new orders. Because materials are bought and utilised almost instantly, warehouse storage costs are cut down significantly.

The goal of inventory optimisation at Kenya Ports Authority's Logistics Performance is significantly facilitated by EOQ theory's methodical approach to finding the best possible order size. EOQ maintains a cost-effective inventory level by minimising the holding costs associated with excess inventory and the ordering expenses linked to the procurement process. By avoiding stockouts and surpluses, boosting responsiveness, and optimising resource allocation, this method not only improves supply chain efficiency but also adds to logistics performance as a whole. The Kenya Ports

Authority can achieve its overarching goal of enhancing performance by streamlining and decreasing the cost of the logistics system via the use of EOQ theories.

2.2.3 Technology Acceptance Model (TAM)

TAM was formed by Davis (1989). The theory suggests that consumers will be open to adopting new technologies if they find them to be both helpful and simple to use. The model used the notion of reasoned action, which states that people's actions in social settings are driven by their own personal beliefs, in order to make predictions about how those people would use various types of information systems. Based on TAM, individuals are more inclined to accept and use a technology if they feel it is easy to do so and would benefit their life. In the context of logistics automation integration, TAM can provide light on how the reception of automated technologies by logistics staff and stakeholders might affect the industry as a whole. According to Maranguni and Grani (2019), the TAM model emerges from the theory of reasoned action where individuals engage in social interactions based on their attitudes.

Successful automated integration, as argued by Alharbi and Steve(2020), may lead to simplified procedures, lower operating costs, more precision, and quicker decision making. Improved inventory management and faster order fulfilment are just two ways that automated warehouse management solutions may boost logistics efficiency. Positive user acceptability may also encourage the study of further technology advances for continued optimisation, contributing to a culture of continuous development.

The theory of technology acceptance model (TAM) acts as a basis for examining how factors determine the acceptability and hence influence success of the adoption of automation. By using TAM principles, the Kenya Ports Authority would be able to adopt automated technologies in a manner that meets the needs of its customers.

2.2 Empirical Review

This section consists of evaluating prior empirical investigations in order to resolve a specific research topic..

2.2.1 Demand forecasting and Logistics Performance.

In circumstances where Just-in-Time or stores are handled by long-principal time dealers, demand forecasting plays a significant role in avoiding inventory stockouts.

A reduction in the amount of time and money spent holding inventory is another benefit of accurately predicting consumer demand via demand predictions.

A solid demand forecasting strategy may effect inventory planning in a variety of ways, including coordinating production request development with manufacturing, preparing for launching of fresh product, preparation for elevations, and preparation for seasonal swings in demand. Standardising these connections may significantly minimise our demand for safety stock, lowering our costs (Craig and Günter, 2019). An empirical investigation on the position of request prediction and planned preparation for an operative source chain inside UAE medical sector was carried out by Haitham et al. (2024). Information as of 15 Medicinal businesses founded in Abu Dhabi, UAE, was utilized to analyse data. The findings showed a significant direct affiliation and influence of request prediction in attaining an operative source chain.

Forecasting the demand is crucial for the marine business, particularly in Ghana. On this note, Mensah, Anim, Obeng, and Peprah (2019) wanted to attain, amid extra things, recognising the kind(s) of classical(s) employed by maritime industries in prediction their working demands, together with developing a suitable estimating typical(s) for this sector by the Maersk line as an example. Based on MAERSK, two fundamental models are utilized to anticipate operative demand

Researchers Seroney et al. (2019) looked at the impact of demand forecasting on the purchasing efficiency of oil distributors in Nakuru County, Kenya. From the findings, supply chain efficiency improved when demand predictions were more accurate. Ogola and Ndeto (2021) required to control the inspiration of demand prediction updates on inventory management at the Brookside Dairies Limited. The findings revealed a very favourable and statistically substantial association of demand forecasting update frequency and inventory management, implying that more frequent demand forecasting updates lead to more frequent inventory management.

The factors impacting the accuracy of demand forecasting in Kenyan shoe manufacturing enterprises were examined by Narandass (2023). The results showed that using forecasting methodologies may improve the reliability of demand forecasts for Kenyan shoe producers. The accessibility of demand forecasting resources influences the relationship between forecasting methodologies and accuracy. As a consequence, the instruments for forecasting demand explain why demand forecasting

strategies enhance prediction precision. The study by Chemirmir and Ndeto (2023) analyzed how demand forecasting impacted on Kenyan milk processing companies' performance. It required both primary and secondary data collecting and processing. The outcomes directed a significant optimistic association of demand prediction on the financial well-being of Kenya's milk processing enterprises..

As per Wamoto et al., 2023, the performance of retail stores, that sell commercial state corporations, was just determined by availability of optimal amount of goods in the stock stored.

2.2.2. Inventory optimization and Logistics Performance

According to Orobias et al., (2020) Record optimisation is the procedure to determine the top stages of record to reduce costs and increase business profitability. It entails matching the expenses of record storage against the costs of stockouts and missed sales owing to inadequate stock. The primary aim of account optimisation is to strike the appropriate stability of a lot of inventory, that locks up money and experiences storage and treatment expenses, and lesser catalogue, that may result in stock-outs and missed sales. The ultimate aim is to reduce overall inventory costs, which include equally charge of catalogue storage and price of stock endings and missed purchases (Ali,2023). Obtaining an ideal record stage lets you meet demand expectations and also cut expenditures on typical inventory concerns like backorders, overstocking, and stockouts. Inventory optimisation is ensuring that the appropriate quantity of inventory is accessible to accomplish both current and anticipated demand. By success an ideal catalogue stage, firms may reduce the expenses of typical inventory issues such as overstocking, backorders, and stockouts while simultaneously fulfilling consumer demand (Gyan,2023).

According to Gomero, Bhat, & Khan (2020) Inventory optimization is successful when it leads to enhanced operational efficacy and liquidity instead of financial performance. This is possible through an effective planning and budgeting system, as well a reasonable sales forecast. Catalogue optimization is needed by administrations to confirm continuous supply, with the minimal cost of holding catalogue. This can only be done if a firm has an adequate understanding of the optimum catalogue level, preparation methods and monitoring and control strategies and its capability to use the knowledge.

Inventory optimisation is a key management challenge for most firms including major corporations, medium-sized companies, and small companies. Successful supply chains often have well-managed inventory flows (Jepchirchir & Noor, 2019). Chinello et al., (2020) researched on the impression of record optimisation drivers in a multiple tiered source restraint for a toy manufacture. As per simulation outcomes, product classification (via ABC analysis) is an important resource for improving stock, especially in respect of stocks on hand, while modifying lead time or delivery amount offered poor results for that specific case. Also, it shows that the fluctuations in demand have considerable influence on stock holding costs incurred as well as the service levels.

In Ethiopia, Debala, Bhat, and Khan (2023) investigated the affiliation of catalogue optimisation and functioning competence in public segment organisations in Ethiopia. The research especially looks at how capacity utilisation, inventory accuracy, infrastructure, IT, managerial buying actions, staff knowledge and expertise, and record-keeping contribute to effective inventory management and operational efficiency in these organisations. The findings show a strong and optimistic association on catalogue optimisation and operational efficiency.

Kwadwo (2019) looked at how manufacturing companies may increase their profits through better inventory management. Findings showed a direct link between raw materials inventory optimisation and the financial success of Ghana's industrial companies.

Inventory optimization's effect on the productivity of Kenyan government agencies was studied by Kazungu and Ochiri (2019). The outcomes of regression analysis designated a significant optimistic connection between inventory optimisation and the act of state companies in Kenya.. In addition, Jepchirchir and Noor (2019) investigated how better inventory management impacts the productivity of Kenya's government agencies. Ministry performance was shown to be positively and significantly impacted by organisational policy, customer service, ICT integration, and lead time.

2.2.3 Transportation optimization and Logistics Performance

Transportation optimization is the process of analyzing consignments, charges, and limitations in order to generate accurate weight plans that lower entire cargo expense while increasing competence transversely entire transport systems. When real goods fees, permitted transporters, stated volumes, transportation periods, and extra nearby data are loaded into the optimization podium, the programme creates a realistic, executable load plan for the cargo. With this information, transporters, 3PLs, and advisors may make smarter decisions, save important resources, increase income, and save expenses (MercuryGate,2022).

As per Bueffer and Beatty (2021) in conveyance, optimization analyses batches, rates, paths and restraints to produce genuine weight strategies obtainable with good cost cross ways the greatest competent conveyance system. Transportation optimization plays a vital role in managing logistics costs and meeting delivery expectations during all logistic peak season. By optimizing transportation routes, selecting the right carriers, and consolidating shipments, businesses can reduce shipping expenses. Additionally, improved route planning leads to more on-time deliveries, enhancing customer satisfaction(Osano,2023).

Njeri (2019) conducted research to determine whether or not optimising oil transport boosted the success of oil marketing companies in Rwanda. The research concluded that transportation logistics management is directly related to the success of Rwanda's oil-marketing firms. Investigation of methods used in logistical management. Based on their research, Basuna(2020) determined that transport management practise is an important part of logistic management practise. Managing the flow of products into and out of a company with a focus towards reducing transportation costs is a crucial component of effective supply restraint management.

The effects of logistics optimization on the success of agricultural businesses in Kenya's Murang'a County were investigated by Mogoi and Osoro (2022). Findings suggest that logistics management, inventory management, data management, and packaging all play significant roles in the success of agricultural businesses in Murang'a County.

In an effort to reduce transportation costs, congestion, and pollution, Bortas (2018) looked at optimizing freight transport routes from road to inland canal and rail travel.

Their findings, which were based on objective functions for calculations, indicated that the fuzzy logic modelling system was the most appropriate mathematical tool for dealing with unclear and undefined information.

In another work, Kanyepe (2023) analyzed how diamond mining companies fared on account of various transport management practices. As it turned out, they enhanced vehicle scheduling, route design, vehicle tracking, and fuel management for improved production.

Oyugi(2021) explored in what way greatest cargo conveyance on rail system us optimized with an emphasis on normal instrument in Kenyan railroad line. The investigation identified SGR consignment operating issues and the implications for competence, output, and dimensions success. Data also revealed that freight size and weight, transfer period, and train reversal had a straight influence on SGR load income assortment.

2.2.4 Automation integration and Logistics Performance

Jones & Stevens (2019) states that automation integration in logistics performance refers to the incorporation of automated technologies and systems within the various processes of the logistics and supply chain management. The incorporation entails using technology like as robots, artificial intelligence, machine learning, and sophisticated data analysis to simplify and optimize logistics processes. The potential for automation to transform the logistics sector is substantial. It simplifies business procedures, making things like inventory management and transportation planning more effective. Deliveries throughout the first, middle, and last mile are all seeing increased efficiency because to the work of startups that have adopted automation technology. They use algorithms to find the most efficient routes, real-time tracking systems, and automated notifications to keep everyone informed and increase delivery efficiency. In addition to improving supply chain visibility, data integration provided by automation allows for insights to be gained in real time. Logistics companies benefit from this because they are better able to anticipate problems, find effective solutions, and improve supply chain efficiency (Pranav, 2023) .

Aberdeen Group(2019) found that the average order accuracy rate for shippers employing automation systems was 99.5%, compared to 97% for shippers using

manual methods. Supply logistics companies may save money by using an automated system. It also has the potential to be significant in scalability. Automation allows logistics companies to quickly respond to changes in demand by increasing or decreasing available resources. According to Ndonye(2019), the value of IT in logistics is measured by how quickly and cheaply processes are completed. According to the results of his research into goods transportation, IT has a major impact on how well logistics operations function.

Research by Naway and Rahmat (2019) discovered that infrastructure in IT can enhance operative competence in source chain processes by lessening principal periods and endorsing message and teamwork between sourcing partners. Similarly, Chandra et al. (2022) showed that IT set-up has the potential to improve efficiency through patient data management ease and communication between healthcare providers' facilitation in the health sector. The research arrived at the conclusion that a strategically designed IT infrastructure can ensure better patient outcomes and work flow efficiency in healthcare organizations.

Non-probability sampling procedures were used by Nel and Badenhorst – Weiss (2019) during primary research of 13 organizations with high brand power from the Sunday Times. They found out that institutions using Information Technology in inventory management systems must adhere to an effective supply chain cycle performance. The results underscore the need of controlling supply chain drivers that are consistent with a defined source chain plan. Furthermore, IT may be positively used in selling organizations to optimize operative movements more excellently.

Furthermore, Mwaura (2019) did an investigation on inventory administration computerization and impression on Kenya supermarket success in Nyanza and Western areas. With all the eleven operational supermarkets in Kakamega, valid conclusions may be drawn from this survey strategy. Inventories were shown to have an optimistic and important impression on success of supermarket.

2.2.5 Logistics Performance

Logistics performance refers to the effectiveness and efficiency of the processes involved in managing, coordinating, and carrying out the different operations of the

supply chain. It involves the design, implementation, and management of the moving and storing of supplies, actions, and related evidence from the origin to the consumption point. A high level of logistics performance indicates that a company or a supply chain is capable of delivering products or services in a timely, cost-effective, and reliable manner, meeting customer expectations and organizational goals (Lambert, Stock, & Ellram, 2019). According to Mungesha(2020)key components of logistics performance include transportation, warehousing, inventory management, order fulfillment, and information systems that facilitate seamless coordination among different stages of the supply chain. Monitoring and optimizing logistics performance is crucial for firms looking to increase customer happiness, save operating costs, and gain a competitive advantage in the market. Metrics like as timely distribution, order accuracy, record employees, and conveyance costs are frequently used to quantify and improve logistics success.

Logistics operations create a system of actions that facilitate physical transportation of commodities, cross-border skill, and intra-border commerce. Proper working logistics, with its international business and transportation structure, is a prerequisite for complete state competitiveness. Research by Janno et al. (2021) used an impartial tactic to explore the world-wide and cross-countries logistics act extent by studying possible constraints. The report proposes a measurable situation study investigation technique based on the assessment of LPI in Estonia and Russia. The new methodological technique for assessing LPI brought attention to complete generalizations about the better conclusion of the notch and the end location of two nations.

How successfully an organization manages its logistics operations is reflected in its logistics performance. Ethiopian logistics service providers were analyzed by Tamiarat(2019) to determine what elements influence logistics performance. They concluded that on average the overall performance of Ethiopian logistics companies was quite low, with operational factors much more likely to influence effectiveness in logistics than socio-legal, infrastructure, or political factors. Mungesha studied the influences affecting logistics exercise success of several designated logistics facility givers in Ethiopia. Vital aspects like customs clearing, port mobbing, expert social labour, commercial setting, controlling implementation, and regulatory agencies have all been assessed. This assessment attempted to identify customs authorisation,

regulatory agencies, accomplished social resources, supervisory application, port congestion, and the commercial setting as the aspects that had the greatest impact on the performance of logistics service providers while performing logistics process activities.

Logistics performance has a significant impact on countries' industrial and economic growth. Moldabekova, Philipp, Reimers and Alikozhayev(2021) examined the consequence of digital logistics success through link and numerous regression investigation. The findings suggested that government policies should aim to provide a solid foundation for the development of ICT experts, long-term use of net facilities like specialised public networks, online sales, and so on, integration of digital knowledges like Big Data, Cloud computing, and so on, and digital connectivity in order to improve success of logistics.

Rutab's (2022) study on the role played by Humanitarian logistics performance in delivering efficient Disaster Relief Operations in Tanzania. The key determinants of successful disaster relief operations for effective humanitarian logistics performance include: trained experts, commendable charitable group, favourable rules, helpful monetary funds, and devoted logistic service givers. A study by Mlimbila and Mbamba (2020) investigated the part of information schemes practise in cultivating port logistics success using the port of Dar es Salaam, Tanzania, as an example. Findings instituted a substantial connection of information schemes procedure and cost savings for shipping and trucking not yet received, timeliness of goods delivery or services consumption apparent increase in trade quantity besides organisational logistics capabilities improvement.

Gacuru & Kabare (2019) conducted research to identify the factors influencing logistics performance at JKIA-based trade and distribution enterprises. Logistics performance at JKIA-area trade and distribution enterprises was shown to be influenced by factors like the use of IT, employee competency, and B2B relationships. To advocate for the widespread use of e-logistics, Kithira(2019) conducted research on its impacts on logistics efficiency. 107 workers who were subjected to stratified random as well as purposeful random sampling for data collection forms part of this study. According to the findings in this study, e-logistics

has improved the performance of logistics companies and organizational effectiveness.

Kihei and Bravo(2022) attempted to identify these characteristics and investigate how they would impact distribution logistics performance at Bata Shoe Company Kenya Limited. The study discovered that client, product, technology, and distribution structure are all elements that influence distribution logistics performance .Anthia and Wanjiru(2021)investigated the factors influencing the performance of logistics management in an organization. In accordance to the findings, information technology is regarded to be a catalyst for the necessary changes that are taking place at the port. Staff competence is one of the issues that contributes to the seamless operation of the complete organisation in terms of workforce for all operations. Infrastructure at any port capacity must spend extensively in modern, mechanised infrastructure that allows for speedier flow of freight and products from one location to another.

2.3 Summary and Research gaps

The effect of operational optimization practices on logistics performance have been highlighted in the previous studies. Most of the research were in other nations and counties, and none of the studies were carried out in Mombasa county, notably in the Kenya Ports Authority.. Therefore, the purpose of this kind of research will be the study that investigates the impact of logistic performance after operational optimization practices

Table 1:Summary of Research gaps

Author	Year	Area of Study	Methodology	Findings	Knowledge Gap	Focus on the current study
Seroney Wanyoike & Kipkorir .	2019	The effect of forecasting demand on supply chain efficiency of the oil industry in Nakuru Kenya	This investigation was based on expressive survey investigate. The researcher recruited 147 supply chain directors and purchasing executives from petroleum marketing companies in Nakuru County.	- The efficacy of the supply chain was shown to be strongly associated with demand forecasting (r=0.285).	The study focused on petroleum promotion corporations in Nakuru County.	The present study will investigate the effect of operational optimization practices on logistics performance at Kenya Ports Authority.
Narandass	2023	Factors that influence the reliability of Kenyan shoe producers' demand forecasts.	The descriptive research technique was used. Participants were given structured questions to complete.	- The descriptive research technique was used. Participants were given structured questions to answer.	This study on focused on demand forecasting and did not focus on other variables such as inventory optimization ,transportation optimization and automation Integration.	The present study will emphasis on the consequence of operational optimization actions on logistics success at Kenya Ports Authority.

Gacuru, & Kabare	2019	The elements impacting trade and distribution organisations' logistics performance at Jomo Kenyatta International Airport.	-This investigation utilized an evocative research approach. Targeted people included 42 JKIA logistics employees. Both main and minor data was composed. Data were acquired through semi-structured questionnaires..	-The study participants observed that information technology, degree of knowledge, and business-to-business interactions all had an impact on logistics efficiency in JKIA-based trade and distribution firms..	The investigation used main and minor data	The present study will seek to explore the consequence of operational optimization actions on logistics success at Kenya Ports Authority.
Rutaba	2022	Relief Logistics Performance Drivers for Successful Emergency Relief Operations in Responding to Pandemics in Tanzania.	The study merged quantitative and qualitative data in a sequential explanatory research style using a sample of 150 respondents from humanitarian groups.	The most important aspects of relief logistical performance for efficient disaster relief operations were identified as competent personnel, a committed humanitarian organisation, enabling guidelines, helpful monetary assets, and devoted logistics facility givers..	The study was done in Tanzania	The present study will seek to inspect the result of operational optimization actions on logistics success at Kenya Ports Authority.
Mogoi & Osoro	2022	The Influence of Supply Chain Administration Improvements on Farm Success in Kenya's Murang'a County.	The study examined 142 agricultural enterprises in Murang'a County, Kenya, using a descriptive research technique. The study's sample subjects were chosen in a methodical, planned manner. To gather primary data from respondents,	The findings reveal that the efficiency with which Murang'a County agricultural firms handle transportation, inventory, information, and packaging all contribute considerably to their overall performance.	The study targeted Agricultural Firms In Murang'a County, Kenya	The present investigation will pursue to investigate the consequence of operational optimization practices on logistics success at Kenya Ports

			questionnaires that were administered privately with both closed and open-ended items were use.			Authority.
Kanyepe	2023	Transportation management techniques and performance of diamond mining businesses in Zimbabwe.	The sample contained 92 individuals, all of whom worked in logistics, procurement, or the financial sector. Participants were nominated through stratified arbitrary selection scheme. Data was composed by a review on a 5-point Likert scale. A model based on regression was employed to investigate the link between all of the elements.	Vehicle scheduling, route planning, vehicle monitoring, and fuel management have all been shown to improve the diamond mining company's operations.	The was done in Zimbabwe	The present study will seek to explore the effect of operational optimization actions on logistics success at Kenya Ports Authority.

2.4 Conceptual Framework

Independent Variables

Dependent Variable

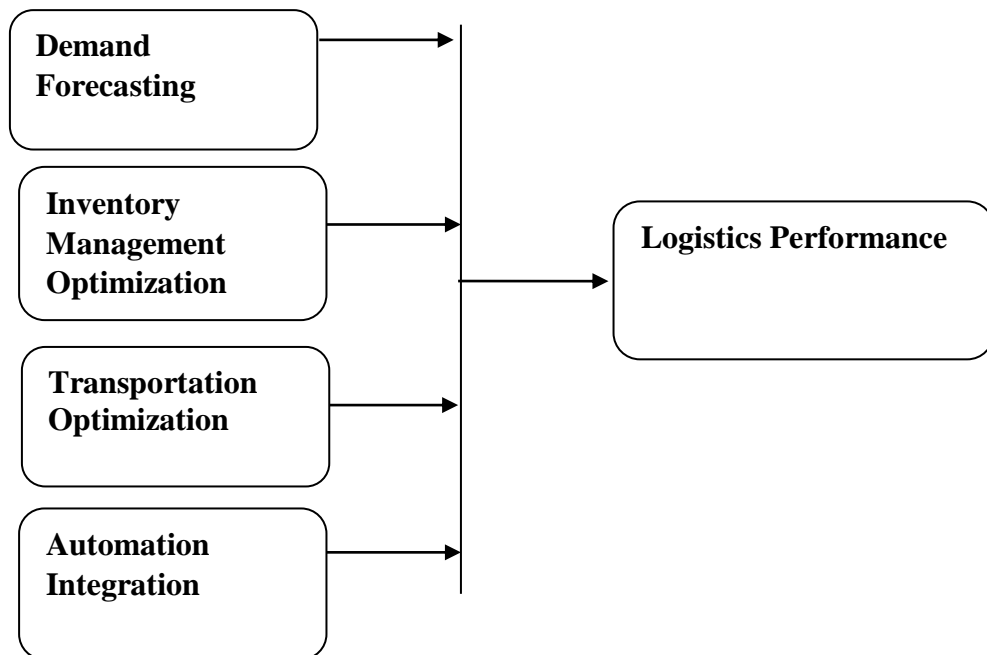


Figure 1: Conceptual Framework

2.5 Operationalization of Variables

Table 2:Operationalization of Variables

Objectives	Variables	Indicators	Measurement	Source
To inspect the effect of demand forecasting on Logistics Success at Kenya Ports Authority.	Demand Forecasting	-Forecast accuracy -Lead time forecast accuracy -Forecast bias -Order cycle time -Inventory holding costs	nominal	Craig and Günter (2019)
To find the effect of inventory optimization on Logistics Success at Kenya Ports Authority	Inventory Optimization	-Reduced Stockouts -Carrying cost of inventory -Faster Order processing time -Improved Supplier Relationships -Enhanced Storage and Space Utilization	Nominal	Kwadwo (2019)
To assess the result of transportation optimization on Logistics Success at Kenya Ports Authority	Transportation Optimization	-On-time delivery. -Route efficiency -Enhanced carrier performance -Supply chain Collaboration -Optimal Resource Utilization	Nominal	Kazungu & Ochiri (2019)
To evaluate the consequence of automation integration on Logistics Success at Kenya Ports Authority.	Automation Integration	-Process efficiency improvement -Error reduction in logistics operations -Downtime reduction -Adaptability and scalability -Increased Productivity	Nominal	Aberdeen Group(2019)
Logistics Performance at Kenya Ports Authority.	Logistics Performance	-Timeliness -Order fulfillment accuracy -Customer satisfaction with logistics services -Cost-effectiveness -Transportation Efficiency	Nominal	Rutab (2022)

2.6 Chapter Summary

This segment offers an empirical assessment of pertinent studies. It has shown the theoretical overview of research done so far in connection to the issue at hand. The study's theoretical underpinnings have been outlined. The conceptual framework has been established, and after that the research gaps have been presented.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

The present sector goes over the research topic, targeted population, sampling strategy, data assortment tool, pilot research, data collecting technique, and data analysis in detail.

3.1. Research Design

Based on Creswell & Plano (2019), research design is the procedures for assembling, studying, understanding, and writing data in research. As such, the research design specifies the way in which the data must be gathered using appropriate techniques, how it will all lead towards addressing the study's main concern. The study will utilize descriptive survey. A descriptive study describes the circumstances surrounding an issue, portrays a picture of the person or event, or demonstrates the relationship between two variables and their natural occurrence (Blumberg, Cooper and Schindler,2020).

3.2 Target Population

This is the total set or collection of individuals who will be considered qualified for data analysis. The research will target all individuals in the Kenya Port Authority's operations section. The operations division has 4 departments that is Convectional Cargo ,Marine Operations,Inland Container depot and Container Operations Departments(KPA,2023). The researcher will involve all the 620 top management,middle level management ,supervisory and low level employees in the four departments. The top management employee are the department heads in the four department . The middle management employee will be the managers and their assistants in the various departments,the supervisor level employee will be

supervisors and team leaders in various sections. The low level include technicians and various staff involved in daily operations of the 4 departments. Employees in the operation division have specialised knowledge and expertise in handling and managing logistics operations within the port, and their perspectives can provide valuable information about the specific challenges, processes, and complexities involved in optimising logistics operations at KPA. Furthermore, these individuals have intimate knowledge of the logistics department's day-to-day operations, systems, and processes. Their viewpoints can provide deep insights into the operational elements of processes, finding inefficiencies, bottlenecks, and places for development.

Table 3: Target Population

Department	Top Management Level	Middle Management Level	Supervisory Level	Low level	Total
Convectional Cargo	1	2	10	97	110
Marine Operations	1	2	12	125	140
Inland Container Depot	1	2	17	150	170
Container Operations	1	2	20	177	200
Total	4	8	59	549	620

Source(KPA,2023)

3.3 Sample and Sampling Technique

3.3.1 Sample

Efficiency is determined by a sample size because it has to provide enough information about the selected item or items to the researcher in its findings so that

the research can be concluded (Levine, 2021). Therefore, the sample size for the research is sixty respondents.

Fishers et al., (1998) Formula was employed to estimate the size;

$$n = \frac{Z^2 P(1-P)}{I^2}$$

Where

Where: n= Sample size [where population > 10,000]

Z= Normal deviation at the desired confidence interval. In this scenario it will be at 95%, Z value at 95% is 1.96

P= The portion of the populace possessing the anticipated features

Because the quantity of the populace having the attribute is unknown, 50 percent was chosen.

I= Degree of precision; was taken to be 10%.

Therefore;

$$n = \frac{Z^2 P(1-P)}{I^2}$$

$$n = \frac{1.962^2 * 0.5(1-0.5)}{0.12}$$

$$n = \frac{1.962^2 * 0.5(1-0.5)}{0.12}$$

$$n = \frac{1.962^2 * 0.5(1-0.5)}{0.12}$$

n=96

The sample size is 96 participants

3.3.2 Sampling Techniques

The investigation will utilize stratified random selection to divide a populace into minor subcategories called strata. This system is also called stratification, divides participants into groups based on common features or characteristics. The

respondents will be divided proportionately into four strata (top management, middle level management, supervisory and low level employees in the four departments.) using the formula:

$$n_h = (N_h / N) \times n$$

n_h = Sample size of stratum h

N_h = population size of stratum h

N = total population size

n = total sample size

Table 4: Sample Size of Each Stratum

Category	Population	Sample Size
Top Management Level	4	1
Middle level Management	8	1
Supervisory Level	59	9
Low Level Management	549	85
Total	620	96

Source(KPA,2023)

3.4 Instruments

The data will be gathered through questionnaire. A questionnaire includes a number of questions, which are directed at different respondents in order to obtain essential information. This method has multiple advantages including gathering information from many people in a shorter period and saving money. There is also room for thought in response as they are simple to administer and score as well. This ensures they are minimized as well as biases from personal experience and opinions (Saty & Roopa, 2022).

3.5 Pilot Study

Steward (2020) claims that a pilot study constitutes of “a small study testing research instruments, methodologies and other elements to be used in larger projects”. Steward explains that pilot studies serve as trial runs or tests to spot any potential shortfalls in the research tools and methods. The piloting process will enable other team members involved in the research study to be aware on how the protocol is carried out. Furthermore, it may assist in deciding upon two different alternative approaches to collect data for example the use of interviews instead of self-administrated questionnaire (Lancaster et al, 2022). For the study the researcher will randomly select 10 respondents working in the operations division at KPA. These respondents will be excluded from the main study. According to the rule of thumb in a pilot study, the sample usually comprises at least 10% of the target population (Lancaster, et al. 2022).

3.5.1 Validity of Research Instrument

Validity reflects how much a tool captures what it set out to capture. As a result, a tool is said to be valid if it accurately actions what it was designed to quantify. Validity of the research instruments will be conducted to determine whether they gauge the research variables. Supervisor will also be consulted to assess the number of mistakes and the quality of needed information. In this regard, validation of procedure will involve ascertaining if the questions are appropriate, the clarity of the instructions given out, fitness of format of the questionnaire and whether they follow a logical sequence. The final versions of the questionnaires will be printed after some corrections made on them.

3.5.2 Reliability of Research Instrument

Zhang, Waszink, and Wijngaard (2013) define consistency as level to every other observer obtains similar results. Internal consistency was utilised to determine the questionnaire's dependability. Internal consistency is a type of dependability that refers to how well various measurements of the same variable agree (Cooper and Schindler, 2013). Cronbach's Alpha will be used to verify the dependability of the instruments. Kombo and Tromp (2011) define acceptable reliability as $\alpha > 0.7$.

3.6 Data Collection Procedure

The investigator must first send an outline letter to the Management of the University of Africa, requesting permission to gather data. Following that, the researcher will make an initial visit to the school official, advise him of the prospective data gathering exercise, and seek an appointment. The researcher will bring printed materials and visit the respondents on scheduled days to distribute the KPA questionnaire. The questionnaires will be distributed to study participants by the researcher. After a week, the researcher will return to collect the surveys to allow ample time for the responders.

3.6 Data Analysis and Presentation

Data will be processed using editing, coding, categorization, and tabulation methods. The SPSS version 25 software will be used to enter and analyse data. The study will focus on extracting numerical information, which will be presented in tables for ease of comprehension.

3.7 Ethical Considerations

The guidelines and principles that researchers should follow when doing study are known as ethical concerns in research. This is because research may require confronting individuals as researchers monitor behaviours and the consequences of

occurrences on the target group. In this study, the researcher will examine the following before and/or before starting a study;

3.7.1 Permission to conduct the study

The research approval will be secured from the Management University of Africa and the Kenya Ports Authority (KPA). Authorization for conducting out the study must also be obtained from KPA's logistics department staff members.

3.7.2 Confidentiality and Privacy

The researcher will maintain the confidentiality of the respondents' personal data. Sensitive information will be safeguarded to guarantee that it remains private and is not accessed by unauthorised individuals. This entails telling the responder that whatever information they reveal will be kept confidential. No identities or personal information were made public. The responders' data was kept private and utilised solely for academic purposes.

3.7.3 Voluntary Participation

Respondents, being independent persons, can choose whether to participate voluntarily or not. This decision should be free of pressure. Giving informed consent to participate will allow respondents to act autonomously (Fouka & Mantzourou, 2019). This will be done to guarantee that respondents provide informed permission before participating in the study. The aim of the investigation will be explicitly communicated to participants before to their assent, and it will be conducted in their chosen language. The risks and rewards were underlined. It is also critical to emphasize that participation is optional, with the freedom to quit at any moment. This assures that respondents understand that engagement, dropout, and non-participation will have no effect on their eligibility for services.

3.7.4 Anonymity

Anonymity in research means that study participants' identities should be kept hidden by guaranteeing that replies cannot be traced back to particular respondents. It may also mean that no personal identifiable information, such as names and addresses, is obtained during the early stages of the research. To preserve anonymity, precautions are made to safeguard the individual's identity by not using their name when presenting study results or revealing identifying factors that may expose their identity, such as work location, personal traits, and occupation (Punch, 1994). In this study, anonymity will be maintained by ensuring that respondents do not reveal their names on the questionnaire. Finally, the researcher should not be able to associate any information with any participant.

3.7.5 Informed consent

Informed consent is described as "a legal requirement before engaging in a study." Respondents will be asked for consent after being properly informed about the nature of the study (Brink & Wood 2018). The investigation should be done with the contributors' informed consent. Subjects in research must be informed about the study before deciding whether or not to join (Trochim, 2019).

3.7.6 Potential for harm

Possibility for damage refers to the risk of physical or mental injury, as well as other inconveniences, as a result of a subject's participation in research. Before engaging with research participants, researchers must fully disclose all possible risks associated with the study. Risk is frequently represented in the authorization form, which details the potential dangers and the methods in place to address them. To get informed consent, the researcher will guarantee that all possible dangers of damage are clarified

to participants before the investigation begins. Prepare to provide resources, counselling, or medical support to participants if there is a risk of harm.

3.8 Chapter Summary

Introduction, research design, target population, sample and sampling strategy, research instrument, pilot study, data collecting processes, data analysis and presentation, ethical consideration, and lastly chapter summary

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APPENDICES

APPENDIX I: Introduction Letter

Dear respondent,

I am a Management University of Africa student. As part of the requirements for the Advanced Diploma in Logistics and Transport, i am conducting research on the ***“OPERATIONAL OPTIMIZATION PRACTICES AND LOGISTICS PERFORMANCE IN KENYA: A CASE STUDY OF KENYA PORTS AUTHORITY, MOMBASA COUNTY.”*** Hence, seek your support both in time and through answering the attached questionnaire. The accuracy and accuracy of your answer will be important in determining the research objective. Data received should be kept totally secret. I appreciate the time you have set out for it.

Thank you in advance.

Yours Faithfully,

Edward Wambua Lengah

APPENDIX II: Questionnaire

Please, answer the following questions as truthfully as you can. The questionnaires will not be identified by your individual responses which are private and remain anonymous. Use your answers for purely academic purposes.

Place a tick (X) against each question by entering it in the boxes below them

Section A: Respondent Details

1. Kindly state your Gender

Male () Female()

2.How long have you worked in the company

- a) No more than one year ()
- b) 1-3 Years ()
- c) 4-6 Years ()
- d) More than 6 Years ()

3. Highest education level attained?

- a) Certificate ()
- b) Diploma ()
- c) Undergraduate degree ()
- d) Post-graduate degree ()

Section B: Effect of demand forecasting on Logistics Performance at Kenya Ports Authority.

Please indicate your degree of agreement with the following comments about the effect of demand forecasting on Logistics Performance at Kenya Ports Authority on a 5-point scale: SD is for Strongly Disagree, D stands for Disagree, U stands for Undecided, A stands for Agree, and SA stands for Strongly Agree

No.	Demand Forecasting	SD	A	U	D	SD
1	Our forecasts consistently align with the actual demand.					
2	The forecasted demand aligns well with the actual demand for goods and services at Kenya Ports Authority.					
3	Lead time forecasts assist in adequately preparing for incoming shipments and logistical operations.					
4.	The lead time forecasts provided by Kenya Ports Authority are generally accurate and reliable.					
5	There is a noticeable bias in the demand forecasts generated by Kenya Ports Authority.					
6.	The forecast bias significantly affects logistics planning and execution at Kenya Ports Authority.					
7.	Orders are processed and delivered within the expected time frame.					
8.	Excessive inventory significantly increases our operational costs.					

Section C: Effect of inventory optimization on Logistics Performance at Kenya Ports Authority

Please indicate your degree of agreement with the following comments about on the effect of inventory optimization on Logistics Performance at Kenya Ports Authority on a 5-point scale: SD is for Strongly Disagree, D stands for Disagree, U stands for Undecided, A stands for Agree, and SA stands for Strongly Agree.

No.	Inventory optimization	SA	A	U	D	SD
1	The inventory management practices at Kenya Ports Authority need improvement to reduce stockouts.					
2	The stockout rate significantly affects the smooth flow of logistics activities at Kenya Ports Authority.					
3	High carrying costs have a notable impact on the overall logistics expenses at Kenya Ports Authority.					
4	The carrying cost of inventory is efficiently managed and optimized at Kenya Ports Authority					
5	The order processing time at Kenya Ports Authority is consistently efficient and meets expectations.					
6	At the organisation delays in order processing significantly hinder the smooth functioning of logistics processes.					
7	Strengthened relations with suppliers have positively impacted inventory management.					
8	Storage spaces are underutilized despite efforts in					

	inventory management.					
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Section D: Effect of transportation optimization on Logistics Performance at Kenya Ports Authority.

Please indicate your degree of agreement with the following comments about evaluate the transportation optimization on Logistics Performance at Kenya Ports Authority on a 5-point scale: SD indicates Strongly Disagree; while D represents Disagree; U signifies Undecided; A signposts Agree; and SA means Strongly Agree.

No.	Transportation optimization	SA	A	U	D	SD
1	Kenya Ports Authority consistently achieves on-time deliveries, meeting established schedules.					
2	There are noticeable delays in achieving on-time deliveries at Kenya Ports Authority.					
3	Optimal route planning significantly contributes to cost savings in logistics at Kenya Ports Authority.					
4	The current route planning adequately addresses logistical challenges at Kenya Ports Authority.					
5	The carriers engaged by Kenya Ports Authority consistently meet performance expectations.					
6	I am confident in the reliability and consistency of carrier performance at Kenya Ports Authority.					
7	Effective collaboration within the supply chain contributes to efficient transportation					
8	Transportation resources are underutilized, impacting logistical operations negatively.					

Section E: Effect of automation integration on Logistics Performance at Kenya Ports Authority.

Please indicate your degree of agreement with the following comments about evaluate the effects of on automation integration on Logistics Performance at Kenya Ports Authority on a 5-point scale: SD indicates Strongly Disagree; while D represents Disagree; U signifies Undecided; A signposts Agree; and SA means Strongly Agree.

No.	Automation Integration	SA	A	U	D	SD
1	Automation integration significantly enhances the overall efficiency of logistics processes at Kenya Ports Authority.					
2	Process efficiency improvements resulting from automation positively impact logistics outcomes.					
3	Automated systems contribute to minimizing human errors in logistics processes.					
4	There is a noticeable lack of improvement in logistics process efficiency despite automation integration.					
5	Despite automation, downtime remains a prevalent issue affecting logistics performance.					
6	The implementation of automation solutions has noticeably minimized interruptions in logistics activities.					
7.	Our automation system adapts and scales effectively to changing logistical needs.					
8.	Automation has substantially increased overall productivity in logistics operations					

Section F: Logistics Performance at Kenya Ports Authority

Please indicate your degree of agreement with the following comments on Logistics Performance at Kenya Ports Authority on a 5-point scale: SD indicates Strongly Disagree; while D represents Disagree; U signifies Undecided; A signposts Agree; and SA means Strongly Agree.

No.	Logistics Performance	1	2	3	4	5
1	Deliveries and operations are consistently completed within the scheduled timeframe.					
2	Kenya Ports Authority demonstrates high accuracy in fulfilling orders as per customer requirements.					
3	Customers are highly satisfied with logistics services provided by Kenya Ports Authority					
4	The on-time delivery rate significantly contributes to the reputation of Kenya Ports Authority.					
5	Our logistics operations are cost-effective without compromising quality.					
6	Transportation processes are efficient and well-organized, contributing to overall performance.					

APPENDIX III: Time Schedule

Time and Activities	October 2023	November 2023	December 2023
Writing Proposal			
Writing literature review			
Presenting the research proposal			
Data Collection			
Presenting research findings			
Final copy			

APPENDIX IV: Research Study Budget

Item	Total Cost(Kshs)
One rim of printing papers	400
Writing pens	100
Typesetting of proposal	2,000
Internet	500
Printing of proposal	1,000
Typesetting and printing of questionnaires	5,00
Transport	5,000
Meals and drinks	2,000
Data collection	5,000
Printing final report	2,000
Printing Hard Cover copy	1200
Miscellaneous/contingency	5,000
TOTAL AMOUNT	24,200

APPENDIX V: Plagiarism Report



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