

**SUPPLY CHAIN VISIBILITY AND OPERATIONAL PERFORMANCE  
OF LOGISTICS FIRMS IN MOMBASA COUNTY, KENYA**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF  
BUSINESS ADMINISTRATION, UNIVERSITY OF NAIROBI**

**DECEMBER, 2020**

## DECLARATION

### STUDENT'S DECLARATION

I declare that this research project is my original work and has not been submitted in this or any other university for the award of a degree.

Signature.....

Reg. No: D61/10854/2018

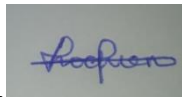
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### SUPERVISOR'S DECLARATION

This research project has been submitted with my permission as the university supervisor.

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## **ACKNOWLEDGEMENTS**

I thank the Almighty for giving me the will and zeal to get this study completed as wished. I give my immense thanks and appreciation to my supervisor Dr Stephen Odock for his unwavering support during this whole period. I also recognize and thank my colleagues and lecturers who provided me with a helping hand during this period. I am very thankful for the department of Management Science for being resourceful during this period. Lastly, am full of gratitude to all my respondents who participated through completing questionnaires and made this study a reality.

## **DEDICATION**

I humbly dedicate this research project to my parents Jemimah Muthoki and Nathaniel Mwangeka. I also wish to recognize my siblings Ruth Muluki Mwangeka and Roselyn Sau Mwangeka for their unwavering support. My gratitude also goes to my uncle Charles Muendo for his support.

## TABLE OF CONTENTS

<b>DECLARATION.....</b>	<b>II</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>III</b>
<b>DEDICATION.....</b>	<b>IV</b>
<b>LIST OF FIGURES .....</b>	<b>VIII</b>
<b>LIST OF TABLES .....</b>	<b>IX</b>
<b>ABBREVIATIONS AND ACRONYMS .....</b>	<b>X</b>
<b>ABSTRACT .....</b>	<b>XI</b>
<b>CHAPTER ONE: INTRODUCTION .....</b>	<b>1</b>
1.1 Background of the Study .....	1
1.1.1 Supply Chain Visibility.....	2
1.1.3 Supply Chain Visibility and Operational Performance.....	4
1.1.4 Logistics Firms in Mombasa County .....	5
1.2 Research Problem .....	6
1.3 Objective of the Study .....	7
1.4 Value of the Study .....	8
<b>CHAPTER TWO: LITERATURE REVIEW .....</b>	<b>9</b>
2.1 Introduction.....	9
2.2 Theoretical Review .....	9
2.2.1 Knowledge-Based Theory.....	9
2.2.2 General Systems Theory .....	10
2.3 Components of Supply Chain Visibility .....	11
2.4 Empirical Review.....	12
2.5 Summary of Knowledge Gaps .....	14
<b>CHAPTER THREE: RESEARCH METHODOLOGY.....</b>	<b>16</b>
3.1 Introduction.....	16
3.2 Research Design.....	16

3.3 Population of the Study.....	16
3.4 Sample Size and Sampling Technique.....	16
3.5 Data Collection .....	17
3.6 Operationalization of Study Variables.....	17
3.7 Reliability and Validity Tests .....	19
3.8 Data Diagnostics .....	19
3.9 Data Analysis.....	20
<b>CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTREPRETATION .....</b>	<b>21</b>
4.1 Introduction.....	21
4.2 Demographics of Logistics Firms.....	21
4.2.1 Longevity of Service in the Current Firm.....	21
4.2.2 Experience in Logistics .....	22
4.2.3 Length of Firm’s Operations .....	23
4.2.4 Level of Education .....	23
4.2.5 Level of Management Position .....	24
4.2.6 Number of Employees per Firm.....	24
4.3 Extent of Supply Chain Visibility Application among the Firms.....	25
4.3.1 Order Visibility .....	25
4.3.2 Shipment Visibility .....	26
4.3.3 Receipts Visibility.....	26
4.3.4 Quality Visibility.....	27
4.3.5 Demand Visibility .....	28
4.4 Operational Performance of the Firm .....	28
4.4.1 Supply Chain Costs .....	29
4.4.2 Risk Response Time.....	29
4.5 Supply Chain Visibility and Operational Performance of the Firm .....	30
4.5.1 Data Diagnostic Tests .....	31
4.5.2 Pearson Co-relation Coefficient.....	33
4.5.3 Model Summary.....	34
4.5.4 Analysis of Variance .....	36
4.5.5 Regression Coefficients.....	36
<b>CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>38</b>
5.1 Introduction.....	38
5.2 Summary of Findings.....	38
5.2.1 Extent of Implementation of Supply Chain Visibility .....	38
5.2.2 Supply Chain Visibility and Operational Performance .....	39

5.3 Conclusion of the Study.....	40
5.4 Recommendations of the Study .....	41
5.5 Limitations of the Study.....	41
5.6 Considerations for Further Research .....	42
<b>REFERENCES .....</b>	<b>43</b>
<b>APPENDICES .....</b>	<b>50</b>
<b>APPENDIX I: RESEARCH QUESTIONNAIRE .....</b>	<b>50</b>
<b>APPENDIX II: LIST OF LOGISTICS FIRMS IN MOMBASA COUNTY, KENYA.....</b>	<b>53</b>

## LIST OF FIGURES

Figure 2. 1 Conceptual Framework .....	15
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## LIST OF TABLES

Table 3. 1: Operationalization of Study Variables.....	17
Table 4. 1: Longevity of Service in the Current Firm.....	22
Table 4. 2: Years of Experience in Logistics .....	22
Table 4. 3: Length of Firm’s Operations .....	23
Table 4. 4: Level of Education of Respondents.....	24
Table 4. 5: Level of Management Position.....	24
Table 4. 6: Number of Employees Per Firm .....	25
Table 4. 7: Order Visibility.....	25
Table 4. 8: Shipment Visibility.....	26
Table 4. 9: Receipts Visibility .....	27
Table 4. 10: Quality Visibility .....	27
Table 4. 11: Demand Visibility.....	28
Table 4. 12: Supply Chain Costs.....	29
Table 4. 13: Risk Response Time .....	29
Table 4. 14: Summary of Means for Study Variables .....	30
Table 4. 15: Tests of Normality .....	31
Table 4. 16: Test of Autocorrelation.....	31
Table 4. 17: Tests of Multicollinearity .....	32
Table 4. 18: Test for Heteroscedasticity .....	32
Table 4. 19: Pearson Co-relation Matrix.....	33
Table 4. 20 Model Summary .....	35
Table 4. 21 Variance Results .....	36
Table 4. 22 Regression Coefficients .....	36

## **ABBREVIATIONS AND ACRONYMS**

CFS	Container Freight Station
CRBC	China Road Bridge Construction
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
EOL	End of Life
ICD	Inland Container Depot
ICT	Information Communication Technology
IT	Information Technology
PCN	Process Change Notification
SGR	Standard Gauge Railway
SCM	Supply Chain Management
SCIS	Supply Chain Information System
SCSR	Supply Chain Sustainability Risks
SCV	Supply Chain Visibility
SPSS	Statistical Package for Social Sciences

## ABSTRACT

Logistics firms in Kenya are faced with cut throat competition to deliver goods and services on time to customers with changing preferences without compromising on quality. This has forced firms to look for innovative ways meet customer requirements without conceding on operational performance. Firms have adopted ICT technologies to mitigate these complexities. Supply chain visibility is one of the discipline in SCM that can be implemented by firms in order to better their operational performance. This study focused on supply chain visibility and operational performance of Logistics firms in Mombasa County, Kenya. The study adopted descriptive cross sectional survey methodology. The target population of the study was 310 logistics firms in Mombasa County. Data was collected using a close ended questionnaire that comprised 3 sections. Section A, B and C captured data on demographics; supply chain visibility; and operational performance of the firms, respectively. Data collected was analyzed using SPSS and was illustrated using frequency tables. Frequencies, means, standard deviations, test results, correlation and regression coefficients were calculated. The findings of the study indicated a positive relationship between supply chain visibility and operational performance. The study however found out that supply chain visibility did not significantly have an effect on operational performance. The findings indicated that firms implemented supply chain visibility to a fair extent. This implied that if supply chain visibility is implemented to a greater extent firms would realize improved operational performance. The researcher recommends logistics firms to consider enhancing ICT systems that would increase operations visibility. The researcher further recommends that logistics firms should take advantage of operational performance indicators to leverage on competitive edge. This is because operational factors such as holding costs of inventory, time taken to respond to a process change and supply chain delays have reduced as a result of implementation of supply chain visibility, resulting in an improved operational performance of logistics firms.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

The progressive growth of businesses necessitated by advancement in technology in particular the web has brought about the opportunity for consumers to compare goods and services with ease. Consumers are more sensitive to pricing and quality and this has been a key driving change in contemporary supply chains Aeb (2015). Today's supply chains are faced with specific challenges that stem from cost control, managing supplier relationships, risk response and meeting customer expectations. Ponomarov (2011) emphasizes that information sharing in firms' chains is the key to positive performance as information creates some sense of certainty which in turn reduces the need to have a lot of contingencies. Even though the idea of supply chain visibility (SCV) and information sharing in supply chains is occasionally used the same way in research, they have two diverse interpretations (Swaminathan, 2003). Barrat (2007) clarified that information sharing is a process while visibility is a product of the same. Zhang (2008) understood that SCV remains inadequately addressed in research.

This research is anchored on two theories; knowledge-based theory and general systems theory. Knowledge-based theory argues that information is the most strategic resource of the organization if used wisely. On the other hand, general system theory proposes that actual organisations are open to network with their internal and external environments and they can acquire improved properties through interaction with one another (Bertalanffy, 1962). Based on these two theories it is important for supply chain actors to interact and share knowledge so as to improve productivity along the chain.

The logistics industry in Kenya is a big pillar of the economy and is expected to cross the \$5billion mark by 2023 according to Business Daily (2020). However, the emergence of the

Covid-19 pandemic put this into doubt due to supply chain disruptions. Logistic firms in Mombasa account for majority of logistic firms in Kenya and this is due to the proximity to the port of Mombasa (Mwita, 2020). In the last decade the operational efficiency of these firms has increased due to improved transport infrastructure; of significance the Standard Gauge Railway (SGR) Business Daily (2020). However, there still exists glaring challenges among these firms. Currently, there is unsatisfactory collaboration between the SGR cargo operator, clearing agents and truckers, which has resulted in increased waiting time and increased supply chain costs. The use of a single window system in place for clearing cargo is inefficient as it experiences occasional downtime Kihara (2019). Supply chain visibility should be enhanced to reduce the effects of aforementioned challenges.

### **1.1.1 Supply Chain Visibility**

Gattorna (2009) described SCV as the individuality, position and currency of items moving along the supply chain. These entities have time logs showing at what point they are in the chain and the duration taken for the activities. Barrat (2007) expresses SCV as the level to which partners within a supply chain can gain access to or share information which will add value to their processes. This information should be beneficial to all members of the chain. Being relevant in today's supply chain setting requires businesses to understand the benefits of information technology (IT). Watson (1998) found that the internet has made it easier for businesses to communicate with their partners, that is, suppliers and customers thus increasing collaboration among partners. Graham (2000) recommends that IT be used to solve some of the complexity experiences by physical initiatives.

Technology provides a competitive edge through sharing of timely and accurate information. As a result, decisions are made quicker and all partners are aware of the outcome on time. Businesses which have instantaneous information about merchandise, consumers and order completion across the supply chain can realize two important objectives: better handling of

customers and increased working efficiencies (Holcomb, 2004). Ponomarov (2011) carried out research on the relationship of SCV and operational performance amongst North American and European firms. The study operationalized the following study factors demand forecasts, customers' inventory position, work in progress, product orders, production capacities and order status tracking. Past research has shown these factors to be effective when measuring SCV. However, for the purposes of this study the visibility factors that will be used to measure this variable include; order visibility, shipment visibility, receipts visibility, quality visibility and demand visibility. These factors have a considerable effect on achieving visibility along the supply chain Gattorna (2009).

### **1.1.2 Operational Performance**

Operational performance is the base mark level of a firm against its set operating targets such as waste minimization, efficiency, turnaround time, conservation obligation and regulatory compliance (O'Brien, 2009). Operational performance is the value derived when a supply chain is operating at optimal level. A firm's operations are guided by how it maximizes on profit opportunities and how it minimizes its expenses. Palevich (1999) further adds that costs related to supply chain comprise 75% of the actual budget.

Measuring operational performance is one big challenge that businesses face (Ittner, 1998). This type of performance is different from organization performance and it refers to the quantifiable aspects of the outcomes of an organization's procedures, such as dependability, lead time and inventory turnover. Operational performance also has an impact on organization performance measures like market share and customer satisfaction (Voss, 1997). (Ponomarov, 2011) conducted a similar study and operationalized the following operational performance indicators; supply chain costs and risk response time. There are other quantifiable aspects like reliability and quality but in the case of SCV and operational

performance a lot of significance is given to costs and risk (Ponomarov, 2011). Based on this, the study will operationalize operational performance as having the following indicators; supply chain costs and risk response time.

### **1.1.3 Supply Chain Visibility and Operational Performance**

Visibility within supply chain processes aim to provide businesses, suppliers and their customers quality information on real time basis so that they can make sound supply chain decisions Graham G., (2000). Operational performance on the other hand ensures a firm utilizes its resources effectively and efficiently reaping maximum benefits while cutting down on cost Palevich (1999). Visibility peers through the concept of operational performance by managing time, cost and quality of a product. Constant tracing of components as they move along the supply chain is the key to achieving this Gattorna (2009). It is therefore very critical for partners to sustain the accuracy of the information. Supply chain visibility also cushions a firm against supply chain disruptions; a firm is able to respond rapidly in case of risk (Holcomb, 2004). Visibility in supply chains significantly increases its ability to function because it provides members with information and thus reduces uncertainty. This also translates to a reduction in the amount of safety stock needed (Ponomarov, 2011). SCV therefore can be viewed as catalyst for achieving positive operational performance.

Moreover, linking sharing of information to visibility requires two steps. In the first step, the recipient of the information verifies if it is accurate, time bound and beneficial to the business. If the information ticks all the boxes then visibility is achieved. The second step involves using the information by the beneficiaries for decision-making actions. Swaminathan (2003) was concerned with the matter of what degree information-sharing protocol should be necessary for consideration. He argued in terms of the amount, type of

data and information that should be shared with the rest of the supply chain associates. The use of enterprise resource planning (ERP) systems has provided businesses with a platform which they can share and access information with their suppliers making it easy to control and manage their production and distribution processes.

#### **1.1.4 Logistics Firms in Mombasa County**

Logistics firms in Mombasa County contribute significantly to the country's economy in the following ways; provision of employment and income generation through multilateral trade (Datche, 2019). Logistics firms in Mombasa comprise of container freight stations (CFSs), shipping lines, clearing and forwarding firms and truckers (Business Daily, 2020). The structure is made up road, railway and pipeline which move up tons of goods in the country. The Mombasa port is at the heart of vibrant logistics in East Africa and it connects to countries such Rwanda Burundi, Congo and Uganda (Osodo, 2012). The Mombasa port has witnessed a growth of 10% in the past 10 years and has handled on average 32 million tons per year (Business Daily, 2020).

A feasibility study conducted on SGR by China Road and Bridge Construction (CRBC) expects the port to handle 41 million tons per year on average by 2028 (Kihara, 2019). The development of SGR on the flip side has resulted in a dip in incomes for CFSs and truckers in Mombasa because of the government's directive that all Nairobi bound cargo has to be transported via SGR Kihara (2019). Majority of the challenges facing logistics firms in Mombasa are ICT related which results to cargo clearance delays at the port. It is estimated that it takes on average 3.9 business days for cargo to be cleared (Mwita, 2020). Supply chain visibility is therefore very important for supply chain members because of tracking and tracing of consignments. Companies should therefore find a way to link the single window



system currently being used for cargo clearance with their own internal systems for greater visibility. This will provide them with better decision making on their shipment plans.

## **1.2 Research Problem**

The complexity in modern-day supply chains coupled by heightened competition in today's global markets indicates that there is need to optimize supply chains in order to derive maximum value (Cristopher, 2004). The current supply chains are characterized by shorter lead times, shorter production cycles, increased custom goods, seasonal products and changing customer preferences (Aberdeen, 2013). Customers have more expectations than before which has forced businesses to focus attention on the relationships with customers and suppliers in order to obtain value from supply chains (Simchi-Levi, 2003). One of the key ways to strengthen these relationships and derive value from them is through SCV (Aberdeen, 2013). In addition, the outsourcing of functions further supports the need for companies to incorporate visibility into their systems in order for a better grip on processes controlled by their partners (Murphy, 2018). This creates the need for technology to automate the processes (Africa, 2019). SCV if implemented can be crucial in managing supply chain costs and risk response Simchi-Levi (2003).

Logistics firms in Mombasa county accounted for majority of logistics firms in the country Businesslist (2020). This could be attributed to the close proximity to the port of Mombasa. However, these firms are constantly faced with logistical inefficiencies in terms storage and planning. Cargo should be cleared in 4 days after reaching the port or end up in undesignated inland container depot (ICD) where it starts incurring demurrage costs (Kihara, 2019). This leads to increased cost and waiting time in the entire chain. It was therefore prudent for firms to seek a solution in SCV because information sharing among members can reduce these inefficiencies. Information will allow firms to have control of their operations and make best

decisions based on their production plan even though some of these logistical inefficiencies are caused by external factors (Katuse, 2013).

Aberdeen (2013) did a study on the effect of SCV on supply chain costs and service levels. The units of analysis for this study were logistics firms in Europe. The researcher divided units under study into two categories; supply chain visibility leaders and supply chain visibility followers. They observed them on the following factors; orders delivered to customers complete, orders delivered from suppliers complete, landing costs per unit and rate of stock outs. The findings of the study concluded that SCV leaders enjoyed a better performance compared to SCV followers on those four aspects, concluding that SCV if implemented will have positive influence on operational performance of the firm.

Gustarsson (2010) carried out on how SCV can be applied in a case of Pulp Company in Sweden. The aim of the study was to establish how SCV can be used to mitigate warehousing complexities. The research employed a systems approach to find out areas where SCV was low and can be improved in order to manage inventory better. The study concluded that information sharing was well implemented at the firm leading to visibility. In addition, it further asserts that increased visibility leads to better inventory management. In Kenya little related research had been done and there was need to conduct a study to deepen understanding of the role of SCV. The study answered the following question; what is the relationship between supply chain visibility and operational performance of logistic firms in Mombasa County, Kenya?

### **1.3 Objective of the Study**

The objective of this study was to establish the relationship between supply chain visibility and operational performance of logistics firms in Mombasa County, Kenya.

#### **1.4 Value of the Study**

Findings of this study will provide managers with insights on how to boost their firm's operational performance through information sharing. They will be able to understand how the accuracy and timeliness of information is crucial to decision making in business. It will help give insights as how supply chain visibility affects operational performance. Logistics managers will also recognize how to manage information in order to gain competitive edge within the supply chain.

Academicians will gain meaningful information on the relationship of supply chain visibility and operational performance. It will add into the already known literature and provide possible areas to carry out further research in the field of supply chain visibility. For policy makers, this study will provide a framework on how firms and their entities can interact and share information without necessarily affecting competition. It will also strengthen the idea that collaboration is the best competitive advantage tool that should be adopted. Policy makers should also benefit by gaining information that can be used to formulate frameworks to standardize visibility systems.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews related literature on supply chain visibility and operational performance. It begins by discussing the underlying theories anchoring the study. This is followed by a discussion on the components of SCV. Thereafter, related studies are discussed and the knowledge gaps are brought out. Lastly, the chapter discussed the conceptual framework guiding the study.

### **2.2 Theoretical Review**

This research paper is anchored on two theories; knowledge-based theory and the general systems theory.

#### **2.2.1 Knowledge-Based Theory**

This theory is fundamental to this study because it strongly advocates for use of information in the form knowledge for the benefit of the firm. However, this information should be strategic in that it can be used to add value to the supply chain or reduce complexities in the supply chain. Information is beneficial to a logistic firm if is used to lower the operational costs or avert a possible risk in the form of stock outs or high safety stock. This theory asserts that if knowledge is well managed within a firm, the firm becomes more competitive. This research seeks to go a mile further and examine the benefits of sharing knowledge across inter-firm for the benefit of the entire chain. Supply chain visibility will look to build upon this theory to ensure its goals are achieved.

The business change from resource-based production to information-based production created a paradigm shift in the operations of the firm. Organizations now realize more than ever before that in order gain from their operations they need to be knowledge-based. However majority lack an understanding on how to become one and what concepts they need to embrace in order to become one. The real thrust behind the operations of an organization is

found in the immaterial resources of the organization (Zack, 2003). Knowledge provides a competitive edge that does not wither with time (Nonaka, 1991). Organizations should be able to link knowledge-based organizations with the knowledge-based advantage (Mc Evily, 2002), then organizations can be transformed to adapt to the ever-changing environment caused by technological advancement.

Dess (1995) alludes that intangible factors have influence on firm performance. These include factors such as; management competences and procedural knowledge; tacit organizational practices and they determine how successful an organization will become. Knowledge-based abilities are well-thought-out to hold more water for firms that want to create a long-lasting edge over their rivals (DeNisi, 2003). The hunger to acquire new concepts faster than competitors could be decisive in having an edge over other firms (Geus, 1998). Conner (1991) asserts that knowledge grows over time and it forms a precedent for acquiring new knowledge.

### **2.2.2 General Systems Theory**

Boulding (1956) defines general systems theory as the main body of science that anchors and relate to certain disciplines in a comprehensible manner. An entity can be described by its organization structure and how the various structures relate with one another through information sharing minimizing ambiguity (Weick, 1979). The systems consist of routine patterns of entities that are linked together bringing out relationships that can express the entire organization (Katz, 1966). Furthermore, systems theory seeks to understand the organization holistically. Therefore, it follows several steps in order to achieve this (Farace, 1977). This theory puts emphasis on both vertical and horizontal organization orientation to get a more accurate view point of the organization. In the organizational context, communication networks are defined in terms of management roles or casual roles which emerge through interactions.

The open systems model was purposefully created for organizations to communicate with another exchange messages in the form of information and receive feedback from the external environment. The model takes into account all aspects of the organization and can be used to measure the stability of the same (Hickson, 1973). Realistically, this was tasked with identifying organization challenges and tackling them through interaction with other entities. It was implemented to single out any difficulties and prescribe solutions on the same. Understanding the organization as a whole could help decipher where actual problems lie. Lai (2017) urged businesses to remove all communication complexities with all stakeholders. These include inner, outward, and interorganizational communication, with employees, customers, suppliers, and organized stakeholders in general.

This theory is crucial for implementing SCV because it advocates for interaction among supply chain members. Similar to this theory, SCV proposes interaction and collaboration of members through sharing of information. The theory acknowledges that any complexity in operation can be solved through interaction with other members. In addition, interactions among firms can lead to acquiring new properties that have a positive influence on their performance. Collaboration among members is therefore fully supported in this theory; SCV borrows from this concept of collaboration in order to ensure information sharing is achieved among members.

### **2.3 Components of Supply Chain Visibility**

SCV can be operationalized using the following indicators (Ittner, 1998). Order visibility informs a firm which orders are fulfilled and those that are pending. It also provides the logistics personnel with information on priority of the orders (Aberdeen, 2013). Which orders are to be executed first? Which suppliers have received the orders and have accepted to supply the materials? If they have accepted the orders what stage are, they in terms of order processing? What are their lead time and the expected delivery date? Shipment visibility will

ensure firms know which products are in transit and where they are at any point in time. This will also provide the firm with information on when the product will arrive to the consumers door step. This is a very critical step in SCV because it involves client and costumer trust. Clients will use this information to plan for businesses on their end so information has to be accurate.

Receipts visibility involves the firm acknowledging they have received the raw materials in right quantity from the suppliers. This is necessary because suppliers will send invoices to the firm for materials supplied. Any misleading information can result in delayed payments or wrong payments. This can lead to strained client and supplier relationship. Quality visibility allows a firm to assess and communicate the requirements and specifications of the materials in need to suppliers. It also checks for number of defects in the materials supplied and informs the supplier for action. This helps firms to compare how different suppliers perform on quality basis and choose the right one. Demand visibility provides a firm with information on expected demand in the foreseeable future. This allows a firm to make decisions on the safety stock to keep at one point in time. It also gives an insight on the re order level for raw materials to avoid being caught on the back foot when an order is received.

## **2.4 Empirical Review**

This section aims to address previous studies conducted similar to the one being carried out. Key considerations for each discussed study will be the variables under discussion, context of the study, methodology applied, population under study and key findings alongside with the recommendation of the studies.

Gustarsson (2010) carried out research on how SCV can be applied in a case of Pulp Company in Sweden. The objective was to find out how SCV can be used to mitigate warehousing complexities. The research employed a systems approach to find out areas

where SCV was low and can be improved in order to manage inventory better. The study concluded that information sharing was well implemented at the firm leading to visibility. In addition, it further asserts that increased visibility leads to better inventory management. The study also found out that information sharing is just a tip of the ice berg when it comes to inventory management. The researchers recommend that managerial support is crucial to ensure sustained collaboration among partners so that there is better inventory control.

Odadi (2012) conducted a study to determine the influence of supply chain information systems (SCIS) on inventory tracking among logistics firms in Kenya. The researcher adopted survey design methodology. The population being examined were managers in the logistics industry. The researcher used questionnaires as the main data collection method and descriptive statistics to analyse the data. It concluded that SCIS contributed significantly to improved inventory tracking and reduced risks. However, the researcher identified some challenges which included; lack collaboration among partners to ensure optimum use of SCIS; lack of proper IT infrastructure. The researcher recommended that more research be conducted on the standardization of SCIS because this proved a major hinderance to inventory tracking.

Makori (2013) conducted a study on retail supermarkets in Nairobi to understand the relationship between real time information processing and supply chain optimization. The study targeted a population of 105 supermarkets but based the research on 50 supermarkets in Nairobi. Data collection was done using questionnaires and was analysed using SPSS and Microsoft excel. Research findings revealed that real time information processing has a positive influence on inventory turnover. The study recommended employment of tech savvy staff and increased use of smart devices.



Brussse (2017) carried out a small-scale field study on Swiss retail firms with low SCV to find out how improved stakeholder supply chain management (SSCM) can mitigate supply chain sustainability risks (SCSR). The research concluded that increased stakeholder consultation and sharing of information is crucial when it comes to mitigating risks along the supply chain. However, the study used a procedural model to model SCSR to the particular industry and as such its findings cannot be generalized to other contexts.

Murphy (2018) carried out research in the life science industry to find out the challenges present and how SCV can be implemented to address these challenges. A mixed approach was used in data collection. Data was analysed using an inductive approach mainly looking at similar behaviour patterns among the professionals. The study concluded with past literature that SCV is important in life sciences. However, the research deduced that a lot of information is available as a result of SCV but little information is used in practicality in the industry. This is further worsened by lack of compatibility among the various visibility systems therefore impeding achievement of SCV in full. The scholars recommended for more research on how frameworks could be developed to ensure standardization in visibility.

## **2.5 Summary of Knowledge Gaps**

Majority of these studies concur that indeed supply chain visibility if implemented in the supply chain it would improve the overall performance of the chain. The researchers tend to suggest that firms view SCV as something very important in their operations but very few have implemented it. Those that have implemented SCV are not using the data effectively to optimize their supply chains. There exists a gap in the practicality of SCV in operations management.

Most studies have been done in developed countries where information sharing is advanced as compared to Kenya. Those conducted in Kenya are closely related to SCV but nothing

specific has been done on SCV. Studies conducted in Kenya however seem to support foreign literature that indeed information sharing and the use of information systems has a positive influence on a firm's performance. However, many studies have are yet to address the role of information visibility on operational performance Barrat (2007). Many scholars still view information sharing as a key factor in achieving the needed operational performance but feel most businesses are yet to implement this. Standardization of visibility systems has also been acutely emphasized by scholars. This shows the need to conduct a study on visibility on logistic firms since there is little known information on the same.

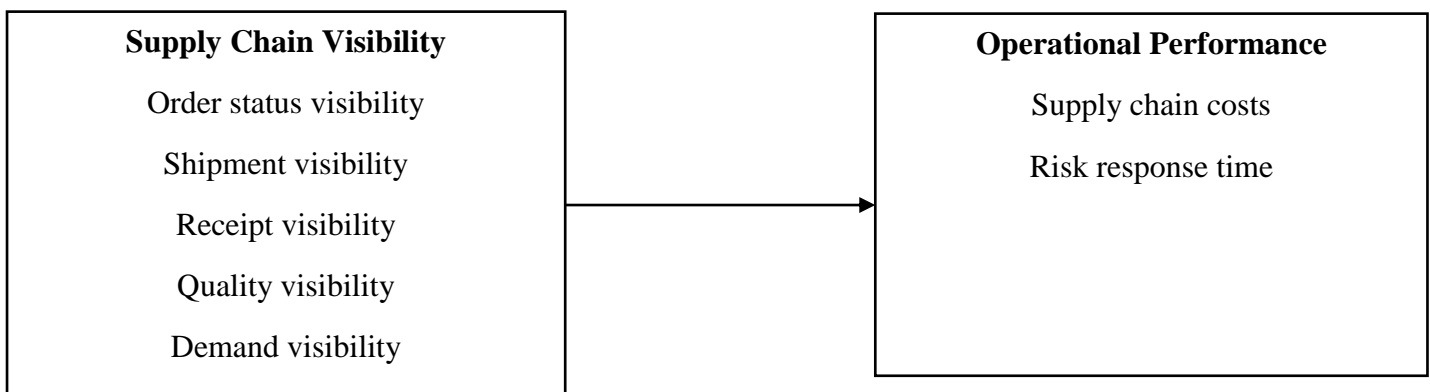
## 2.6 Conceptual Framework

The conceptual framework is a schematic representation of the independent and dependent variable and how they relate. Supply chain visibility represents the independent variable while operational performance represents the dependent variable. The conceptual framework which informs this study is represented in figure 2.1.

**Figure 2.1 Conceptual Framework**

Independent Variable

Dependent Variable



(Author, 2020)

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This section outlined the methodology that was adopted in undertaking this study. It provided information on the design adopted as well as the justification for use in this research. This section also delves into other important aspects such as population under study, sampling, data collection, operationalization of study variables, reliability and validity, diagnostic tests and regression analysis.

### **3.2 Research Design**

Research design informs how the study was carried out (Mugenda, 2003). Therefore, there are key considerations needed in order to choose a particular methodology. These considerations include; the study question which the research aims to address and nature of the subjects under study (Lincoln, 2005). This research employed descriptive cross-sectional survey design. This approach adequately describes the variables under study and was able to provide reliable empirical findings.

### **3.3 Population of the Study**

The target population of the study was logistics firms in Mombasa County, Kenya. Logistics companies are involved in different type of business operations such as warehousing, storage, distribution, shipping and clearing & forwarding. According to KenTrade (2020), there are 310 logistics firms in Mombasa County.

### **3.4 Sample Size and Sampling Technique**

Yamane sampling formula determined the sample size.

$$n = \frac{N}{1 + Ne^2}$$

Where by  $n$ = sample size,  $N$ = population size and  $e$  margin of error. That is 95% confidence level with  $e$  at 0.05. The firms were identified using single random sampling which ensures that each firm has a chance of been selected. The number of firms to be sampled were 174 in total.

### 3.5 Data Collection

Data was collected using online google forms. The questionnaire was forwarded to respondents using email. This questionnaire contained close ended questions to respondents. The questionnaire had three sections; section A sought demographic data of the respondent; section B sought data on supply chain visibility while section C collected data on the operational performance of the firm. The respondents targeted were persons working in logistics firms; employed in a capacity involving supply chain management or operations management. One respondent per firm was targeted.

### 3.6 Operationalization of Study Variables

This study had two main variables supply chain visibility as the independent variable and operational performance of the logistics firms as the dependent variable. SCV was measured by extent to which the firms had applied the following factors; order visibility, shipment visibility, receipts visibility, quality visibility and demand visibility. Two indicators of operational performance were identified from literature; supply chain costs and risk response time. The study variables were measured using a Likert scale. The scale covered a scope of 1-5 similar to a study by (Makori, 2013).

Table 3. 1: Operationalization of Study Variables

<b>Variable</b>	<b>Sub-variable</b>	<b>Indicators</b>	<b>Source</b>
Supply chain visibility	Order visibility	<ul style="list-style-type: none"> <li>• Status of raw materials at plant</li> <li>• Production capacities</li> </ul>	Holcomb (2004)

(independent variable)		<ul style="list-style-type: none"> <li>• Production plans</li> <li>• Process change notification (PCN)</li> <li>• End of Life (EOL) notifications.</li> </ul>	
	Shipment visibility	<ul style="list-style-type: none"> <li>• Shipment plans</li> <li>• On time delivery percentages</li> <li>• Bill of lading creation time</li> <li>• Carrier booking confirmation response time</li> </ul>	Holcomb (2004)
	Receipts visibility	<ul style="list-style-type: none"> <li>• Invoice status of your clients and suppliers.</li> <li>• Payment receipts</li> </ul>	Group (2005)
	Quality visibility	<ul style="list-style-type: none"> <li>• Number of defects in raw materials</li> <li>• Number of times there has been machine downtime</li> <li>• Number of damaged final goods</li> <li>• Numbers of goods delivered on time in good condition</li> </ul>	Pisello (2006)
	Demand visibility	<ul style="list-style-type: none"> <li>• Inventory turnover</li> <li>• Re-order level</li> <li>• Demand forecasts</li> </ul>	Aberdeen (2013)
Operational performance (dependent variable)	Supply chain costs	<ul style="list-style-type: none"> <li>• Transport costs</li> <li>• Holding costs</li> <li>• Labour costs</li> </ul>	Cristopher (2004)
	Risk response time	<ul style="list-style-type: none"> <li>• Time taken to respond to PCN.</li> <li>• Difference in quantities of goods</li> </ul>	Ponomarov (2011)

		supplied <ul style="list-style-type: none"> <li>• Supply delays</li> </ul>	
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### 3.7 Reliability and Validity Tests

Reliability checks for the correctness or accuracy of scale used to measure a given phenomenon (Carmines, 1979). Reliability is also concerned with consistency such that if a scale in an experiment is used again under the same conditions the outcome will be similar with the earlier experiment (Moser, 1989). In this study reliability was considered because all the variable constructs were measured using the same Likert scale. Cronbach’s alpha coefficient was used to measure internal reliability.

Validity measures how the collected data has actually been able to capture what was supposed to be measured by the study (Field, 2005). There are various forms which validity takes such as; content, criterion predictive and face validity. Content validity was tested by; seeking an opinion on the variable constructs to be measured from the lecturers and professionals in the industry before administering the questionnaire. Face validity was tested by checking on the linguistics used to ask the various questions. Criterion predictive was tested by checking how well one measure can be used describe another measure.

### 3.8 Data Diagnostics

Data diagnostics in research involves evaluating the strength of the data collected and if it can inform the objective of the study (Dodge, 2008). Normality was tested using Shapiro-Wilk’s test. Multicollinearity was checked by evaluating the Variance Inflation Factors (VIFs). Autocorrelation was tested using the Durbin-Watson test; where by a value closer to 0 indicates a strong positive autocorrelation while a value closer to 4 indicates a strong negative autocorrelation. Heteroscedasticity will be tested using Test whereby,  $\chi^2 = n \cdot R^2 \cdot k$ .

### 3.9 Data Analysis

Data collected was in quantitative form therefore descriptive statistics was used to analyze the data. The tools used was statistical product for social sciences (SPSS). Data was visualized using tables where appropriate. The regression equation contained the following ( $Y = a + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5$ ): whereby Y = Operational performance of logistics firms; X<sub>1</sub>= Order visibility, X<sub>2</sub>= Shipment visibility, X<sub>3</sub>= Receipts visibility, X<sub>4</sub>= Quality visibility, X<sub>5</sub>= Demand visibility, while a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, a<sub>4</sub> and a<sub>5</sub> are regression co efficient.

## **CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTREPRETATION**

### **4.1 Introduction**

This chapter reports on data analysis, the findings of the study and discusses imperatives of the findings based on the objective of the study. The structure of analysis begins with descriptive analysis of the demographics, supply chain visibility factors and operational performance factors of the firm. Regression analysis follows thereafter and analysis ends by carrying out data diagnostic tests. The sample size of the study was 174 out of which 34 responded. This represented a 19.5 % response rate. This being a scientific study it adopted the minimum 10% sample size threshold (Mugenda, 2003)

### **4.2 Demographics of Logistics Firms**

Demographics of logistics companies under discussion include; longevity of the professional in the current position, number of years of experience, length of firm's operations, level of education, seniority of position held at firm and the number of employees per firm.

#### **4.2.1 Longevity of Service in the Current Firm**

The findings of table 4.1 below report that 26.5% of the respondents had been in similar position for less than 5 years while another 26.5 % had been in that similar position for 5 to less than 10 years. In addition, 20.6% indicated they had been in that position for 10 to less than 15 years while 2.9 % stated they have been in that position for 15 to less than 20 years. 23.5 % indicated they have served in that position for over 20 years.



Table 4. 1: Longevity of Service in the Current Firm

	Frequency	Percentage
< 5 years	9	26.5
5 =< 10 years	9	26.5
10 =< 15 years	7	20.6
15 =< 20 years	1	2.9
20 years and above	8	23.5
Total	34	100

Source: Research data (2020)

The inference of the results in Table 4.1 is that 73.5 % of respondents had served in their current capacities for longer than 5 years. This implied that data collected was very reliable because the professionals had a good understanding of the company operations. They could relate with the variables under study link it with the company's operations.

#### 4.2.2 Experience in Logistics

The findings of the study indicate 38.2 % of the respondents have less than 5 years' experience in logistics while 50 % have more than 5 to less than 10 years' experience. A further 8.8 % of the respondents have more than 10 but less than 15 years' experience while 2.9% have 15 to less than 20 years' experience in logistics.

Table 4. 2: Years of Experience in Logistics

	Frequency	Percentage
< 5 years	13	38.2
5 =< 10 years	17	50.0
10 =< 15 years	3	8.8
15 =< 20 years	1	2.9
Total	34	100

Source: Research data (2020)

The findings in Table 4.2 can be deduced that 61.8 % of the respondents had over 5 years' experience in logistics. It can be assumed that majority understand the dynamics in the industry and were able to relate the same with variables under study.

#### 4.2.3 Length of Firm's Operations

The Table 4.3 shows that 26.5% of the firms have been in operation for less than 5 years while 26.5% of the firms have been in operation for 5 to less than 10 years. In addition, 20.6% of the firms have been in operation for 10 to less than 15 years while 2.9 % of the firms had been in operation for 15 to less than 20 years. Lastly, 23.5 % of the firms responded they have been in operation for over 20 years.

Table 4. 3: Length of Firm's Operations

	Frequency	Percentage
< 5 years	9	26.5
5 =< 10 years	9	26.5
10 =< 15 years	7	20.6
15 =< 20 years	1	2.9
20 years and above	8	23.5
Total	34	100

Source: Research data (2020)

It can be concluded that 73.5 % of the firms had been in operation for over 5 years. This time is long enough to set up information sharing systems that provide some visibility into their operations.

#### 4.2.4 Level of Education

Table 4.4 shows that 14.7 % of the respondents had attained a diploma while 73.5% had attained an undergraduate degree. The remaining 11.8% had attained a postgraduate degree.

Table 4. 4: Level of Education of Respondents

	Frequency	Percentage
Diploma	5	14.7
Undergraduate degree	25	73.5
Postgraduate degree	4	11.8
Total	34	100

Source: Research data (2020)

Based on the findings in Table 4.4 it can be concluded that all respondents had the necessary education to provide insights on the variables under study.

#### 4.2.5 Level of Management Position

The Table 4.5 shows that 38.2% of the respondents were in entry level positions while 52.9% of the respondents were in middle level positions. The remaining 8.8% of respondents were in senior level management position.

Table 4. 5: Level of Management Position

	Frequency	Percentage
Entry level	13	38.2
Middle level	18	52.9
Senior level	3	8.8
Total	34	100

Source: Research data (2020)

The findings in Table 4.5 it can be concluded that majority were in middle level positions and have some responsibility of the firm's operations.

#### 4.2.6 Number of Employees per Firm

Findings from the table below indicated 26.5% firms had 1 to 50 employees while 29.4% of the companies had 51 to 100 employees. A further 11.8% indicated that they had 101 to 150 employees while 5.9 % indicated they had 151 to 200 employees. The remaining 26.5% had over 200 employees on board.

Table 4. 6: Number of Employees Per Firm

	Frequency	Percentage
1 – 50	9	26.5
51 – 100	10	29.4
101 – 150	4	11.8
151 – 200	2	5.9
201 and above	9	26.5
Total	34	100

Source: Research data (2020)

Based on the Table 4.6 it can be concluded that 73.6% of the firms have over 50 employees on their firms. This implies that these firms are large enough to adopt visibility in their operations.

### 4.3 Extent of Supply Chain Visibility Application among the Firms

SCV is the independent variable in this study. This section reports on how SCV was applied among the firms and to what extent using a 5-point Likert scale. Whereby; 1 = No extent, 2 = Little Extent, 3 = Fair Extent, 4 = High Extent and 5 = Very High Extent.

#### 4.3.1 Order Visibility

Table 4.7 shows that order visibility is implemented to a fair extent among the firms with a mean of 3.0706 (SD = 0.72343). This can be reasoned that firms have shared order information to a fair extent with their partners to ensure effective and efficient order processing.

Table 4. 7: Order Visibility

Order Visibility	N	Mean	Std. Deviation	Rank
Raw materials at plant	34	3.00	.888	4
Production capacities	34	3.09	.830	3
Production plans	34	3.21	.914	1
Process/Product change notifications	34	2.94	.886	5
End of life notifications	34	3.12	1.008	2
Average	34	3.0706	.72343	

Source: Research data (2020)

The results further indicate that production plans were the most shared information among firms with a mean of 3.21 (SD = .914), followed closely by end of life notifications with a mean of 3.12 (SD = 1.0008). Production capacities were shared at a mean of 3.09 (SD = .830), followed closely by raw materials at plant with a mean of 3.00 (SD = .888). Lastly, process/product change notifications were shared with a mean of 2.94 (SD = .886).

#### 4.3.2 Shipment Visibility

The results in Table 4.8 show that shipment visibility had been implemented to a fair extent with a mean of 3.0809 (SD = .73268). This implied that firms shared shipping information with their partners to a fair extent minimizing shipping complexity.

Table 4. 8: Shipment Visibility

	N	Mean	Std. Deviation	Rank
Shipment plans	34	2.88	1.038	4
On time delivery percentages	34	3.12	0.913	2
Bill of lading creation time	34	3.32	0.768	1
Carrier booking confirmation response time	34	3.00	0.953	3
Average	34	3.0809	0.73268	

Source: Research data (2020)

Bill of lading creation time ranked highest shared information with a mean of 3.32 (SD = .768) followed closely by on time delivery percentages with a mean of 3.12 (SD = 0.913). Carrier booking confirmation response time was shared with a mean of 3.00 (SD = 0.953), followed lastly by shipment plans with a mean of 2.88 (SD = 1.038).

#### 4.3.3 Receipts Visibility

The results in Table 4.9 provided that receipts visibility was implemented with a mean of 3.3824 (SD = .86216). This implied that firms shared financial information to a fair extent this ensured quicker delivery of goods and services from suppliers.

Table 4. 9: Receipts Visibility

	N	Mean	Std. Deviation	Rank
Invoice status	34	3.15	0.958	2
Payment receipts	34	3.62	0.985	1
Average	34	3.3824	0.86216	

Source: Research data (2020)

Information concerning payment receipts was the highest and was shared with a mean of 3.62 (SD = .985) followed by payment receipts with a mean of 3.15 (SD = .958). Receipts visibility was the highest form of visibility achieved by the firms.

#### 4.3.4 Quality Visibility

The findings in Table 4.10 showed that quality visibility was implemented with a mean of 3.2721 (SD = .80803). This implied that firms were concerned with quality information affecting their operations on a fair extent and some had quality information systems in place.

Table 4. 10: Quality Visibility

	N	Mean	Std. Deviation	Rank
Number of raw material defects	34	3.79	1.008	1
The amount of time there has been machine downtime	34	3.26	1.136	2
Number of damaged final goods	34	3.03	1.167	3
Number of goods delivered on time	34	3.00	1.015	4
Average	34	3.2721	0.80803	

Source: Research data (2020)

Number of raw material defects was the most shared information with a mean of 3.79 (SD = 1.008) followed by the amount of time there has been machine downtime with a mean of 3.26 (SD = 1.136). Number of damaged final goods was third with a mean of 3.03 (SD = 1.167), followed closely by number of goods delivered on time with a mean of 3.00 (SD = 1.015).

### 4.3.5 Demand Visibility

The empirical findings in Table 4.11 indicate that demand visibility was implemented by the firms with a mean of 3.3333 (SD = .76100). This implied that firms shared information concerning demand to a fair extent.

Table 4. 11: Demand Visibility

	N	Mean	Std. Deviation	Rank
Inventory turn over	34	3.59	0.821	1
Re order level	34	3.15	0.989	3
Demand forecasts	34	3.26	1.024	2
Average	34	3.3333	0.76100	

Source: Research data (2020)

Inventory turnover information was shared with a mean of 3.59 (SD = .821), followed by demand forecasts information with a mean of 3.26 (SD = 1.024), lastly re order level information was shared with a mean of 3.15 (SD = .989).

Based on these findings it can be concluded that SCV has been applied to a fair extent across the firms. Order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility were implemented with overall means of 3.076, 3.089, 3.3824, 3.2721 and 3.3333 respectively. The application of SCV therefore can be improved in order to realize better operational performance.

### 4.4 Operational Performance of the Firm

This is the dependent variable in this study. This section reports on how firms responded on the various performance indicators and to what extent using a 5-point Likert scale similar to the one used in measuring supply chain visibility.

#### 4.4.1 Supply Chain Costs

The Table 4.12 shows that firms realized a little improvement on their costs with a mean of 2.8431 (SD = .86158). However, firms are yet to significantly reduce their costs as a result of improved visibility. This translates to 56.86 % reduction in costs.

Table 4. 12: Supply Chain Costs

	N	Mean	Std. Deviation	Rank
Holding costs of inventory have reduced	34	3.21	1.122	1
Transportation costs of Goods have reduced	34	2.59	0.957	3
Labor costs have reduced	34	2.74	1.163	2
Average	34	2.8431	0.86158	

Source: Research data (2020)

Table 4.12 indicates that holding costs of inventory have reduced with a mean of 3.21 (SD = 1.122) while labor costs have reduced with a mean of 2.74 (SD = 1.163). Lastly, transportation costs of goods have reduced with a mean of 2.59 (SD = .957).

#### 4.4.2 Risk Response Time

The Table 4.13 indicate that risk response time reduced to a fair extent with a mean of 3.0784 (SD = .77006). This translates to 61.57% decrease in time to respond to a risk factor. This was the most improved operational performance indicator.

Table 4. 13: Risk Response Time

	N	Mean	Std. Deviation	Rank
Time taken to respond to a product change reduced	34	2.35	1.070	3
Time taken to respond to a process change has reduced	34	3.44	0.927	2
Supply delays have reduced	34	3.44	0.894	1
Average	34	3.0784	0.77006	

Source: Research data (2020)



The Table 4.13 indicates that supply delays have reduced with a mean of 3.44 (SD = .894) while time taken to respond to a process change has reduced with a mean of 3.44 (SD = .927). Lastly, time taken to respond to a product change has reduced the least with a mean of 2.35 (SD = 1.070).

#### 4.5 Supply Chain Visibility and Operational Performance of the Firm

The objective of this study was to establish the relationship between SCV and operational performance of the firm. The independent variable (SCV) consisted of; order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility. The dependent variable (Operational performance) on the other hand is a summary of; supply chain costs and risk response time. The Table 4.14 gives a detailed explanation on the independent and dependent variables of the study.

Table 4. 14: Summary of Means for Study Variables

<b>Firm</b>	<b>Order visibility X<sub>1</sub></b>	<b>Shipment visibility X<sub>2</sub></b>	<b>Receipt visibility X<sub>3</sub></b>	<b>Quality visibility X<sub>4</sub></b>	<b>Demand visibility X<sub>5</sub></b>	<b>OP</b>
1	3.00	3.00	2.50	2.75	3.33	3.17
2	3.00	3.00	3.50	3.75	4.00	3.00
3	1.80	1.75	2.00	2.50	3.33	1.83
4	3.80	3.75	4.50	3.00	3.00	3.00
5	3.00	3.50	4.00	3.50	4.67	3.33
6	4.00	4.00	4.50	3.25	2.67	2.50
7	2.60	3.00	3.50	3.25	4.00	1.83
8	1.00	1.00	1.00	1.25	1.00	1.00
9	2.20	3.25	3.00	2.25	2.67	3.33
10	2.80	2.25	3.00	3.00	3.67	3.17
11	3.40	3.75	4.50	3.50	3.00	2.00
12	3.00	2.75	4.00	4.75	4.67	5.00
13	2.40	2.50	3.50	4.25	4.67	2.67
14	3.80	3.75	3.50	2.50	3.67	3.00
15	3.40	4.00	3.50	3.50	2.67	3.50
16	2.20	4.00	4.00	2.75	2.33	2.33
17	4.20	4.00	5.00	4.25	4.00	3.50
18	4.20	4.00	4.00	5.00	3.67	3.00
19	3.60	4.00	4.50	2.75	2.33	3.50
20	2.60	3.25	3.50	2.75	3.00	3.00

21	2.80	2.25	2.50	2.50	3.33	2.50
22	3.20	3.25	3.50	4.25	3.67	4.00
23	2.40	2.50	3.00	3.00	3.33	3.00
24	3.60	2.75	2.50	4.00	3.33	3.33
25	3.60	3.25	3.50	4.00	3.67	3.33
26	4.00	4.00	4.50	4.25	4.00	4.00
27	2.60	3.00	3.00	2.50	3.33	2.17
28	3.80	3.25	4.00	4.00	4.00	2.83
29	3.40	2.75	3.00	3.00	3.00	2.83
30	3.00	2.75	2.50	2.25	2.67	3.00
31	3.80	3.25	3.00	3.50	3.00	3.17
32	2.80	2.25	2.00	2.75	2.33	2.33
33	3.00	2.75	3.50	3.00	3.67	3.50
34	2.40	2.25	3.00	3.75	3.67	3.00

Source: Research data (2020)

#### 4.5.1 Data Diagnostic Tests

Prior to carrying out regression analysis four key tests namely; normality, autocorrelation, heteroscedasticity and multicollinearity were performed. This was done in order to ensure data collected does not violate the assumptions of regression analysis.

Table 4. 15: Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Supply chain visibility and operational performance	0.082	34	.200*	0.981	34	0.803

Source: Research data (2020)

Table 4.15 shows that data was normally distributed since Shapiro-Wilk statistic value is above 0.05. Since P values are above (0.05), therefore accept the null hypothesis.

Table 4. 16: Test of Autocorrelation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.643 <sup>a</sup>	.413	.309	.60456	2.358
a. Predictors: (Constant), Demand visibility, Shipment visibility, Quality visibility, Order visibility, Receipt visibility					
b. Dependent Variable: Operational performance					

Source: Research data (2020)

Define the hypothesis

H0:  $\rho = 0$  (autocorrelation is absent)

H1:  $\rho > 0$  (autocorrelation is present)

$\alpha = 0.05$ ,  $k = 5$ ;  $n = 34$ .  $dl = 1.208$  and  $du = 1.728$ ,

$d = 2.358$

Conclusion: Since computed  $d (2.358) > (1.728)$ , the null hypothesis is upheld hence no autocorrelation

Table 4. 17: Tests of Multicollinearity

<b>Variables</b>	<b>Tolerance</b>	<b>VIF</b>
Order visibility	0.349	2.863
Shipment visibility	0.173	5.786
Receipt visibility	0.189	5.279
Quality visibility	0.344	2.904
Demand visibility	0.431	2.32

Source: Research data (2020)

Multicollinearity is usually evaluated using VIF and Tolerance factors. VIF factors should fall between 1 and 10 to avoid multicollinearity while tolerance factors should be above 0.2.

Table 4.17 shows that multicollinearity is not a major problem in this regression model since all VIF values are below 10.

Table 4. 18: Tests for Heteroscedasticity

<b>Breusch-Pagan and Koenker test statistics and sig-values</b>		
	<b>LM</b>	<b>Sig</b>
BP	9.224	.100
Koenker	7.962	.158

Source: Research data (2020)

Breusch-Pagan and Koenker test results are as follows;

Regression SS 18.448

Residual SS 60.334

Total SS 78.782

R-squared .054756

Sample size (N) 34

Number of predictors (P) 5

Breusch-Pagan test for Heteroscedasticity = 5.0

Significance level of Chi-square df=.008

Koenker test for Heteroscedasticity = 7.962

Significance level of Chi-square df=P (H0: homoscedasticity) .158

H0: Heteroscedasticity does not exist

H1 Heteroscedasticity exists

$\alpha = 0.05$ , Reject the null hypothesis if the p-value is less than 0.05

Koenker test statistic = 7.962 , p-value = .158

Since the p-value (0.158) >  $\alpha$  (0.05), null hypothesis upheld hence no heteroscedasticity.

#### 4.5.2 Pearson Co-relation Coefficient

Correlation analysis was computed using Pearson bivariate correlation to determine how the variables relate. If the coefficient is ranging from -1.0 to +1.0 the relationship is assumed to be linear. -1.0 indicates a negative correlation while +1.0 indicates a positive correlation.

Table 4. 19: Pearson Co-relation Matrix

		Order visibility	Receipt visibility	Shipment visibility	Demand visibility	Quality visibility	Operational performance
Order visibility	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	34					
Receipt visibility	Pearson Correlation	.674**	1				
	Sig. (2-tailed)	0.000					
	N	34	34				

Shipment visibility	Pearson Correlation	.741**	.849**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	34	34	34			
Demand visibility	Pearson Correlation	0.308	.416*	0.154	1		
	Sig. (2-tailed)	0.076	0.014	0.385			
	N	34	34	34	34		
Quality visibility	Pearson Correlation	.586**	.575**	.406*	.702**	1	
	Sig. (2-tailed)	0.000	0.000	0.017	0.000		
	N	34	34	34	34	34	
Operational performance	Pearson Correlation	.501**	.448**	.397*	.496**	.584**	1
	Sig. (2-tailed)	0.003	0.008	0.020	0.003	0.000	
	N	34	34	34	34	34	34

\*\* . Correlation is significant at the 0.01

\* . Correlation is significant at the 0.05

Source: Research data (2020)

The results above concluded that order visibility and operational performance had a positive correlation of ( $r=.501$ ), while receipts visibility and operational performance had a positive correlation of ( $r=.448$ ). The findings further show that shipment visibility and operational performance had a positive correlation of ( $r=.397$ ), while demand visibility and operational performance had a positive correlation of ( $r=.496$ ). Lastly quality visibility and operational performance had a significant positive correlation of ( $r=.584$ ).

### 4.5.3 Model Summary

The findings of table 4.20 describe the relationship between independent variable and the dependent variables.  $R^2$  coefficient determines the relationship between supply chain visibility and operational performance.

Table 4. 20 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.643 <sup>a</sup>	.413	.309	.60456	2.358

a. Predictors: (Constant), Demand visibility, Shipment visibility, Quality visibility, Order visibility, Receipt visibility

b. Operational performance

Source: Research data (2020)

From the model summary,  $r = 0.643$ . This shows that there is a positive relationship between the supply chain visibility and operational performance of firm. The following steps were used to test for significance:

Step 1: Define H0 and H1

H0:  $r = 0$  (the relationship between supply chain visibility and operational performance is not significant.)

H1:  $r \neq 0$  (the relationship between supply chain visibility and operational performance is significant.)

$\alpha = 0.05$  and this is a two tailed test.

$n=34$ ; Degrees of freedom =  $n - 2$

$t_{0.05, 32} = 2.036933$

Reject the null hypothesis if T is outside the region:  $-2.036933 \leq t \leq 2.036933$

$$T = r \sqrt{\frac{34 - 2}{1 - .643}}$$

$$= 7.5918$$

$T = (7.5918)$  and does not fall in the rejection region, the null hypothesis is rejected.

Therefore, the relationship between the supply chain visibility and operational performance is significant.  $R^2 = .309$  and this meant that 30.9% of variations in operational performance is caused by variations in order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility. The implication is that supply chain visibility affects the operational performance of logistics firms to some extent.

#### 4.5.4 Analysis of Variance

The table 4.21 below indicates there is a significant relationship between supply chain visibility and operational performance of the firm at 0.008 ( $P < 0.05$ ).

Table 4. 21 Variance Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.214	5	1.443	3.948	.008 <sup>b</sup>
Residual	10.234	28	.365		
Total	17.448	33			

a. Operational performance

b. Predictors: (Constant), Demand visibility, Shipment visibility, Quality visibility, Order visibility, Receipt visibility

Source: Research data (2020)

The findings of table 4.21 observed that the p-value (0.008) is less than the level of significance (0.05). This asserted that the overall model was significant in establishing the relationship between supply chain visibility and operational performance of the firm.

#### 4.5.5 Regression Coefficients

The Table 4.22 shows separate relationships between the various independent variables with operational performance of logistics firms in Mombasa County. The table provides indications on coefficient betas for each of the independent variable and the values.

Table 4. 22 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.435	.631		.690	.496		
Order visibility	.183	.246	.182	.744	.463	.349	2.863
Shipment visibility	.221	.346	.223	.641	.527	.173	5.786
1 Receipt visibility	-.113	.280	-.135	-.405	.689	.189	5.279
Quality visibility	.248	.222	.276	1.119	.273	.344	2.904
Demand visibility	.256	.211	.267	1.213	.235	.431	2.320

a. Operational performance

Source: Research data (2020)

The Table 4.22 show that order visibility, shipment visibility, quality visibility and demand visibility have positive coefficients showing that a positive relationship exists in independent variable(S) and the dependent variable by the same scale as given that; order visibility ( $\beta=.183$ ), shipment visibility ( $\beta =.221$ ), quality visibility ( $\beta=.248$ ) and demand visibility (.256). Receipts visibility however had negative coefficient indicating that improved receipt visibility negatively affects operational performance with the same scale ( $\beta=-.113$ ). These findings are also consistent with t-values. The study showed that order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility have significant effect on supply chain performance indicated by  $p=.463$ ,  $p=.527$ ,  $p=.689$ ,  $p=.273$  and  $p=.235$  respectively. The implication is that order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility does not significantly affect operational performance because p-values were above (.05).

Based on the findings, the regression model is defined as follows;

$$Y = .435 + .183X_1 + .221X_2 - .113X_3 + .248X_4 + .256X_5$$

Whereby; Y = Independent variable;  $X_1$  = Order visibility,  $X_2$  = Shipment visibility,  $X_3$  = Receipt visibility,  $X_4$  = Quality visibility and  $X_5$  = Demand visibility; a = constant



## **CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This section discusses the summary of the findings, recommendations, limitations of the study and possible areas for research. The results of the findings are based on quantitative data being analysed using frequency tables, test results, correlation and regression analysis.

### **5.2 Summary of Findings**

Empirical results informed the objective of the study which was to establish the relationship between supply chain visibility and operational performance of logistics firms of Mombasa County, Kenya. The study further determined to what extent the visibility factors; Order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility were implemented by the logistics firms of Mombasa County, Kenya. Demographic information was also collected and analysed to inform on the profile of firms under study.

#### **5.2.1 Extent of Implementation of Supply Chain Visibility**

The objective of the study was to establish the relationship between supply chain visibility and operational performance of logistics firms in Mombasa County, Kenya. A 5-point Likert scale. The study found that the firms implemented the visibility factors as follows; Order visibility was implemented with a mean of 3.0706 (SD = .72343); Shipment visibility was implemented with a mean of 3.0809 (SD = .73268); Receipts visibility was implemented with a mean of 3.3824 (SD = .86216); Quality visibility with a mean of 3.2721 (SD = .80803); and lastly Demand visibility was implemented with a mean of 3.3333 (SD = .76100).

The results show that firms have implemented supply chain visibility to a fair extent into their operations. The findings agree with the study by Osodo (2012) who established that logistics

firms in Kenya have incorporated use of ICT technologies to enhance information sharing among partners.

### **5.2.2 Supply Chain Visibility and Operational Performance**

The study concluded that order visibility had a positive correlation with operational performance given that;  $r=.501$ ,  $p\text{-value} = .003$  and the level of significance =  $.01$ . The findings indicate a strong positive correlation since  $p\text{-value} 0.003$  is less than  $0.01$ . Shipment visibility also had a positive correlation with operational performance given that;  $r=.397$ ,  $p\text{-value} =.020$  and the level of significance =  $.05$ . The results allude to the fact that order and shipment visibility affect operational performance the firms.

Receipt visibility also had a positive correlation with operational performance given that;  $r=.448$ ,  $p\text{-value} =.008$  and level of significance =  $.01$ .  $P\text{-value}$  is significantly less than  $.01$  an indication that there exist a strong positive correlation between receipt visibility operational performance. Quality visibility also had a positive correlation with operational performance given that;  $r=.584$ ,  $p\text{-value} =0.000$  and level of significance =  $0.01$ . Demand visibility also had a positive correlation with operational performance given that;  $r=.496$ ,  $p\text{-value} =.003$  and level of significance =  $.01$ . These results support that both quality and demand visibility have had a positive effect on operational performance of the firms. The implication of these findings is that supply chain visibility has a positive relationship with operational performance of the firms. An increase in the implementation of supply chain visibility would lead to an improved operational performance of the firm. The results are consistent with the study done by (Aberdeen, 2013) that concluded that supply chain visibility had a positive relationship on operational performance of the firm.

The results based on regression coefficients indicated that order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility were implemented as

follows respectively;  $\beta = .183$ ,  $\beta = .221$ ,  $\beta = -.113$ ,  $\beta = .248$  and  $\beta = .256$ . It was concluded that order visibility, shipment visibility, quality visibility and demand visibility have a positive effect on performance. However, receipts visibility returned a negative regression coefficient implying that receipt visibility has a negative effect on performance with  $\beta = -.113$ . Findings based table 4.21 show that p-value (0.008) is below the level of significance (0.05). This implied that the overall model was significant in establishing the relationship between supply chain visibility and operational performance of the firm.

### **5.3 Conclusion of the Study**

Founded on the objective of the study, it was concluded that supply chain visibility has a significant positive relationship with operational performance of logistics firms in Mombasa County, Kenya. The p-values were the key indicator to this relationship. Order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility were indicated by the following p-values  $p = .463$ ,  $p = .527$ ,  $p = .689$ ,  $p = .273$  and  $p = .235$  respectively. Based on these P values the researcher concluded that supply chain visibility had less or not effect operational performance of logistics firms in Mombasa County, Kenya. These findings were consistent with Murphy (2018) who found out that there is a lot of information on supply chain visibility and operational performance but little is done in practicality by the firms.

Holding costs of inventory, time taken to respond to a process change and supply delays reduced with a fair extent with means of; 3.21 (SD = 1.122), 3.44 (SD = .894) and 3.44 (SD = .927) respectively, as a result of supply chain visibility implementation among firms. The study further indicated that order visibility, shipment visibility, receipt visibility, quality visibility and demand visibility were implemented to a fair extent with means of; 3.0706, 3.0809, 3.3824, 3.2721 and 3.3333 respectively. This showed that logistics firms had a room for improvement on the implementation of supply chain visibility. The level of application of

supply chain visibility was also not significant in determining the operational performance of the firm.

#### **5.4 Recommendations of the Study**

As a result of the findings, the researcher provides a number of recommendations. The first recommendation is that logistics firms should consider implementing supply chain visibility into their operations, because there exists a positive relationship between the independent variable and the dependent variable. Improved visibility therefore would translate to an improved operational performance. Logistics firms should consider adopting ICT systems that would increase their visibility into their operations.

The researcher further recommends that logistics firms should take advantage of operational performance indicators to gain a competitive edge over their competitors. Operational factors such as; holding costs of inventory, time taken to respond to a process change and supply delays have reduced significantly as a result of implementation of supply chain visibility. This leads to an improved overall operational performance.

#### **5.5 Limitations of the Study**

The research experienced some limitations, these included; limited physical access to respondents due to the current covid-19 pandemic being experienced. This forced the researcher to use online google forms to collect data. The respondents were also fairly concerned about the data being collected. However, the researcher restored their confidence by providing the introductory letter to show that data collected was purely for academic purposes.

The lack of similar studies conducted in Kenya about the research variables was also another challenge the study faced. However, the researcher was able to rely on related studies to

inform the study. Foreign literature was useful in supporting this study. Generally, all limitations expressed by the researcher did not have any implications on the overall findings of the study.

## **5.6 Considerations for Further Research**

The study focused on logistics firms of Mombasa County, Kenya. It would be imperative that future research should focus on logistics firms of Kenya. This will help determine if the findings realized by this research could be generalized to the entire logistics industry. Future research should also consider the effect of supply chain visibility on the other operational factors such as speed and reliability.

Further the researcher recommends that future research be conducted on the challenges faced when adopting supply chain visibility. Future research should also consider other visibility factors on operational performance since the independent variables under this study did not significantly affect the outcome of the dependent variable. Future should consider supply chain visibility on other operational performance factors other than supply chain costs and risk response time.

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## APPENDICES

### APPENDIX I: RESEARCH QUESTIONNAIRE

This research questionnaire is in partial fulfilment for the award of the degree of Master in Business Administration from University of Nairobi. This questionnaire comprises of three sections. Kindly provide answers to the questions appropriately.

#### SECTION A: Demographic data

1. Please indicate how long you have been in this position in your organization. (Tick as appropriate).

< 5 years     5 =< 10 years     10 =< 15 years

15 =< 20 years     20 years and above

2. How many years of experience do you have in logistics?

< 5 years     5 =< 10 years     10 =< 15 years

15 =< 20 years     20 years and above

3. How long has your company been in operation?

< 5 years     5 =< 10 years     10 =< 15 years

15 =< 20 years     20 years and above

4. Please provide your highest level of education (Tick as appropriate)

Certificate     Diploma     Undergraduate degree

Postgraduate degree     Other(s) (please specify) \_\_\_\_\_

5. Level of position held at the firm (Tick as appropriate)

Entry Level management	Middle level management	Senior level management

6. How many employees are there in your firm?

1 – 50       51 – 100       101 – 150       151 – 200       201 and above

### SECTION B: Supply Chain Visibility

7. Please indicate the extent to which you share or access the following information on time with your partners, clients and suppliers.

**1= No extent 2= Little extent 3= Fair extent 4 = High extent 5= Very High**

Supply Chain Visibility	1	2	3	4	5
<b>Order visibility</b>					
Raw materials at plant					
Production capacities					
Production plans					
Process/Product change notifications					
End of life notifications					
<b>Shipment visibility</b>	1	2	3	4	5
Shipment plans					
On time delivery percentages					
Bill of lading creation time					
Carrier booking confirmation response time	1	2	3	4	5
<b>Receipts visibility</b>					
Invoice status					
Payment receipts					
<b>Quality visibility</b>	1	2	3	4	5
Number of raw material defects					
The amount of time there has been machine down					
Number of damaged final goods					
Number of goods delivered on time					

<b>Demand visibility</b>	1	2	3	4	5
Inventory turn over					
Re order level					
Demand forecasts					

**SECTION C: Operational performance of the firm**

8. To what extent are the following statements operational performance measures true?

**1= No extent 2= Little extent3= Fair extent4= High extent5=Very High Extent**

Operational Performance Indicators	1	2	3	4	5
<b>Supply chain costs</b>					
Holding costs of inventory have reduced					
Transportation costs of Goods have reduced					
Labour costs have reduced					
<b>Risk response</b>					
Time taken to respond to a product change					
Time taken to respond to a process change					
Supply delays have reduced					

**APPENDIX II: LIST OF LOGISTICS FIRMS IN MOMBASA COUNTY, KENYA**

S/N	NAME OF LOGISTIC FIRM
1	A.M.A. AL AMMARY LTD.
2	MITCHELL COTTS FREIGHT (K) LTD.
3	SANDEK AGENCIES LTD.
4	ACTIVE CARGO SERVICES LTD.
5	MULTICARGO FREIGHTERS
6	SEMATI STORES ENTERPRISES
7	AGS WORLDWIDE MOVERS LTD.
8	NARCOL ALLUMINIUM ROLLING MILLS
9	SLEEK INTERNATIONAL LTD.
10	ALCORDIA LOGISTICS LTD.
11	OCEANROCK LOGISTICS LTD.
12	SPEAR LOGISTICS (K) LTD.
13	ALIMANN LOGISTICS LTD.
14	PATANA ENTERPRISES LTD.
15	SWIFT ROYAL CONVEYORS
16	APEX STEEL LTD.
17	EMPIRE KENYA EPZ LTD
18	THREWAYS SHIPPING SERVICES LTD.
19	BAHARI TRANSPORT CO. LTD.
20	ROSMIK TRADING CO. LTD.
21	TRIBERTO (K) LTD.
22	BILATERAL SEMITE SAP LTD.
23	SAHUSA FREIGHTERS LTD
24	UTILITY FREIGHT LOGISTICS LTD.
25	CASCADE SWIFT E.A. AGENCY LTD.
26	SEAGATE FREIGHTERS LTD.
27	WEKALAMBA AGENCIES LTD.
28	DAHLA KENYA LTD.
29	SINZA FREIGHT AND LOGISTICS
30	ECU LINE KENYA LTD.
31	DREAMLINE FREIGHTERS E.A. LTD.
32	SONEVA ENTERPRISES
33	ANKIN COMMERCIAL AGENCY
34	FAST CARGO MASTERS (K) LTD.
35	SUMMIT COVE LINES CO. LTD.
36	BAABZ FREIGHT FORWARDERS LTD.
37	FORA LTD.
38	TEOS COMPANY LTD.
39	BENELI FREIGHTERS LTD.
40	GAMARA INVESTMENTS LTD.
41	TRANSONIC LOGISTICS LTD. NAIROBI



42 BUHAYRAH FREIGHTS LTD. NAIROBI  
43 GEORINE AGENCIES LTD.  
44 UNIMAR LOGISTICS LTD.  
45 CHEBE FREIGHTERS LTD.  
46 GOLDEN FREIGHT SERVICES  
47 VILLESSY AGENCY LTD.  
48 DAVELINE NETWORK CO. LTD.  
49 GREENBELT LOGISTICS LTD.  
50 ZAMIN ENTERPRISES CO. LTD.  
51 ECS LOGISTICS (K) LTD.  
52 HERBER LOGISTICS LTD.  
53 ABSOLUTE FR. SERVICES & LOGISTICS  
54 INDIAN OCEAN F. (E.A.) LTD.  
55 INSPIRE AFRICA LOGISTICS  
56 AEROMARINE CARGO SERVICES LTD.  
57 JADE PRIME LOGISTICS (E.A.) LTD.  
58 JAMES FINLAY LTD.  
59 ALAQMAR FORWARDERS LTD.  
60 JORDAN FREIGHTERS LTD.  
61 JUWELLS TRADING CO. LTD.  
62 ALIMANN LOGISTICS LTD.  
63 KANDITO FREIGHT AGENCIES  
64 KEIHIN MARITIME SERVICES  
65 ALPINE TRADING LTD.  
66 KENYA BONDED WAREHOUSE  
67 KESA LOGISTICS LTD.  
68 ARNOP LOGISTICS CO. LTD.  
69 KODAVI INVESTMENTS LTD.  
70 LAS AIRFREIGHT LTD.  
71 BAYONNE FREIGHT FORWARDERS  
72 LINKAGE CONVEYORS LTD.  
73 LOGISTICS SERVICES LTD.  
74 BLUE STAR TOURS INTERNATIONAL  
75 MACKENZIE MARITIME E.A. LTD.  
76 MAK CARGO HANDLING SERVICES  
77 CHAISO AGENCIES LTD.  
78 MAST INVESTMENTS CO. LTD.  
79 MEGRIAN ENTERPRISES LTD.  
80 DANJOS INTERNATIONAL AGENCIES  
81 LOGISTICS LTD.  
82 MTUDAWA FREIGHTERS LTD.  
83 EAST AFRICA CARGO LOGISTICS  
84 MUSTAFA MOHAMED ISSA LTD.  
85 MWAMBA FREIGHT SERVICES LTD.  
86 FILIKEN TRANSIT FORWARDERS LTD.  
87 NIBAL FREIGHTERS LTD.

88	OCEAN HARVEST AND LOGISTICS LTD.
89	FREMMY FREIGHT INT.1 LOGISTIC LTD.
90	PAK PACIFIC LTD.
91	PAN AFRICAN SYNDICATE LTD.
92	GEOMWA EXPRESS CARGO LTD.
93	PETRUT FREIGHT FORWARDERS LTD.
94	PORTLINK LOGISTICS LTD.
95	GLOBAL BUSINESS COMMANDERS
96	RELIABLE FREIGHT SERVICES LTD.
97	RISALA LTD.
98	GREEN LEAF TRADING CO. LTD.
99	S. K. AMIN LTD.
100	SAHA FREIGHTERS LTD.
101	HARRY CARGO FRIEGHTERS LTD.
102	SASI FREIGHT SERVICES LTD.
103	SEACON (K) LTD.
104	HOMELINE CONSOLIDATION SERVICES
105	SHARAF LOGISTICS LTD.
106	SILICON FREIGHT INTL CO. LTD.
107	INTERTROPICAL LOGISTICS CO. LTD.
108	SMART CHOICE SERVICES LTD.
109	SOKOTA INVESTMENTS LTD.
110	JAMREKS ENTERPRISES
111	SPEDAG INTERFREIGHT (K) LTD.
112	STEFRAH AGENCIES
113	KAKSINGRI FREIGHT DEVELOPMENT
114	SYLLER IMPRESS CO. LTD.
115	TANDEM FREIGHT SERVICES LTD.
116	KENREVV CARGO CONVEYORS
117	TIBA FREIGHT FORWARDERS LTD.
118	TRADEPULSE (K) LTD
119	KIPKEBE LTD.
120	TUDOR SERVICES LTD.
121	UMOJA RUBBER PRODUCTS LTD.
122	LIBAAN LTD.
123	VALUE CARGO LTD.
124	VIBGYOR FREIGHT SERVICES LTD.
125	LYCHEEWOOD LTD.
126	WESTIN ENTERPRISES LTD.
127	WIGGLESWORTH EXPORTERS LTD.
128	MARK RIECH AFRICA LIMITED
129	FEELS TIME COMPANY LTD.
130	AAN CLEARING & FORWARDING LTD.
131	MNET STARS LTD.
132	ANYTIME CLEARING & FORWARDING
133	ACTIVE FORWARDERS LTD.

134 MUMILO FREIGHTERS LTD.  
135 BAHARI FORWARDERS LTD.  
136 AL ASEEF IMPES LTD.  
137 NATALYA HOLDINGS CO. LTD.  
138 BEYOND CHANCE FREIGHT SERVICES  
139 ALEMIR LTD.  
140 OGAKA FREIGHT LOGISTICS  
141 C. K. ROTTUK LTD.  
142 ALITIGAN INVESTMENTS CO. LTD.  
143 PAWEED EXPRESS CARGO NAIROBI  
144 CHINAKE INVESTMENTS LTD.  
145 APPROVED LOGISTICS LTD.  
146 QUISSAN ENTERPRISES LTD.  
147 DAVKIT ENTERPRISES LTD.  
148 BAKRIZ HOLDINGS LTD.  
149 ROYAL ENERGY (K) LTD.  
150 EDISA HOLDINGS (K) LTD.  
151 BLACKBOX (K) LTD  
152 SAJA FREIGHT LINER LTD.  
153 INDUS LOGISTICS LTD.  
154 CENTRINO CARGO LTD.  
155 SEAGATE LOGISTICS LTD.  
156 JAGOMA LOGISTICS LTD.  
157 DALSAN FREIGHTERS LTD.  
158 SIVORINE (K) LTD.  
159 JOSIM AGENCIES LTD.  
160 DRENAL ENTERPRISES LTD.  
161 SOUTHERN SHIPPING SERVICES LTD.  
162 KANZIZE LOGISTICS LTD.  
163 FAST CARGO MOVERS CO. LTD.  
164 SUPERWISE FREIGHTERS LTD.  
165 KENYA GENERAL INDUSTRIES LTD.  
166 FREIGHT FORWARDERS (K) LTD.  
167 TERYANI AGENCIES LTD.  
168 KWAME FREIGHT LOGISTICS LTD.  
169 GATEWAY MARINE SERVICES LTD.  
170 TRANSQUICK LTD.  
171 LINKFREIGHT E.A. LTD.  
172 GIFCO KENYA LTD.  
173 UNION C & F LTD.  
174 MAGNEX LTD.  
175 GOSHEN INTERNATIONAL LTD.  
176 VISAN FREIGHT AGENCIES  
177 MBARAKI PORT WAREHOUSES (K) LTD.  
178 GULF CROSS LTD.  
179 ZULA GLOBAL DEVELOPMENT LTD.

180 TIMES AFRICA LTD.  
181 HEROS CO. LTD.  
182 ALSHOG SYSTEMS LTD.  
183 MUSTHAFI ENTERPRISES LTD.  
184 INTER PLANET C&F CO. LTD.  
185 ASHTON APPAREL EPZ LTD.  
186 NICAH LOGISTICS  
187 JAMES FINLAY LTD.  
188 BECOZI INVESTMENTS  
189 PALM FREIGHTERS LTD.  
190 K. B. FREIGHTERS LTD.  
191 BLUESHED FREIGHTERS LTD.  
192 PHAHIM FREIGHT FORWARDERS LTD.  
193 KENFREIGHT (E.A.) LTD.  
194 CHANNEL ATLANTIC LTD.  
195 REPLAN CARGO HANDLING SERVICES  
196 KIMM FREIGHTERS (K) LTD.  
197 DANROS (K) LTD.  
198 SAA INTERSTATE TRADERS (K) LTD.  
199 LAXAT TRADERS LTD.  
200 EAST GLOBAL LOGISTICS (K) LTD.  
201 SEA LORD AGENCIES  
202 LOGISTICS THREE SIXTY FIVE LTD.  
203 FOOD CHAIN E.A. LTD.  
204 SHIPFREIGHT LOGISTICS LTD  
205 MANGO VISION FREIGHTERS LTD. XXXX  
206 GALAXY LOGISTICS LTD.  
207 SMART TRADERS LTD.  
208 MIDSTAR FORWARDERS CO. LTD.  
209 GEOMWA EXPRESS CARGO LTD.  
210 SPRING LOGISTICS LTD.  
211 MUGENGA HOLDINGS LTD  
212 GOHOMU AGENCIES  
213 SYLLER IMPRESS CO. LTD.  
214 NAJMI CLEARING & FORWARDING  
215 GREENBELT LOGISTICS LTD.  
216 TRACMI FREIGHTERS LTD.  
217 OCEAN PACIFIC INTL LINES  
218 HEME FREIGHTERS  
219 TURNER FREIGHT LTD.  
220 PAN AFRIQUE FORWARDERS LTD.  
221 IKONGO FARMS LTD.  
222 VENUS KENYA LTD.  
223 PRINCIPAL FORWARDERS LTD.  
224 ISLAND EXPRESS SERVICES  
225 WESTON LOGISTICS LTD.

226 ROLLING CARGO LTD.  
227 JIHAN FREIGHTERS LTD.  
228 TRANSFREIGHT LOGISTICS LTD.  
229 SAHARA INTERNATIONAL LOGISTICS  
230 KALEMU FREIGHTERS LTD.  
231 CAPRICON FREIGHT FORWARDERS  
232 SEACROSS FREIGHTERS (EA) LTD.  
233 KENTAN CONNECTIONS LTD.  
234 CHWILE INVESTMENTS LTD.  
235 SILVER ANCHOR FREIGHTERS LTD.  
236 KIPTEBEE'S FREIGHTERS LTD  
237 DECCAN FREIGHT LOGISTICS  
238 SOLLATEK ELECTRONICS (K) LTD.  
239 LIDAN ENTERPRISES LTD.  
240 ELMON AGENCIES  
241 STEJA GENERAL AGENCIES CO. LTD.  
242 LYNX LOGISTICS LTD.  
243 INLAND AFRICA LOGISTICS LTD.  
244 TEKOL HOLDINGS (K) LTD.  
245 MARKENS FREIGHT LOGISTICS  
246 JAGOMA LOGISTICS LTD.  
247 TRANSNORTH LOGISTICS LTD.  
248 MODA FREIGHT FORWARDERS LTD.  
249 JOVAMA ENTERPRISES LTD.  
250 UNCLE RIVERSIDE INVESTMENT LTD.  
251 MUPEKI HAULIERS LTD.  
252 KAPRIC APPAREL LTD.  
253 VIBRASI ENTERPRISES LTD.  
254 NEW WAY INTL FORWARDERS  
255 KENYA HAULAGE AGENCY LTD.  
256 YURAI INVESTMENTS LTD.  
257 OTOX MAWEZO LTD.  
258 LAMU LOGISTICS CO. LTD.  
259 ABBAS TRADERS LTD.  
260 PEERLESS TEA SERVICES LTD.  
261 LIVERCOT IMPEX LTD.  
262 ACTIVE FORWARDERS LTD.  
263 RANK NETWORK LOGISTICS LTD.  
264 MAGOT FREIGHT SERVICES LTD.  
265 AL SHOG SYSTEMS LTD.  
266 RUBY CLEARING & FORWARDING  
267 MEADOW AGENCIES LTD.  
268 ALFOST ENTERPRISES LTD.  
269 SALMIR C&F CO. LTD.  
270 MORNING GLORY FREIGHT SERVICES  
271 ALMUSTAQIM TRADING CO. (K) LTD.

272	SEALINE FORWARDERS LTD.
273	MUZDALIFA C&F LTD.
274	ARCHIECRAFT HOLDINGS LTD.
275	SKYLIFT CARGO LTD. NAIROBI
276	NORTH WEST (K) LTD.
277	BAMBURI SHIPCHANDLERS (K) LTD.
278	SPART FREIGHT LOGISTICS LTD.
279	PAMOL CONNECTIONS
280	BLUE LOGISTICS LTD.
281	SUPREME OUTLETS LTD.
282	PLUMASON CO. TD.
283	CHABS TRADE CONNECTIONS LTD.
284	THE HEARTLAND TRADING CO.
285	RICA LOGISTICS LTD.
286	DAMINT FORWARDERS LTD.
287	TRANSVAAL LOGISTICS LTD.
288	SABINA LOGISTICS LTD.
289	DUME GENERAL AGENCIES LTD.
290	UNITED (E.A.) WAREHOUSES LTD.
291	SEABASE SOLUTIONS LTD.
292	FEEDERLINK LOGISTICS LTD.
293	WANANCHI MARINE PRODUCTS LTD.
294	SHIPSIDES & GENERAL SERVICES LTD.
295	FREIGHTCARE LOGISTICS LTD.
296	BRYSON EXPRESS LTD.
297	SMART TRADERS LTD.
298	GEMINI TRADING CO. LTD.
299	ALUJO ENTERPRISES CO. LTD.
300	SPRINT FREIGHT & LOGISTICS
301	GLADIN LOGISTICS (K) LTD.
302	ASK CARGO LTD. NAIROBI
303	SYNERGY FREIGHT & LOGISTICS LTD.
304	GREATSPAN MARITIME SERVICES LTD.
305	BEEKAY LOGISTICS LTD.
306	TRADE HAUS & GLOBAL LOGISTICS
307	HAMBU FREIGHT SERVICES LTD.
308	BRAVILLE AGENCY LTD.
309	TURNING POINT FREIGHT LTD.
310	HILLCONS ENTERPRISES CO. LTD.

Source: KenTrade (2020)