EFFECT OF LEAN PRACTICES ON OPERATIONAL PERFORMANCE OF SHIPPING FIRMS IN KENYA

MARK MBOLOI MATHUVA

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DECLARATION

I declare that this research project has not been submitted for a degree in any other University.

Signature……. Date…….

Mark Mboloi Mathuva

D61/79596/2015

This research project has been submitted for examination with my approval as University Supervisor.

Signature……. Date…….

Dr. Kingsford Rucha

Department of Science,

School of Business,

University of Nairobi

DEDICATION

I take this opportunity to thank the Almighty God for His grace, provision and insight to complete this study. I hereby dedicate this study to Dorris Kavata (my beloved wife); Gift, Ivanna and Prince (our children), my friends and mentors who accorded me the necessary support, understanding and prayers while working on this study.

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God Bless you all!

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ABBREVIATIONS

CFS:	Container Freight Station
ICT:	Information and Communication Technology
JIT:	Just In Time
KMA:	Kenya Maritime Authority
KPA:	Kenya Ports Authority
KRA:	Kenya Revenue Authority
KSAA:	Kenya Ship's Agents Association
LM:	Lean Management
OM:	Operations Management
RBV:	Resource Based View
SMEs:	Small and Medium-sized Enterprises
SPSS:	Statistical Package for Social Scientists
TOC:	Theory of Constraints
TQM:	Total Quality Management
VSM:	Value Stream Mapping
WIP:	Work In Process

ABSTRACT

The aim of the study was to identify the effects of lean practices on the operational performance of shipping companies in Kenya. The research project was based on three theories, the resource-based view, the theory of constraints and the theory of contingency. In this study, the lean practices were Just in Time, 5S, Total Quality Management (TQM) Kaizen and Value Stream Mapping. In this study, a descriptive research design was adopted to collect data from respondents. The population for the study consisted of 78 shipping companies in Kenya, comprising ship owning and operating companies operating in the East African region, which includes Kenya, as well as shipping agents representing various foreign companies and acting as logistics and service centers for their different customers. A questionnaire was used to collect data from shipping companies. The respondents were sent a total of 78 questionnaires, of which only 45 were returned. This represented a response rate of 57.7 percent and was considered appropriate for the study, as suggested by Mugenda & Mugenda (2007), which claimed that a response rate of 50% was sufficient. The study concluded that Just in Time, Kaizen and Value Stream Mapping have a positive relationship with operational performance in general. In particular, 5S and TQM were found to be negatively related to operating performance. Although 5S was found to be insignificant, the effect of the independent variables and the dependent variables was significant. This study recommends improving the adoption and implementation of lean practices such as Just in Time, 5S, TQM, Kaizen and Value Stream Mapping to improve operational performance, among others. In order to benefit from the use of these lean practices, it is advisable to apply all lean practices. This is because one or two lean practices cannot achieve the desired operational performance in comparison with all synergistic practices.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Many firms, in the manufacturing as well as the service sector face various challenges that arise from competition in the global arena, and this has necessitated them to embrace appropriate strategies in manufacturing management, in a bid to remain competitive and efficient. Service and manufacturing firms that have adopted lean philosophies have benefited by having strategic and operational gains (Wafa & Small 2011). Lean practices are the practices that lead to minimization of waste and maximization of customer value. In the service industry, these lean practices produce value for the customers and hence meeting the customer expectations.

Operational performance can be defined as an organization's achievement of performance objectives that are important to customer satisfaction. operational performance is therefore related to customer satisfaction (Luciano, 2012). The performance objectives that are important to customer satisfaction requirements include cost, delivery speed, quality, dependability, flexibility (Slack et al., 2007). While endeavoring to improve their operational performance, shipping firms face various challenges which include high operational costs and volatility of freight rates, regulatory compliance issues among others. Due to the unpredictability and turbulence of the business environment, for firms to remain profitable and competitive in the market they should adopt lean supply chain concepts and philosophies such as lean procurement, Kaizen, lean production, waste management, operation excellence, Just-In-Time deliveries as well as total management of quality practices. These lean management practices have made service and manufacturing sectors improve in strategic gains and operations performance (Openda, 2013).

In this study three theories were considered. These are; the resource-based view which postulates that the ability of an organization to accumulate worth, rare capabilities and resources which are difficulty to imitate, is the major cause of superior performance by firms (Barney, 2000); the theory of constraints whose major purpose is to find the factor that is most limiting and which is an obstacle towards goal attainment, and the attempt to slowly work on the factor until it is no longer an obstacle (Goldratt, 2014) and finally the contingency theory which asserts that firms are open structures, and their exposure to contingency factors, should be taken into account in strategy formulation (Hofer, 1975).

Shipping firms are involved in activities which facilitate international seaborne trade. These activities include; receiving shipments from exporters or shippers, loading of cargo at the ports of loading, planning sea passage of the ships, then offloading cargo at the discharge ports, as well as facilitating release and delivery of the cargo to the cargo owners of consignees. The clientele base of shipping firms include operators of Container Freights Station (CFS), providers of logistics service such as warehouse and transporters operators, export and import customers, Inland container depot operators, clearing and forwarding agents, among other. Other stakeholders in the local shipping industry are the Kenya Maritime Authority (KMA), the Kenya Revenue Authority (KRA), the Kenya Ports Authority (KPA) and other regulatory authorities within the country and the hinterland (KPA, 2015).

1.1.1 Lean Practices

Lean practices are all things done in an organization with a clear goal of eliminating waste (Walters, 2006). Waste is any process or people of which the attainment of the end result is inconsequential to the desired result either in a production process service or a manufacturing industry (Benson & Kulkarni, 2011). Benson & Kulkarni further argue

that, lean thinking and practices are concepts aimed at offering a very low cost to satisfy the needs of customers using the minimal available resources at one's disposal. Sharing of responsibilities is a common practice in ensuring total quality management (TQM) so that everyone owns the idea aimed at ensuring that the organization achieves more with less factors of production. If all this is taken into consideration, then there should be no build up to work in process (WIP) and inventory (Shewhart, 2006).

There are various lean practices as outlined by various studies. Perfection, the value stream, pull, value and flow are five major lean principles pointed out by Womack and Jones (2003). Total productive maintenance, JIT, how total quality is managed and how human resources are managed are categories of a four-some of bundles of lean practices that were summarized from 22 lean principles by Shah & Ward (2003). Production stop procedure, continuous improvement, standardized work, level production, just in time, process stability and visual control are 8 lean principles which were identified by Detty & Yingling (2000). Product system design, (Taj & Morosan, 2011) together with supplies as well as human resources are the three main practices of lean operations. This study will concentrate on lean elements JIT, TQM, Kaizen, 5S, and value stream mapping as postulated by Cost and Rothenberg (2004). Despite these practices being used mainly in manufacturing, this study will also look into how lean practices are applied in the industry of service since lean practices in service firms have a very high similarity to those used by firms in manufacturing (Allway & Corbett, 2002).

1.1.2 Operational Performance

Many scholars have done research on operational performance. According to Luciano (2012) operational performance is related to customer satisfaction. The performance objectives that are important to customer satisfaction requirements include cost, delivery

speed, quality, dependability, flexibility (slack et al., 2007). Operational performance can therefore be defined as organization's achievement of performance objectives that are critical to customer satisfaction. Voss et al., (1997) argues that operational performance is the measurable aspects of the results of the processes of an organization, such as production reliability, cycle time, reduction in non-conformity and inventory management. Birech (2011) found out various measures of overall performance inside operational location like, personal overall performance measures, which consist of: high-quality measures, productiveness measures, stock measures, lead-time measures, and preventive-preservation measures.

According to Bou & Belton (2005), Shah & Ward (2003), TQM reduces process variance which makes the manufacturing process simple and closely matches customer demand and production, while JIT has an impact on quality management by reducing lot sizes hence decreasing waste potential and rework. Elisa, Andrea & Massimiliano (2013) noted that better financial results, increased operation efficiency, better performance are some of the benefits that accrue as a result of adopting TQM and other lean practices.

1.1.3 Lean Practices and Operational Performance

The reason why lean practices are used in organizations is to eliminate "muda" (Japanese name for waste) in the system of production (Womack & Jones 2003). When these wastes are removed, then the organization can concentrate on the activities that can be wealth generating. Therefore, due to cost reduction, there would be profit increase and also a better business performance for the company (Shingo, 1996). Operational capabilities and competitive skills that are related to costs, quality and flexibility need to be developed for performance improvement goal achievement (Flynn & Flynn, 2004).

Jain, Lyons, Mittal, Panwar & Yadav (2018) found a positive relationship between operational performance and implementation of lean practices. Their study was an inquiry to better comprehend the lean perception in smaller as well as average sized enterprises and establishing a relation between lean practices and operational performance. Walukwe (2016) studied operational performance and how it's affected by lean practices carried out in various workshops in Nairobi operated by selected automotive firms. The study found out that operational performance is affected by lean practices in these organizations. Notably, when applied, the practices highly increased the profits, sales while reducing the training costs. On the other hand, these practices were found to have little influence on talent retention, workshop accident level and customer complaints.

1.1.4 Shipping Firms in Kenya

There is a dominance by multi-national shipping lines in the shipping industry in Mombasa, who load and discharge cargo at the port using their vessels. The shipping multi-nationals are domiciled in Kenya through their agents or subsidiaries which they fully own (KPA, 2015) and Kenya Maritime Authority (2016). The ship agency firms operate as logistics offices; and they provide ship husbandry services for their principals' vessels and act as the point of contact with all the stakeholders in the local maritime industry. According to Kenya Maritime Authority website (2015), after the discovery of natural resources in the region as well as Kenya, there has been an exponential growth in the usage of maritime transport as trade volumes have soared and maritime transport now contributes to ninety two percent of Kenya's trade internationally. This industry has great potential.

Reliability, responsiveness, flexibility in service, reduction of business costs are the features of operational performance which are impacted positively upon improvement of

organizational logistics and innovation after utilization of shipping knowledge by the shipping companies (Lee & Song, 2015). The shipping industry is categorized under the maritime transport sector, which is service oriented. This study will concentrate more on the liner shipping sector which entails carriage of containerized cargo and breakbulk, offering scheduled services and therefore they form a good category in the industry which can exhibit an avenue of the application of the lean practices.

1.2 Research Problem

In this era of global competitiveness many service and manufacturing firms have adopted strategies focusing on the satisfaction of customers, product or quality of service and therefore they have resorted to employing a set of competitive priorities including cost, flexibility, dependability, quality, delivery speed and reliability to remain competitive on the market by meeting the ever-increasing customer needs. For improvement of operational performance organizations have had to employ the lean production mechanisms. Removal of waste, cost reduction and improved productivity are the various benefits that accrue as a result of adoption of lean production mechanisms (Ahmad, Rakim & Raja, 2015). This is why it is important and worth investigating the impact of lean practices on operational performance.

In endeavoring to improve their operational performance, shipping firms face different challenges; overheads, operational costs, wastes and utilities. For firms to remain profitable and competitive in the unpredictable and turbulent business environment, they should adopt lean supply chain concepts and philosophies. These practices and concepts have made service and manufacturing sectors improve in strategic gains and operations performance (Openda, 2013). On the basis of the above arguments, the study examines whether lean practices affect the operational performance of shipping companies in

Kenya. However, the researcher expects to find a positive link between lean practices and the operational performance of the Kenyan shipping companies.

Laosirihongthong, Rahman & Sohal (2010) examined the adoption of lean management practices in Thailand's organizations involved in manufacturing and how these practices impact operational performance. The findings showed that waste minimization, Just in Time and flow management were positively and significantly related to the operational performance. Jain, Lyons, Nepal, Panwar & Rathore (2017) investigated how lean practices impacted the improvement Process industry performance in India. The lean practices investigated were found to have influenced performance by waste elimination, productivity, inventory control and cost reduction. Malonza (2014) established at Mumias Sugar Company, a positive effect on operational performance of lean manufacturing practices. Rucha (2018) while studying lean practices and operational performance for third party port-centric logistics companies in Kenya found out that quality management, cost management, customer orientation and waste management were related to operational performance. A few studies have been done in this area of research and this study will therefore endeavor to fill the gap in the lean practices and operational performance of shipping companies by answering the question: What is the impact of lean practices on the operational performance of shipping companies in Kenya?

1.3 Research Objective

The aim of the study was to assess the impact of lean practices on the operational performance of shipping companies in Kenya.

1.4 Value of the Study

The study attempted to explain the concept and impact of lean practices on operational performance. This would help scholars learn more about the various types of lean practices undertaken by service organizations with the aim of remaining competitive. The study will therefore help researchers obtain materials for reference whenever they want to conduct their study on lean practices.

The policy makers will be able to comprehend what policies should be implemented to improve operating performance in shipping companies in Kenya, for the betterment of international seaborne trade. Such policies when formulated would be aligned to the Shipping industry's best practices. This would help in coming up with policies that enhance organization performance.

Further, this study will encourage the industry players to employ strategies that would not only improve their performance but also their management. In the business environment, the study would help to establish the different lean practices that are undertaken by various organizations. Organizations in the service sector would be beneficiaries by gaining better understanding of lean practices and being able to borrow the positive aspects that would enable them enhance growth and competitive advantage.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter attempts to review the literature relevant to the study concept. The chapter examines the practice of lean management, operational performance and the theories involved. It also examines the different studies performed on lean management practices and operational performance and the gaps.

2.2 Theoretical Review

In a bid to address the objective of this study, three theories have been considered. These theories are Resource-Based View (RBV), Theory of Constraints (TOC) and contingency theory. The goal of reviewing these theories was to establish a theoretical foundation for a systematic literature review. Each theory has been considered separately in the ensuing discussion.

2.2.1 Resource Based View

The RBV explains fully the basis of competitive advantage as opposed to the insufficiency of the external view of strategy. Consultants may be outsourced from time to time while some other resources may belong to the firm (Mills, Platts & Bourne 2003). The RBV approach considers companies which have better structures and systems to be more profitable since they will exhibit superior performance of product of a higher quality and lower costs (Teece, Pisano & Shuen, 1997). RBV deals with waste elimination and being efficient (Peteraf & Barney, 2003). For creation of capabilities in the organization there should be a correct mix of the human resources in the company (for instance motivation, knowledge and skills) with the other resources defined as the intangible and tangible assets the organization accesses, controls or possesses. Barney (1991) argued that a source of competitive advantage which is sustainable can be attained

when resources are distributed variedly across the companies. This RBV point of view delves into strategies that utilize the specific company assets so as to maximize on the economic value (Teece et al. 1997).

Improving processes, development of new products, strategic alliance engagement are just a few choices that can be undertaken in lean practices implementation. Lean practices as well as RBV both concentrate on waste, customer value and efficiency (Peteraf & Barney 2003; Womack, 2002). Lean implementation helps in reduction of economic cost, performance delivery, responsiveness, while at the same time improving quality which in turn leads to increases in distinguished benefits. Therefore, when there is creation of economic value, this trickles down and gets divided amongst the suppliers and customers according to the price. Lean makes companies to be more competitive since at some given price they achieve more producing surplus than their competitors that don't practice lean. These companies also offer large customer surplus and thence give more attractive products to their customers. This study will be anchored on this theory because it focuses on cycle time, turnover, service quality, operational costs and stock-outs which are competitive advantages gained from better resource utilization.

2.2.2 Theory of Constraints

It is the approach in management anchored on the continuous improvement processes. The major purpose is to find the factor that is most limiting, and which is an obstacle towards goal attainment, then working on the factor until it becomes a non-limiting factor. The Theory of Constraints (TOC) is founded on the premise that every firm must have constraints otherwise it will produce streams of profits infinitely (Goldratt & Cox, 2014). The company wholesomely is viewed as a work in progress as it undergoes transformation periodically while seeking to survive in an ever-changing business

environment. Managers, therefore, need to continuously monitor performance so as to be able to implement positive changes in the process of production. To improve performance the efforts by managers require the ability to; effectively manage the systemic change implementation in the process of production, assess, analyze and measure the situation currently in comparison with the organization goals (Goldratt & Cox, 2014, Lewinson, 2007).

TOC's 5-steps give focus and systematic approach for organizations to use to successfully follow the ongoing improvements, these are; establishing the system's constraints, decision making on exploitation of the constraints in the system, raising the system's constraints, and stopping an element like inertia to become the system's constraint. Breaking a constraint means going back to the drawing board again to step one. TOC and Lean Management (LM) have some similarities since they are both methods which offer focused and systematic processes used by organizations in pursuing successfully the ongoing improvements. Both TOC and Lean acknowledge that the value of a product or service is derived from the perception of value by the customer (Lewinson, 2007).

2.2.3 Contingency Theory

Contingency theory is used as a theoretical mirror on organizations. The theory provides that for companies to achieve and maintain higher performance, they need to fine tune their structures to keep up with the ever-dynamic external factors (Donaldson, 2001). The practical and theoretical contributions of this theory are obtained through identification of the most important contingency variables that bring out the contextual difference, putting into groups different contexts that are based on the already identified contingency variables and in each major group, determination of the design that is most effective in the internal organization.

The relationship between performance components, employed strategy and the working environment should be considered in the frameworks that are typical to the research contingency tradition. This is better explained by recognizing that an organization is usually affected by the environment it operates in and therefore the organization should endeavor to put in place processes and structures that are in line with the working business environment for performance maximization (Flynn, Huo & Zhao, 2010). The dynamism in the environment can come from various sources; changing customer's preferences, unpredictability or uncertainty of the actions of the competitors, new service and product introduction and finally the changing trends in the industry the company or firm is operating in (Miller & Friesen, 1983).

2.3 Lean Best Practices

Lean practices have a more significant impact when implemented together as opposed to when implemented as stand-alone programs. Although there are various lean management practices that can bring about improvement in a firm's bottom line, this study will consider only a few of the practices as outlined below;

2.3.1 Just In Time (JIT)

The origin of JIT is universally linked to Toyota Motor Corporation where it was identified as a technique for optimizing the processes and procedures by ensuring that only the products that are needed are produced. This eliminates work in progress and ensures that all wastes are reduced to a bare minimum. This concept epitomizes the need to develop products designed to the specification of the customers' needs and delivered at the opportune time thus ensuring that there are no unnecessary waiting times or inventories (Svensson, 2001). Application of the principles of JIT has benefitted the service environments which deal with tangible products, operations that are repetitive,

that have high volume operations (Krajewski & Ritzman, 2005). When the resources are at a bare minimum and are well utilized, operational efficiency if fully attained when service delivery is timely. This in turn improves the quality and enhances reduction in inventory levels (Lee, 1990; Schniederjans, 1993). Vonderembse & White (1991) asserts that focusing on service quality, reduction of supplies of inventories, simplification of the processes of production are the best way JIT can be implemented in the service sector.

Service companies must ensure clear cut communication is maintained with the customers. Proper design of organization's work area encourages effective communication. Reduction of receivables that are overdue and also the reduction in lead time of operations in shipment was evidenced by Hewlett-Packard's implementation of JIT (Lee, 1990). Companies need to ensure that employees and customers understand the requirements of JIT in the process of simplification of the procedures of operations. Order processing time is thus reduced when JIT is employed. JIT is very effective as it increases product quality, performance of work and the quality of products. Kanban as a JIT system can be effective in operations management by providing effective maintenance programs, reducing lead time and minimizing employee turnover through consensus management.

2.3.2 5S

According to Gapp, Fisher & Kobayashi (2008), 5S deals with systematically and gradually organizing the workplace and periodic housekeeping. 5S is aimed at attaining standardization and organization at the work place. Employees tend to be motivated when the work place is well organized. The 5S method helps in improving efficiency of work, safety, productivity and helps also in the establishment of a sense of belonging and ownership. SEIRI is the first stage whereby everything that is not wanted in the production process is removed from the workplace. SEIRI a Japanese word meaning

"Sort". Only the materials and tools that are important and will be used for the day's work are retained. When SEIRI as a stage is properly done there will be improvement in employee communication, productivity and consequently the product quality. SEITON (meaning "Set in Order") is the second stage whereby arrangement and labeling of items is done for easy location when required. The arrangement in an orderly fashion of the items that may be needed for easy usage and accessibility for everyone. Where there is orderliness there is elimination of wastage in production and activities that are clerical in nature. The third stage is known as SEISO (meaning "Shine") in which all the working areas need to be clear and clean. Everything here should be kept clean and swept. This is important as it helps in maintaining a working area that is safe and in the event a problem crops up, it is well identified.

SEIKETSU (meaning "Standardize") is the fourth stage. Here, the common practice is sorted, set and made to shine. This entails the creation of a steady way of conducting procedures and tasks. When there is orderliness, standardization will be ubiquitous and visual control is maintained. SHITSUKE (meaning "Sustain") is the auditing or the checking stage which involves making the 5S a common practice by ensuring that it is well-grounded and seamless. This is the last stage and requires practicing and discipline of the previous 4 stages. Without the sustenance of the above four practices, the workplace will revert to its chaotic and dirty former self. Higher productivity and job satisfaction can be attributed to when employees are proud of their workplace and work.

2.3.3 Total Quality Management (TQM)

TQM is a structure of processes, policies and procedures used to enhance the operations of an organization. Organizations are thus able to maintain competitiveness by maintaining the quality of their products in order to maintain their clientele (Chapman &

Al-Khawaldeb, 2002). TQM is an approach used for continued refining and maintaining the quality of goods and services delivered by ensuring that employees are well trained. TQM applies to all operations within the company and recognizes the strength of employee participation (Mohanty, 1994). It includes a set of guidelines, practices, methods and techniques for quality improvement and customer satisfaction. It further ensures that the quality meets the customer's preferences in a manner that is affordable to the client.

Better service quality is obtained when TQM is adopted, which in turn is an enhancer of the company's image through treating of a customer base that is loyal, reducing employee turnover and in turn leads to increased sales. Spechler & Rasmussen (1989) assert that firms need to desist from promising quality to actual delivering of quality from both external view of the customer to the internal view of the service provider.

2.3.4 Kaizen

Kaizen is the process of measured and increased improvement while striving towards an exemplary business (Imai, 1997). Kaizen can be used to continuously search for "muda" and eliminate it thus achieving the main objective of lean thinking. The organization's objectives are aligned towards meeting customers' expectations. This ensures efficient and flexible compliance with the customer's requirements as to product or service specifications. Kaizen when implemented by organizations tends to show improvement in its processes and activities (Wilcox & Morton, 2006). Chan (2005) recommended firms to consider adoption of Kaizen for improvement of competitiveness and also to deal with increased market competition and thence customer satisfaction.

The Planning-Doing–Checking-Acting (PDCA) cycle is a continuous improvement tool which is a process oriented approach according to Imai (1997). Planning is the setting of the target for further improvement, checking is making sure that there are controls in the effective performance of what was planned and finally acting is the standardization of the process that has been improved and also setting targets for the improvement of a new cycle. There must be an effort to minimize the working processes so as to improve service flows and response times. When implemented in continuous manner, Kaizen is likely to lead to greater improvements in an organization (Elliff, 2004).

2.3.5 Value Stream Mapping

Value Stream Mapping (VSM) is used in the designing and analysis of the process of production. VSM creates an easier way for managers to see the flow of value in the firm. Value is what clients are wishing to give after seeing a product in the form that they desire, reckon Kocakulah, Brown, & Thomson, (2008). Its aim is to assist executives pick out wastage from all the techniques so as to get rid of them. Some of the wastes that can be eliminated in an organization include: overproduction, which is basically making too much, too soon, too fast compared to the needs of the next processes; defects which will bring about inspection repair and scrap costs; energy waste, which involves using more people and machines than is required to make the product; materials waste, which is using more materials than what is required to create value; Transport waste, unnecessary movement of materials around the plant; waste of time caused by any activity that consumes time without adding value; waste of space using more space than is necessary to build a product due to poor layout, excessive inventory and poor organization of the workplace.

2.4 Empirical Literature Review

Furlan, Vinelli & Dal Pont (2011) investigated the effects of complementarity between JIT and TQM on the operating performance of 266 plants in nine countries in three different industries. The researcher also investigated the role of HRM to enhance the interdependence between JIT and TQM. This study assessed manufacturing firms with over 100 employees and the findings found that there was complementarity between JIT and TQM and that HRM was able to play a role in this complementarity (Furlan et al. 2011). Laosirihongthong, Rahman and Sohal (2010) the impact of what lean strategy a Thai company has chosen to pursue in relation to its operational performance impact was investigated. The study examined 13 lean strategies with 3 high - level lean construction components; JIT, waste reduction and flow management; throughout different organizations and the findings showed that JIT's large companies operational performance (W200 employees) is more influential compared for small organizations (less than or equal to 200) (Laosirihongthong et al., 2010). However, waste reduction has had a greater impact on smaller organizations than the larger ones.

Umarali & Amal (2017) studied how operational performance was affected by lean practices and the results showed a positive impact on operational performance by lean success factors. Other lean instruments elimination of waste, employee awareness & involvement and visual management were found to contribute more on success of lean manufacturing in Indian automobile manufacturing industry. Othieno (2016) studied the lean practices and operational performance of Nation newspaper printing division, Kenya and discovered that new technology, 5S, total quality management, and standard work were implemented at the firm. During the study period, there was no significant impact of lean practices on operational measures, there seemed to be a lack of knowledge on how the practices can be of benefit to the firm. A study by Yala (2016) on the Kenya's

manufacturing companies' lean supply chain management and operational performance practices concluded that lean supply chain management practices have a very strong correlation with manufacturing firms in Kenya with demand management having the highest level of effect.

Muchiri (2017) found out that parastatals had adopted lean supply chain strategies and aligned them to their corporate strategy and these practices had significantly contributed to the performance and created a competitive advantage focusing on efficiency and effectiveness. Another study by Rucha (2018), found out that quality management, cost management, customer orientation and waste management were positively related to operational performance, while studying lean practices and operating performance for third party logistics port-centric (3PL) companies in Kenya,

2.5 Summary and Research Gaps

The different studies examined above show a positive and important relationship between lean production practices and operational performance. Furlan et al., (2011) discovered that JIT, TQM and HRM had a positive effect on operational performance. Laosirihongthong et al., (2010) studied JIT, waste minimization and flow management in Thailand and found that they had an effect on operational performance. Umarali & Amal (2017) found out that elimination of waste, employee awareness and involvement, visual management were found to contribute positively to operational performance. This study aimed at determining the relationship between JIT, Kaizen, TQM, 5S and value stream mapping lean practices. In terms of the organizations studied, Othieno (2016) studied the Nation Newspaper printing division, with practices new technology, 5S, total quality management, and standard work. Muchiri (2017), state corporations in the Energy and Petroleum Ministry and Rucha (2018) studied 3PL firms in Kenya focusing on cost

management, waste management, customer orientation and quality management. This study will therefore fill the gap.

2.6 Conceptual Framework

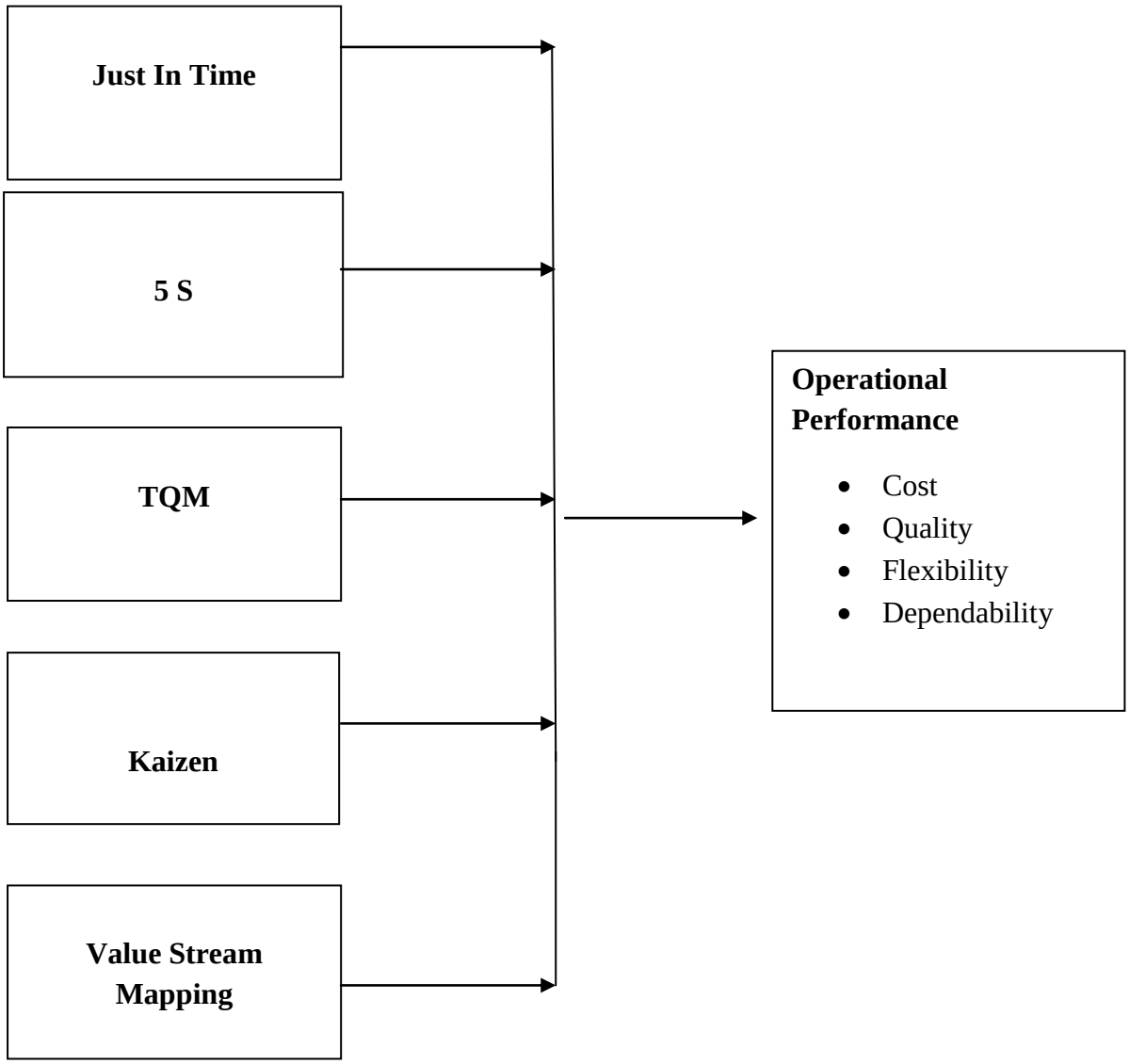

Figure 2.1 Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The research problem can be solved efficiently and consistently by employing a research methodology. This chapter discusses the research methodology, the population for the study, the instrument used in the research, the procedure used in collection of data and how it was analyzed.

3.2 Research Design

A descriptive study design was adopted in this study. According to Mugenda & Mugenda (1999) a descriptive research method is a data collection process for testing hypotheses or answering questions relating to the study's objectives. Such a study method determines and reports the situation, by allowing the individuals to give personal relevant opinions. The descriptive survey research design is considered to be the best suited for these requirements because it obtains in-depth understanding on how lean practices affect operational performance of Shipping companies in Kenya.

3.3 Population of the Study

The study population was 78shipping firms in Kenya. In a given field of research, Kothari (2004) defines a population as the total sum of objects to be considered. According to the Kenya Ship's Agents Association (2018) and the Kenya Maritime Authority (2018) there are 78 shipping firms operating in Kenya, duly registered with the KMA which is the regulatory body mandated to regulate the activities of the maritime industry in Kenya, as shown in Appendix III. These firms comprise of ship-owning companies which operate in the East African route with ships calling Mombasa port and also the shipping agents duly registered to operate in Kenya. The study was a census based on this population being relatively small and available within Mombasa County, where the entire population has

offices. This was for easy accessibility and timely collection of data. The General Managers, Operations Manager and Operations Officers were the respondents in the 78 shipping firms.

3.4 Data Collection

Collection of primary data was done by use of a questionnaire which was administered by drop and pick later method to give the respondents time to fill. For the respondents that the researcher was unable to meet physically, the questionnaires were sent to them by email and follow up by phone calls done to increase the response rate. The respondents of this study were the operations managers or their equivalents in all the 78 shipping firms. The operations managers and officers were deemed to be well versed with the kind of operations undertaken by the individual shipping firms and therefore best placed to answer the questions in the questionnaire with a higher degree of accuracy and understanding.

3.5 Reliability and Validity Test

Mugenda (2003) stipulates that after repeated trials, when research instruments give results that are consistent, the research instrument is considered to be reliable. A test and retest method was done and administered to respondents in this study to determine reliability. The questionnaire was tested on the same population after a certain period of time to check the consistency of the answers. When a correlation value of more than 0.7 was reached, it was said that reliability was good.

A research instrument exhibits validity when it is true, accurate, meaningful and correct. Content and construct validity was used in this study to show whether the objectives of the study are clearly measured by the data the questionnaire has collected. Ogula (2015)

asserts that in order to modify the research instrument it is necessary to use the information that was collected during testing at the pilot stage. To ensure construct validity, the questionnaire was divided into various sections to make sure that each specific objective is addressed by a specific section and that the questionnaire captured all the elements of the conceptual framework. Thorough and particular examination of the questionnaire was done by the supervisor to enhance content validity.

3.6 Data Analysis

The collected data was verified for accuracy, consistency and redundancy. In this study, SPSS version 20 software was used to analyze data. In determining the relationship between lean practices and operational performance, a multiple regression model was helpful. The relationship's strength of the variables was determined via correlation analysis. Tables were also used in data presentation because of their ability to bring up a relative form to the otherwise abstract nature of results. Means, frequencies, standard deviations and percentages was computed. The regression equation was as follows;

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon;}$$

Where Y= Operational performance, X_1=Just in Time, X_2=5S, X_3= Total Quality Management, X_4= Kaizen, X_5=Value Stream Mapping

α, Constant term indicating the level of performance in the absence of any independent variables.

β_1, β_2, β_3, β_4 and β_5, coefficients of the independent variables

ε= error or noise term indicating the unexplained variation outside the model.

Further, R and R^2, were obtained from the Regression Analysis. R^2 (coefficient of determination) is the fraction of the variance in the dependent variable (operational performance) that is predictable from the independent variables (lean practices). R (the co-efficient of correlation) tested the strength of the interaction of the variables.

3.7 Operationalization of Study Variables

Variable	Indicators	Data Collection Tool	Measurement Scale
Just In Time	Providing required services Non-toleration of waste and non-value adding activities Timely and open communication	Questionnaire	Ordinal
5 S	Proper work area organization Consistent approach in carrying tasks Discipline and commitment	Questionnaire	Ordinal
Total Quality Management	Defined Quality Policies Employee involvement in work process formulation Checks and balances to reduce wastage	Questionnaire	Ordinal
Kaizen	Organization objectives meet customers' expectations Minimized working processes Defined performance targets and deadlines	Questionnaire	Ordinal

Value Stream Mapping	Employee identification of non-value adding activities and eliminating them. Well defined processes Delivery of value	Questionnaire	Ordinal
Operational Performance	Reduced lead time Flexibility Dependability Reliability Cost	Questionnaire	Interval

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

This study aimed at investigating the impact of lean practices on operational performance of shipping companies in Kenya. This chapter presents the results of the data analysis according to the research goals. The conclusions are shown in tables and figures. Data was obtained from the questionnaires to the respondents.

4.2 Response Rate

The study targeted a sample of 78 shipping firms out of which general managers, operations managers and officers were to be the respondents. Out of the 78 questionnaires administered, the returned questionnaires were 45; which represented a response rate of 57.7 percent. 33 questionnaires, representing 42.3 percent, were not returned. According to Mugenda & Mugenda (2007), a response rate of 50% is sufficient, 60% is good and 70% is excellent. This response rate was therefore considered appropriate for the study.

4.3 General Information

The respondents were asked to state the years of operation of the shipping company, the work position within the organization, the work experience and the level of education in the companies. This was necessary in obtaining background information from the respondents in order to help them better understand the answers and subsequently analyze them.

4.3.1 Years of Operations

The results for the years of operations for the shipping firms are as shown in Table 4.1, the firms that operated for between 1-5 years were 7 which represented 15.6% of the total

firms, those that operated for between 6-10 years were 6 which signified 13.3% and a majority operated for between 11-20 years which was 71.1%.

Table 4.1: Years of Operations

Years of Operations	Frequency	Percentage
1-5 years	7	15.6
6-10 years	6	13.3
11-20 years	32	71.1
Total	45	100.0

4.3.2 Work Position

The work positions that the respondents held in the shipping firms are as shown in Table 4.2. The operations managers were 13 which represented 28.9%. The operations officers were a whopping 32 representing 71.1%. This shows that the respondents were working in the operations departments of the firms and thereby better placed to understand the lean practices.

Table 4.2: Work Position

Work Position	Frequency	Percent
Operations Manager	13	28.9
Operations Officer	32	71.1
Total	45	100.0

4.3.3 Work Experience

The respondents were asked to indicate their level of experience in the shipping firms. The responses are tabulated in Table 4.3, those who worked for the firms between 1-5 years were a paltry 6, which represented 13.3%. The respondents who worked for

between 6-10 years were 22 which signified 48.9% (a majority), while those who worked for between 11-20 years were 17 which represented 37.8%.

Table 4.3: Work Experience

Work Experience	Frequency	Percent
1-5 years	6	13.3
6-10 years	22	48.9
11-20 years	17	37.8
Total	45	100.0

4.3.4 Education Level

The questionnaire also required the respondents to indicate their level of education. The results are as shown in Table 4.4. The respondents whose educational level was certificate were a meagre 2 which represented 4.4%. The respondents with Diploma level were 18 which represented 40.0% and this was the majority. Those with an undergraduate degree were 15 which was 33.3% and finally the respondents with post graduate qualifications were 10 which represented 22.2%. This shows that most of the respondents were well educated and understood the contents of the questionnaire.

Table 4.4: Education Level

Education Level	Frequency	Percent
Certificate	2	4.4
Diploma	18	40.0
Undergraduate	15	33.3
Post Graduate	10	22.2
Total	45	100.0

4.4 Diagnostic Tests of the Study Variables

The data was subjected to various diagnostic tests before the analysis to enable subsequent analyses. Tests for normality using Analysis of Variance (ANOVA), tests for validity using factor analysis; Kaiser-Meyer-Olkin (KMO) measures and Bartlett's Test of Sphericity were conducted. Cronbach's Alpha was also used to test the reliability of the research instrument. All the values obtained for the various tests are discussed hereunder.

4.4.1 Tests for Normality

Many parametric statistical methods, such as ANOVA, Discriminant Analysis, Linear Regression, Pearson Correlation, F-Test and T-Test, require that the dependent variable for each independent variable be approximately normally distributed (Razali & Wah, 2011). Normality tests can be measured using the Z-values of skewness and Kurtosis which should be between -1.96 and + 1.96. Kurtosis and Skewness measures were used in this study. Table 4.5 shows a measure of skewness -0.346 Standard Error (SE) of 0.354 and Kurtosis measure of 0.027 (SE 0.695). The values for skewness and Kurtosis are all within the span of -1.96 to 1.96. This shows that the data is slightly bent and Kurtotic and is not significantly different from normality. Therefore, it was concluded that the data was normally distributed.

Table 4.5: Skewness and Kurtosis Measure Results

		Statistic	Std. Error
Mean		4.2756	.05696
95% Confidence Interval for	Lower Bound	4.1608	
Mean	Upper Bound	4.3903	
5% Trimmed Mean		4.2840	

Median	4.4000	
Variance	.146	
Std. Deviation	.38207	
Minimum	3.40	
Maximum	5.00	
Range	1.60	
Interquartile Range	.50	
Skewness	-.346	.354
Kurtosis	.027	.695

4.4.2 Validity Test

The analysis of the factor was used to verify the validity of the structures. The two commonly used sample adequacy measures are the KMO and Bartlett 's sphericity test. A KMO acceptable value is very good for a factor between 0 and 1 and an index above 0.5. The sphericity test refers to the importance of the study in terms of the validity and suitability of the factors for a particular study. The acceptable index of the Bartlett sphericity test must be less than 0.05. From Table 4.6 below, the results of the KMO sampling adequacy measurement were found to be 0.564, which is between 0 and 1.0 and therefore an acceptable index. On the other hand, the Bartlett's test of Sphericity had a p-value =.000 which is less than 0.05 showing significance. It was therefore concluded that the instrument was valid.

Table 4.6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.564
Approx. Chi-Square	80.724
Bartlett's Test of Sphericity df	15

	Sig.	.000

4.4.3 Reliability Test

The Alpha of Cronbach measures how well a set of elements or variables measures a uni-dimensional latent structure which is a reliability or consistency coefficient. Reliability is expressed in the range of 0.0 to 1.00. The higher the factor, the more reliable the test will be. A Cronbach Alpha threshold of 0.7 and above is acceptable (Cronbach, 1951). To test the reliability of the proposed structures, Cronbach Alpha has been used. The value of .740 obtained was therefore deemed acceptable. Hence the questionnaire was found to be reliable. After the data collection instrument was found to be valid (via validity test), reliable (via reliability test) and also the data normal (via normality test). The data was deemed fit to be used for parametric tests.

Table 4.7: Reliability Test

Cronbach's Alpha	**N of Items**
.740	6

4.5 Descriptive Analysis of the Study Variables

The research instrument was in two sections. The first segment of the questionnaire was designed to simulate data on the application of each of the five shipping companies' lean practices. The respondents were required to answer the questions in each variable on a five-level Likert scale, where 1 represented (Strongly Disagree), 2 represented (Disagreement), 3 represented (Neutral), 4 represented (Agree) and 5 represented (Strongly Agree). The second section of the questionnaire required the respondents to indicate whether they agreed or dis-agreed also on a Likert scale table as in the first section, on issues of operational performance that have been made possible by lean

practices in their organization. Below is a summary of the descriptive analysis of the study variables.

4.5.1 Just In Time

Descriptive analysis of this variable aimed at establishing the impact of JIT on operational performance of shipping companies in Kenya. The selected respondents were requested to stipulate whether they agree or disagree, on a scale of 1 – 5, regarding the JIT issues, as shown in Table 4.8. On whether the organization meets the needs of the customers by providing the services that they required 8.9% were indifferent, 71.1% agreed and 20% registered their strong agreement, which implies that majority agreed on this aspect. On whether the organization had invested enough resources to ensure an effective and efficient ICT to support all services 11% were neutral, 62.2% agreed while the rest 26.7% strongly agreed. An overwhelming majority agreed on these issues.

Table 4.8: Just in Time

Just in Time (JIT)	**1**	**2**	**3**	**4**	**5**
My organization meets the needs of the customers by providing the services that they require	-	-	8.9%	71.1%	20%
My organization has invested enough resources to ensure an effective and efficient ICT to support all services	-	-	11%	62.2%	26.7 %
My organization does not tolerate wastage and non-value adding activities	-	-	4.4%	40%	55.6 %
My organization has a policy on timely and open communication and passage of	-	-	11.1%	46.7%	42.2 %

information to customers for transparency					
In my organization there is efficient team work amongst the functional teams to reduce lead time/response time	-	-	6.7%	57.8%	35.6 %

4.5.2 5S

The respondents were requested to indicate their level of agreement or disagreement on issues of 5S as shown in Table 4.9. On whether there was proper organization of the work area, leading to improvement in communication between workers and hence service quality and productivity 13.3% were indifferent, a vast majority of 60% registered their agreement and 26.7% also strongly agreed. This implies that an overwhelming majority agreed on this aspect. On whether in the organization, there is orderly arrangement of needed items for easy usage and accessibility to eliminate waste 8.9% were neutral, 71.1% agreed while the rest 20% strongly agreed. An overwhelming majority agreed on this.

On whether in the organization, there was a consistent approach of carrying out tasks and procedures (standardization) for effectiveness and orderliness 31.9% were neutral, 26.7% agreed and a majority of 42.2% strongly agreed. It can be taken that a majority agreed on this. On whether all areas in the organization were kept clean and clear, for safety and easy problem identification, 11.1% were indifferent, 51.1% agreed while 37.8% strongly agreed. An overwhelming majority agreed. On whether there was discipline and commitment by all employees to reduce unwanted items in their working areas 15.6% were indifferent, a big number 51.1% agreed and 33.3% strongly agreed. It can be construed that a majority agreed on this issue.

Table 4.9: 5S

5 S	1	2	3	4	5
There is proper organization of the work area, leading to improvement in communication between workers and hence service quality and productivity.	-	-	13.3%	60%	26.7 %
In the organization, there is orderly arrangement of needed items for easy usage and accessibility to eliminate waste.	-	-	8.9%	71.1%	20%
In the organization, there is a consistent approach of carrying out tasks and procedures (standardization) for effectiveness and orderliness.	-	-	31.9%	26.7%	42.2 %
All areas in the organization are clean and clear, for safety and easy problem identification	-	-	11.1%	51.1%	37.8 %
There is discipline and commitment by all employees to reduce unwanted items in their working areas	-	-	15.6%	51.1%	33.3 %

4.5.3 TQM

The respondents were asked to indicate their level of agreement or disagreement on the issues of TQM in Table 4.10. On whether in the organization there were clearly defined quality policies, to which the top management of the organization was committed 22.2% were indifferent 42.2% agreed and 35.6% strongly agreed. This implies that an overwhelming majority agreed. On whether in the organization, employees were involved in the formulation of work processes and in the making of quality decisions at their level

15.6% were indifferent, 55.6% agreed while the rest 28.9% strongly agreed. An overwhelming majority agreed on this.

Table 4.10: TQM

TQM	1	2	3	4	5
In my organization there are clearly defined quality policies, to which the top management of the organization is committed	-	-	22.2%	42.2%	35.6%
In my organization, employees are involved in the formulation of work processes and in the making of quality decisions at their level.	-	-	15.6%	55.6%	28.9%
In my organization, there is effective communication and teamwork between the employees to ensure that quality decisions are made	-	-	13.3%	48.9%	37.8%
In my organization, there are checks and balances to reduce wastage, and system failures through fail-proofing methods at critical points	-	-	26.7%	55.6%	17.8%
In my organization, there is customer engagement at all levels to ensure that customer complaints and suggestions are incorporated into the organization's decision-making system to as to ensure customer satisfaction	-	-	11.1%	57.8%	31.1%

On whether in the organization, there was effective communication and teamwork between the employees to ensure that quality decisions are made, 13.3% were neutral, 48.9%agreed while a majority of 37.8% indicated their strong agreement. A significant

majority agreed on this. On whether there are checks and balances to reduce wastage, and system failures through fail-proofing methods at critical points, 26.7% were neutral, 55.6% agreed while 17.8% strongly agreed. A majority of the respondents agreed on this aspect. On whether there was customer engagement at all levels to ensure that customer complaints and suggestions are incorporated into the organization's decision-making system to as to ensure customer satisfaction, a paltry 11.1% registered their indifference, 57.8% agreed and 31.1% were in strong agreement. It can be taken to imply that a majority agreed on this.

4.5.4 Kaizen

The respondents were asked to indicate their level of agreement or disagreement on the issues of Kaizen in Table 4.11. On whether the organization's objectives are aligned to meet customers' expectations for efficiency, 15.6% were neutral, 37.8% agreed and 35.4% strongly agreed. This implies a majority agreed. On whether in the organization, there were minimized working processes to improve service flows and response times 20% were neutral, 57.8% agreed while the rest 22.2% strongly agreed. An overwhelming majority agreed on this.

On whether in the organization, formation of cross functional teams in the workforce is mandatory to enhance smooth workflow for effectiveness 17.8% were neutral, 51.1% of the respondents agreed and 31.1% strongly agreed. A clear majority agreed on this. On whether the employees in the organization were continuously trained to ensure that there is effective usage of resources, 4.4% strongly disagreed, 4.4 agreed while 17.9% were neutral, 51.1% agreed while 22.2% strongly agreed. A majority of the respondents agreed but the dissenting respondents should not be ignored. On whether the employees in the organization have well defined performance targets and deadlines 11.1% were neutral,

51.1% agreed and 37.8% strongly agreed. It can be taken to imply that a majority agreed on this.

Table 4.11: Kaizen

Kaizen	1	2	3	4	5
In my organization, the organization's objectives are aligned to meet customers' expectations for efficiency.	-	-	15.6%	37.8%	35.4%
In my organization, there are minimized working processes to improve service flows and response times	-	-	20%	57.8%	22.2%
In my organization, formation of cross functional teams in the workforce is mandatory to enhance smooth workflow for effectiveness.	-	-	17.8%	51.1%	31.1%
The employees in our organization are continuously trained to ensure that there is effective usage of resources	4.4%	4.4%	17.9%	51.1%	22.2%
The employees in my organization have well defined performance targets and deadlines	-	-	11.1%	51.1%	37.8%

4.5.5 Value Stream Mapping

The respondents were requested to indicate their level of agreement or disagreement on the issues of Value Stream Mapping in Table 4.12. On whether the organization has trained all employees to identify non-value adding activities and try to eliminate them 4.4% disagreed, 20% were indifferent, a significant majority of 66.7% agreed and paltry 8.9% strongly agreed. This implies a majority agreed. On whether in the organization, there are well-defined processes for performing the required services 17.8% were neutral,

57.8% agreed while the rest 24.4% strongly agreed. An overwhelming majority agreed on this. On whether in the organization, the employees are trained to engage customers so as to know their exact requirements before offering them any service, 4.4% disagreed 46.7% were indifferent, 26.7% agreed while the rest 22.2% strongly agreed. The percentage of the respondents that were indifferent, coupled with the percentage that disagreed made 51.1%. while the remaining 48.9% agreed on the same.

Table 4.12: Value Stream Mapping

Value Stream Mapping	**1**	**2**	**3**	**4**	**5**
My organization has trained all employees to identify non-value adding activities and try to eliminate them	-	4.4%	20%	66.7%	8.9%
In my organization, there are well-defined processes for performing the required services	-	-	17.8%	57.8%	24.4%
In my organization, the employees are trained to engage customers so as to know their exact requirements before offering them any service	-	4.4%	46.7%	26.7%	22.2%
In my organization, there is top management commitment to the quality policy and proper channels of implementing this policy	-	-	15.6%	64.4%	20%
The organization is committed to ensuring delivery of value to the customer at an effective cost	-	-	2.2%	51.1%	46.7%

On whether in the organization, there was top management commitment to the quality policy and proper channels of implementing this policy, 15.6% were indifferent, 64.4% agreed while 20% strongly agreed. Most of the respondents agreed. On whether the

organization is committed to ensuring delivery of value to the customer at an effective cost, an insignificant number 2.2% were indifferent, 51.1% agreed and 46.7% strongly agreed. A clear majority agreed on this aspect.

4.5.6 Operational Performance

The respondents were requested to indicate their level of agreement or disagreement on the issues of operational performance as a result of implementation of lean practices in Table 4.13 below;

Table 4.13: Operational Performance

Operational Performance	**1**	**2**	**3**	**4**	**5**
The organization is able to offer competitive prices as low or lower than our competitors	-	-	13.3%	60.0%	26.7%
There is reduced lead time in fulfilling customer orders	-	-	8.9%	71.1%	20.0%
The organization has achieved timely delivery of services to clients and this has led to customer satisfaction	-	-	15.6	57.7	26.7%
The organization experienced timely turnaround times of the ships as per the published scheduled services	-	4.4%	6.7%	57.8%	31.1%
The organization is flexible and adaptable to accommodate changes that shippers may request	-	-	22.2%	55.6%	22.2%
Our organization has experienced increased profits	-	-	17.8%	75.5%	6.7%
My organization has experienced increased overall productivity levels	-	-	26.7%	64.4%	8.9%

Our organization has experienced a tremendous reduction in customer complaints	-	-	15.6%	42.2%	42.2%

On whether the organization was able to offer competitive prices as low or lower than the competitors, the respondents who were indifferent were 13.3%, those that agreed were 60.0% while those that strongly agreed were 26.7%. A majority agreed on this. On whether there was reduced lead time in fulfilling customer orders, 8.9% of the respondents were indifferent, while a majority 71.1% agreed and 20.0% strongly agreed. An overwhelming majority agreed. On whether the organization had achieved timely delivery of services to clients and which had led to customer satisfaction 15.6% were neutral, 57.7% agreed while 26.7% strongly agreed. This can be taken to imply that most respondents agreed to this. On whether the organization experienced timely turn round times of the ships as per the published scheduled services, 4.4% disagreed, a paltry 6.7% were indifferent, 57.8% agreed while 31.1% strongly agreed which can be taken to imply that the majority agreed. On whether the organization was flexible and adaptable to accommodate changes that shippers may request, 22.2% were indifferent, 55.6% were in agreement, while 22.2% registered their strong agreement. Here again, a majority were in the affirmative.

On whether the organization had experienced increased profits 17.8% of the respondents were indifferent, 75.5% agreed and a small number, 6.7% strongly agreed. A majority here also agreed. On whether the organization has experienced increased overall productivity levels 26.7% of the respondents were neutral, 64.4% agreed while 8.9% of the respondents strongly agreed. The majority agreed on this. Finally, on whether the organization had experienced a tremendous reduction in customer complaints 15.6% of the respondents were neutral, 42.2% of the respondents agreed while 42.2% of the

respondents strongly agreed. Wholesomely, the respondents agreed with an emphatic majority.

4.6 Regression Analysis of the Study Variables

Regression analysis was carried out to determine the linearity of the relationship between the dependent and the independent variables of the study. The results were tabulated and discussed as shown in the subsections here below.

4.6.1 Multiple Regression Model Summary

In Table 4.14 below, the coefficient of determination, R^2 obtained was .658. This value implies that 65.8% of the total variance of operational performance was explained by the model. This means that 34.2% of the total variance of operational performance cannot be explained by the model. Hence the results reveal that the independent variables affect operational performance of shipping firms. The Table 4.14 below shows the results for variations between the dependent and independent variables.

Table 4.14: Model Summary

Model	R	R-Square	Adjusted R Square	Std. Error of the Estimate
1	.811[a]	.658	.614	.22379

a. Predictors: (Constant) JIT, 5S, Kaizen, TQM, VSM,

4.6.2 Analysis of the Variance of the Study Variables (ANOVA)

The table 4.15 below clearly shows that the ratio of regression to residuals is positive, implying that there was a significant relationship between the dependent and independent variables used in the study. From the ANOVA Table 4.15 below, it was established that JIT, 5S, TQM, Kaizen and VSM affected Operational performance, though significantly

since F-critical at (5, 39) degrees of freedom is 2.46<14.974 at 5% level of significance. This implies that lean management practices influenced operational performance for shipping firms in Kenya. The ANOVA table was generated from the Analysis and is as Table 4.15;

Table 4.15: Analysis of Variance

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.750	5	.750	14.974	.000[b]
	Residual	1.953	39	.050		
	Total	5.703	44			

a. Dependent Variable: Operational Performance

b. Predictors: (Constant) JIT, 5S, Kaizen, TQM, VSM,

4.6.2 Coefficients of the Regression Model

The co-efficients of the regression model were obtained from the analysis and presented as below;

Table 4.16: Coefficients of the Regression Model

Coefficients[a]						
Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.766	.532		3.321	.002
	Just In Time(X_1)	.484	.102	.456	4.763	.000
	5S(X_2)	-.139	.111	-.177	-1.257	.216

TQM(X_3)	-.684	.131	-.870	-5.206	.000
Kaizen (X_4)	.624	.162	.780	3.843	.000
Value Stream Mapping(X_5)	.286	.067	.440	4.261	.000

a. Dependent Variable: Operational Performance

The regression equation is as shown below;

$$\mathbf{Y=1.766+0.484X_1-0.139X_2-0.684X_3+0.624X_4+0.286X_5}$$

When the independent variables are at all zero, the operational performance will be at 1.766 units. When JIT increases by one unit, operational performance increases by 0.484 units. When 5S increases by one unit, operational performance will decrease by 0.139 units. When TQM increases by one unit, operational performance decreases by 0.684 units. When Kaizen increases by one unit, Operational performance increases by 0.624 units. Finally, when VSM increases by one unit, operational performance increases by 0.286 units.

4.7 Correlation of the Study Variables

The Pearson Correlation coefficient was used to test the strength of the relationship between the variables. The task was one of quantifying the strength of the association and direction of the variables. This is shown in Table 4.17 below;

Table 4.17: Correlation of the Study Variables

Variable	Pearson Correlation	Sig. (2 tailed)
Operational performance	1	
Just In Time	0.449	0.001
5S	0.088	0.016
TQM	-0.194	0.026
Kaizen	0.145	0.003
Value Stream Mapping	0.424	0.002

As shown in table 4.17 above, there was a positive relationship between operational performance and Just In Time, 5 S, Kaizen and Value Stream Mapping This implies that as these variables change (increase or decrease), operational performance changes in a similar direction. TQM related negatively with the operational performance. This study assessed the significance of the relationship as well as its strength where the smaller the p-level, the more significant the relationship. The results show that most of the independent variables had a strong and significant relationship with operational performance ($p<0.05$).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter focused on the summary of the findings, study conclusion, recommendations and key areas of further research. This chapter is based on the discussions and findings of the study which was guided by the data collected and analyzed. The chapter further provides recommendations for further research on the area of lean practices and operational performance.

5.2 Summary of Findings

A total of 78 questionnaires were distributed to the 78 shipping firms, out of which 45 were returned. This represented 57.7% which was considered fit for this study. The data was subjected to various diagnostic tests namely, normality, validity and reliability tests. The questionnaire had an overall Cronbach Alpha of 0.740>0.7 implying that the questionnaire was a reliable tool for the study and it had the internal consistency required. The data was subjected to normality tests and was found to be normal. The research instrument was also found to be valid using KMO and Bartlet test of factor analysis.

Just in Time practices were found to relate positively with operational performance and also significantly with a p-value of 0.000 on the regression model. On the correlation analysis table its two-tailed significance value was 0.001. This implies that due to the implementation of JIT practices the shipping firms improved their operational performance. This is consistent with Laosirihongthong, Rahman &Sohal (2010) who found out that Just in Time was positively and significantly related to the operational performance.

5S related with operational performance negatively and insignificantly on the regression model with a p-value of 0.216. On the correlation analysis table its two-tailed significance value was 0.016. This shows that the operational performance of shipping firms will not be affected with increase in implementation of 5S practices. This contradicts the assertion by Gapp, Fisher & Kobayashi (2008), and Othieno (2016) that implementation of 5S in an organization leads to increased productivity and hence operational performance.

TQM related negatively with the operational performance and significantly with a p-value of 0.000 on the regression model. On the correlation analysis table its two-tailed significance value was 0.026. This implies that adoption of TQM does not lead to improved operational performance in shipping firms. This is contradicting the findings of Elisa, Andrea & Massimiliano (2013) who noted that better financial results, increased operation efficiency, better performance are some of the benefits that accrue as a result of adopting TQM.

Kaizen related positively with organizational performance and significantly s0, with a p-value of 0.000 on the regression model. On the correlation analysis table its two-tailed significance value was 0.003. Implementation of Kaizen practices leads to the improvement of operational performance for shipping firms. Chan (2005) recommended firms to consider adoption of Kaizen for improvement of competitiveness, which agrees with the findings of the subject study.

Value stream mapping related positively with operating performance and significantly with a p-value of 0.000. On the correlation analysis table its two-tailed significance value was 0.002 Implementation of Value Stream Mapping practices in the Shipping firms led to the improvement of operational performance. Kocakulah, Brown, & Thomson, (2008)

asserts that Value stream mapping increases the value of the firm and hence improving operational performance which is in line with the findings of this study.

5.3 Study Conclusions

The study concluded that the lean practices affected the operational performance of shipping firms in Kenya. This effect was however 65.8% of the total variation. This means that 34.2% of the variation of operational performance was not captured by this study. The deliberations, scope and results of this study opens an avenue through which lean practices can be cross-examined contextually for services offered by shipping firms. Shipping firms and the services they offer are crucial in the Kenyan fast growing and dynamic economy. With the advent of the building of the second port in Lamu and the embracing of gains to be harvested from the blue economy concept in Kenya, lean practices are expected to play a significant role in the operational performance of these firms.

5.4 Study Recommendations

This study recommends improvement in adoption and implementation of lean practices such as JIT, 5S, TQM, Kaizen and VSM amongst others. In a bid to improve the operational performance of the institutions all lean practices should be adopted. This is because one or two lean practices may not bring out the desired gains in operational performance compared to all practices working in synergy.

5.5 Suggestions for Further Research

More factors could have influenced the operational performance of shipping firms in Kenya and this study recommends that these unknown factors be studied to establish what the 34.2% represents. Since the shipping firms do not operate in isolation, it is prudent to

conduct a study on the role of the regulators, providers of financial services partners among others, and how they affect the operational performance. More studies can be done in other jurisdictions to ascertain whether the same or different results may be obtained. With the advent of the blue-economy concept it would be prudent to carry out a study on lean practices and how they can be of benefit to the shipping industry.

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APPENDICES

Appendix I: Introduction Letter

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH DATA

I am a postgraduate student undertaking a Master of Business Administration (MBA) degree at the University of Nairobi. The research topic is **'Effect of Lean Practices on Operational Performance of Shipping Firms in Kenya'.** You have been selected as one of the respondents in this study. I therefore request you to kindly facilitate the collection of the required data by answering the questions herein. This questionnaire is purely for academic purposes and the data collected will be treated with utmost confidentiality. While your cooperation in completing the questionnaire attached onto this letter is highly valued, your participation is voluntary.

The results will be contained in the thesis that will be available at the University of Nairobi. It is also hoped that aspects of the results will be published in aggregate in various academic journals. Your assistance and cooperation will be highly appreciated. Thank you in advance.

Yours faithfully,

Mark Mboloi

0780 053 802

mark.mboloi@gmail.com

Appendix II: Questionnaire

This questionnaire consists of three sections: A, B and C. Section A seeks to obtain pertinent details about the respondents, Section B seeks to obtain information on the extent to which lean practices are used in shipping firms and Section C seeks to obtain information on the effect of lean practices on operational performance of shipping firms in Kenya.

Section A: General information

1. Name of the organization…….
2. Years of Operation

   [ ] 1-5 Years

   [ ] 6-10 Years

   [ ] 11-20 Years
3. Position of the respondent within the organization

   [ ] General Manager

   [ ] Operations Manager

   [ ] Operations Officer
4. Experience Level

   [ ] 1-5 Years

   [ ] 6-10 Years

   [ ] 11-20 Years
5. Education level of respondent

   [ ]Certificate

   [ ]Diploma

   [ ]Undergraduate

   [ ]Post Graduate

Section B: Lean Practices

6. Please tick the level of agreement or disagreement on the following issues of lean practices in your organization. Where 1 represents (Strongly Disagree), 2 represents (Disagree), 3 represents (Neutral), 4 represents (Agree) and 5 represents (Strongly Agree). There is no right or wrong answer, just express your opinion.

Lean Practices	**1**	**2**	**3**	**4**	**5**
Just in Time (JIT)					
My organization meets the needs of the customers by providing the services that they require					
My organization has invested enough resources to ensure an effective and efficient ICT to support all services					
My organization does not tolerate wastage and non-value adding activities					
My organization has a policy on timely and open communication and passage of information to customers for transparency					
In my organization there is efficient team work amongst the functional teams to reduce lead time/response time					
5 S					
There is proper organization of the work area, leading to improvement in communication between workers and hence service quality and productivity.					
In the organization, there is orderly arrangement of					

needed items for easy usage and accessibility to eliminate waste.					
In the organization, there is a consistent approach of carrying out tasks and procedures (standardization) for effectiveness and orderliness.					
All areas in the organization are clean and clear, for safety and easy problem identification					
There is discipline and commitment by all employees to reduce unwanted items in their working areas					
Total Quality Management (TQM)					
In my organization there are clearly defined quality policies, to which the top management of the organization is committed					
In my organization, employees are involved in the formulation of work processes and in the making of quality decisions at their level.					
In my organization, there is effective communication and teamwork between the employees to ensure that quality decisions are made					
In my organization, there are checks and balances to reduce wastage, and system failures through fail-proofing methods at critical points					
In my organization, there is customer engagement at all levels to ensure that customer complaints and					

suggestions are incorporated into the organization's decision making system to as to ensure customer satisfaction					
Kaizen					
In my organization, the organization's objectives are aligned to meet customers' expectations for efficiency.					
In my organization, there are minimized working processes to improve service flows and response times					
In my organization, formation of cross functional teams in the workforce is mandatory to enhance smooth workflow for effectiveness.					
The employees in our organization are continuously trained to ensure that there is effective usage of resources					
The employees in my organization have well defined performance targets and deadlines					
Value Stream Mapping					
My organization has trained all employees to identify non-value adding activities and try to eliminate them					
In my organization, there are well-defined processes for performing the required services					
In my organization, the employees are trained to					

engage customers so as to know their exact requirements before offering them any service					
In my organization, there is top management commitment to the quality policy and proper channels of implementing this policy					
The organization is committed to ensuring delivery of value to the customer at an effective cost					

Section C: Operational Performance of Shipping Firms

7. Please tick the level of agreement or disagreement on the following issues of operational performance that have been made possible by lean practices in your organization. Where 1 represents (Strongly Disagree), 2 represents (Disagree), 3 represents (Neutral), 4 represents (Agree) and 5 represents (Strongly Agree). There is no right or wrong answer, just express your opinion.

Operational Performance	**1**	**2**	**3**	**4**	**5**
The organization is able to offer competitive prices as low or lower than our competitors					
There is reduced lead time in fulfilling customer orders					
The organization has achieved timely delivery of services to clients and this has led to customer satisfaction					
The organization experienced timely turn round times of the ships as per the published scheduled services					

The organization is flexible and adaptable to accommodate changes that shippers may request					
Our organization has experienced increased profits					
My organization has experienced increased overall productivity levels					
Our organization has experienced a tremendous reduction in customer complaints					

End

Thanks for your participation and cooperation

Appendix III: List of Shipping Firms in Kenya

S/NR	Shipping Firm's Name	Representative Agent/Address/Telephone Number
1.	A.M.A. Al-Ammry Limited	Mombasa
2.	African Shipping Limited	Sharaf House, 3rd Floor, Archbishop MakariosClose, Off Moi Avenue
3.	AKL Shipping Co. (K) Limited	Signon Warehouses, Warehouse 1 Shimanzi Road, Mombasa. Tel: +254 711 272727;
4.	Alba Petroleum Limited	Liwatoni Road, Mombasa, Tel: 041 231 7001
5.	American Global Marine & Trading Comp. Ltd	Riverside Drive Town House, Number 1, Riverside Drive
6.	American President Line	Diamond Shipping Services Limited, 3rd Floor, Sharaf House, off Moi Avenue
7.	Amsterdam Holdings Limited	Mombasa
8.	Bari Shipping and Logistics	Mombasa
9.	Bay Lines	Rais Shipping Services, Inchcape Hse, 2nd Flr, Archbishop MakariosCls, off MoiAve
10.	Bio Shipping Logistics Limited	Email: info@bio-shipping.com;
11.	BLPL Singapore (Pte) Limited	Magellan Logistics, 1st Floor, Apollo House, Moi Avenue
12.	Captain Shipping Agency Limited	
13.	Caravel Lines	Logistics Expeditors, TSS Tower, 5th Floor Nkrumah Rd

14.	CMA CGM Line	CMA CGM Kenya Limited, 1st Floor, Baywood Building, Moi Avenue
15.	COSCO Container Lines	Rais Shipping Services, Inchcape Hse, 2nd Floor, Archbishop Makarios Close off Moi Avenue
16.	Deep Sea Shipping Solutions	1st Floor, Regal Chambers, Moi Avenue, Mombasa. Tel: +254 719746936. Email: phillip@d-sss.com
17.	Diamond Shipping Services Limited	3rd Floor, Sharaf House, off Moi Avenue
18.	Diverse Shipping Limited	4th Floor, Cannon Towers, Next to CMC Motors, Moi Avenue, Mombasa. Tel. 41 231 3212
19.	East African Commercial & Shipping	East African Commercial & Shipping Co Ltd, Changamwe Area, off Mombasa-Nairobi Highway
20.	Emirates Shipping Lines - DMCEST	Wilhelmsen Ship Services, 9th Floor, Imaara Building, Dedan Kimathi Avenue, Mombasa.
21.	Emkay Lines (Pvt) Ltd	Diamond Shipping Services Limited, 3rd Floor, Sharaf House, off Moi Avenue
22.	Eukor Car Carriers Inc.	Diamond Shipping Services Limited, 3rd Floor, Sharaf House, off Moi Avenue
23.	Evergreen Marine (Singapore)	Gulf Badr Group Kenya Limited, 6th Floor,

	Pte. Limited	TSS Building, Nkrumah Road
24.	Express Shipping & Logistics E.A. Limited	Moi Avenue, Cannon Towers II, 7th Floor, Bandari Wing.
25.	Green Island Shipping Services Ltd	Kaunda Avenue (Kizingo), Fidelity House, 1st Floor.
26.	Gulf Badar Group Kenya	TSS Building, Nkrumah Road, 6th Floor
27.	Habor Agency Limited	info@habour-maritime.com; 041 2221700
28.	Hanjin Shipping Company	Sharaf Shipping Agency Ltd, Sharaf Hse, Flr 2, off Moi Ave.
29.	Hapag Lloyd	Diamond Shipping Services Limited, 3rd Floor, Sharaf House, off Moi Avenue
30.	Hyundai Glovis Company Co. Limited	Sharaf Shipping Agency Ltd, Sharaf Hse, Flr 2, off Moi Ave.
31.	Hyundai Merchant Marine	Sharaf Shipping Agency Ltd, Sharaf Hse, Flr 2, off Moi Ave.
32.	Ignazio Messina & Co. S.P.A.	Ignazio Messina Kenya Limited, Tarachand Plaza, 3rd Floor, Archbishop Makarios Close, Off Moi Avenue
33.	Inchcape Shipping Services	1st Floor, Inchcape House, Archbishop Makarios Close, Off Moi Avenue, Mombasa
34.	Inclusive Agencies Limited	Mombasa
35.	International Shipping Agency Limited	Off Moi Avenue, Archbishop Makarios Cls. info@intershipltd.com;

		041 2221173
36.	ITTICA Limited	Behind KPLC substation, Off Makande Road, Shimanzi. Tel: 042 223 0844
37.	Kenya National Shipping Line	Kenya National Shipping Line, Canon Towers, Moi Avenue
38.	Kenya Risk Consultants Limited	4th Floor, Texas Towers, Nyali Road. +254 (0) 202684041
39.	Kusi Shipping Services Limited	Baywood Building, 2nd Floor, Moi Avenue
40.	Limuti Shipping Limited	Limutti House, Chambilo Road, Kizingo; Tel: +254 711 918 180, 41 222 2238
41.	Maersk Line	Maersk Kenya Limited, Sharaf Hse, Flr 2, off Moi Ave.
42.	Magellan Logistics (K) Limited	1st Floor, Apollo House, Moi Avenue
43.	Mediterranean Shipping Company. S.A.	Oceanfreight East Africa Limited, MSC Plaza, Moi Avenue
44.	Merlion Shipping Limited	info@merlionshipping.co.ke; +254 (020) 2319898
45.	Mitsui O.S.K. Lines	Inchcape Shipping Services, 1st Flr, Inchcape House, Archbishop Makarios Close, Off Moi Avenue
46.	Motaku Shipping Agencies Limited	Tangani Road, Mombasa, Tel: 041 2228970
47.	Nippon Yusen Kaisha (NYK)	East African Commercial & Shipping Co Ltd, Changamwe Area, off Mombasa, Nairobi Highway
48.	Nisomar Limited	Wilhelmsen Ship Services, 6th Floor,

		Imaara Building, Dedan Kimathi Avenue
49.	OBJ Maritime Services Limited	Social Security House, Nkrumah Road, 8th Floor, Room 29
50.	Ocean Network Express	East African Commercial & Shipping Co. Ltd Changamwe Area, off Mombasa-Nairobi Highway
51.	Oceanfreight (E.A.) Limited	Oceanfreight East Africa Limited, MSC Plaza, Moi Avenue
52.	Pacific International Lines	P.I.L. Kenya Limited, 2nd Floor, Inchcape House, Archbishop Makarios Close, off Moi Avenue
53.	Rais Shipping Services	Inchcape Hse, 2nd Floor, Archbishop Makarios Close off Moi Avenue
54.	Ravo Logistics Limited	
55.	Safmarine Container Lines N.V.	Maersk Kenya Limited, araf House, Archbishop Makarios Close, Off Moi Avenue
56.	Sarjack Container Lines	Diamond Shipping Services Limited, 3rd Floor, Sharaf House, off Moi Avenue
57.	Sea Consortium (Pte) Limited	Rais Shipping Services, Inchcape Hse,2nd Floor, Archbishop Makarios Close off Moi Avenue

58.	Seabulk Shipping Services	89 St. Edward Cls, Off Archbishop Makarios & St. Benard Rd, Sea-Bulk House
59.	Seaforth Shipping Kenya Limited	Cotts House, 1st. Floor, Moi Avenue. Tel. +254 41 231 3776
60.	Seaglow Shipping Services Limited	
61.	Seatrade Agencies Limited	Moi Avenue, Cotts House, 1st Floor
62.	Seven Seas Shipping Agencies (K) Limited	Biashara Bank Building, 1st Floor, Nyerere Avenue, Mombasa
63.	Sharaf Shipping Agency Kenya Limited	Floor, Sharaf House, Archbishop Makarios Close, off Moi Avenue
64.	Shipmarc Agency & Logistics Ltd	Comarco Base,Liwatoni Bay, Off Mikanjuni Road
65.	Sima Marine Kenya Limited	Seven Seas Shipping Agencies (K) Ltd, Biashara Bank Building, 1st Floor, Nyerere Avenue, Mombasa
66.	SMAT Shipping Services Limited	info@smatshippingservicesltd.co.ke, Tel: 0724272703
67.	Socopao Kenya Limited	East African Commercial & Shipping Co Ltd, Changamwe Area, off Mombasa-Nairobi Highway
68.	Southern Engineering Company (SECO)	Mbarakhi Wharf near Likoni Ferry
69.	Spanfreight Shipping Kenya Ltd	Creek Marina House, Nyali Road.
70.	Spears Shipping Agency (K) Ltd	Moi Avenue, MSC Plaza, 1st Floor
71.	Sturrock Shipping Kenya Limited	Moi Avenue, Habour House, 2nd Floor

72.	Transatlantic Trading Company	info@tatc.co.ke; +254 (0)20 2004959, +254 791 071 920
73.	United Africa Feeder Lines	Spanfreight Shipping Limited. Creek Marina House, Nyali Road.
74.	Universal Consolidated Security Solutions Limited	Mombasa
75.	WEC Lines B.V.	WEC Lines Kenya Limited, Mezzanine Floor, MSC Plaza, Moi Avenue
76.	Wilhelmsen Ship Services Limited	Wilhelmsen Ship Services, 9th Floor, Imaara Building, Dedan Kimathi Avenue, Mombasa.
77.	Worldwide Shipping Services Limited	Mombasa
78.	ZAM ZAM Shipping Limited	Bondeni, Mackawi Road, Mombasa

Source: KSAA and KMA (2018)

Appendix VI: Budget Plan

ITEM DESCRIPTION	**AMOUNT IN KSH**
Stationery	17,000
Transport	18,000
Internet costs	20,000
Typing, printing and binding	25,000
Subsistence	10,000
TOTAL AMOUNT	**90,000**

Appendix V: Schedule of Activities

TASK AND TIMELINE	AUGUST 2018	SEPT 2018	OCT 2018	NOV 2018	DEC 2018
Choosing the topic, formulating Research objectives & questions Literature review & writing the research proposal Designing chapter Three					
Editing, printing and submitting draft Submission and defense of the proposal Correction of the proposal					
Data collection Data analysis and report writing Project Defense					
External Examiners Graduation					