

**EFFECT OF LOGISTICS MANAGEMENT PRACTICES ON SUPPLY CHAIN
PERFORMANCE OF CEMENT MANUFACTURING FIRMS IN KENYA**

BY

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DECLARATION

I declare that this research project is my original work and has not been presented for degree in any other university.

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DEDICATION

I dedicate this project to my Family, who have been my pillar of strength, my source of inspiration, and for their support.

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ABBREVIATIONS AND ACRONYMS

| | |
|----------------|--|
| CAGR | Compound Annual Growth Rate |
| CSCMP | Council of Supply Chain Management Professionals |
| CTM | Collaborative Transportation Management |
| EAPCC | East African Portland Cement Company |
| LM | Logistics management |
| NACOSTI | National Commission for Science, Technology and Innovation |
| NSE | Nairobi Securities Exchange |
| NT | Network Theory |
| SCM | Supply Chain Management |
| SPSS | Statistical Package for Social Sciences |
| TCT | Transaction Cost Theory |

OPERATIONAL DEFINITION OF TERMS

Distribution Management: is a sub-function of supply which deals with the physical movement of material from the point of production to the point of consumption (Roosta *et al.*, 2009).

Information Flow Management: is the management of movement of information between people and systems in the firm (Singh, 2006).

Inventory Management: effective management of stock, materials, parts and finished products, that is; control of movements in and out of the firm (Lowe, 2005).

Logistics Management: is part of supply chain management which deals with transportation and control of movement of goods/ services, inventory management warehousing and storage of goods, and information management between the point production and the point of consumption in order to meet customers' need (CSCMP, 2016).

Supply Chain Performance: is the extent to which supply chain's activities are delivering end-customer value, including product availability, on-time delivery, in a responsive manner (Council of Supply Chain Management Professionals, 2005).

Transportation Management: is an element of supply chain management that entails the planning, execution and enhancement of the physical movement of goods (Mentzer, 2001).

Warehousing Management: it entails managing the storage and handling of materials and products in the supply chain (Keller & Keller, 2013).

ABSTRACT

The objective of the study was to determine the effects of logistics management practices on supply chain performance of cement manufacturing firms in Kenya. The study specifically sought to establish the influence of warehousing management, information flow management, transportation management and inventory distribution management on supply chain performance of cement manufacturing firms in Kenya. The study was anchored on Resource Based Theory, Network Theory and Transaction Cost Theory. The descriptive design was applied and the target population was six cement manufacturing firms in Kenya. The population comprised of 72 management staff in the various departments which are involved in logistics management, in the targeted firms. This was a census study; hence all the 72 respondents formed the sample size for the study. The study collected primary data through use of a questionnaire which was administered to the management staff in the targeted six cement manufacturing firms in Kenya. The questionnaire was piloted to check for reliability and validity. The collected data was analysed through descriptive and inferential statistics. The descriptive statistics included means, standard deviation and frequency distribution while in inferential statistics. A regression analysis was also conducted to determine the relationship between variables. The analysed data was presented using pie charts, bar charts, percentages and frequency tables. The study found out that the cement manufacturing firms had adequate warehouse and storage space to hold their stock; and that there was adequate utilization of the storage facilities in the factories. It was found that information flow management had improved production processes, stock control, and distribution of products to the market, which improved supply chain performance. Majority of the respondents indicated that transport management and inventory distribution management influenced supply chain performance in cement manufacturing firms to a great extent. The study concludes that warehousing management influences supply chain performance of cement manufacturing firms in Kenya to a great extent ($\beta = 0.137$, $p=0.028$). The study also concludes that information flow management has a positive effect on supply chain performance of cement manufacturing firms in Kenya ($\beta = 0.468$, $p=0.001$). Inventory distribution management also has a positive effect on supply chain performance of cement manufacturing firms in Kenya ($\beta = 0.375$, $p=0.001$). The study recommends that management of cement manufacturing firms should consider to outsource some logistics services such as transport due to its advantages and its possible influence on operational performance, as it enables the firms to focus on its core competencies. The study also recommends that the cement manufacturing firms should continually communicate, network and share information with value chain partners so as to enable the firms understand the market demand. Effective inventory distribution management strategies would also enhance speed in delivery of goods to the market, production process, and also improve responsiveness and flexibility of the firms.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Organizations are facing exciting and dynamic challenges in the 21st century. In the globalized business, companies require strategic thinking and only by evolving good corporate strategies can they become strategically competitive (Kasimoğlu, 2016). Organizations adopt numerous business improvement methodologies to improve business performance. Logistics as well as supply chain management has been regarded to be the crucial factor for the companies to obtain competitive edge. In fact, logistics as well as supply chain management has received attention since the early 1980s, yet conceptually the management of supply chains is not particularly well understood, and many authors have highlighted the necessity of clear definitional constructs and conceptual frameworks on supply chain management (Li, 2014).

Logistics management plays a significant role in the success of any company's operations and has a direct impact on its bottom line. Logistics is defined as planning implementing and controlling the physical flow of material and finished goods from point of origin to point of use to meet customer's need at a profit (Kotler, 2001). It is essentially a planning process and an information activity. So it is an integrative process that optimizes the flow of material and supplies through the organization and its operations to the customer. It encompasses a harmonization of various professional activities like

planning, controlling, managing, directing, coordinating, forecasting, warehousing and transportation (Neerajaa, Mehtab & Chandanic, 2014). The various functions of logistics involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security (Li, 2014).

The Council of Supply Chain Management Professionals (CSCMP) (2016) defines logistics management as that part of supply chain management that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. Logistics management (LM) is the more practical, hands-on part of the supply chain where goods are transported into a facility, properly stored, handled and transported out. LM focuses on short-term procedures and SCM is focused on the long-term.

Stock and Lambert (2001) indicated that the major objective of logistics management is to minimize the total costs given the customer service objective where total costs include transportation costs, warehousing costs, order processing cost, information costs, lot quantity costs and inventory carrying costs. An effective system of logistics contributes greatly towards the achievement of the business and marketing objectives of a firm. It creates time and place utilities in the product and thereby helps in maximizing satisfaction to consumers. It helps the company

bring down the cost of carrying inventory, material handling, transportation and other related activities of distribution.

Logistics which is that part of the larger supply chain management is a major determinant of business performance. It is the process of planning, implementing and controlling effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers' requirements (Jacoby, 2009). More importantly, logistics processes play a big part in customer satisfaction, which is more important than low product costs. The importance of better tracking of products logistics, improved efficiency in information processing, better control of supplies on the SCM performance has been repeatedly reported by the cases such as Frankfurt Airport in Germany and Wal-Mart in the USA (Koh *et al.*, 2007).

Logistics management is that part of procurement management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfilment, logistics network design, inventory management, supply or demand planning, and management of third party logistics service

providers (Lieb, Millen & Wassenhove, 2013). To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. It is involved in all levels of planning and execution strategic, operational and tactical. Logistics management is an integrating function which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions, including marketing, sales, manufacturing, finance, and information technology (Morris & Imrie, 2012).

1.1.1 Supply Chain Performance

Business organizations need to capitalize on supply chain capabilities and resources to bring products and services to the market faster, at the lowest possible cost, with the appropriate product and service features and the best overall value (Kurien & Qureshi, 2011). Indeed, modern supply chains encompass owned or contract manufacturing and transportation facilities, suppliers, distributors, and customer service centres scattered over the globe (Bottani & Montanari, 2011). Performance measures are important to the effectiveness of SC. Supply Chain Performance Measures serve as an indicator of how well the SC system is functioning. Measuring SC performance can facilitate a better understanding of the SC and improve its overall performance (Charan *et al.*, 2008).

Various performance metrics are in place for measuring effectiveness of SC. Different perspectives of Supply Chain Performance Measures (SCPM) are cost and non-cost perspective; strategic, tactical or operational focus (Gunasekaran *et al.*, 2004); business process perspective and financial perspective (Beamon & Balcik, 2008). The earlier focus of performance measurement was on financial perspective which is gradually changing to non-financial perspectives.

The non-financial metrics and measures are discussed in the context of the following supply chain activities/ processes: plan, source, make/assemble, and delivery/customer (Gunasekaran *et al.*, 2004). In metrics for order planning, one of the methods is the order entry. This method determines the way and extent to which customer specifications are converted into information exchanged along the supply chain.

Second is order lead-time; the total order cycle time also called order to delivery cycle time, refers to the time elapsed in between the receipt of customer order until the delivery of finished goods to the customer. The reduction in order cycle time leads to reduction in supply chain response time, and as such is an important performance measure and source of competitive advantage (Christopher, 2011); it directly interacts with customer service in determining competitiveness. The third aspect is the customer order path; the path that an order traverses is another important measure whereby the time spent in different channels can be determined. By analyzing the customer order path,

non-value adding activities can be identified so that suitable steps can be taken to eliminate them (Gunasekaran *et al.*, 2004).

Another non-financial measure of supply chain performance is the evaluation of supply link. Traditionally supplier performance measures were based on price variation, rejects on receipt and on time delivery. For many years, the selection of suppliers and product choice were mainly based on price competition with less attention afforded to other criteria like quality, reliability. More recently, the whole approach to evaluating suppliers has undergone drastic change. The evaluation of suppliers in the context of the supply chain (efficiency, flow, integration, responsiveness and customer satisfaction) involves measures important at the strategic, operational and tactical level (Beamon & Balcik, 2008).

Strategic level measures include lead time against industry norm, quality level, cost saving initiatives, and supplier pricing against market. Tactical level measures include the efficiency of purchase order cycle time, booking in procedures, cash flow, quality assurance methodology and capacity flexibility. Operational level measures include ability in day to day technical representation, adherence to developed schedule, ability to avoid complaints and achievement of defect free deliveries (Gunasekaran & Kobu, 2007; Beamon & Balcik, 2008).

1.1.2 Cement Industry in Kenya

The key markets have continued to experience slowdowns and this has not affected the continuous growth of the Cement Sector in the Sub Saharan Africa. In Kenya, Cement consumption has been growing faster at a CAGR where between 2009 and 2015 a growth rate of 13.4% was recorded with the main demand driver being housing with record of 65%, 25% and 10% being taken by both infrastructure and organized infrastructure (AIB Capital, 2016). The business environment is however changing with international players setting up operations to close the supply gap in these markets (Muriungi, 2017). Consequently, only companies that have enough capacity to supply the region will be able to defend their market share as competition increases (AIB Capital, 2016).

The companies in the cement industry in Kenya include: East Africa Portland Cement controlling 24% of the market share, Bamburi Cement controlling 40.5% of the market share, Athi-River Mining with 15.5% market share, Mombasa cement with 13% market share, National Cement with 7% market share and Savannah Cement which is the latest entrant in the cement industry in the country.

East African Portland Cement Company Limited, one of the major players in cement industry in Kenya is engaged in the manufacture and sale of cement and cement related products. East African Portland Cement Company has been Kenya's leading cement manufacturer producing world class cement since 1933. The company specializes in the manufacturing and selling of cement and cement related products. The Company's major brand includes the Blue Triangle Cement.

The company is listed in the Nairobi Securities Exchange (NSE) where the shares of the company are traded, under the symbol: PORT. Over the years, EAPCC greatly expanded its production capacity (East Africa Portland Cement, 2013/14 Annual Report).

In order to improve business processes, enhance quality and volume of production as well as competitiveness, the company has successfully implemented a number of strategies with time. For instance, in 2009, the company commissioned a new mill, which aimed at increasing production capacity to 1.3 Million tonnes. The company also acquired ISO 9001: 2008 certification. In 2010, the company EAPCC implemented ERP system which automates all business processes. In this regard, in 2011, the company received recognition from Computer Society of Kenya for Best ERP system implementation.

Many firms are starting to focus on the effective and efficient supply chain management. However, supply chains are dynamic in nature and require constant revision and fine-tuning at various levels to make sure that any undesired performance is identified analysed and improved. Today the practice of logistics management is becoming extremely important to achieve and maintain competitiveness (Al-Shboul *et al.*, 2017). In today's dynamic competitive environment, logistics management strategy plays a significant part in the overall performance and competitiveness of a company (Ristovska *et al.*, 2017).

1.2 Statement of the Problem

In the current competitive climate in Kenya, the cement manufacturing firms are facing unprecedented pressure to meet the customers demand in the market as a result of new

business trends. According to Georgise, Thoben, and Seifert (2014) the success of many companies is dependent to a large extent on the effectiveness (efficiency and responsiveness) of its supply chain. To be able to meet the customer's needs, the organization must have a good and responsive supply chain. With the fierce competition and heightened expectations of customers, cement manufacturing firms have no option other than to focus attention on their supply chains and more so on logistics. An effective logistic system can help the cement manufacturing firms to optimize the existing production and distribution processes, and fill in the supply gap that is being experienced not only in Kenya, but also in the East Africa markets.

A review of studies conducted in this area shows that Green *et al.*, (2012) conducted a study on the impact of logistics performance on organizational performance in a supply chain context in a large number of companies in the United States. This study did not link logistics management with supply chain performance but rather with organizational performance. Moreover, this study was conducted in United states, which is a more developed economy than Kenya, and therefore the findings may not be generalised in the Kenyan context. Locally, Mukolwe and Wanyoike (2015) conducted a study to assess logistics management practices on operational efficiency of Mumias Sugar Company Limited, Kenya. This study only looked at operational efficiency and not supply chain performance, as it is the case for this proposed study. Again, the study was conducted in a sugar company, whose operation may be different from a cement manufacturing company. In another study, Nyaberi and Mwangangi (2014) looked at the effects of logistics management practices on organization performance in Rift Valley

bottlers limited in Uasin Gishu County. This study only concentrated on logistics management practices and organization performance; and not supplies chain performance. A review of studies shows that no notable of study have sought to fill the gap identified in the cement manufacturing firms in Kenya. It is against this background therefore that the study sought to fill that gap by conducting a study to establish the logistics management practices employed by the cement manufacturing firms in Kenya, and how the practices are influencing their supply chain performance.

1.3 Objectives of the Study

The purpose of the study was to determine the effect of logistics management practices on supply chain performance of cement manufacturing firms in Kenya.

1.3.1 Specific Objectives

The study was guided by the following specific objectives:

- i. To establish the effect of warehousing management on supply chain performance of cement manufacturing firms in Kenya.
- ii. To determine the effect of information flow management on supply chain performance of cement manufacturing firms in Kenya.
- iii. To assess the effect of transportation management on supply chain performance of cement manufacturing firms in Kenya.
- iv. To explore the effect of inventory distribution management on supply chain performance of cement manufacturing firms in Kenya.

1.4 Research Questions

The study sought to answer the following questions:

- i. What is the effect of warehousing management on supply chain performance of cement manufacturing firms in Kenya?
- ii. What is the effect of information flow management on supply chain performance of cement manufacturing firms in Kenya?
- iii. What is the effect of transportation management on supply chain performance of cement manufacturing firms in Kenya?
- iv. What is the effect of inventory distribution management on supply chain performance of cement manufacturing firms in Kenya?

1.5 Significance of the Study

The study is expected to be of benefit to the following:

1.5.1 Management of Cement Manufacturing Companies

The findings of this study will be of benefit to the managers of the Cement manufacturing firms as it will enlighten them on the best logistics management practices to adopt in order to enhance supply chain performance. The study will also help the management to make sound and informed decisions in the future on how they can employ the various logistics management practices. With such exposition, managers will understand how they can enhance their firms' performance and competitiveness through efficient logistics management practices, in an industry that is currently very competitive.

1.5.2 Government and Regulatory Bodies

The study findings may be of value to the policy makers, for instance, the government and regulatory authorities such as Kenya Association of manufacturers. The findings of this study may influence the government as a policy maker to make policies on logistics management practices. The Kenya Association of manufacturers may also come up with regulations guide the implementation of logistics management practices in the cement industry or in the larger manufacturing sector.

1.5.3 Scholars and Researchers

The scholars and researchers may also benefit from this study by expanding their knowledge on logistics management practices and supply chain performance. The study will therefore add value to the existing body of knowledge and be a source of reference to future researchers. The study may also be a basis for further research in the same field.

1.6 Scope of the Study

This study was limited to cement manufacturing firms in Kenya. There are six major cement manufacturing companies in Kenya, they include: East Africa Portland Cement controlling 24% of the market share, Bamburi Cement controlling 40.5% of the market share, Athi-River Mining with 15.5% market share, Mombasa cement with 13% market share, National Cement with 7% market share and Savannah Cement which is the latest entrant in the cement industry in the country.

The focus on cement manufacturing firms was a result of the changing business trends in the cement industry. For instance, Kenya's cement manufacturing firms are currently not able to meet the current demand. This demand has attracted competition from within and without. New companies have come to invest in Kenya, while there are increased imports. There was need to investigate the logistics management practices being employed by the Kenyan cement manufacturing firms; as these can help the firms manage effectively their production, storage and distribution processes in a bid to meet the customer's demand.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the related existing literature review on the relationship between human capital management and organizational performance. Specifically, this chapter covers the theoretical review, empirical review of the study variables, conceptual framework, existing research gaps and the summary of the chapter.

2.2 Theoretical Review

This section discusses the theories that are attributed by other authors and scholars and which guides the study. This study was anchored on Resource Based Theory and Network Theory.

2.2.1 Resource-Based Theory

In 1984, Birge Wenefeldt developed this theory which is also the Resource Based Theory. The views of Penrose (1959) and Barney (1991) on organization economics and strategic management were combined in the RBV theory. The firm's competitive advantage is made up of the resources that they possess which determine the performance of the firm which is a significant determinant as suggested by the Resource Based Theory (Wernerfelt, 2007). Performance of an organization that is effective and effecient is facilitated by the knowledge, processes, assets and the firm's assets as indicated by Ling and Jaw (2011).

The Resource Based Theory indicated that the resources that an organization possess are used in add value where strategies to develop the resources rarely and inimitably so that they can be able to substitute their competitors as the firm provided (Wright et al., 2009). The talents that employees have need to be identified by managers and add value to the most valuable unique talent so that the organization's current and future expectations can be attained effectively. The RBV theory encourages organizations to make use of their unique resources so that sustainable competitive advantage can be achieved through adopting strategies which are unique and cannot be copied by the competitors as explained by (Bethke, Langenegger et al., 2011). By possessing of the unique resources, an organization is able to maintain its competitive advantage as explained by the RBV theory which also improved its performance through individual employees' talent management by the organization (Wright et al., 2009). The theory elaborates further on how organizations should use unique resources so that their competitors cannot copy which will also add value to the organization (Ling & Jaw, 2011).

The performance and competitive advantage are considered by the theory as internal resources, which are focused upon by the theory more than the external factors. This thus makes this theory very crucial for the study.

2.2.2 Network Theory (NT)

Network Theory (NT) has been widely used to study the structure of relationships between individuals, groups, or organizations; particularly to describe and map how they interact with each other (Bellamy & Basole,

2013). The interpersonal relationships between human beings were first developed and studied by Jacobo Moreno in the 1930s. The social and behavioral sciences later on made the interpersonal relationships to be formalized (Borgatti *et al.*, 2009). By using exchange processes, mutual adaptations are developed, cooperative relations and personal chemistry is thus created which are greatly emphasized by the Network Theory (Freeman, 2004).

Network Theory has primarily been applied in SCM to map activities, actors, and resources in a supply chain. The theory states that firms rely not only on their relationship with direct partners but with the extended network of relationships with supply chain firms (Bellamy & Basole, 2013). The focus has been on developing long-term, trust based relationships between the supply chain members. Examples of issues include buyer-supplier relationships (Gadde & Haakansson, 2001), third party logistics (Halldorsson, 2002), and management roles in supply networks (Harland and Knight, 2001). The core concern of the Network Theory is to understand how social networks facilitate and constrain the flows of information and resources between actors, and hence also cognitions, opportunities, and behaviours (Tindall & Wellman, 2001).

From the tenets of the theory, it can be deduced that the performance of a firm in the supply chain depends on how a business efficiently cooperates with its direct partners. In the context of this study, Network Theory will help understand how well EAPCC can

develop long-term, trust based relationship with other partners in order to enhance successful implementation of logistics management practices in the organization.

2.2.3 Transaction Cost Theory

Ronald Coase, Chester Barnard, and Herbert Simon are among the early authors who describe the contributions of transaction cost theory to the existence of firms (Scott, 2003; Williamson, 2005). The early studies of transaction cost theory as described in the works of Coase (1937) and others had paid little attention to the internal operation of the organization (Foss, 1999). Williamson (1989) further expanded the application of transaction cost theory by highlighting the role of transaction cost theory in promoting vertical integration and trust in organizations. These aspects of transaction cost theory are supporting evidences for the role of supply chain management in organizations. Whether we look at supply chain, as a network or as an integrated process, the transaction cost theory explains the vertical connection and integration of various elements of organizational supply chain, from second tier and first tier suppliers to first tier and second tier customers.

According to the transaction cost theory, firms do exist to maximize profit by reducing their transaction costs; outsourcing to third party logistics service providers helps to minimize a firm's costs because as they grow in their capability they offer services at lower costs to their clients (Bolumole *et al.*, 2007). It is generally accepted that transaction cost analysis

is useful for assessing and taking a decision concerning outsourcing in logistics (Andersson,2007).

Grover and Malhotra (2003) in their well-cited study conduct an extensive investigation on the application of transaction cost theory in supply chain management. In their empirical study of 1000 purchasing managers, Grover and Malhotra (2003) concludes that transaction cost theory applies to organizational supply chain management in four facets: effort, monitor, problem, and advantage. Effort to “build and maintain the relationship” with suppliers; cost of “monitoring the performance of suppliers”; resolving the problems that arises in the business relationships; and engagement of suppliers in “an opportunistic behavior”. However, transaction cost theory is primarily concerned with the direct economic factors in organizations and hence fails to address some important aspects of the operation of organizational supply chain, including personal and human relations among actors in the supply chain (Lavassani & Movahedi, 2010).

This theory is therefore critical in this study since it helps to understand why firms would want to manage the inventory, information flow, transport/distribution of goods and management its warehouse. According to the TCT, the key purpose is to minimize their transaction costs.

2.3.4 Agency Theory

Agency theory was developed after seminal contributions made by scholars such as Ross (1973, 1979), Mitnick (1973, 1975), Jensen and Meckling (1976) and Eisenhardt (1989) who substantially improved the understanding about how agency theory informs economic relations (Stock, 1997). Agency theory is relevant for the situations wherein one party (the principal) delegates authority – in terms of control and decision-making about certain tasks – to another party (the agent) (Eisenhardt, 1989; Mitnick, 2006). Agency theory handles principal-agent relationships within or between organisations where the principal delegates work to the agent. In this paper, the principal represents the buying firm while the agent is the supplier. In agency theory the contract between the principal and agent is investigated with concerns on two problems, namely the agency problem and the problem of risk sharing. The agency problem involves basically two parts (i) goal conflict and (ii) verification. Risk sharing concerns the difference in attitude towards risk of the principal and agent (Eisenhardt, 1989).

Agency theory has been widely used across a variety of disciplines, but little work has been undertaken with regard to how agency theory might be used to explain relations between organisations within the supply chain (SC) (Fayezi, O'Loughlin & Zutshi, 2012). The central tenets of agency theory have been used to partially show that where zones of tolerance (Wilson, 2006) and relationship elasticity (Zomorodi & Fayezi, 2011) dominate supply chain

relationship development, behavioural abnormalities are less likely to occur because the principal-agent relationship is more clearly defined. In short, it is because agency theory is able to deal with some of the more complex elements of SC relationship intangibility, as well as co-exist with the more pragmatic approaches associated with complicated networks (Fayezi et al., 2012).

Agency theory identifies behavioural change by SC actors and sheds light on activities involving principal and agent, self-interest, risk aversion, lack of trust, goal conflict and imperfect policy implementation (Simatupang & Sridharan, 2002). More importantly, it identifies how contractual responses might attenuate the tensions through, for example, information sharing, incentive alignment, and behaviour/outcome-based coordination (Knoppen & Christiaanse, 2007). Agency theory therefore can be used to inform contractual responses to outcome/behaviour uncertainty of agents (or principals) within the SC relationships. According to Fayezi *et al.* (2012), information sharing and incentivisation have received considerable attention in agency theory-based explanations of relationship/behaviour-contract alignment.

Agency theory was critical in informing this study since it explains why the principal delegates an activity/task (in a supply chain) to an agent. Principals and agents are assumed to be self-interested, rational and risk-averse. The theory helps us understand that one of the reasons for seeking logistics services from a third party is to share or averse risks. This is

aimed at enhancing efficiency, minimise costs, and improve performance of the supply chain.

2.3 Empirical Review

2.3.1 Warehousing Management and Supply Chain Performance

In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer. In today's competitive market environment companies are continuously forced to improve their warehousing operations. Many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses (Ramaa, Subramanya & Rangaswamy, 2012). The warehouse is today playing a more vital role than it ever has in the success(or failure) of businesses. Warehouses play a critical intermediate rolebetween supply chain members, affecting both supply chain costs and service (Faber, de Koster & Smidts, 2013).

Warehousing has also been recognized as one of the main operations where companies can provide tailored services for their customers and gain competitive advantage. There are various types of warehouses: they can be classified into production warehouses and distribution centers (Ghiani, Laporte & Musmanno, 2014), and by their roles in the supply chain they can be classified as raw materials warehouses, work-in-process warehouses, finished good warehouses, distribution warehouses, fulfillment warehouses, local

warehouses direct to customer demand, and value-added service warehouses (Frazelle, 2011).

A review of the existing literature shows that Mutai and Moronge (2017) did a study on how Kenya's state corporations organizational productivity was influenced by warehouse management. They intended to find out how organizational productivity was affected by stock control and distribution planning. The descriptive research design was applied by the study. The Kenya Electricity Generating Company Limited (Kengen) employees were the targeted population by the study. 117 respondents through questionnaires were used to collect the data which collected both quantitative and qualitative data. The data findings showed that when both stock control and distribution planning were increased, they also increased the productivity of the organization. It concluded that state corporations rate of productivity was influenced by increases in both stock control and distribution planning. The study focused more on control of stock.

A study by Faber *et al.* (2012), established that warehousing is becoming more and more a critical activity in the supply chain to outperform competitors on customer service, lead times, and costs. Warehousing takes up to between two percent and five percent of the cost of sales of a corporation and with today's highly competitive global business environment organizations are emphasizing on Return on Assets, and hence minimizing warehousing costs has become an important business issue. Many firms are automating their basic warehousing functions to achieve the increase in throughput rates or

inventory turns required for their warehousing operations to be cost effective. It is important to allocate warehouse resources efficiently and effectively to enhance the productivity and reduce the operation costs of the warehouse.

Omondi (2017), conducted a study on an assessment for effective warehouse management on physical distribution in a service organization in Kenya Power company in Kisii County. The specific objectives were to: determine the effect of stock control in organization productivity; determine to examine how distribution planning influence organization planning; and to determine the impact of information technology used in organization productivity in Kenya Power Company in Kisii County. Descriptive research design was adopted and the sample size of 60 respondents. The data was collected using questionnaire, and analysed through descriptive statistice. It was found out that stock control influence organizational productivity in state corporations in Kenya, and that distribution planning influence organizational productivity in state corporations in Kenya. It was also found out that information communication technologies were introduced in order to achieve integration, minimize communication costs, enhance efficiency and increase sharing of information which eventually led to improved performance.

In another study Gitau (2016) conducted a study to determine the effect of inventory management practices in warehousing firms in Mombasa

County. The study applied cross-sectional descriptive design and targeted 48 warehousing firms in Mombasa County. Data was collected through use of a questionnaire. A regression and correlation analysis were conducted to show the relationship between the inventory management variables and operational performance. It was found out that there was a significant relationship between inventory management practices and operational performance. It was recommended that all warehousing firms and other organizations adopt inventory management practices so that they can relish the advantages.

2.3.2 Information Flow Management and Supply Chain Performance

The information dimension encompasses the communication and decision making infrastructure which overlays and is interwoven with the physical dimension, with few exceptions (Jones, 2007). The importance of information flow in supply chain was demonstrated by Singh (2006) who proposed that information must be managed at three different stages, before, during and after sales have been made. Singh (2006) observed that in order to ensure that customer requirements in the supply chain can be fulfilled, it is fundamental to manage the information flow associated with the movement of products (goods or services) to the final customer. Effective flow of product and services is dependent on information sharing among supply chain members (Lee, So & Tang, 2010). Firms would be able to

respond effectively to changing market demand requirement through information sharing (Mason-Jones & Towill, 2007).

Stevenson and Spring (2017) while reviewing flexibility from a supply chain stated that accurate and real-time information flow in the supply chain is considered as important as material flow by most organizations. “An information-enriched supply chain would have a single customer entity connected to every scheduling process, showing order information flowing to all links. For a non-enriched supply chain, the customer entity might connect only to the final scheduling link, leaving the remainder of the supply chain hidden from the customer” (Hull, 2012).

Li, Yan, Wang and Xia (2015) conducted a comparative analysis on value of information sharing in supply chains and revealed that information sharing is an important element that reflects cooperation in supply chain management. Simatupang and Sridharan (2014) further asserts that information sharing is “the ability to see private data in a partner’s systems and monitor the progress of products as they pass through each process in the supply chain. This activity includes monitoring (data capturing), processing, and dissemination of customer data, end-to-end inventory status and locations, order status, costs-related data, and performance status”. These authors have argued that information sharing ensures that partners in the supply chain are able to fulfill demand within shorter order cycle times

based on the shared information. Information sharing among supply chain partners creates information flow within supply chain management and this enables supply chain partners to make decision effectively. As noted by Li *et al.* (2015), information flow can be categorized according to operational areas such as inventory, sales, demand forecasting, order state and production plan. Koh, Saad and Arunachalam (2016) also noted in their study that managing supply chain includes activities such as material sourcing, production scheduling and physical distribution system, but all these are supported by information flow which is necessary.

A study by Heung and Gyu (2016) revealed that warehousing takes upto between 2% and 5% of the cost of sales of a corporation and with today's highly competitive global business environment organizations are emphasizing on return on assets, and hence minimizing warehousing costs has become an important business issue. Many organisations are outsourcing these logistics services and automating their basic warehousing functions to achieve the increase in throughput rates or inventory turns required for their warehousing operations to be cost effective.

The findings by Heung and Gyu (2016) above corroborates with those of Ramaa *et al.* (2012) who conducted a study on the impact of warehouse management system in a supply chain. The study revealed that in a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between

the supplier and customer. They revealed that in today's competitive market environment companies are continuously forced to improve their warehousing operations. They also indicated that many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses.

Mukolwe and Wanyoike (2015) conducted a study to assess logistics management practices on operational efficiency of Mumias Sugar Company Limited, Kenya. The target population was staff from selected departments of Mumias Sugar Company, representatives of farmers, and officials from the Ministry of Agriculture and the Kenya Sugar board. Stratified sampling technique was used to select the predetermined sample size of 92. Purposive and convenience sampling methods were used to select sample elements for interviews. Data was analyzed using mean, standard deviation and inferentially through correlation and regression analysis. The study revealed that effective management of information flow improves the company's internal and external processes. Automation of warehousing activities greatly enhances accuracy, speed of operations and reduces wastage. Transport management and physical distribution practices on the other hand allows faster and cost effective flow of goods and raw materials thus improving operational efficiency. The study recommends a strategic approach to logistics management practices through embracing modern technology and employee training.

In another study, Lai and Cheng (2013) discuss the importance of a supply chain focus on the part of transport logistics service providers as they function to link suppliers, manufacturers, sellers, and customers throughout the supply chain. They argue that transport logistics service providers must focus on supply chain performance in addition to organizational performance. Zhou and Benton (2007) investigated the link between logistics management practices and distribution performance regarding reliability of service, and concluded that practices related to the distribution and sharing of information have a direct impact on performance.

Okiria, Mwirumubi and Mpaata (2016) conducted a study to assess the relationship between the information flow management in the public hospitals and the effectiveness of the downward supply chain of essential medicines in the selected six public hospitals in Uganda. This was a cross sectional descriptive and analytical survey done with both qualitative and quantitative data collected. Two hospitals were regional referral and the four were general hospitals. The major findings of the study were that; sharing planning information, distribution schedules, knowledge of each other stock levels and new demand were statistically significant in influencing the downward supply chain effectiveness. Improved sharing of information that is accurate, timely and complete, development of computerized medicines management systems in the hospitals, collaborative procurement planning at all levels, improvement in records and record keeping and enhancement of online

communication between the hospitals and the suppliers was significantly influencing the effectiveness of the supply chain.

Leng and Zailani (2012) examined the effects of information, material and financial flows on supply chain performance of Manufacturing Companies in Malaysia. The study focused on manufacturing companies in the northern region of Malaysia. Data was collected from 202 manufacturing companies in the northern region of Malaysia by use of questionnaires. Results show that information flow and material flow do not have significant impacts on the performance of supply chain management, while financial flow has a significant impact on the performance of supply chain management. Financial flow information provides significant insights about the financial health of the supply chain.

2.3.3 Transportation Management and Supply Chain Performance

Another important field in logistics management is transportation. A review of the studies on transportation management and supply chain performance shows that Tseng, Yue and Taylor (2005) reviewed the role of transportation in logistics chain, and revealed that transport is a crucial component in logistics, which joints each activity in the logistics chain. The performance of logistics heavily relies on the efficiency of transport services. The paper established that transportation and logistics systems have interdependent relationships that logistics management needs transportation to perform its activities and meanwhile,

a successful logistics system could help to improve traffic environment and transportation development. Since transportation contributes the highest cost among the related elements in logistics systems, the improvement of transport efficiency could change the overall performance of a logistics system. Transportation plays an important role in logistics system and its activities appear in various sections of logistics processes. Without the linking of transportation, a powerful logistics strategy cannot bring its capacity into full play.

In another study, Chan and Zhang (2011) conducted a study on the impact of collaborative transportation management on supply chain performance. Collaborative Transportation Management (CTM) is based on the interaction and collaboration between trading partners and carriers participated in the supply chain. The study established that appropriate application of CTM can improve the flexibility in the physical distribution and minimize the inefficiency of supply chain management. The study also revealed that Collaborative Transportation Management can significantly reduce the firm's total costs and improve the service level, mitigate the firm's delivery demand (delivery lead time) variation, and improve the carrier's flexibility by changeable capability (delivery lead time).

Locally Kyusya (2015) investigated the effect of logistics outsourcing on the operational performance of shipping industry in Kenya. The population of the study in this research was 42 shipping companies' operating in Kenya. The data was analyzed using

descriptive and inferential statistics. The study established that transport management is positively related to operational performance of the firms. The study recommended that the firms should build a culture of logistic outsourcing within cross functional teams in among the service providers and transport companies.

The literature generally shows that research on VRP (vehicle routing problem) and its various extensions has been extensive. However, with the remarkable growth in intermodal transportation over the past decade, there has been little empirical literature especially in Kenyan context to show the extent to which intermodal transportation enhances efficiency and minimizes costs. Chang (2008) explores one of the intermodal operational issues: how to select best routes for shipments through the international intermodal network. The problem is formulated as a multi-objective multimodal multicommodity flow problem with time windows and concave costs, and an efficient heuristic is proposed.

Verma and Verter (2010) present a first attempt for the development of an analytical framework for planning rail-truck intermodal transportation of hazardous materials by developing a biobjective optimization model to plan and manage intermodal shipments to represent the current practice; the routing decisions in the model are driven by the delivery times specified by the customers. Bruns and Knust (2012) study the problem of load planning for trains in intermodal container terminals. The objective is to

assign load units to wagons of a train such that the utilization of the train is maximized and setup and transportation costs in the terminal are minimized. Bruns et al. (2013) further study the problem of robust load planning for trains in intermodal container terminals. The goal of load planning is to choose wagon settings and assign load units to wagons of a train such that the utilization of the train is maximized and setup and transportation costs in the terminal are minimized. García *et al.* (2013) adopt a new hybrid approach by combining OR techniques with AI search methods in order to obtain good quality solutions for complex intermodal transport problems, by exploiting the benefits of both kinds of techniques. The solution has been applied to a real-world problem from one of the largest Spanish companies using intermodal transportation.

In the manufacturing industry, the supply-chain network is composed of shipping via vessel and trucks, and railway lines that may run across multiple countries. This network is used to transport products from manufacturing, to transport intermediates to distribution centers and finally to the customers (Kinisa, 2019). Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of products, demand, transportation, market volatility, and political climate. Hence, to effectively model a supply-chain design problem, the dynamics of the

supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed (Saad, Udin & Hasnan, 2014).

2.3.4 Inventory Distribution Management and Supply Chain Performance

Distribution is business activities pertaining to the transportation of finished inventory and/or raw materials in a way that they arrive at the designated place, when needed and in usable condition. Distribution are the steps taken to store and transport a product from the supplier stage to the customer stage in the supply chain (Yang, 2013). Only two stages are explicitly considered in this definition: supplier and customer. There could be more than two stages in the distribution network, such as a consolidation, break-bulk, or crossdock distribution centers (DCs) (Yang, 2013).

In this competitive business world, the dimensions of cost, quality, efficiency and customer service level are not trade-offs for a company anymore. They have to be considered simultaneously. To achieve these objectives, optimally redesigning the entire distribution network is critical, and most of the time, necessary (Yang, 2013). Accurate and efficient approaches and tools are required to support and enhance the distribution planning process. There are several important factors to consider when designing a distribution network: cost, quality, delivery reliability, service

level, lead time, product availability, technical ability, warranties and so on (Mentzer, Gomes & Krapfel, 2009).

Green *et al.* (2012) conducted a study on the impact of logistics performance on organizational performance in a supply chain context in a large number of companies in the United States. The results indicate that logistics performance is positively impacted by supply chain management strategy and that both logistics performance and supply chain management strategy positively impact marketing performance, which in turn positively impacts financial performance. They concluded that logistics practices have a positive impact on business performance, namely in speed of delivery, the responsiveness and flexibility of delivery, and also influence marketing performance, which has a leverage effect on the average sales growth and business profitability.

A study by Ajakaiye (2012) analyzed the logistics service providers' roles within the logistics firms' supply chain by identifying how the expected roles are performed. The study established that logistics service providers are able to perform their roles through vertical and horizontal cooperation with other firms and with other logistics firms respectively. He further revealed that third-party logistics service providers add value for their customers through their value-added services in various ways such as time and place utility including tracking and tracing the goods to ensure that they are delivered.

In another study, Srivastava (2016) investigated the state of logistics and supply chain practices in India. He found that, while Indian managers are well aware of the need to develop supplier partnerships, integrate and coordinate the flow of goods from supplier's to ultimate customer, and share information among supply chain partners, the infrastructure necessary to facilitate such seamless integration is as yet unavailable. There is pressure in emerging markets to rapidly adopt logistics and supply chain integration practices in an effort to compete globally.

Green, Whitten and Inman (2014) conducted a study to examine the effect of logistics performance on organizational performance in a supply chain context. Data was collected from a national sample of 142 plant and operations managers and analyzed using a structural equation modelling methodology. The results indicate that logistics performance is positively impacted by supply chain management strategy and that both logistics performance and supply chain management strategy positively impact marketing performance, which in turn positively impacts financial performance. Neither supply chain management strategy nor logistics performance was found to directly impact financial performance.

Kinisa (2019) conducted a study to assess the factors affecting logistics distribution in manufacturing industries in Tanzania. The specific research objectives were: to identify the challenges affecting products distribution

channels at Miku Investment Limited, to assess the staff competence on performance of the distribution channels and to find out technologies used to increase the performance of the distribution channels at Miku Investment Limited. This was a case study and data was collected through interview and questionnaire using a sample size of 50 respondents. Data was analysed using qualitative and quantitative analysis techniques.

The study found out that factors affecting logistics distribution channels in manufacturing industries are completion, legal issues, social cultural, economic challenges, technological challenges. The researcher concluded that information technology affects the efficiency in logistics performance of trading and distribution firms. The study concluded that information technology integration facilitates communication between focal firm and its suppliers and customers, information systems fasten communication between managers in the logistics, information technology integration enhances quality, reduces time and costs, enhances competitiveness and generates future growth and that information technology sharing aids replacement of inventories aiding in fast decision making. The study recommended that there should be developed regulations and procedures on how to manage logistics in manufacturing industries so as to improve the performance of logistics.

Locally, Nyaberi and Mwangangi (2014) conducted a study on the effects of logistics management practices on organization performance in Rift Valley

bottlers limited in Uasin Gishu County. One of the objectives was to investigate effects of inventory control on logistics management practices on the performance in Rift Valley bottlers limited. The study revealed that inventory control assists the performance of Rift Valley bottlers limited through costs of maintenance of stock reduces, quality of the product remains intact, production flow improves and cost of breakages reduces. This in turn leads to customer good will and a high volume of sales, hence improvement in overall performance of the business.

Gacuru and Kabare (2015) sought to establish factors affecting efficiency of logistics performance in trading and distribution firms based in Jomo Kenyatta International Airport (JKIA). The study examined different concepts of information technology, competence and business to business relationship and their impact on logistics performance. Descriptive research design was adopted. The target population was 42 respondents working in the logistics firms at JKIA. Both primary and secondary data was collected. Primary data was gathered using semi-structured questionnaires. Data was analysed using descriptive and inferential forms of analysis. The study found that information technology, level of competence, business to business relationship affects the efficiency of logistics performance in trade and distribution firms based in JKIA area. The study concludes that that information technology, level of competence and business to business relationship affects the efficiency of logistics performance in trade and distribution firms. It was recommended

that the logistic firms should enhance the use information technologies that are compatible with their logistics activities. The trade and distribution firms should employ a change agents to oversee the staffs of the logistics forms undergo on the job training, in order to improve their skills and capabilities to enhance efficiency of logistics performance. Efforts should reach across the entire logistics industry to help streamline essential infrastructure and processes to enhance service delivery, reduce costs and improve responsiveness to customer demand in the logistics activities.

2.4 Conceptual Framework

The conceptual framework below shows the hypothesized relationship between the dependent and independent variables. The independent variables are: warehousing management, information flow management, transportation management, inventory distribution management while the dependent variable is supply chain performance.

Independent Variables

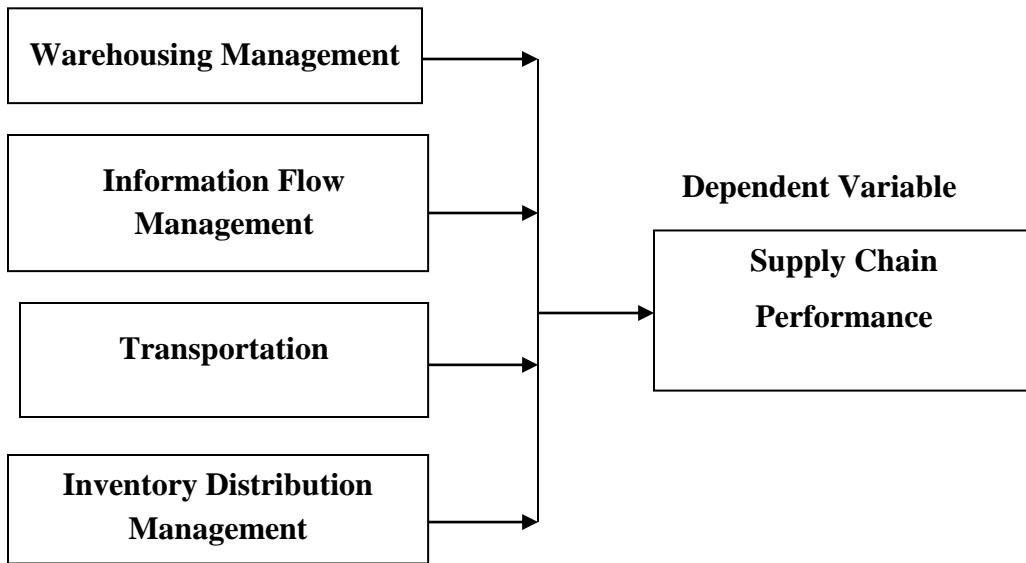


Figure 2.1: Conceptual framework

Source: Author (2018)

2.6 Operationalization of Variables

Table 2.1 shows the operationalization of variables. It outlines the indicators to the variables, the measurement scale and type of analysis to be conducted under each variable.

Table 2.1 Operationalization of Variables

| Variables | Indicators | Measurement Scale | Type of analysis |
|-----------------------------------|--|--|--|
| Dependent Variable | | | |
| Supply Chain Performance | <ul style="list-style-type: none"> • Lead time • Costs Reduction • Cost effectiveness | <ul style="list-style-type: none"> • Nominal Scale • Ordinal scale | <ul style="list-style-type: none"> • Descriptive Statistics • Inferential Statistics |
| Independent Variable | Indicators | Measurement Scale | Type of analysis |
| Warehousing Management | <ul style="list-style-type: none"> • Storage utilization • Downtime • Dock to stock time • Order fill Rate | <ul style="list-style-type: none"> • Nominal • Ordinal | <ul style="list-style-type: none"> • Descriptive Statistics • Inferential Statistics |
| Independent Variable | Indicators | Measurement Scale | Type of analysis |
| Information Flow Management | <ul style="list-style-type: none"> • Information sharing • Communication • Partnership/Networking | <ul style="list-style-type: none"> • Nominal • Ordinal | <ul style="list-style-type: none"> • Descriptive Statistics • Inferential Statistics |
| Independent Variable | Indicators | Measurement Scale | Type of analysis |
| Transportation Management | <ul style="list-style-type: none"> • Capacity • Distribution channels • Cycle time | <ul style="list-style-type: none"> • Nominal • Ordinal | <ul style="list-style-type: none"> • Descriptive Statistics • Inferential Statistics |
| Independent Variable | Indicators | Measurement Scale | Type of analysis |
| Inventory Distribution Management | <ul style="list-style-type: none"> • Inventory Turnover • Inventory Accuracy • Order Cycle Time • Carrying Costs | <ul style="list-style-type: none"> • Nominal • Ordinal | <ul style="list-style-type: none"> • Descriptive Statistics • Inferential Statistics |

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The execution of this study involved methods and procedures which are presented in this study. They include research design, study population, data collection procedure, data collection instrument and pilot testing. How this study's data was analyzed and presented is also outlined. The study also involved considering some ethical issues which are described at the end of the chapter.

3.2 Research Design

The research problems answers are generated through the scheme, outline or plan which are defined as the research design as defined by McLaughlin, 2012). The descriptive research design was used in studying of the research problem. The phenomenon's what, where and how are used in the concern of a descriptive study as per (Creswell, 2014)'s argument.

The design was appropriate in describing the research problems under study through an investigation which was made possible by the descriptive research design. The case study selected was used as the basis of the research questions so as to solve the possible alternatives identified by an intensive analysis through the several targeted cases selected by the underlining concept. A subject is defined and described by the researcher, through creation of a profile of the problems in the group (Cooper & Schindler, 2003).

3.3 Target Population

The hypothetical set of people, events or objects which the researcher tends to use as his/her population to generalize the results which is the study's universal set as (Bryman, 2012) described a target population. The study targeted 6 cement manufacturing firms in Kenya (see appendix V). The unit of observation was the management staff in the various departments which are involved in logistics management, in the targeted firms. The target population consisted of staff in the logistics & transport department, supply chain department, warehousing and production departments in the 6 cement manufacturing firms in Kenya. The population is shown in the Table 3.1.

Table 3.1 Target Population

| Staff Department | Population No. |
|-----------------------------|-----------------------|
| Bamburi Cement Company | 32 |
| East Africa Portland Cement | 21 |
| Athi-River Mining Company | 24 |
| Savannah Cement Company | 15 |
| National Cement Company | 21 |
| Mombasa cement Company | 24 |
| Total | 137 |

3.4 Sample Size and Sampling Design

The unit of sampling, frame, procedures and the size are described by the study's sample. The selected sample from the initial population is what is described as a sampling frame. This is the process where a smaller number is selected from the total number of all the respondents that had been targeted initially for the study (Kothari, 2007). When a smaller portion is selected for the whole population is defined by Bernard (2013) as a sample.

This study considered the whole population as it was since the sampling frame is small and variable. When a certain population is targeted, and is small in number and have different elements from one another then Cooper and Schindler assert that (2011) terms is as a census. A small number of respondents is effective enough to provide the required data in the study.

Therefore, a census study was deemed appropriate for study since the sampling frame is small; thus all the 137 respondents formed the sample size for the study.

3.5 Data Collection Instrument

Primary data was collected through a questionnaire. The feelings, motivations, attitudes, accomplishments and experiences of individuals are inquired through questionnaire's and that why it is appropriate for the collection of information (Mellenbergh, 2008). The questions consisted of both open and close-ended questionnaires. The study's questionnaire captured the objectives of the study and the researcher also ensured that the participants were not manipulated as stated by Franker, (2006). The questionnaires are less costly and consume less time and that's why they were preferred in collection of the data as per Franker (2006).

The questionnaires were divided in a way that the research objectives were well addressed. The respondent's general information was included in the questionnaire's first section. The questionnaires were distributed to targeted respondents with the help of three other assistants who were involved by the researcher. The drop and pick later method was used

in administering of the questionnaires. The variables were determined and formatted using a nominal and a Likert type scale format. The questions statement ranged from 1 to 5 in the 5-point Likert scale .

3.6 Validity and Reliability of the Questionnaire

The research results' inference meaningfulness and accuracy is termed as validity as defined by Mugenda and Mugenda (2003). The questionnaires validity is used to ascertain the main reasons for conducting the plot study. The questionnaires validity was ascertained through the use of both face and content validity of the study. The representativeness of the sample population was concerned with content validity. The knowledge and skills in the large domain are represented by the items covered by the knowledge and skills as stated by Gillham (2008).

3.6.1 Validity of of the Questionnaire

This is where a concept is measured through an indicator to find out whether that concept was really measured by the specific indicator called validity (Bryman & Bell, 2011). Content validity was adopted in this study. Expert judgment is used in improving the instrument of the content validity. To determine whether all the questions in the questionnaire were essential, useful or necessary, a panel was presented with the questions before the actual study. The questions that were passed by the panel as applicable were retained for the study (Cooper & Schindler, 2011).

3.6.2 Reliability of the Questionnaire

The repetition of the results of the study is the main concern of reliability. Above 0.7 or exact 0.7 co-efficient (Cronbach alpha) is the construct composite reliability, which the study considers adequate for all the constructs (Rousson, Gasser & Seifer, 2002). The research instrument's reliability was tested through the Cronbach Alpha test.

3.7 Data Collection Procedure

The student received a permit from National Commission for Science, Technology and Innovation (NACOSTI) and the university also offered her an introductory letter where she also wrote to the institutions targeted so that she would be granted permission to use the subjects as respondents. The respondents were then interviewed by the researcher and other assistants when the permission was granted. Each respondent's questionnaire contained a cover letter that explained the purpose of the information they were required to give. There was also identification of the contact person in each questionnaire. The contact person constantly reminded the respondents to fill and return the questionnaires in time.

3.8 Data Analysis and Presentation

Both qualitative and quantitative data were generated by the study. The Statistical Packages for Social Scientists (SPSS Version 17.0) was used to code and enter the quantitative data and descriptive statistics were used in analysing the data. The responses content matter was used in analysing of the qualitative data. The use of (percentages) frequencies that are absolute and relative and central tendency and dispersion (mean and

standard deviation respectively) measurements were involved in descriptive statistics. Tables and graphs were used to present the quantitative data while qualitative data was analysed in prose. The regression model took the following form:

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

Where: Y = Supply chain performance

X₁ = Warehousing management

X₂ = Information flow management

X₃ = Transportation management

X₄ = Inventory distribution management

β_0 = the intercept (value of EY when X = 0)

β_{1-n} = the regression coefficient or change included in Y by each χ

ε_i = error term

The quantitative data was presented using pie charts, bar charts, percentages and frequency tables. The qualitative data generated from the open ended questions was categorized in themes in accordance with research objectives and reported in narrative form along with quantitative presentation.

3.8.1 Diagnostic Tests

The study conducted the following diagnostic tests on the data.

Test for Multicollinearity

Multicollinearity occurs when the independent variables, in this case debt management, saving practices, financial planning and investment practices are inter-correlated; its

presence can adversely affect ones regression results. A variance inflation factor (VIF) test will be conducted to detect multicollinearity in the regression model. The VIF estimates how much the variance of a regression coefficient is inflated due to multicollinearity in the model.

The VIF was calculated using the SPSS software. A rule of thumb for interpreting the variance inflation factor is that, a value of 1 means not correlated, values between 1 and 5 means moderately correlated while values greater than 5 means highly correlated. The more the VIF increases, the less reliable the regression results are going to be. In general, a VIF above 10 indicates high correlation and is cause for concern.

Test of Serial Correlation

One assumption that allows the use of a regression model is that the variables are uncorrelated with each other. However, it happens a time when the variables happen to be correlated with each other, this is known as serial correlation. Serial Correlation of variables means that the estimates obtain using ordinary least square model for regression are still unbiased, but inefficient.

The Durbin Waston Test was used to test the presence of serial correlation for the model. The Durbin Watson statistic is a number that tests for autocorrelation in the residuals from a statistical regression analysis. The test will be calculated using SPSS software. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in

the sample, values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation.

Stationarity Test

The study assessed the relationship or association of dependent and independent variables. After that, the variables were subjected for stationarity testing. Thus, the time series properties of the variables was explored to determine the order of integration of each variable included in the model. A popular unit root test, which is Augmented Dickey-Fuller (ADF) was used to examine the stationarity status of the variables. The essence of this test was to avoid spurious regression problem normally associated with time series econometric modelling. Based on the estimates of unit root test, a Multivariate Time Series linear Regression Model will be adopted according to best suited specification.

Test of Statistical Significance of Regression Coefficients

To test for overall significant of the regression coefficients in OLS regression model, F statistics and R-squared was used. Under null hypothesis, F-test assumes that the regression coefficients are jointly equal to zero i.e. jointly regression coefficients are not statistically significant. The value of F-statistics with its respective p-value was examined for a decision to ensure a decision is reached with respect to null hypothesis at 5 percent significance level. It was also important that the value of R-square is high.

3.9 Ethical Consideration

The study adhered to the required ethical issues. One was that the researcher gave the respondents the freedom to decide on their own if they wanted to participate on the study or not. This ensured that the respondents participated in the study at their own free will and not forced or intimidated.

The respondents were not to provide any personal information which made their response anonymous. This made the respondents free from any type of victimization that would result much later.

Third, the student received a permit from National Commission for Science, Technology and Innovation (NACOSTI). And finally, the findings were later shared to the university and other stakeholders who were interested.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1: Introduction

This chapter presents the data analysis and interpretation of the research findings in line with the objectives of the study. The objective of the study was to determine the effect of logistics management practices on supply chain performance of cement manufacturing firms in Kenya. The data was analyzed through descriptive and inferential statistics and presented in charts and tables.

4.2: Response Rate

In this section, the study shows the number of the respondents who responded in the study. A research study must have a good response rate in order to produce accurate, useful results. This was therefore important so as to determine whether the response rate was good enough to provide reliable results that could help make inferences on the study.

Table 4.1: Response Rate

| Response Rate | Frequency | Percentage |
|----------------------|------------------|-------------------|
| Responses | 102 | 74.5 |
| None Response | 35 | 25.5 |
| Sample Size | 137 | 100.0 |

Source: (Author 2019)

The study sample size was 137 respondents in 6 cement manufacturing firms in Kenya. The respondents consisted of staff in the logistics and transport department, supply

chain department, warehousing and production departments. A total of 102 responses were successfully received back in time for data analysis which represents a response size of 74.5%. The response was therefore within the required margins for and this means the response rate was good enough to generate reliable findings for the study. According to Mugenda and Mugenda (2003), a fifty percent response rate is adequate, sixty percent good and above seventy percent rated very well.

4.3 Respondents Demographic Information

The respondents' information captured included: gender, age of the respondents, level of education, number of years worked and department worked in the organization.

4.3.1 Gender of the Respondents

In this section, the study sought to establish the gender of the respondents who took part in the study. The findings are presented in Table 4.2.

Table 4.2: Gender of the Respondents

| Gender | Frequency | Percentage |
|---------------|------------------|-------------------|
| Male | 61 | 59.8 |
| Female | 41 | 40.2 |
| Total | 102 | 100.0 |

Results in Table 4.2 shows that majority of the respondents (59.8%) were male while 40.2% were female. This implies that majority of staff in the logistics and transport department, supply chain department, warehousing and production departments in the six cement manufacturing firms were male, with a substantial number of females.

4.3.2 Age of the Respondents

The respondents were asked to indicate their age. The respondents' age was captured in structured age brackets. The results are presented in Table 4.3.

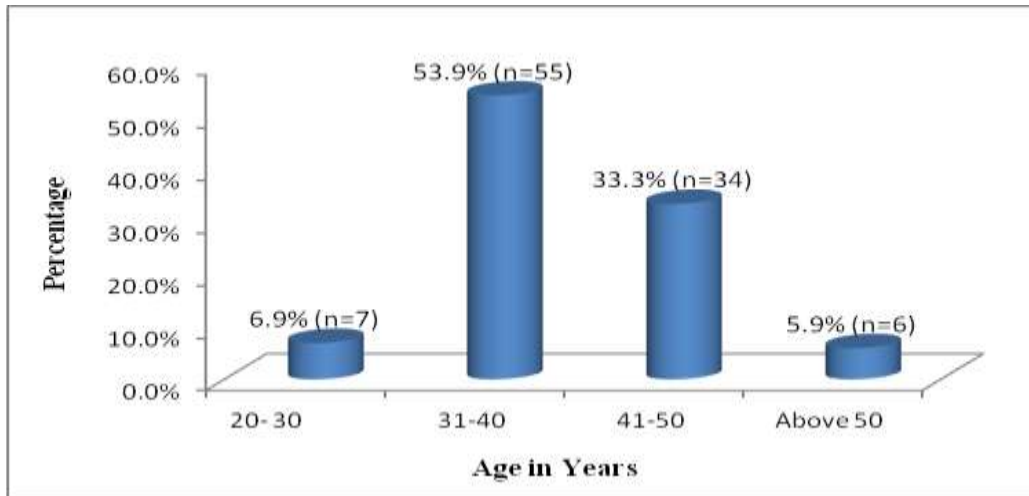


Figure 4.1: Age of the Respondents

Results in Figure 4.1 show that majority of the respondents (53.9%) were aged between 31-40 years while 33.3% were aged between 41-50 years. On the other hand, 6.9% of the respondents indicated that they were aged between 20-30 years while 5.9% were aged above 50 years of age. This implies that majority of the employees in the selected departments the six cement manufacturing firms were aged between 30 years and 50 years of age.

4.3.3 Level of Academic Qualification

The respondents were asked to indicate the highest level of academic qualification they had attained. The findings are in Figure 4.2.

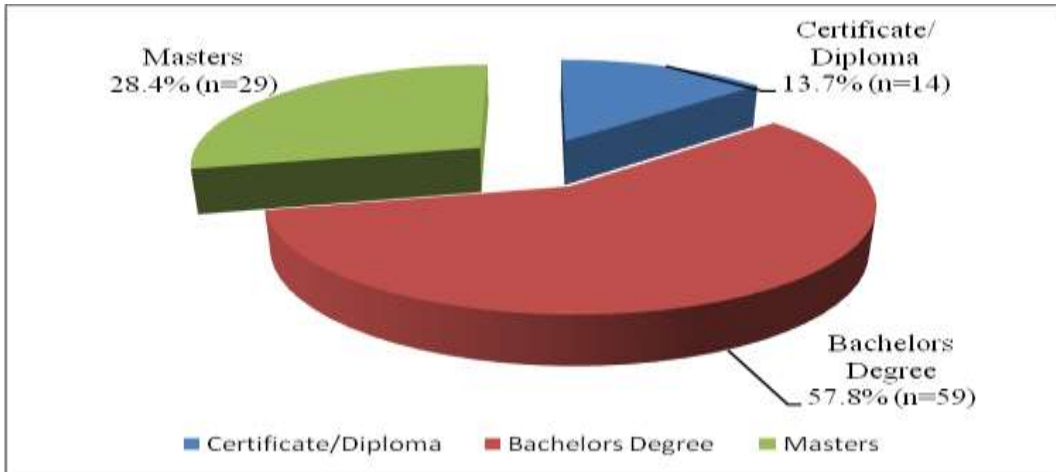


Figure 4.2: Respondents' Academic Qualification

The study findings in Figure 4.2 show that 57.8% of the respondents indicated that they had a Bachelors degree while 28.4% had reached Masters level. Majority of the respondents fell in these two categories which implies that majority of the employees in the selected departments in six cement manufacturing firms were highly educated, which improves the reliability of the information given by the respondents. A further 13.7% of the respondents indicated that they attained a certificate or Diploma as their highest level of academic qualification.

4.3.4 Duration Worked in the Organisation

The respondents were asked to indicate the number of years they had worked in their respective organisations. The findings are presented in Table 4.3.

Table 4.3: Duration Worked in the Organisation

| Duration (in Years) | Frequency | Percentage |
|----------------------------|------------------|-------------------|
| Less than 5 Years | 12 | 11.8 |
| 5-10 Years | 29 | 28.4 |
| 11-15 Years | 31 | 30.4 |
| 16-20 Years | 21 | 20.6 |
| Above 20 Years | 9 | 8.8 |
| Total | 102 | 100.0 |

As shown in Table 4.3, 30.4% of the respondents indicated that they had worked in their respective organizations for a duration of 11-15 years while 28.4% had worked for a duration of 5-10 years. A further 20.6% of the respondents reported that they had worked in their organization for a duration of 16-20 years while 8.8% indicated that they had been working for more than 20 years. From the results, it can be seen majority of the respondents had worked for a substantial time in their respective organizations. They therefore well understood about the operations of their organization and this improves the reliability of the information given by these respondents.

4.3.5 Department of the Respondents

The respondents were asked to indicate the department they worked in. The results are presented in Table 4.4.

Table 4.4: Department of the Respondents

| Staff Department | Frequency | Percentage |
|--------------------------------------|------------------|-------------------|
| Logistics/ Transport Department | 27 | 26.5 |
| Procurement/ Supply Chain Department | 25 | 24.5 |
| Warehousing Department | 20 | 19.6 |
| Production Department | 30 | 29.4 |
| Total | 102 | 100.0 |

The findings in Table 4.4 show that 29.4% of the respondents were in production department; 26.5% were in Logistics/ Transport department; 24.5 were in procurement or supply chain department while 19.6% were in the warehousing departments. The study was limited to those departments which are involved in logistics management.

4.4. Warehousing Management and Supply Chain Performance

This section of the study addresses the first objective of the study which sought to establish the effect of warehousing management on supply chain performance of cement manufacturing firms in Kenya.

4.4.1 Warehousing Management in Cement Manufacturing Firms

The respondents were asked to indicate their extent of agreement with statements on warehousing management in their firms. The findings are presented in Table 4.5.

Table 4.5: Warehousing Management in Cement Manufacturing Firms

| Statements on Warehousing Management | N | Mean | Std. Deviation |
|---|----------|-------------|-----------------------|
| The organization has adequate warehouse/storage space to hold additional stock. | 102 | 4.19 | 0.853 |
| The warehousing/storage strategies employed by our firm ensure effective management of inventory levels. | 102 | 4.05 | 0.894 |
| There is adequate utilization of the storage facilities in the factory. | 102 | 4.30 | 0.715 |
| There is inefficiencies in the store, warehousing processes which leads to downtime. | 102 | 3.14 | 0.995 |
| There is good management of the warehouse which ensures high order rate to avoid delay in production process. | 102 | 4.15 | 0.723 |
| Firm uses modern techniques of product handling in the warehouse. | 102 | 4.22 | 0.816 |

The study findings in Table 4.5 show that the respondents agreed that the cement manufacturing firms had adequate warehouse and storage space to hold their stock (mean score = 4.19); and that there was adequate utilization of the storage facilities in the factories (mean score = 4.30). The respondents further agreed that firm used modern techniques of product handling in the warehouse (mean score = 4.22); and that there was good management of the warehouse which ensures high order rate and avoids delay in production process (mean score = 4.15). The respondents also agreed that the strategies employed by their firms ensured effective management of inventory levels. (mean score = 4.05). They were however neutral when asked whether there was inefficiencies in the store, warehousing processes which would lead to downtime (mean score = 3.14).

4.4.2 Extent Warehousing Management Influence supply Chain Performance

The respondents were asked to indicate the extent to which warehousing management influenced supply chain performance in their firms. The findings are presented in Figure 4.3.

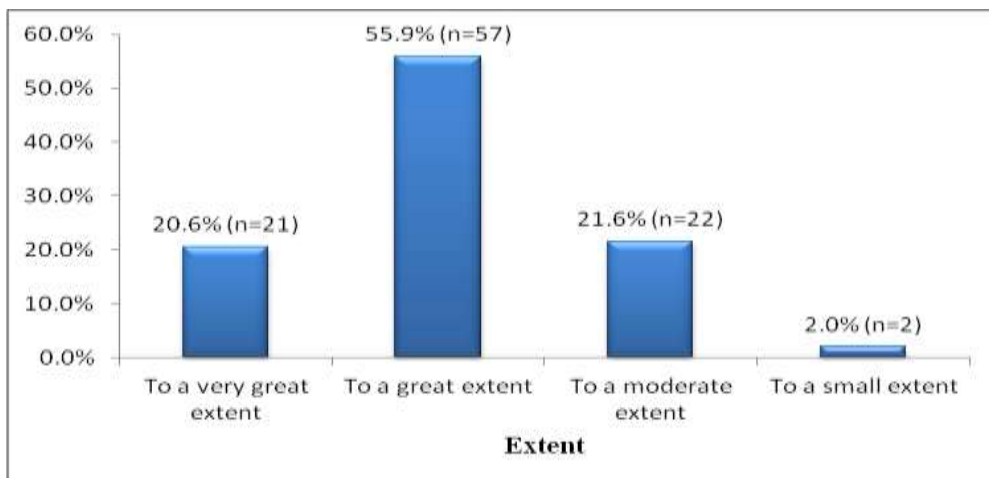


Figure 4.3: Extent Warehousing Management Influence supply Chain Performance

The study findings in Figure 4.3 show that majority of the respondents (55.9%) indicated that warehousing management influenced supply chain performance in the cement manufacturing firms to a great extent while 20.6% indicated to a very great extent. On the other hand, 21.6% of the respondents reported that warehousing management influenced supply chain performance in the cement manufacturing firms to a moderate extent while 2% indicated that it influenced to a small extent.

4.5 Information Flow Management and Supply Chain Performance

This section addresses the second objective of the study which sought to determine the effect of information flow management on supply chain performance of cement manufacturing firms in Kenya.

4.5.1 Information Flow Management in the Cement Manufacturing Firms

The respondents were asked to indicate their extent of agreement with statements on information flow management in their firms. The findings are presented in Table 4.6.

Table 4.6: Information Flow Management in the Cement Manufacturing Firms

| Statements | N | Mean | Std. Deviation |
|---|----------|-------------|-----------------------|
| There is adequate information sharing among supply chain partners which enhances easy movement of products in the market. | 102 | 4.21 | 0.619 |
| Communication and sharing of information has improved the demand/ market forecast. | 102 | 4.25 | 0.681 |
| The networking among supply chain partners has improved the time the products take to get to the market | 102 | 4.18 | 0.883 |
| Information flow management has improved production processes, stock control, and distribution of products to the market. | 102 | 4.07 | 0.707 |

| | | | |
|---|-----|------|-------|
| Catalogue Information is available and adequate. | 102 | 3.71 | 0.816 |
| Good communications is established with stakeholders. | 102 | 4.00 | 0.745 |

The study results in Table 4.6 show that the respondents agreed that there was adequate information sharing among supply chain partners which enhanced easy movement of products in the market (mean score = 4.21); and that communication and sharing of information has improved the demand and market forecast (mean score = 4.25). The respondents further agreed that networking among supply chain partners had improved the time the products take to get to the market (mean score = 4.18); and that information flow management had improved production processes, stock control, and distribution of products to the market (mean score = 4.07). Moreover, the respondents agreed that there was good communications among the stakeholders in the value chain as shown the mean score of 4.0 on the likert scale.

4.5.2 Extent Information Flow Management influence Supply Chain Performance

The respondents were asked to indicate the extent to which information flow management influenced supply chain performance in their firms. The findings are presented in Table 4.7.

Table 4.7: Extent Information Flow Management influence Supply Chain Performance

| Extent | Frequency | Percent |
|----------------------|------------------|----------------|
| To very great extent | 43 | 42.2 |
| To great extent | 28 | 27.5 |
| To moderate extent | 21 | 20.6 |
| To Small extent | 10 | 9.8 |
| Total | 102 | 100.0 |

As shown in Table 4.7, 42.2% of the respondents indicated that information flow management influenced supply chain performance in the cement firms to a great extent while 27.5% indicated to a great extent. However, 20.6% of the respondents indicated that information flow management influenced supply chain performance in the firms to a moderate extent while 9.8% indicated to a small extent.

4.6 Transportation Management and Supply Chain Performance

This section addresses the third objective of the study which sought to assess the effect of transportation management on supply chain performance of cement manufacturing firms in Kenya.

4.6.1 Efficiency of Transportation System the Firm

The respondents were asked to rate various aspects of transportation in their firms. A five point likert scale was used to interpret the results where 1 is Inefficient, 2 is somehow inefficient, 3 is uncertain, 4 is efficient while 5 is highly efficient. The findings are presented in Table 4.8.

Table 4.8: Efficiency of Transportation System the Firm

| Statements | N | Mean | Std. Deviation |
|---|----------|-------------|-----------------------|
| Physical movement of products to the market. | 102 | 3.87 | 1.031 |
| Delivery of raw materials to the factory. | 102 | 3.91 | 1.127 |
| Fleet management by the firm. | 102 | 3.53 | 1.183 |
| Safeguarding goods on transit from theft and damages. | 102 | 3.97 | 1.164 |

The findings in Table 4.8 show that the respondents indicated that their firms were efficient in safeguarding goods on transit from theft and damages (mean score = 3.97); and in delivery of raw materials to the factory (mean score = 3.91). The respondents also indicated that their firms were efficient in physical movement of products to the market (mean score = 3.87). The respondents were however uncertain on whether fleet management by the firm was efficient (mean score = 3.53).

4.6.2 Transport Management in the Cement Manufacturing Firms

The respondents were asked to indicate their extent of agreement with statements on transport management in their cement manufacturing firms. The findings are presented in Table 4.9.

Table 4.9: Transport Management in the Cement Manufacturing Firms

| Statements | N | Mean | Std. Deviation |
|--|----------|-------------|-----------------------|
| Transport systems in our organisation enhance efficient flow of products from the factory to the market. | 102 | 4.23 | 0.900 |
| There is effective monitoring and tracking goods in transit to ensure their safety and timely delivery. | 102 | 3.94 | 0.953 |
| Our firm had adequate transport capacity to ensure effective distribution that meets the market demands. | 102 | 3.75 | 1.009 |
| Our firm outsource transport services from Third Party Providers. | 102 | 4.26 | 0.878 |
| Our firm partly collaborates with other partners to ensure delivery of goods/products. | 102 | 4.21 | 0.837 |
| Transportation packaging of products is of good quality. | 102 | 4.14 | 1.063 |

As shown in Table 4.9 the respondents agreed that their firms outsourced transport services from Third Party Providers (mean score = 4.26); and that transport systems in their organisation enhanced efficient flow of products from the factory to the market (mean score = 4.23). The respondents also agreed that their firms partly collaborated with other partners to ensure delivery of goods/products (mean score = 4.21); and also agreed that transportation packaging of products was of good quality (mean score = 4.14). Moreover, the respondents agreed that their firms had adequate transport capacity to ensure effective distribution that meets the market demands (mean score = 3.75); and also agreed that there was effective monitoring and tracking of goods in transit to ensure their safety and timely delivery (mean score = 3.94).

4.6.3 Extent Transport Management Influence Supply Chain Performance

The respondents were asked to indicate the extent to which transport management influence supply chain performance in their firm. The findings are presented in Figure 4.4.

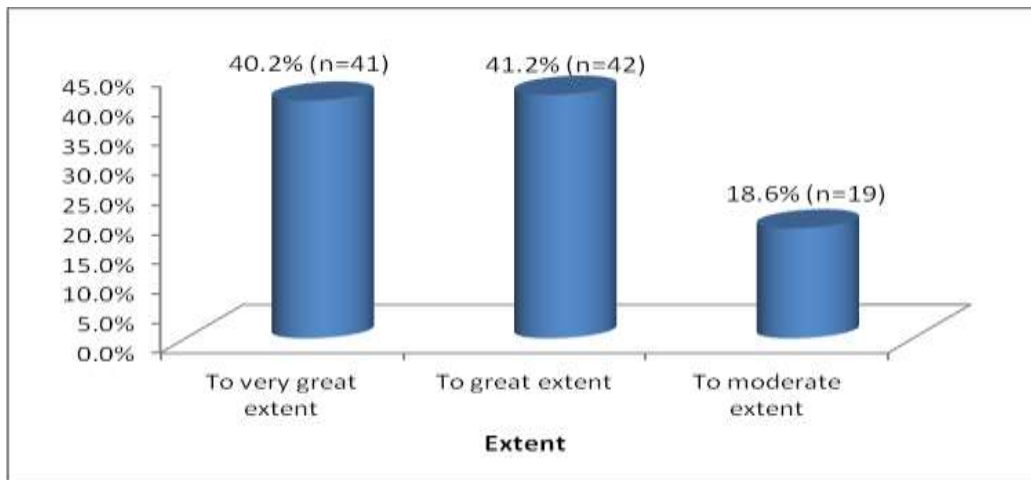


Figure 4.4: Extent Transport Management Influence Supply Chain Performance

The findings in Figure 4.4 show that 41.2% of the respondents agreed to a great extent while 40.2% agreed to a very great extent that transport management influence supply chain performance in cement manufacturing firms. However, 18.6% of the respondents indicated that transport management influence supply chain performance in cement manufacturing firms to a moderate extent.

4.7 Inventory Distribution Management and Supply Chain Performance

This section sought to establish the effect of inventory distribution management on supply chain performance of cement manufacturing firms in Kenya.

4.7.1 Inventory Distribution Management in Cement Manufacturing Firms

The respondents were asked to indicate their level of agreement with statements on inventory distribution management in cement manufacturing firms. The findings are presented in Table 4.10.

Table 4.10: Inventory Distribution Management in Cement Manufacturing Firms

| Statements | N | Mean | Std. Deviation |
|--|----------|-------------|-----------------------|
| There is effective stock control and movements. | 102 | 4.18 | 0.979 |
| The organization has stock control systems available | 102 | 3.91 | 1.082 |
| The distribution planning in the firm ensures timely delivery of goods | 102 | 4.40 | 0.824 |
| The inventory distribution management strategies employed by our firm enhances efficient delivery of goods in the intended markets, at the right time. | 102 | 4.09 | 1.025 |
| Delivery lead time is short | 102 | 3.96 | 1.080 |
| Deliveries arrive on the proposed dates | 102 | 4.07 | 0.893 |
| Materials/goods transported by outsourced third parties is always of good quality. | 102 | 3.88 | 1.046 |
| Organization helps in return/reverse logistics when needed. | 102 | 3.82 | 1.085 |

The study findings in Table 4.10 show that the respondents agreed that distribution planning in the firm ensures timely delivery of goods (mean score = 4.40); and that there was effective control and movement of stocks (mean score = 4.18). The respondents further agreed that inventory distribution management strategies employed by their firms enhanced efficient delivery of goods in the intended markets, at the right time (mean score = 4.09). They also agreed that deliveries arrived on the proposed dates (mean score = 4.07); and that delivery lead time was short (mean score = 3.96). In addition, the respondents agreed that their organizations had stock control systems (mean score = 3.91); and that their organizations helped in return of stocks when needed (mean score = 3.82).

4.7.2 Extent Inventory Distribution Management Influence Supply Chain Performance

In this section the study sought to examine the extent to which inventory distribution management influence supply chain performance in cement manufacturing firms. The results are presented in Table 4.11.

Table 4.11: Extent Inventory Distribution Management Influence Supply Chain Performance

| Extent | Frequency | Percent |
|----------------------|------------------|----------------|
| To very great extent | 45 | 44.1 |
| To great extent | 38 | 37.3 |
| To moderate extent | 17 | 16.7 |
| To Small extent | 2 | 2.0 |
| Total | 102 | 100.0 |

The study results in Table 4.11 show that 44.1% of the respondents agreed to a very great extent while 37.3% agreed to a to a great extent that inventory distribution management influence supply chain performance in cement manufacturing firms. A further 16.7% of thye respondents indicated that inventory distribution management influence supply chain performance in cement manufacturing firms to a moderate extent.

4.8 Supply Chain Performance

The respondents were asked to indicate the extent to which logistics management practices they employed enhanced various supply chain performance aspects in their firms. The findings are presented in Table 4.12.

Table 4.12: Supply Chain Performance

| Statements | N | Mean | Std. Deviation |
|--|----------|-------------|-----------------------|
| The logistics management practices employed in the firm has improved suppliers performance. | 102 | 4.03 | 1.019 |
| The logistics management practices have improved the quality of services offered at different levels along the supply chain. | 102 | 4.14 | 0.901 |
| The logistics management practices have reduced costs in the supply chain. | 102 | 4.25 | 0.841 |
| Responsiveness towards the customers is high. | 102 | 4.23 | 0.807 |
| There is flexibility in logistics operations in the organisation. | 102 | 3.96 | 0.843 |
| There is improved operating efficiency. | 102 | 4.01 | 0.980 |

As shown in Table 4.12, the respondents indicated logistics management practices had reduced costs in the supply chain to a great extent (mean score = 4.25). It was also found out that responsiveness towards the customers was high (mean score = 4.23); and

logistics management practices had improved the quality of services offered at different levels along the supply chain, to a great extent (mean score = 4.14). The respondents further agreed that the logistics management practices employed by their firms had improved suppliers performance to a great extent (mean score = 4.03); as well as improving operating efficiency (mean score= 4.01).

4.9 Regression Analysis

A regression analysis was conducted to establish the form of relationship between the independent variables and the dependent variable. The independent variables are logistics management practices (warehousing management, information flow management, transportation management, inventory distribution management) while the dependent variable is supply chain performance of cement manufacturing firms in Kenya. The results are presented below.

Table 4.13: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|--------------------|----------|-------------------|----------------------------|
| | 0.836 ^a | 0.699 | 0.686 | 0.21793 |

a Predictors: (Constant), warehousing management, information flow management, transportation management, inventory distribution management

The R is the correlation co-efficient which shows the relationship of the variables. The value of R is 0.836 which shows there is a strong relationship between the variables. The value of R square is 0.686 which implies that the four variables or predictors warehousing management, information flow management, transportation management

and inventory distribution management) explain 68.6% of supply chain performance in cement manufacturing firms in Kenya. The remaining percentage can be explained by other variables not included in the study.

Table 4.14: ANOVA(b)

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|--------------|----------------|------------|-------------|--------|--------------------|
| 1 | Regression | 10.694 | 4 | 2.674 | 56.292 | 0.000 ^a |
| | Residual | 4.607 | 97 | .047 | | |
| | Total | 15.301 | 101 | | | |

a Predictors: (Constant), warehousing management, information flow management, transportation management, inventory distribution management

b Dependent Variable: Supply chain performance

The ANOVA shows whether there is a statistically significant difference between the variables means. The results in Table 4.14 shows an F- calculated value (F= 56.292) which is significant ($p=0.001 < 0.05$). Therefore, there is a statistically significant difference. This therefore means that the regression model is significant and there the results can be relied upon.

Table 4.15: Regression Coefficients(a)

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-----------------------------------|-----------------------------|------------|---------------------------|-------|-------|
| | B | Std. Error | Beta | | |
| (Constant) | 1.129 | 0.397 | | 2.843 | 0.005 |
| Warehousing management | 0.137 | 0.061 | 0.127 | 2.226 | 0.028 |
| Information flow management | 0.468 | 0.082 | 0.385 | 5.705 | 0.000 |
| Transportation management | 0.124 | 0.038 | 0.183 | 3.277 | 0.001 |
| Inventory distribution management | 0.375 | 0.046 | 0.546 | 8.224 | 0.000 |

a Dependent Variable: Supply chain performance

The study results show that in Table 4.15 show that there is a positive and statistically significant relationship between information flow management and supply chain performance of cement manufacturing firms as shown by $\beta = 0.468$ and $p=0.001 < 0.05$. There is also a positive and statistically significant relationship between inventory distribution management and supply chain performance of cement manufacturing firms ($\beta = 0.375$, $p= 0.001$). The results further shows that there is a positive and significant association between supply chain performance of cement manufacturing firms and warehousing management ($\beta = 0.137$, $p= 0.028$); transportation management ($\beta = 0.124$, $p= 0.001$). This implies that all the four variables; that is, warehousing management, information flow management, transportation management, inventory distribution management have a positive and statistically significant influence on supply chain performance of cement manufacturing firms in Kenya.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The objectives of the study were covered in this chapter using summary of findings, conclusions. The entire research was inference through the research questions and their answers. Recommendations were also provided and further researches were also recommended.

5.2 Summary of Findings

5.2.1 Warehousing Management and Supply Chain Performance

The study sought to establish the effect of warehousing management on supply chain performance of cement manufacturing firms in Kenya. The study found out that the cement manufacturing firms had adequate warehouse and storage space to hold their stock; and that there was adequate utilization of the storage facilities in the factories. The study also found out that the firms used modern techniques of product handling in the warehouse; and that there was good management of the warehouse which ensures high order rate and avoids delay in production process. The respondents also agreed that the strategies employed by their firms ensured effective management of inventory levels. Majority of the respondents (55.9%) revealed that warehousing management influenced supply chain performance in the cement manufacturing firms to a great extent. The regression analysis results further shows that there is a positive and significant

association between warehousing management and supply chain performance of cement manufacturing firms.

5.2.2 Information Flow Management and Supply Chain Performance

The study sought to determine the effect of information flow management on supply chain performance of cement manufacturing firms in Kenya. It was found out that there was adequate information sharing among supply chain partners which has enhanced easy movement of products in the market; and that communication and sharing of information had improved the demand and market forecast. The respondents agreed that networking among supply chain partners had improved the time the products take to get to the market; and that information flow management had improved production processes, stock control, and distribution of products to the market. It was also established that there was good communications among the stakeholders in the value chain. On overall, majority of the respondents indicated that information flow management influenced supply chain performance in the cement firms to a great extent. In addition, the regression analysis shows that there is a positive and statistically significant relationship between information flow management and supply chain performance of cement manufacturing firms.

5.2.3 Transportation Management and Supply Chain Performance

The study sought to assess the effect of transportation management on supply chain performance of cement manufacturing firms in Kenya. The study found out that majority of the cement manufacturing firms were efficient in safeguarding goods on transit from

theft and damages; in delivery of raw materials to the factory and in physical movement of products to the market. However fleet management by the firms was a challenge. As a result, majority of the firms revealed that they had outsourced transport services from Third Party Providers and this had enhanced efficient flow of products from the factory to the market. The respondents also agreed that their firms partly collaborated with other partners to ensure delivery of goods/products and this gave the firms adequate transport capacity to ensure effective distribution that meets the market demands. It was also found out that the firms had effective monitoring and tracking of goods in transit to ensure their safety and timely delivery. Majority of the respondents indicated that transport management influence supply chain performance in cement manufacturing firms to a great extent. The regression results found that there is a positive and significant association between transportation management and supply chain performance of cement manufacturing firms in Kenya.

5.2.4 Inventory Distribution Management and Supply Chain Performance

The study also sought to determine the effect of inventory distribution management on supply chain performance of cement manufacturing firms in Kenya. The study found out that inventory distribution management influence supply chain performance in cement manufacturing firms to a great extent. The respondents agreed that distribution planning in the firm ensures timely delivery of goods; and that there was effective control and movement of stocks. They also agreed that inventory distribution management strategies employed by their firms enhanced efficient delivery of goods in the intended markets, at the right time – the delivery lead time was short. Moreover, it was found out that the

cement manufacturing firms had stock control systems; and their firms also helped in return of stocks (reverse logistics) when needed. The regression results established that there is also a positive and statistically significant relationship between inventory distribution management and supply chain performance of cement manufacturing firms.

5.3 Conclusions

The study concludes that warehousing management influences supply chain performance of cement manufacturing firms in Kenya to a great extent. Aspects such as having adequate warehouse and storage space and adequate utilization of the storage facilities in the factories has an effect on how the cement manufacturing hold and manage the flow of stocks/goods. Use of modern techniques of product handling in the warehouse also enhances warehouse management which enhances effective management of inventory levels and avoids delay or hiccups on the supply chain, hence improved supply chain performance.

The study concludes that information flow management has a positive effect on supply chain performance of cement manufacturing firms in Kenya. When there is adequate communication and information sharing among supply chain partners, it helps the firms predict the demand and improve their market forecast. Information flow and networking among supply chain partners also helps the firms improve production processes, stock control, and distribution of products to the market. This enhances supply chain performance of these firms.

The study concludes that inventory distribution management has a positive effect on supply chain performance of cement manufacturing firms in Kenya. When there is effective inventory distribution management, there is effective control and movement of stocks which ensures timely delivery of goods by the firms. It was established that the inventory distribution management strategies employed by the cement manufacturing firms have enhanced efficient delivery of goods in the intended markets, at the right time which reduces lead time.

5.4 Recommendations

The study recommends that management of cement manufacturing firms should consider to outsource some logistics services such as transport due to its advantages and its possible influence on operational performance, as it enables the firms to focus on its core competencies. It was found out that most cement manufacturing firms have a challenge in fleet management which would have a negative effect on their supply chain. By outsourcing such logistics services the firms would improve their supply chains.

The study also recommends that the cement manufacturing firms should continually communicate, network and share information with value chain partners so as to enable the firms understand the market demand. Increased networking among supply chain partners could improve the time the products take to get to the market and also enhance market responsiveness.

The study also recommends the employ effective inventory distribution management strategies as this would enhance speed in delivery of goods to the market, production

process, responsiveness and flexibility of delivery, and also influence marketing performance, which has a leverage effect on the average sales growth and business profitability.

5.5 Areas for Further Research

This study looked at the effect of logistics management practices on supply chain performance. The study was limited to cement manufacturing firms in Kenya which may not represent the other industries in the manufacturing sector due to different business environment. In this regard, the study recommends that a further study be conducted on other industries in the manufacturing sector for comparison of results. There is also need to establish how logistics management practices affects other aspects of the manufacturing firms such as operational performance and organisation competitiveness.

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APPENDICES

Appendix I: Letter of Introduction

Dear Respondent,

RE: DATA COLLECTION

I am a student in KCA University pursuing Master of Business Administration Degree in Procurement and Supplies Management. I am conducting a research study on the **“effect of logistics management practices on supply chain performance of cement manufacturing firms in Kenya”** to fulfil the deree program’s requirement. The study chose this organzoaton as its major target population.

You are required to provide accurate answers and be as honets as you can. The answers that you will provide wil be trrated with confidence and will be used for the research purposes only.

I realy apprecacite your cooperation. Thank you

Yours Sincerely

Emily Rapario

Appendix II: Questionnaire

Section A: Demographic Information

1. Kindly indicate your gender

Male [] Female []

2. Indicate your age?

a). 20- 30 years []

b). 31-40 Yrs []

c). 41-50 Yrs []

d). Above 50 Yrs []

2. Which level of education have you reached?

a) Certificate/Diploma [] b) Bachelors Degree []

d) Masters [] c). PhD. []

d). Other (specify).....

3. Indicate the number of years have you worked in this company?

a) Less than 5 Years [] b) 5-10 Years []

c) 11-15 Years [] d) 16-20 Years []

d) Above 20 Years []

4. Indicate your Department.....

Section B: Warehousing Management

Indicate your agreement with the statements asked on Warehousing Management in your organisation? A scale of 1 - 5 was used where 1 implies strongly disagree, 2 means disagree, 3 is Neutral, 4 is agree and 5 implies Strongly agree

| Statements | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| The organization has adequate warehouse/storage space to hold additional stock. | | | | | |
| The warehousing/storage strategies employed by our firm ensure effective management of inventory levels. | | | | | |
| There is adequate utilization of the storage facilities in the factory. | | | | | |
| There is inefficiencies in the store, warehousing processes which leads to downtime. | | | | | |
| There is good management of the warehouse which ensures high order rate to avoid delay in production process. | | | | | |
| Firm uses modern techniques of product handling in the warehouse. | | | | | |

5. To what extent do warehousing Management influence supply chain performance in your firm?

Not at all [] Small extent [] Moderate extent [] Great extent []

Very great extent []

Section C: Information Flow Management

Indicate your agreement with the statements asked on Information Flow Management in your firm? A scale of 1 - 5 was used where 1 implies strongly disagree, 2 means disagree, 3 is Neutral, 4 is agree and 5 implies Strongly agree

| Statements | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| There is adequate information sharing among supply chain partners which enhances easy movement of products in the market. | | | | | |
| Communication and sharing of information has improved the demand/market forecast. | | | | | |
| The networking among supply chain partners has improved the time the products take to get to the market | | | | | |
| Information flow management has improved production processes, stock control, and distribution of products to the market. | | | | | |
| Catalogue Information is available and adequate. | | | | | |
| Good communications is established with stakeholders. | | | | | |

6. To what extent do information flow management influence supply chain performance in your firm?

Not at all [] Small extent [] Moderate extent [] Great extent []

Very great extent []

Section D: Transportation Management

7. How would you rate the following aspects of transportation in your firm? Use a scale of 1-5, where 1 is Not at all efficient, 2 is Somehow inefficient, 3 is Uncertain, 4 is Efficient, 5 is Highly efficient

| Statements | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Physical movement of products to the market. | | | | | |
| Delivery of raw materials to the factory. | | | | | |
| Fleet management by the firm. | | | | | |
| Safeguarding goods on transit from theft and damages. | | | | | |

8. Indicate your agreement with the statements asked on transport management in your firm? A scale of 1 - 5 was used where 1 implies strongly disagree, 2 means disagree, 3 is Neutral, 4 is agree and 5 implies Strongly agree

| Statements | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| Transport systems in our organisation enhances efficient flow of products from the factory to the market | | | | | |
| There is effective monitoring and tracking goods in transit to ensure their safety and timely delivery. | | | | | |
| Our firm had adequate transport capacity to ensure effective distribution that meets the market demands. | | | | | |
| Our firm outsource transport services from Third Party Providers. | | | | | |
| Our firm partly collaborates with other partners to ensure delivery of goods/products. | | | | | |
| Transportation packaging of products is of good quality | | | | | |

9. To what extent do transport management influence supply chain performance in your firm?

Not at all [] Small extent [] Moderate extent [] Great extent []

Very great extent []

Section E: Inventory Distribution Management

10. Indicate your agreement with the statements asked on inventory distribution management in your firm? A scale of 1 - 5 was used where 1 implies strongly disagree, 2 means disagree, 3 is Neutral, 4 is agree and 5 implies Strongly agree

| Statements | 1 | 2 | 3 | 4 | 5 |
|--|----------|----------|----------|----------|----------|
| There is effective stock control and movements. | | | | | |
| The organization has stock control systems available | | | | | |
| The distribution planning in the firm ensured timely delivery of goods | | | | | |
| The inventory distribution management strategies employed by our firm enhances efficient delivery of goods in the intended markets, at the right time. | | | | | |
| Delivery lead time is short | | | | | |
| Deliveries arrive on the proposed dates | | | | | |
| Materials/goods transported by outsourced third parties is always of good quality. | | | | | |
| Organization help in Return/reverse logistics when needed | | | | | |

11. To what extent does inventory distribution management influence supply chain performance in your firm?

Not at all [] Small extent [] Moderate extent [] Great extent []

Very great extent []

Section F: Supply Chain Performance

12. To what extent do logistics management practices enhance the following supply chain performance aspects in the organization? A scale of 1-5 was applied where 1 means Not at all, 2 implies Small extent, 3 means Moderate extent, 4 means Great extent and 5 implies Very great extent

| Statements | 1 | 2 | 3 | 4 | 5 |
|--|----------|----------|----------|----------|----------|
| The logistics management practices employed in the firm has improved suppliers performance | | | | | |
| The logistics management practices have improved the quality of services offered at different levels along the supply chain. | | | | | |
| The logistics management practices have reduced costs in the supply chain. | | | | | |
| Responsiveness towards the customers is high. | | | | | |
| There is flexibility in logistics operations in the organisation. | | | | | |
| There is improved operating efficiency. | | | | | |

13. How else has the organization benefitted from the logistics management practices it has employed?

.....

.....

THANK YOU FOR YOUR PARTICIPATION

Appendix III: List of Cement Manufacturing Firms in Kenya

1. East Africa Portland Cement Company.
2. Bamburi Cement,
3. Athi-River Mining
4. Mombasa cement
5. National Cement
6. Savannah Cement