

**SUPPLY CHAIN INTEGRATION AND OPERATIONAL PERFORMANCE  
OF LARGE SCALE MANUFACTURING FIRMS IN KENYA**

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## **DECLARATION**

### **STUDENT DECLARATION**

This project is my original work and has not been presented for the award of degree in another University.

Signed..... Date.....

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### **APPROVAL**

The project has been presented for the examination with my approval as the supervisor.

Signed..... Date.....

Mr. Lazarus mulwa

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## **DEDICATION**

I dedicate my research project to our God above for his grace and mercy that has seen me throughout the project. To my lovely family for their love, encouragement and continued support whenever I felt like giving up.

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## **ABBREVIATIONS AND ACRONYMS**

**GoK** Government of Kenya

**ICT** Information Communication Technology

**KAM** Kenya Association of Manufacturers

**PwCIL** PriceWaters Consultancy International Limited

**ROA** Return on Assets

**ROI** Return on Investment

**SCI** Supply Chain Integration

**SCM** Supply Chain Management

## **ABSTRACT**

Supply chain management is a complex system which covers all supportive activities from the point of sourcing raw materials from suppliers to the point of conducting after sales services offered to consumers. The specific objectives of the study were to: determine supply chain integration practices adopted by Large-scale Manufacturing firms in Kenya, establish the relationship between supply chain integration practices and operational performance of Large-scale Manufacturing firms in Kenya and to determine barriers to integration faced by Large-scale manufacturing firms in Kenya. A descriptive survey was adopted. The population for this study included all the large-scale manufacturing firms in Nairobi County, Kenya. The sample size for this study was 88 respondents. The study used primary and secondary data sources that will be obtained using a self-administered questionnaire that is designed to elicit specific answers for quantitative and qualitative analysis respectively. Collected data was analysed using descriptive statistics which include mean and standard deviation to achieve the first objective. Factor analysis was used to analyze the third objective of the study. The study concludes that most large manufacturing companies in Kenya have adopted the various supply chain integration practices. The study concludes that supply chain integration has an effect on operational performance of large manufacturing firms in Kenya. This study recommends that manufacturing firms should strengthen their supply chain management by putting greater effort to the implementation of some key best practices. This should be done by keeping all practices updated. In addition, the study recommends that all manufacturing companies and other organizations should be advised to embrace the concept so that they can be able to reap the benefits of adopting these practices. Organization are also advised to adopt the practices that are currently adopted at a very small extent because they can significantly improve organization operational performance from the current position.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

To survive in an uncertain environment with stiff competition, firms have been forced to think beyond their boundaries in order to cope with this form of competition and accomplish their objectives. Slack, Chambers and Johnston (2007) posit that creating a distinct competitive advantage and profitability through supply chain management requires a firm to think beyond the boundaries of the firm. The way to achieve this is through the supply chain. Fawcett, Ellgram and Ogden (2007) note that having an effective supply chain is a critical milestone towards firm success and improved performance. Blackwell (1997) argues that progressive firms fight to dominate the market place and not to outdo their competitors but through alliances with all their supply chain partners; wholesalers, manufacturers and suppliers within their supply chain.

Firms have realized the critical role played by supply chain and this has given rise to the concept of Supply Chain Management (SCM). There are several benefits derived from effective SCM. These include improved delivery reliability, inventory reduction and responsiveness, (Harrison & Van, 2008). Effective management of supply chain needs cross-functional and cross-organisational business processes with adequate information sharing levels, coordination of operational activities and close partnerships, (Leuschner, Rodgers & Charvet, 2013).

Supply chain managers must devise strategies that accommodate all members in a supply chain, and effectively manage diversity of relationships right from the suppliers, distributors, wholesalers, retailers and the final consumers. Supply Chain

Integration (SCI) seeks to strengthen the relationship between supply chain members (Fawcett, *et al.*, 2007). SCI builds relationships among supply chain partners and this improves supply chain capabilities resulting into supply chain effectiveness. Supply chain participants must collaborate closely in their inter-firm activities to ensure a smooth flow of information and resources within their supply chain systems and hence the concept of Supply Chain Integration (SCI), (Fawcett et al., 2007).

Operational performance on the other hand is the performance of an organization against its set standards such as waste reduction, productivity, cycle time, environmental responsibility and regulatory compliance (O'Brien, 2015). The operations of a firm should be efficient and effective. Effectiveness is the expanse to which customers' needs are fulfilled, while efficiency is defined as a measure of how economical firms' resources are employed. In order to accurately enhance accessibility and evaluation of operational performance, the correct measurement systems should be planned, developed and implemented. Performance measurement networks are hence developed in order to monitor and maintain operational control.

### **1.1.1 Supply Chain Integration**

SCI is defined as the management of several sets of activities which are aimed at inter-connecting business processes across firms and eliminating needless parts of the processes in order to build an effective and functional supply chain. SCI puts more emphasises on connectivity and simplicity of business processes which is aimed at improving the flow of products from the manufacturer to the final consumer. The two important themes of SCI include connectivity and simplification. Connectivity links the internal operations across functional units and externally within organisations in order to harmonize material flow, products and information. Connectivity can be achieved through effective coordination, collaboration, cooperation and interaction

(Leuschner et al., 2013). Simplification is described as identifying and eliminating duplication including activities that do not add value among other elements within the processes. This can be realized primarily through establishing and adhering to operational policies and procedures.

SCI dimensions include customer, supplier and internal integration (Flynn *et al.*, 2010). Supplier integration and customer dimensions constitute the external integration that involves the degree to which the firm interacts with its partners in a bid to align inter-organisational strategies, practices and processes into a collaborative and synchronized process. Suppliers collaborate with a firm through various supply chain activities, interaction and communication to ensure that products and services are delivered timely. Reliability of suppliers is a key pillar of supply chain success; however, this is defined by the manner in which the firm relates with its suppliers existing relationships. Customer integration is the approaches employed by the firm to ensure that customers are satisfied with the services offered by an organisation. They must establish effective coordination and control systems for customer feedback and continuous improvement. This provides guarantees customer satisfaction since the organisation is able to know and improve on its weak areas. Customer integration also allows customers to participate in key decision making. Internal integration is concerned with activities that take place in a firm. It is the extent to which the firm aligns its strategies, practices and processes into a collaborative and synchronized processes to satisfy customer expectations and efficiently interact with the suppliers.

### **1.1.2 Operational Performance**

Operational performance (OP) involves aligning the business units in an organisation to ensure that they are working towards achieving similar goals. Boyer and Lewis (2002) stated that operational performance allows organisations to make effective use

of their available resources such as knowledge and human assets to achieve corporate goals and objectives. Achieving operational performance is considered critical by firms that aspire to be best and compete with their rivals on the basis of efficiency and competitiveness. Wong, Lai and Cheng (2011) argue that operational performance enables firms to deliver their services efficiently to the customers and improve value for products or services.

Through operational performance assessment an organisation can quantify the efficiency and effectiveness of past actions. The firm can determine how well the organisation is managed and the value that it is able to deliver to customers and the stakeholders. OP can be looked at from customisability of products or services, addressing customer needs beyond their expectation, overall cost of producing products or services including delivery time, (Moullin, 2002).

Zhang and Huo (2013) contend that operational performance also considers organisational performance that entails productivity, quality and service delivery. OP entails enhancing cost performance which implies that organisations need to establish wastage and inefficiencies in their processes. Operational performance is associated to an organisation's ability to produce and deliver products to customers (Green, Zelbst, Meacham & Bhadauria, 2012). Chadzoudes and Chadzoglou, (2011) pointed out a few important indicators such as cost reduction, low lead time, high inventory turnover and customer satisfaction. Operational performance will be assessed with the help of the following indicators: efficiency, effectiveness, cost reduction and customer satisfaction.



### **1.1.3 Large Scale Manufacturing Firms in Kenya**

In reference to KAM, (2011) a large-scale manufacturing has more than 100 staff. Today, we have 627 large-scale manufacturing firms in Kenya operating in 12 different sub-sectors; food processing, chemicals, construction, plastic, metal, energy, textile, automobiles, wood, leather, pharmaceuticals and paper processing firms.

Manufacturing is one of the sectors that make a significant contribution towards economic growth (Kenya Vision 2030). Manufacturing sector is an essential element for Kenya' economic growth that has currently employed approximately 300,000 people that constitutes 13% of the entire workforce in Kenya. Nonetheless, from 1960s, large-scale manufacturing sector had been having a growth trend of 10%.. In line with Vision 2030, the manufacturing sector is expected to create employment opportunities and attract foreign investment and support economic development (GoK, 2007).

Large scale manufacturing firms provides a better platform for strategic direction in managing ICT in supply chain, maintaining efficiency and improving operational performance. This will enable manufacturing firms to effectively utilize ICT in managing their supply chains as provided in the Kenya's Vision 2030, (Okoth, 2012). Kimaru (2015) argues that manufacturing firms in Kenya are appreciating technology as an important resource to effectively manage their supply chain and connect with other partners within the supply chain system. Remarkable benefits have been achieved from these IT investments making a need for the manufacturing firms to make it a priority to invest in modern technology.

## **1.2 Research Problem**

It has been noted that organisations are constantly evolving to effectively cope with the changes in the environment such as stiff competition and uncertainty in demand and supply (Kaipia, Holmstrom & Hellstrom; 2007). Lancioni, Smith and Schau, (2003) observed that an individual organisation can no longer prosper in business on its own but rather the entire supply chain that moves raw materials through production and ultimately to the end users. Thus, SCI is considered an essential component in enhancing supply chain effectiveness and improved performance. According to Cooper (2012) supply chain management is a system that improves all activities which are carried out by an organization. Supply chain management is a complex system which covers all supportive activities from the point of sourcing raw materials from suppliers to the point of conducting after sales services offered to consumers. In order to grow and survive any organization has to identify its strengths and weaknesses, so as to capitalize on the strengths and to overcome the weaknesses. Vaidya and Hudnurkar (2012) stated that collaboration in supply chain plays a dominant role for improving an organization's performance and gaining competitive advantage.

Studies have been done on the link between SCI and operational performance but there seem to be a limited consensus in the findings (Frohlich & Westbrook, 2001; Flynn, et al., 2010; Ralston, 2015). Globally, Frohlich and Westbrook (2001) did a study on SCI integration: an international study of supply chain strategies and obtained evidence where companies with the strongest association with performance improvement are those with the widest degree of arc of integration with both suppliers and customers. Halley and Beaulieu (2009) in their paper sought to understand the association between a more thorough supply chain integration and greater mastery of

operational competencies. The study concluded that supply chain management practices may be either integrated or distant with upstream or downstream partners and highly integrated supply practices led to operational mastery o competency in logistics. According to Rajagopal (2015), integrating the supply chain through recognition of the inter-relationships of the different supply chain parts as well as alignment of design and execution of company's competitive strategy, leads to proper realization of the potential benefits.

Locally, Muthoni (2015) did a research on SCI and performance of pharmaceutical firms in Kenya. Her findings established that pharmaceutical firms have embraced SCI and there was improvement in operations performance. The study also found that through SCI organizations have been able to reduce cost, lead times, inventory levels, improved productivity and product quality thereby leading to customer satisfaction. Wamuku (2016) found a positive link between supply chain integration and operational performance constructs of private hospitals. Ndambuki (2013) showed that sharing of information resulted into reduced lead-time, improved SC performance and ease of processing orders. Integration was found to enhance efficiency. Limited attention has been given to SCI and operational performance particularly large-scale manufacturing firms in Kenya. It is against this backdrop that this study seeks to to assess the contribution of supply chain integration to operational performance of Large-scale Manufacturing firms in Kenya

### **1.3 Research Objective**

The broad objective of this study was to assess the contribution of supply chain integration to operational performance of Large-scale Manufacturing firms in Kenya.

The specific objectives of the study were to:-

- i. Determine supply chain integration practices adopted by Large-scale Manufacturing firms in Kenya.
- ii. Establish the relationship between supply chain integration practices and operational performance of Large-scale Manufacturing firms in Kenya.
- iii. Determine barriers to integration faced by Large-scale manufacturing firms in Kenya.

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

The study may be of great value to policy makers; KAM to firms in a supply chain relationship and it may be timely communications to supply chain members resulting in optimal decisions for suppliers and customers. Hence customers can get products at the right price, right quality and the right time due to reduction of production cost, improvement in product quality and reduced lead time.

Manufacturing firms can borrow some of the best supply chain integration practices adopted by manufacturing firms in Kenya. In addition, they may understand the challenges faced by these firms when implementing supply chain integration practices hence this can inform ways appropriate ways of dealing with such challenges.

The study may be expected to make a significant contribution to the existing literature in the field of supply chain integration laying a specific focus to information communication technology. It may form a basis for future research on the relationship between supply chain integration and financial performance; this debate can be extended to include intervening and moderating variables and their effect on this similar relationship.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The field of SCI has been a subject of theoretical and empirical discussion over the last two decades. This chapter is seeking to address the theories that underpin SCI, SCI, the link between SCI and performance, the limitations that face organisations in implementing SCI, the conceptual framework and a summary of the literature review.

#### **2.2. Supply Chain Integration**

American Production and Inventory Control Society (APICS, 1990) define the supply chain as the processes from the initial raw materials to final consumption of the finished products linking across supplier-user industries. The supply chain constitutes all functions within and outside an industry, which enable the value chain to make products and provide services to customers (Inman, 1992). Scott and Westbrook (1991) described SCM as the chain linking each element of the manufacturing and supply process from raw materials to the end user. This management philosophy focused on how firms utilized their suppliers' processes, technology, information, and capability to enhance competitive advantage (Farley, 1997), and the coordination of the manufacturing, materials, logistics, distribution and transportation functions within an organization (Lee & Billington, 1992). SCM is an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user (Cooper et al., 1997).

Wang and Miller (2005) define supply chain integration as the process of merging elements from two similar antecedent processes to create a single process that can be

used to replace the original processes. Also, according to Fabbe-Costes and Jahre (2008) integrated supply chain concept refers to administering the various supply chain functions into a unified program. A successful supply chain then coordinates and integrates all of the activities into a seamless process and links all the partners in the chain whether suppliers or customers. In order to gain a better perspective of supply chain integration, Fawcett and Magnan (2002) identify four types of integration, internal cross- functional process integration; backward integration with key first- tier suppliers; forward integration with key first tier customers, or with the customers' customers and complete forward and backward integration, or expresses as integration from "suppliers' supplier to the customers' customer".

## **2.2 Theoretical Framework**

Various theories provide insights into the rationale underlying SCI. These theories are Resource-based Theory, Knowledge-based Theory and Resource Dependence Theory.

### **2.2.1 Resource-Based Theory**

Key to RBT is the contention that a firm's sustained competitive advantage results from unique resources and capabilities held by the firm (Lynch, Keller & Ozment, 2000). Barney (1991) argued that sustained competitive advantage and improved performance may be realized by exploiting resources that are valuable, rare, imperfectly and non-substitutable. A valuable resource or bundles of resources allows an enterprise to harness opportunities and reduce threats in the environment (Barney, 1991; Hart, 1995). Daft (1983) lists these resources as all assets, capabilities, organizational processes, firm attributes, information and knowledge among others.

In the context of SCI, integration with partners could endow the firm with competitively valuable resources and capabilities that it does not possess. Within

RBT, promoters of knowledge-based theory argue that RBVT does not go far enough (Alavi & Leidner, 2001; Grant, 1996; Nonaka & Noboru, 1998). They argue that RBT treats knowledge as a generic resource rather than having special characteristics; that it does not distinguish between different types of knowledge- based capabilities. The value in knowledge –based view as far as SCI lies in its sharing in internal and external organizational supply chain collaboration (Lavassani & Movahedi, 2010). This study takes the view that RBT and particularly its variant, knowledge –based view of the firm underlies the rationale for SCI

### **2.2.2 Knowledge-based View**

Most scholars that subscribe to RBV perceived knowledge as a generic resource, . some researchers (Murray 2000; Teece et al. 1997; Tiwana 2002) indicate that knowledge has unique traits that make it worthwhile resource. Hamel and Prahalad (1994) opine that know-how, knowledge and intellectual assets and competencies are important drivers of superior performance in this information age. Evans (2003) and Tiwana (2002) also suggest that knowledge is a critical component of the firm. Evans (2003) indicates that material resources decline when utilized in the firm, while knowledge assets increase with the use.

Grant (1996) asserted that there are two kinds of knowledge which include information and know-how. Information can be expressed in words and numbers and shared in the form of data, scientific formulae, product specifications, manuals, universal principles, and so forth. This kind of knowledge can be readily transmitted across individuals formally and systematically. Know-how is highly personal and hard to formalise, making it difficult to communicate or share with others. Subjective insights, intuitions and hunches fall into this category of knowledge. Furthermore, know how knowledge is deeply rooted in an individual's action and experience, as well as in the ideals, values or emotions he or she embraces.

Beckmann (1999) stated that a five-level knowledge hierarchy having data, information, knowledge, expertise and capabilities. Zack (1999) categorizes organisational knowledge into three categories namely core knowledge, forward-thinking knowledge, and inventive knowledge. Core knowledge is rudimentary knowledge that enables the firm to survive in the market within the short-term. Advanced knowledge gives the firm identical knowledge as its challengers and allows



the firm to compete actively in the short-term. Innovative knowledge provides the firm with competitive position against other players. The firm with unique knowledge is capable of introducing innovative products or services that potentially makes it a market leader (Zack, 1999).

In line with this study, SCI offers a platform that allows supply chain partners to share knowledge and information efficiently. Members are able to work together towards achieving similar goals. SCI will enable the firm to share information and collaborate with its supply chain partners in managing processes to achieve efficient flow of products and services and information to provide value to customers at lower costs and high speed. These results into a strategic partnership that seeks to achieve common goals and objectives.

### **2.2.3 Resource Dependence Theory**

The Resource Dependence Theory (RDT) was developed in 1978 at Stanford University by Jeffrey Pfeffer , an American business theorist and Gerald R. Salancik,,an American organizational theorist (Pfeffer & Salancik, 1978). It is the study of the effects of external resources on the behavior of an organisation. This means the strategic and tactical management of the organisation is dependent on the procurement of external resources. Resource dependence theory has meaning on the strategies on production, organizational strategy, Recruitment of employees, external links optimal divisional structure of the firm, and board members, contract structure among others.

This theory recognizes that very few organizations are self- sufficient (Heide, 1994). It therefore proposes that organizations engage in exchanges with their environment in order to obtain resources. Harrison, Hitt, Hoskisson and Ireland, (2001) argued that

through organizational interdependence, firms can synergistically combine their resources with complementary resources of the firms they are collaborating with, thereby creating a resource bundle that is unique and difficult to replicate, thereby resulting in competitive advantage. This study takes the view that interdependence is at the core of SCI and so this study borrows from RDT.

Resource dependence reveals how important it is for a firm to acquire its resources from other firms in order to achieve its goals (Wisner et al., 2006). The RDT theory implies that most firms are not self-reliant and therefore rely on other organisations to obtain critical resources. Domenica (2002) asserts that a company must develop a supply chain that is efficient and effective in order to thrive over and above its competitors. This efficiency refers to use of minimal resources to achieve specific objectives, while effectiveness is the design of the distribution channels.

### **2.3 Supply Chain Integration**

The supply chain integration (SCI) has diverse dimensions classified into customer, supplier, and internal integrations. According to Flynn et al. (2010) it is crucial to consider the different dimensions of SCI to understand the functionality of individual aspects and the joint function of all the dimensions. Stank, Keller & Closs (2001b) explain that supplier and customer integration form the external integration, which defines the degree of interaction between a firm and its partners. The interaction leads to the creation of inter-organizational strategies and practices that promote collaborative processes.

Supply chain practices include technologies and activities that play a crucial role in promoting collaboration between a firm and the customers or vendors. Examples of supply chain practices are EDI, vendor-managed inventories, integrated production

planning, and delivery synchronisation (de Toni and Nassimbeni, 1999; Frohlich and Westbrook, 2001; Kulp et al., 2004). Supply chain patterns promote communication between the firm and its suppliers and/or consumers. Examples of supply chain patterns include regular visits to the supplier's facilities, high corporate level communication, and face-to-face communication (Chen et al., 2004; Duffy and Fearn, 2004; Bagchi et al., 2005). Supply chain attitudes also affect the effectiveness of supply chain integration. It refers to the attitude of buyers and/or vendors towards the supply chain management (van der Vaart and van Donk, 2008). Some examples of supply chain attitudes include firm's expectations concerning the relationship between buyers and suppliers (Chen et al., 2004; Johnston et al., 2004).

Although the external and internal integration have different roles in SCI, they are complementary. Internal integration supports the existence of departments and functions acting as a part of an integrated process while external integration emphasizes the establishment of close and interactive relationships with suppliers and consumers (Flynn, et al., 2010). However, both internal and external perspectives allow the parties involved in the supply chain to maximize their benefits. Different researchers have varying opinions about the dimensions of SCI. For (Marquez, Bianchi & Gupta, 2004; Rosenzweig, Roth & Dean, 2003), SCI is one-dimensional, but other researchers such as (Stank et al., 2001b; Zailani & Rajagopal, 2005) classify SCI into internal and external integration. Other researchers including (Gimenez & Ventura, 2005; Droge, Jayaram & Vickery, 2004) argue that SCI is multidimensional. The different dimensions of SCI make it difficult to separate them. This paper supports the view that SCI is a unidimensional concept, comprising of internal, customer, and supplier integration that act as independent variables in the study.

## **2.4 The Relationship between Supply Chain Integration and Operational Performance**

Stank, Keller and Daugherty (2001) explored the link between supply chain logistical integration and performance using a population of 306 firms in North America. The goal of the study was to develop and examine measures to test the empirical relationships between internal and external supply chain collaboration and logistical performance. Six aspects of SCI were identified and applied as well as six different performance measures. The respondents were senior logistics and supply chain executives selected from each firm. Five points liker scales were used to indicate the level of agreement. Data was analysed with the help of a regression analysis as the key analytical tool. Customer and internal integration were found to have a positive link with operational performance. Measure integration was also found to have a positive linkage with customer satisfaction. Further, a direct relationship was found to exist between integration and financial performance. There lacked a notable relationship between supplier integration and performance. The study limited itself to regression analysis and likert scale measures. Other factors that might affect this relationship such as firm size and age were not considered.

Chatzoudes and Chatzoglou (2011) evaluated the impact of SCI on operational and firm performance. The study objectives were to determine the effect of SCI on the firm's operational performance and to determine the effect of SCI on business performance. Independent variables included SCI dimensions and the dependent variables were separated into operational performance and business performance. Greek manufacturing firms formed the study population and a sample of 132 was chosen. The results found that customer integration impacted significantly on business

performance while internal integration had a greater impact on operational performance.

Ralston, et al., (2015) did a study on the link between an organisational strategy, its SCI efforts and firm performance. The study objectives were determining the impact of corporate strategy on customer and supplier integration. Analysis of data was achieved with the help of structural modelling equation and the results showed that corporate integration was positively linked to customer and supplier integration that was also found to have a positive relationship with demand. Similarly, demand was found to have a positive linkage with operational and financial performance. But, the connection between operational and financial performance was found to lack significance. One important observation about this study is that it considered firm characteristics such as industry size, market share as control variables.

## **2.5 Limitations faced by Organisations when Implementing Supply Chain Integration**

SCI is not a popular method of managing supply chain for firms operating in developing nations due to various barriers. Inadequate financial resources is a major barrier that hinders firms in developing countries from applying SCI. Wehrmann (2006) explains that the SCI demands high capital investment that may not be readily available for the organizations. The author further reveals that the limited financial resources hinder the ability of the companies to integrate their systems for improved access to information and decision-making. Hannula & Pirttimaki (2003) cites that many businesses in developing economies lack adequate funds to venture into business analytics. In addition to the initial cost incurred in purchasing the systems, firms incur high costs in implementing the system. Lack of adequate technical skills

to execute the processes involved in SCI is another barrier that limits the application of SCI by firms in developing nations because it has adverse effect on the implementation of SCI. In most developing nations, the number of SCI professionals is limited, forcing the organizations to outsource experts from developed countries.

Outsourcing a team to implement the SCI is not only expensive to the firm, but also denies the employees in the firms the exposure needed to gain skills in SCI field. Additionally, due to the inadequate skills, the organizations are unable to control of the implementation process. Ferreira & Otley (2009) explain that in some cases, few employees may possess the technical skills required in SCI but their ability to train their colleagues is affected by the heavy workload.

For this reason, the companies rely on developed economies for experts, which cost them huge amounts of money and limit their ability to develop the same skills and knowledge in future (Reynolds, 2005). Inadequate support by the top management is the other barrier to the use of SCI in supply chain management in developing nations (Ranjan, 2010). An organization's top management influences adoption of advanced technology because it is responsible for making major company decisions. The top management achieves this by explaining the importance of adopting the advanced technology to the employees. It is the role of the top management to motivate and encourage the employees embrace change and support the implementation of business analytics. William (2010) argues that the failure to involve customers in the planning and implementation of the SCI also hinders the success of firms. This hinders the alignment of company expectations and consumer needs, making it difficult to meet the set goals.

## **2.6. Empirical Review**

Stank and Keller (2001) studied the relationship between supply chain logistical integration and performance by using 306 firms in North America. The study identified and used six aspects of supply chain integration and also six different measures of performance. A positive relationship was found between customer & internal integration and operational performance; technology & planning integration vs information systems support and advanced shipment notification support; measurement integration with customer satisfaction; finally relationship integration vs financial performance, specifically return on assets. No significant relationship was found between supplier integration and performance. A limitation of this study is that it used regression analysis on ordinal (Likert) scale measures. Also other factors that could influence the relationship such as firm size and age were not considered.

Awasthi and Grzybowska (2014) examined the barriers of supply chain integration process using Decision Making Trial and Evaluation Laboratory (DEMATEL) methodology. A total of 17 barriers affecting the integration of business entities in the supply chain were identified through a survey. The results of the study show Lack of Resource sharing (integration), Lack of Organizational compatibility, Lack of Information sharing, Lack of Responsibility sharing, and Lack of Planning of supply chain activities as top five barriers in supply chain integration. It was applied to problem solving decision making and help make counter measures. This study offers a basis for further research on lack of resource sharing, information and organizational compatibility affecting supply chain integration.

Hudnurkar, Jakhar and Rathod (2014) sought to determine the factors affecting collaboration in supply chain through a review of 69 randomly selected research

papers published in the refereed journals in the area of supply chain collaboration. The papers were classified based on the year in which they published, based on specific countries, the journal in which they published, specific industry type, and finally based on research methodology. Based on the analysis of reviewed papers a total number of 28 factors affecting supply chain collaboration were identified. Further research is required to explore the impact of SCI on performance.

Owino (2015) investigated the impact of supply chain integration and organizational performance of Large Scale Manufacturing Firms in Kenya designed as a descriptive study focused on 42 Commercial banks. The study found that technology plays an important role on the competitive edge for improving performance through service delivery. Hence Integration is a major role for service delivery. The results indicated that internal and customer integration was more strongly related to improving performance than supplier integration. The study did not consider firm characteristics and only looked at SCI on banks.

Kanda and Iravo (2015) on the factors affecting efficiency of supply chain of pharmaceutical products to Public Health facilities in 47 Counties of Kenya. The study precisely sought to establish whether: procurement processes, ICT infrastructure, distribution channels and competency of medical staff in supply chain, are factors affecting efficiency of supply chain of pharmaceutical products to Health Centers in Kenya. A population size of 120 employees was targeted in 15 health Centers from which a sample size of 60 was chosen out of the 66 questionnaires distributed, 60 filled and returned. The results showed that indeed these factors influenced supply chain efficiency.



Ralston et al. (2015) studied the relationship between a firm's strategy, its supply chain integration efforts and firm performance using a sample size of 220 supply chain employees of firms in USA. Structural equation modeling approach was used. Corporate strategy was hypothesized to influence both customer and supplier integration and these two variables in turn affect demand. Demand on the other hand will impact on both operational and financial performance. It is hypothesized that operational performance will influence financial performance. It was found that corporate integration had positive relationship to both customer and supplier integration which were also found to have a positive relationship with demand as predicted. As expected, demand was found to have a positive relationship with both operational and financial performance. However the relationship between operational and financial performance was not significant, surprisingly. This study utilized some firm characteristics such as industry size and market share as control variables.

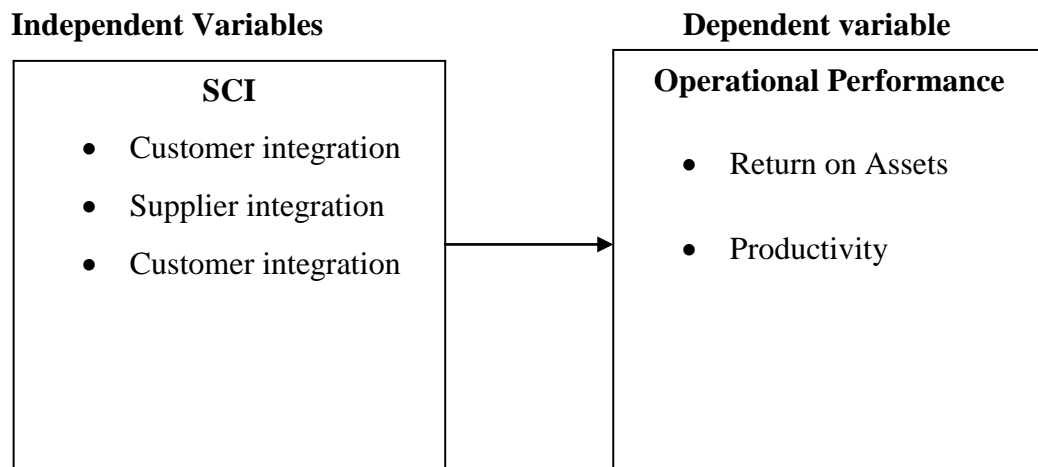
## **2.7. Summary**

It can be concluded that SCI allows seamless communication and cooperation between the buyers and the sellers with the aim of benefiting all the parties in a relationship. This partnership encourages sharing of ideas and information that is essential for decision making. Hence, this makes it easier for firms to improve; quality and delivery and enhances customer focus, satisfaction, reliability and feedback mechanism. SCI and operational performance is supported by the study theories. Notable SCI dimensions include the customers, suppliers and internal integration.

## **2.8. Conceptual Framework**

Figure 2.1 captures the existing relationship between SCI and operational performance. Independent variables included supplier, customer and internal firm

operations. The dependent variable was the operational performance. The study projects that the independent variables impact on the dependent variable as follows:



**Figure 2.1. Conceptual Framework**

**Source: Researcher, 2018**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discussed the research methodology which was adopted by the researcher to achieve the objective (s) of the study. It included the research design, the population of the study, sampling approaches and sample size, data collection methods, tools and procedures and data analysis

#### **3.2 Research Design**

A descriptive survey was adopted. With this kind of a study, information will be obtained to achieve the underlying objectives. Descriptive survey is suitable when a study is seeking to investigate the existing relationships among the study parameters. This argument is also supported by Cooper & Emory (1995), who indicated that a survey is applicable when the population is small hence the researcher is able to study all the elements of a population

#### **3.3 Study Population**

The population for this study included all the large-scale manufacturing firms in Nairobi County, Kenya. According to KAM (2017), there are 875 large-scale manufacturing firms in Nairobi County. The choice of Nairobi County was because this was where most of the large-scale manufacturing firms are concentrated and thus providing a population where a proportionate sample was derived.

#### **3.4 Sample Design**

The sample size for this study was 88 respondents. This had been arrived at through the formula that was developed by Kelley and Maxwell (2003) as follows:

$0.101 = \text{Sample Size} / \text{Total population} (0.101 * 875) = 88$ . This formula originated from a series of samples holding the assumption of non-zero probability. This approach is considered effective when applying a descriptive survey research design and a regression model as suggested by Kelley et al. (2003). The study adopted a stratified sampling method to determine the study sample provide in Appendix II of this research.

### **3.5 Data Collection**

The study used primary and secondary data sources that will be obtained using a self-administered questionnaire that is designed to elicit specific answers for quantitative and qualitative analysis respectively. The study entailed a cross-sectional study on SCI and operational performance of large-scale manufacturing firms. Secondary sources of data were obtained audited financial statements and records from Kenya KAM.

Questionnaires contained four main sections: the first section had questions on the general information. The second section constituted questions with regard to the first objective which was determining supply chain integration adopted by large-scale manufacturing firms in Kenya, third section will constituted questions regarding to the second objective which was establishing the link between supply chain integration and operational performance of large scale manufacturing firms in Kenya and the fourth section had questions regarding the third objective which was determining barriers facing large-scale manufacturing firms in Kenya.

The respondents were the heads of purchasing or Procurement or supply Chain department and management officers who were responsible for making decisions on supply chain management. Choice of these respondents was because they are involved

in the adoption and implementation of SCI. The questionnaires were administered using a drop and pick later method at an agreed time with the researcher.

### **3.6 Data Analysis**

Collected data was analysed using descriptive statistics which include mean and standard deviation to achieve the first objective. Factor analysis was used to analyze the third objective of the study. A regression model was used to achieve the aforementioned second objective of this study. The model covered four important variables: the independent variables (customer, supplier and internal) and the dependent variable which was operational performance of large-scale manufacturing firms in Kenya. Provided below was the regression equation adopted for this study:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \varepsilon$$

Where:

Y was Operational performance

a was the Y intercept when x is zero

$b_1$  and  $b_2$  are regression weights attached to the variables constants

$X_1 \dots X_n$  are the coefficients

$X_1$  = Customer

$X_2$  = Supplier

$X_3$  = Internal operations

$\varepsilon$  was the error term

## **CHAPTER FOUR**

### **DATA ANALYSIS, RESULTS AND INTERPRETATION**

#### **4.1 Introduction**

This chapter presents the research findings on the contribution of supply chain integration to operational performance of Large-scale Manufacturing firms in Kenya. The data was gathered exclusively from the questionnaire as the research instrument. The results of the study are presented according to the objectives and research questions. The findings in this chapter were also arrived at by analyzing and interpreting the available data using SPSS software. All the responses are presented in terms of frequencies and percentages which are displayed in tables.

#### **4.2 Response Rate**

A total of 88 questionnaires were distributed to procurement staffs in the manufacturing companies of which 83 were returned fully filled. The response rate for the distributed questionnaires was therefore 94%. This is a very high response rate which is good for research as any response rate above 70 % is good and adequate for analysis and reporting (Mugenda 2003).

#### **4.3 General Information**

This section outlines information about the respondents of the large manufacturing firms for this research. The findings have been presented as below.

##### **4.3.1 Position in the Firm**

The researcher sought to find out the respondents position in the firm

**Table 4.1: Position in the Firm**

<b>Position</b>	<b>Frequency</b>	<b>Percentage</b>
Information Technology Manager	12	14.5
Research and Development Manager	15	18.1
Marketing Manager	21	25.3
Supply chain officer	35	42.2
<b>Total</b>	<b>83</b>	<b>100.0</b>

**Source: Researcher, 2018**

The findings in table 4.1 show that majority of the respondents (42.2%) were supply chain officers, 25.3% were marketing managers, 18.1% were research and development managers, while 14.5% were information technology managers. The findings conclude that majority of the respondents were in a position to give reliable information with regard to supply chain integration and how it contributes to and operational performance of large manufacturing firms in Kenya.

#### **4.3.2 Gender of the Respondents**

The respondents were asked to show their gender. The results of the study are presented in the table below.

**Table 4.2: Gender of the Respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	50	60.2
Female	33	39.8
<b>Total</b>	<b>83</b>	<b>100.0</b>

**Source: Researcher, 2018**

The results as shown in the table 4.2 show that majority of the respondent were male at 60.2% while female was 39.8%. The results indicate that majority of staff in the large manufacturing firms were male thus the results might be influenced by gender imbalance

#### **4.3.3 Respondents' Age Group**

This area of the study, the researcher sought to know the age category of the respondents. Table 4.3 shows that the study findings.



**Table 4.3: Respondents' Age Group**

<b>Age Group</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 30 years	3	4
31-40 years	32	38
41-50 years	23	28
51-60 years	17	20
Over 60 years	8	10
<b>Total</b>	<b>83</b>	<b>100.0</b>

**Source: Researcher, 2018**

The findings show that majority 38% of the respondents were aged between 31 – 40 years, followed by 28% who were aged 41 – 50 years, 20% were aged over 50 years, 10% were aged over 60 years while 4% were aged less than 30 years. From these findings, most of the respondents belong to an age category of 31-40 years. This is the most active age group hence they are actively involved in running of procurement department, therefore they had rich experiences, could also appreciate the importance of the study.

#### **4.3.4 Period served in the Organization**

The respondents were asked to indicate the number of years they had worked in the organization. The results are shown in table below.

**Table 4.4: Period served in the Organization**

<b>Period served in the Organization</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 5 years	12	14
6-10 years	48	58
11-15 years	15	18
16-20 years	5	6
Over 20 years	3	4
<b>Total</b>	<b>83</b>	<b>100.0</b>

**Source: Researcher, 2018**

Table 4.4 above shows that majority 58% of the respondents had served for 5-10 years, 18% had served for 11-15 years, 14% had served for Less than 5 years, 6% had served for 16 – 20 years while 4% had served for over 20 years. The findings therefore indicated that majority of the respondents had worked in the firm for a considerable period of time and thus were familiar about the supply chain integration and how it contributes to operational performance.

#### **4.4 The Extent of Supply Chain Integration**

The researcher sought to find out the extent to which the organizations have implemented the supply chain integration to improve operational performance. The study findings are as shown in subsequent subheadings.

#### 4.4.1 Supplier Integration

Respondents were asked to indicate on the following statements, the extent to which their firm has embraced Supply Integration. Responses were based on five Likert based questions where 5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent. Table 4.5 presents the study findings

**Table 4.5: Supplier Integration**

Supplier Integration	Mean	Std. Deviation
We maintain long term relationships between our firm and our suppliers	4.3171	.6098
Stable procurement through supplier networks has been achieved	3.9024	.9166
There is participation of our suppliers in the processes of procurement and production	4.1463	.9099
Production plans with our main suppliers are shared	4.0000	.6708
The gains resulting from cooperation with suppliers are equally shared	4.1951	.9005
<b>Average Mean</b>	<b>4.1122</b>	<b>0.8015</b>

Source: Researcher, 2018

The study established that to a very large extent that: large scale manufacturing firms in Kenya maintain long term relationships between their firm and their suppliers (mean= 4.317), the gains resulting from cooperation with suppliers are equally shared (mean= 4.195), there is participation of their suppliers in the processes of procurement and production (mean= 4.146) and that production plans with their main suppliers are shared (mean= 4.000). In addition, respondents indicated to a large extent that stable procurement through supplier networks has been achieved (mean= 3.902). This implies that large scale manufacturing firms in Kenya maintain long term relationships between their firm and their suppliers, the gains resulting from cooperation with suppliers are equally shared, there is participation of their suppliers in the processes of procurement and production and that production plans with their main suppliers are shared

#### **4.4.2 Internal Integration**

Respondents were asked to indicate on the following statements, the extent to which their firm has embraced internal integration. Responses were based on five likert based questions where 5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent. Table 4.6 shows the study findings

**Table 4.6: Internal Integration**

Internal Integration	Mean	Std. Deviation
Cross-functional management is extensively used in our firm	4.4286	.8084
Cross-functional integration is very significant for all supply chain initiatives	4.3143	.9947
Information is shared inside the organisation	3.8860	.9941
Data integration among internal functions is achieved through the use of Information Technology systems	4.2100	.8832
Integrative inventory management has been implemented	3.7714	.9041
<b>Average Mean</b>	<b>4.1221</b>	<b>0.9169</b>

**Source: Researcher, 2018**

The study revealed that to a very large extent that cross-functional management is extensively used in large scale manufacturing firms in Kenya (mean= 4.4286), cross-functional integration is very significant for all supply chain initiatives (mean= 4.3143), and that data integration among internal functions is achieved through the use of Information Technology systems (mean= 4.2100). Further, respondents indicated to a large extent that information is shared inside the organisation (mean= 3.8860), and that integrative inventory management has been implemented (mean= 3.7714). This is an indication that cross-functional management is extensively used in large scale manufacturing firms in Kenya, cross-functional integration is very

significant for all supply chain initiatives, and that data integration among internal functions is achieved through the use of Information Technology systems

#### 4.4.3 Customer Integration

their firm has embraced customer integration. Responses were based on five likert based questions where 5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent. Table 4.7 presents the study findings

**Table 4.7: Customer Integration**

Customer Integration	Mean	Std. Deviation
There is computerization for customer ordering	4.4285	.9420
Market information is shared with customers	4.4768	.4428
The company is actively seeking feedback from customers	4.2304	.6171
The feedback provided by customers is used to improve customer relations, processes, products and services	3.9071	.9727
The firm uses systematic processes for handling complaints	4.0365	.9125
<b>Average Mean</b>	<b>4.2159</b>	<b>0.7774</b>

**Source: Researcher, 2018**

The study established that to a very large extent that: in large scale manufacturing firms in Kenya Market information is shared with customers (mean=4.4768), there is computerization for customer ordering (mean= 4.4285), large scale manufacturing

firms in Kenya are actively seeking feedback from customers (mean= 4.2304) and that the firm uses systematic processes for handling complaints (mean= 4.0365). Moreover, respondents indicated to a large extent that the feedback provided by customers is used to improve customer relations, processes, products and services (mean= 3.9071). This implies that in large scale manufacturing firms in Kenya market information is shared with customers, there is computerization for customer ordering, large scale manufacturing firms in Kenya are actively seeking feedback from customers and that the firm uses systematic processes for handling complaints

#### **4.5 Barriers of Supply Chain Intergration on The Firm**

In order to find out the key factors affecting supply chain integration on the firm, factor analysis was conducted to reduce the dimensions and give better suggestions of factors considered. This was important because the researcher was able to identify the factors that were significant in supply chain integration.

**Table 4.8: Communalities**

	<b>Initial</b>	<b>Extraction</b>
Supplier Integration reduces the materials total costs	1.000	.892
Supplier Integration improves the procurement process	1.000	.888
Supplier Integration reduces the supplier's delivery lead time	1.000	.848

Supplier Integration leads to improved materials quality and variety	1.000	.850
Internal Integration reduces the average unit manufacturing cost	1.000	.722
Internal Integration reduces manufacturing lead time	1.000	.853
Internal Integration reduces equipment changeover time	1.000	.770
Internal Integration increases direct labour productivity	1.000	.739
Customer Integration improves customer service	1.000	.713
Customer Integration leads to customer satisfaction	1.000	.740
Customer Integration leads to improved product quality and variety	1.000	.743
Customer Integration increases the speed and numbers of product development	1.000	.787
Sourcing and tendering decisions are easily made due to SCM integration and information sharing.	1.000	.817



SCM integration has provided the organization ability to quickly and easily relate with suppliers.	1.000	.915
Orders are easily processed as a result of SCM integration, thus avoiding delays.	1.000	.878
Monitoring stock movement has been made easier as a result of the collaboration between procurement, logistics and warehouse/inventory management.	1.000	.837
With an integrated SCM function, information moves faster and this reduces lead time in the organization	1.000	.873
Distribution and delivery is made at the right time and place due to SCM integration, information sharing and coordination	1.000	.917
In general SCM integration has enhanced the performance of our organization	1.000	.909
User feedback is considered important in SCI implementation	1.000	.869
Use of technology in SCI is important in aligning demands of the markets and customers	1.000	.907

Total Supply Chain integration (supplier-firm-customer) is positively related to financial performance	1.000	.916
Customer Relationship Management plays an important role in SCM	1.000	.857

**Source: Researcher, 2018**

The study sought to establish the factors affecting supply chain integration on the firm. It was revealed that most factors had an extraction greater than 0.7 proportion of variance and hence has an impact on the supply chain integration in large scale manufacturing firms in Kenya. These factors range from the one with the highest extraction i.e. Distribution and delivery is made at the right time and place due to SCM integration, information sharing and coordination with 0.917, to the one with the least extraction i.e. customer Integration improves customer service that has an extraction of 0.713.

**Table 4.9: Contribution of extracted variable**

	Component Initial Eigen-values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.411	13.527	13.527	5.411	13.527	13.527
2	4.017	12.042	25.569	4.017	10.042	23.568

3	3.656	9.89	35.459	3.656	9.140	32.708
4	3.185	7.961	43.42	3.185	7.961	40.670
5	2.865	7.164	50.584	2.865	7.164	47.834
6	2.602	6.505	57.089	2.602	6.505	54.339
7	2.398	5.996	63.085	2.398	5.996	60.335
8	2.013	5.032	68.117	2.013	5.032	65.367
9	1.699	4.247	72.364	1.699	4.247	69.613
10	0.976	3.439	75.803			
11	0.917	3.293	79.096			
12	0.913	2.77	81.866			
13	0.908	2.645	84.511			
14	0.902	2.605	87.116			
15	.898	2.246	89.362			
16	.765	1.912	91.274			
17	.735	1.837	93.111			
18	.584	1.46	94.571			
19	.565	1.412	95.983			
20	.506	1.264	97.247			

21	.432	1.08	98.327
22	.404	1.01	99.337
23	.280	0.663	100
Extraction Method: Principal Component Analysis.			

**Source: Researcher, 2018**

Table 4.9 shows the importance of each of the components. The components with an Eigen value of over 1.00 are the first 9 components and together they explain 72.364% of the total variability of the data. The 9 components are probably adequate factors affecting supply chain integration in large scale manufacturing firms in Kenya. The components are the factors with the highest extraction value which include: Distribution and delivery is made at the right time and place due to SCM integration, information sharing and coordination, total Supply Chain integration (supplier-firm-customer) is positively related to financial performance, SCM integration has provided the organization ability to quickly and easily relate with suppliers, in general SCM integration has enhanced the performance of our organization, Use of technology in SCI is important in aligning demands of the markets and customers, Supplier Integration reduces the materials total costs, Supplier Integration improves the procurement process, Orders are easily processed as a result of SCM integration, thus avoiding delays and that With an integrated SCM function, information moves faster and this reduces lead time in the organization

#### **4.6 Operational Performance**

To measure operational performance the study undertook descriptive statistics. Descriptive statistics are the measures that summarise the general features of the data

set under study. They define the nature of response from secondary data. Descriptive statistics for this study were: minimum, mean, maximum and standard deviation. Descriptive analysis was carried out on the return on assets; total sales, total value of supply costs, and total customer base. The descriptive statistics results are tabulated below:

**Table 4.10: Descriptive Statistics**

	ROA	Sales (Millions)	Total supply costs (millions)	Total customer base
Minimum	-7.54	0	0	0
Maximum	7.152	14773.21	10124.981	125109.6
Mean	2.667	8568.242	5872.34	72753.014
Std. Deviation	2.679	4236.359	2903.436	37412.21
Skewness	-	-0.359	-0.359	-0.243
	1.285			
Std. Error	0.365	0.365	0.365	0.365
Kurtosis	3.949	-1.285	-1.285	-1.325
Std. Error	0.717	0.717	0.717	0.717

**Source: Researcher, 2018**

Table 4.10 above illustrates the average ROA of all the Large Scale Manufacturing Firms in Kenya over the study period to be 2.667 with a maximum of 7.152 and the minimum of -7.54. A small standard deviation of 2.679 was noted implying that there

was low variation of ROA across the Large-scale Manufacturing firms in Kenya. In addition, the mean of the total value of Total Sales was 8568.242 million recording the highest value of 14773.21 millions. The mean total value of the Total supply costs was 5872.34 million with a maximum of 10124.981 millions. The Total customer base mean was noted to be 72753.014 thousands across the Large Scale Manufacturing Firms. High standard deviations were noted on total value of Total Sales Total supply costs as well as Total customer base meaning there was a high variation across all the Large Scale Manufacturing Firms with regards to total value of Total Sales, Total supply costs and Total customer base

#### **4.7 Regression Analysis**

The researcher conducted a multiple regression analysis so as to test relationship among supply chain integration variables and operational performance of Large-scale Manufacturing firms in Kenya. The researcher made use of the statistical package for social sciences (SPSS V 21.0) to input and compute the study's measurements of the multiple regressions.

Coefficient of determination explains the extent to which changes in the independent variables explain changes in the dependent variable or the percentage of variation in the dependent variable (operational performance) that is explained by all the three independent variables (Customer integration, Supplier integration, and internal integration).

#### 4.7.1 Model Summary

**Table 4.11: Model Summary**

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.896 <sup>a</sup>	.802	.775	0.0131

**Source: Researcher, 2018**

a. Predictors: (constant), customer integration, supplier integration, and internal integration

b. Dependent Variable: Return on Assets

**Table 4.12: Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.891 <sup>a</sup>	.794	.642	3.31805

**Source: Researcher, 2018**

a. Predictors: (constant), customer integration, supplier integration, and internal integration

b. Dependent Variable: Productivity

Table 4.11 shows model summary of regressed variable of the study with a dependent variable being return on assets. The correlation coefficient (R) value represents the degree and strength of relationship between dependent variable and the independent variables. Coefficient of correlation ranges between -1 and 1 and in this model the coefficient of correlation is 0.896 which indicates a positive correlation between Return on Assets, Customer integration, Supplier integration, and internal integration.

The R Squared is the coefficient of determination which indicates how much of the total variation in the dependent variable. From the above the R squared statistic gives the goodness of fit of the model which shows how good the regression model approximates the real data points. The R squared of this model is 0.802 which shows that the model is a good fit of the actual data. The coefficient of determination of 0.802 implies that 80.2% of the variance in dependent variable.

The results in Table 4.12 indicate that the supply chain integration had a joint significant effect on productivity of large scale manufacturing firms in Kenya as shown by r value of 0.891. The R squared of 0.794 shows that the independent variables accounted for 79.4% of the variance on productivity of large scale manufacturing firms in Kenya.

#### 4.7.2 ANOVA (Analysis of Variance)

**Table 4.13: ANOVA (Analysis of Variance)**

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	6.942	3	2.314	6.51	.001 <sup>a</sup>
	Residual	28.045	79	0.355		
	<b>Total</b>	<b>34.987</b>	<b>82</b>			

**Source: Researcher, 2018**

a. Predictors: (Constant), customer integration, supplier integration, and internal integration

b. Dependent Variable: Return on Assets



**Table 4.14: ANOVA**

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	74.682	3	24.894	8.145693	.00001 <sup>b</sup>
Residual	241.432	79	3.0561		
<b>Total</b>	<b>316.114</b>	<b>82</b>			

**Source: Researcher, 2018**

a. Predictors: (Constant), customer integration, supplier integration, and internal integration

b. Dependent Variable: Productivity

The model summary also indicates that the dependent variable (Return on Assets) is significantly accurately predicted by the regression model. The statistical significance of the regression model that was run is shown by the F test. The P=0.001, which is less than 0.05 designates that, generally the regression model statistically and significantly predicts the outcome variable that is good fit for the data.

The results in Table 4.14 show that the F statistic was 8.145693. At 5% level of confidence, the F statistic was significant. In this case, all the predictor variables (customer integration, supplier integration, and internal integration) explain a variation in productivity and that the overall model is significant

### 4.7.3 Coefficient of Correlation

**Table 4.15: Coefficient of Correlation**

	Unstandardized Coefficients		Beta	Standardized Coefficients	
	B	Std. Error		t	Sig.
(Constant)	7.232	.643		11.24	.0000
Customer integration	0.802	0.976	0.23	0.822	.0006
Supplier integration	0.769	.946	0.46	0.813	.0012
Internal integration	0.593	1.05	0.31	0.565	.0233

**Source: Researcher, 2018**

**Table 4.16: Coefficient of Correlation**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.706	0.229		3.0830	0.0038
	Customer integration	0.601	0.125	0.321	4.8080	0.0000
	Supplier integration	0.556	0.218	0.441	2.5505	0.0148
	Internal integration	0.599	0.144	0.245	4.1597	0.0002

**Source: Researcher, 2018**

The overall equation model for Return on Assets, Customer integration, Supplier integration, and internal integration was as follows:

$$Y_{bt} = 7.232 + 0.802 X_1 + 0.769 X_2 + 0.593 X_3 + \varepsilon$$

From the model, in any given time, the Return on Assets will be 7.232 when all the predictor values are zero. The model indicates that when the Customer integration changes by one unit the Return on Assets will increase by 0.802. In addition, supplier integration changes by one unit the Return on Assets increases by 0.769. Further, the study findings revealed that when the internal integration value changes by one unit the Return on Assets will increase by 0.593

The overall equation model for Productivity, Customer integration, Supplier integration, and internal integration was as follows:

$$Y_{bt} = 0.706 + 0.601 X_1 + 0.556X_2 + 0.599 X_3 + \varepsilon$$

From the model, in any given time, the productivity will be 0.706 when all the predictor values are zero. The model indicates that when the Customer integration changes by one unit the productivity will increase by 0.601. In addition, supplier integration changes by one unit the productivity increases by 0.556. Further, the study findings revealed that when the internal integration value changes by one unit the productivity will increase by 0.599

To test the significance of each individual variable which was based at 0.05 the t-test was carried out. The result indicates the Supplier integration and internal integration have a value of 0.0012 and 0.0233 against the Return on Assets in the model respectively. This shows that the relationship between Return on Assets, Supplier integration and internal integration is significant. The relationship between Return on Assets and Customer integration recorded at rate of 0.0006 which is significant since it's less than p-value (P.0.05).

Based on the study findings, it is evident that customer integration had more influence on Return on Assets of Large-scale Manufacturing firms in Kenya followed by supplier integration and finally the internal integration

#### **4.8 Interpretation of the Study Findings**

The study revealed that large scale manufacturing firms in Kenya maintain long term relationships between their firm and their suppliers, the gains resulting from cooperation with suppliers are equally shared, there is participation of their suppliers

in the processes of procurement and production and that production plans with their main suppliers are shared. The study also found out that cross-functional management is extensively used in large scale manufacturing firms in Kenya, cross-functional integration is very significant for all supply chain initiatives, and that data integration among internal functions is achieved through the use of Information Technology systems. The study also revealed that in large scale manufacturing firms in Kenya market information is shared with customers, there is computerization for customer ordering, large scale manufacturing firms in Kenya are actively seeking feedback from customers and that the firm uses systematic processes for handling complaints. T

he study further revealed that supply chain integration has an effect on Return on Assets of large manufacturing firms in Kenya In tandem with the study findings, Stank, Keller and Daugherty (2001) explored the link between supply chain logistical integration and performance using a population of 306 firms in North America. The goal of the study was to develop and examine measures to test the empirical relationships between internal and external supply chain collaboration and logistical performance. Six aspects of SCI were identified and applied as well as six different performance measures. The respondents were senior logistics and supply chain executives selected from each firm. Five points liker scales were used to indicate the level of agreement. Data was analysed with the help of a regression analysis as the key analytical tool. Customer and internal integration were found to have a positive link with Return on Assets. Measure integration was also found to have a positive linkage with customer satisfaction. Further, a direct relationship was found to exist between integration and financial performance. There lacked a notable relationship between supplier integration and performance. The study limited itself to regression

analysis and likert scale measures. Other factors that might affect this relationship such as firm size and age were not considered. Chatzoudes and Chatzoglou (2011) evaluated the impact of SCI on operational and firm performance.

The results found that customer integration impacted significantly on business performance while internal integration had a greater impact on Return on Assets. Further Ralston, et al., (2015) did a study on the link between an organisational strategy, its SCI efforts and firm performance. The study objectives were determining the impact of corporate strategy on customer and supplier integration. Analysis of data was achieved with the help of structural modelling equation and the results showed that corporate integration was positively linked to customer and supplier integration that was also found to have a positive relationship with demand. Similarly, demand was found to have a positive linkage with operational and financial performance. But, the connection between operational and financial performance was found to lack significance. One important observation about this study is that it considered firm characteristics such as industry size, market share as control variables.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This study was carried out to establish the contribution of supply chain integration to Return on Assets of Large-scale Manufacturing firms in Kenya. The study had three objectives, to determine supply chain integration practices adopted by Large-scale Manufacturing firms in Kenya, to establish the relationship between supply chain integration practices and operational performance of Large-scale Manufacturing firms in Kenya and to determine barriers to integration faced by Large-scale manufacturing firms in Kenya. This chapter presents the summary of findings for the three objectives mentioned above, the conclusions, recommendations made based on findings and the suggestions on areas that need to be researched as far as this concept is concerned.

#### **5.2 Summary of Findings**

The study revealed that large scale manufacturing firms in Kenya maintain long term relationships between their firm and their suppliers, the gains resulting from cooperation with suppliers are equally shared, there is participation of their suppliers in the processes of procurement and production and that production plans with their main suppliers are shared

The study also found out that cross-functional management is extensively used in large scale manufacturing firms in Kenya, cross-functional integration is very significant for all supply chain initiatives, and that data integration among internal functions is achieved through the use of Information Technology systems

The study also revealed that in large scale manufacturing firms in Kenya market information is shared with customers, there is computerization for customer ordering, large scale manufacturing firms in Kenya are actively seeking feedback from customers and that the firm uses systematic processes for handling complaints

The study also revealed that that when the Customer integration changes by one unit the operational performance will increase by 0.802. In addition, supplier integration changes by one unit the operational performance increases by 0.769. Further, the study findings revealed that when the internal integration value changes by one unit the operational performance will increase by 0.593

### **5.3 Conclusions**

The study concludes that most large manufacturing companies in Kenya have adopted the various supply chain integration practices. The practices have assisted the large manufacturing companies to enhance the operational performance of their organizations. This is supported by the results from a regression analysis conducted that indicated that there is a strong relationship between supply chain integration practices and operational performance. The study has confirmed that strategic supply chain integration practices are very significant in enhancing the operational performance of organizations and as we know today's competition is moving from among organizations to between supply chains. More and more organizations are adopting SCM in the hope of reducing supply chain costs and securing competitive advantage.

The study concludes that supply chain integration has an effect on operational performance of large manufacturing firms in Kenya. The factors tested includes; supplier integration, internal integration and customer integration. All the variables



were found to have a positive influence on operational performance of large manufacturing firms in Kenya. Customer relationship was found to have the highest effect followed by supplier integration and finally internal integration

#### **5.4 Recommendations**

The study has confirmed that supply chain integration practices are very significant in enhancing organization operational performance. All manufacturing companies and other organizations should be advised to embrace the concept so that they can be able to reap the benefits of adopting these practices. Organization are also advised to adopt the practices that are currently adopted at a very small extent because they can significantly improve organization operational performance from the current position. They include practices like outsourcing, lean practices and postponement which have proven to have tremendous results in other organizations like Toyota for example.

Supply chain management plays a critical role in the operations of many organizations. This is because it helps in improving its operational performance by coordinating resource flows among members in the upstream and downstream supply chain to create value. This study recommends that manufacturing firms should strengthen their supply chain management by putting greater effort to the implementation of some key best practices. This should be done by keeping all practices updated. Monitoring and further improvements for specific supply chain integration that showed a moderate extent of application should be done to ensure full adoption and appreciation of these practices.

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

The findings of this study and application therefore are limited to large manufacturing companies in Kenya. They may not be applicable directly to other organizations

operating outside the Kenyan manufacturing industry. It is therefore important to note that they can only be used for comparative purposes and not any direct application in another industry or country.

The research only focused on the large manufacturing firms in Nairobi. It did not feature the large manufacturing firms in other parts of the country. This was because of limited time and resources. It was such an uphill task for the researcher to convince the respondents to participate in the study. Manufacturing companies are very busy organizations and getting a respondent was challenging. Most of the respondents agreed to participate on condition that the information will not be divulged to any other party other than for academic purposes only.

#### **5.6 Suggestions for future research**

This study represents a research carried out in order to enrich the literature of supply chain integration and operational performance a topic that has been neglected by researchers. Moreover, it contributes to the theoretical knowledge of strategy and its impact on project outcomes. More comparative studies should also be done with other countries both the developed and those developing and give the correlation and the differences in the supply chain integration. Future studies can be conducted using different sectors such as retail industry to achieve possible generalization of the results and to ascertain the influence of the supply chain integration and operational performance. Also, future studies may consider variables that may mediate the relationship between supply chain decisions and organizational effectiveness.

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## LIST OF APPENDICES

### APPENDIX I: QUESTIONNAIRE

This questionnaire has been designed for the sole purpose of collecting data on supply chain integration on factors affecting supply chain integration in large manufacturing firms in Nairobi. The data collected will be treated with a very high degree of confidentiality and it is meant for academic purpose only. Kindly fill out this questionnaire by putting an “X” on the applicable provided space of the applicable answer.

#### Section A : General Information

1. Name of the Firm:.....

2. Address/Location of the firm:.....

3. Year of establishment:.....

4. What is your position in this firm?

Information Technology Manager ( )

Research and Development Manager ( )

Marketing Manager ( )

Supply chain officer ( )

Other (specify).....

5. Respondent's gender:

Male ( ) Female ( )

6. Respondent's age bracket:

Less than 30 years	
31-40 years	
41-50 years	
51-60 years	
Over 60 years	

7. How long have you served in the Firm:

Less than 5 years	
6-10 years	
11-15 years	
16-20 years	
Over 20 years	

## **SECTION B: THE EXTENT OF SUPPLY CHAIN INTEGRATION**

### **SUPPLIER INTEGRATION**

Please indicate on following statements, the extent to which your firm has embraced Supply Chain Integration.

The scale below will be applicable:



5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent.

No.	Statement	1	2	3	4	5
1	We maintain long term relationships between our firm and our suppliers					
2	Stable procurement through supplier networks has been achieved					
3	There is participation of our suppliers in the processes of procurement and production					
4	Production plans with our main suppliers are shared					
5	The gains resulting from cooperation with suppliers are equally shared					

### **INTERNAL INTEGRATION**

Please indicate on following statements, the extent to which your firm has embraced Supply Chain Integration.

The scale below will be applicable:

5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent.

No.	Statement	1	2	3	4	5

1	Cross-functional management is extensively used in our firm					
2	Cross-functional integration is very significant for all supply chain initiatives					
3	Information is shared inside the organisation					
4	Data integration among internal functions is achieved through the use of Information Technology systems					
5	Integrative inventory management has been implemented					

### **CUSTOMER INTEGRATION**

Please indicate on following statements, the extent to which your firm has embraced Supply Chain Integration. The scale below will be applicable:

5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent.

No.	Statement	1	2	3	4	5
1	There is computerization for customer ordering					
2	Market information is shared with customers					
3	The company is actively seeking feedback from					

	customers					
4	The feedback provided by customers is used to improve customer relations, processes, products and services					
5	The firm uses systematic processes for handling complaints					

**SECTION C: BARRIERS AFFECTING SUPPLY CHAIN INTEGRATION ON LARGE MANUFACTURING FIRM'S**

**SUPPLIER INTEGRATION**

Please indicate on the following statements, the factors affecting supply chain integration on the firm. The scale below will be applicable: 5= to a very large extent 4= to a large extent 3= to a moderate extent 2= to a small extent 1= to a very small extent.

No	Statement	1	2	3	4	5
1	Supplier Integration reduces the materials total costs					
2	Supplier Integration improves the procurement process					
3	Supplier Integration reduces the supplier's delivery lead time					
4	Supplier Integration leads to improved materials quality and variety					
5	Internal Integration reduces the average unit manufacturing cost					

6	Internal Integration reduces manufacturing lead time					
7	Internal Integration reduces equipment changeover time					
8	Internal Integration increases direct labour productivity					
9	Customer Integration improves customer service					
10	Customer Integration leads to customer satisfaction					
11	Customer Integration leads to improved product quality and variety					
12	Customer Integration increases the speed and numbers of product development					
13	Sourcing and tendering decisions are easily made due to SCM integration and information sharing.					
14	SCM integration has provided the organization ability to quickly and easily relate with suppliers.					
15	Orders are easily processed as a result of SCM integration, thus avoiding delays.					
16	Monitoring stock movement has been made easier as a result of the collaboration between procurement, logistics and warehouse/ inventory management.					
17	With an integrated SCM function, information moves faster and this reduces lead time in the organization					
18	Distribution and delivery is made at the right time and place due to SCM integration, information sharing and coordination					
19	In general SCM integration has enhanced the performance of our organization					

20	User feedback is considered important in SCI implementation					
21	Use of technology in SCI is important in aligning demands of the markets and customers					
22	Total Supply Chain integration (supplier-firm-customer) is positively related to financial performance					
23	Customer Relationship Management plays an important role in SCM					

**SECTION D: OPERATIONAL PERFORMANCE**

	2017
ROA	
Sales (Millions)	
Total supply costs (millions)	
Total customer base	

**THE END**

**THANK YOU**

**APPENDIX II: LARGE SCALE MANUFACTURING FIRMS IN NAIROBI, KENYA**

<b>Sector: Building, Construction and Mining (6)</b>	
Central Glass Industries Ltd	Kenya Builders & Concrete Ltd
Karsan Murji & Company Limited	Manson Hart Kenya Ltd
Kenbro Industries Ltd	Mombasa Cement Ltd
<b>Sector: Food, Beverages and Tobacco (6)</b>	
Central Glass Industries Ltd	Kenya Builders & Concrete Ltd
Karsan Murji & Company Limited	Manson Hart Kenya Ltd
Kenbro Industries Ltd	Mombasa Cement Ltd
<b>Sector: Food, Beverages and Tobacco (100)</b>	
Africa Spirits Ltd Highlands	Mineral Water Co. Ltd
Agriener Agricultural Development Limited	Homeoil
Belfast Millers Ltd Insta	Products (EPZ) Ltd
Bidco Oil Refineries Ltd	Jambo Biscuits (K) Ltd
Bio Foods Products Limited	Jetlak Foods Ltd
Breakfast Cereal Company(K) Ltd	Karirana Estate Ltd
British American Tobacco Kenya Ltd	Kenafric Industries Limited
Broadway Bakery Ltd	Kenblest Limited
C. Czarnikow Sugar (EA) Ltd	Kenya Breweries Ltd
Cadbury Kenya Ltd Kenya	Nut Company Ltd
Centrofood Industries Ltd	Kenya Sweets Ltd
Coca cola East Africa Ltd	Nestle Kenya Ltd

Confec Industries (E.A) Ltd	Nicola Farms Ltd
Corn Products Kenya Ltd	Palmhouse Dairies Ltd
Crown Foods Ltd	Patco Industries Limited
Cut Tobacco (K) Ltd	Pearl Industries Ltd
Deepa Industries Ltd	Pembe Flour Mills Ltd
Del Monte Kenya Ltd	Premier Flour Mills Ltd
East African Breweries Ltd	Premier Food Industries Limited
East African Sea Food Ltd	Proctor & Allan (E.A.) Ltd
Eastern Produce Kenya Ltd	Promasidor (Kenya) Ltd
Farmers Choice Ltd	Trufoods Ltd
Frigoken Ltd	UDV Kenya Ltd
Giloil Company Limited	Unga Group Ltd
Glacier Products Ltd	Usafi Services Ltd
Global Allied Industries Ltd	Uzuri foods Ltd
Global Beverages Ltd	ValuePak Foods Ltd
Global Fresh Ltd W.E.	Tilley (Muthaiga) Ltd
Gonas Best Ltd	Kevian Kenya Ltd
Hail & Cotton Distillers Ltd	Koba Waters Ltd
Al-Mahra Industries Ltd	Kwality Candies & Sweets Ltd
Alliance One Tobacco Kenya Ltd	Lari Dairies Alliance Ltd
Alpha Fine Foods Ltd	London Distillers (K) Ltd
Alpine Coolers Ltd	Mafuko Industries Ltd
Annum Trading Company Limited	Manji Food Industries Ltd 61
Aquamist Ltd	Melvin Marsh International

Brookside Dairy Ltd	Kenya Tea Development Agency
Candy Kenya Ltd	Mini Bakeries (Nbi) Ltd
Capwell Industries Ltd	Miritini Kenya Ltd
Carlton Products (EA) Ltd	Mount Kenya Bottlers Ltd
Chirag Kenya Limited	Nairobi Bottlers Ltd
E & A Industries Ltd	Nairobi Flour Mills Ltd
Kakuzi Ltd	NAS Airport Services Ltd
Erdemann Co. (K) Ltd	Rafiki Millers Ltd
Excel Chemical Ltd	Razco Ltd
Kenya Wine Agency Limited	Re-Suns Spices Limited
Highlands Canner Ltd	Smash Industries Ltd
Super Bakery Ltd	Softa Bottling Co. Ltd
Sunny Processor Ltd	Spice World Ltd
Spin Knit Dairy Ltd	Wrigley Company (E.A.) Ltd
<b>Sector: Chemical and Allied (62)</b>	
Anffi Kenya Ltd	Crown Berger Kenya Ltd
Basco Product (K) Ltd	Crown Gases Ltd
Bayer East Africa Ltd	Decase Chemical (Ltd)
Continental Products Ltd	Deluxe Inks Ltd
Cooper K- Brands Ltd	Desbro Kenya Limited
Cooper Kenya Limited	E. Africa Heavy Chemicals (1999) Ltd
Beiersdorf East Africa Ltd	Elex Products Ltd
Blue Ring Products Ltd	European Perfumes & Cosmetics Ltd
BOC Kenya Limited	Galaxy Paints & Coating Co. Ltd



Buyline Industries Limited	Grand Paints Ltd
Carbacid (CO2) Limited	Henkel Kenya Ltd
Chemicals & Solvents E.A. Ltd	Imaging Solutions (K) Ltd
Chemicals and Solvents E.A. Ltd	Interconsumer Products Ltd
Coates Brothers (E.A.) Limited	Odex Chemicals Ltd
Coil Products (K) Limited	Osho Chemicals Industries Ltd
Colgate Palmolive (E.A) Ltd	PolyChem East Africa Ltd
Johnson Diversity East Africa Limited	Procter & Gamble East Africa Ltd
Kel Chemicals Limited	PZ Cussons Ltd
Kemia International Ltd	Royal Trading Co. Ltd
Ken Nat Ink & Chemical Ltd	Reckitt Benckiser (E.A) Ltd
Magadi Soda Company Ltd	Revolution Stores Co. Ltd
Maroo Polymers Ltd	Soilex Chemical Ltd
Match Masters Ltd	Strategic Industries Limited
United Chemical Industries Ltd	Supa Brite Ltd
Oasis Ltd	Unilever Kenya Ltd
Rumorth EA Ltd	Murphy Chemical E.A Ltd
Rumorth East Africa Ltd	Syngenta East Africa Ltd 62
Sadolin Paints (E.A.) Ltd	Synresins Ltd
Sara Lee Kenya Limited	Tri-Clover Industries (K) Ltd
Saroc Ltd	Twiga Chemical Industries Limited
Super Foam Ltd	Vitafoam Products Limited
<b>Sector: Energy, Electrical and Electronics (42)</b>	
A.I Records (Kenya) Ltd	East African Cables Ltd

Amedo Centre Kenya Ltd	Eveready East Africa Limited
Assa Abloy East Africa Ltd	Frigorex East Africa Ltd
Aucma Digital Technology Africa Ltd	Holman Brothers (E.A.) Ltd
Avery (East Africa) Ltd	IberaAfrica Power (EA) Ltd
Baumann Engineering Limited	International Energy Technik Ltd
Centurion Systems Limited	Kenwest Cables Ltd
Digitech East Africa Limited	Kenwestfal Works Ltd
Manufacturers & Suppliers (K) Ltd	Kenya Power & Lighting Co. Ltd
Marshall Fowler (Engineers) Ltd	Kenya Scale Co. Ltd/ Avery
Mecer East Africa Ltd	Kenya Ltd
Metlex Industries Ltd	Kenya Shell Ltd
Metsec Ltd	Libya Oil Kenya Limited
Modulec Engineering Systems Ltd	Power Technics Ltd
Mustek East Africa Sanyo	Reliable Electricals Engineers Ltd
Nationwide Electrical Industries	Armo (Kenya) Ltd
Nationwide Electrical Industries Ltd	Socabelec East Africa
Optimum Lubricants Ltd	Sollatek Electronics (Kenya) Limited
PCTL Automation Ltd	Specialised Power Systems Ltd
Pentagon Agencies Tea	Synergy-Pro
Power Engineering International Ltd	Vac Machinery Limited
<b>Sector: Plastics and Rubber (54)</b>	
Betatrad (K) Ltd	ACME Containers Ltd
Blowplast Ltd	Afro Plastics (K) Ltd
Bobmil Industries Ltd	Alankar Industries Ltd

Complast Industries Limited	Dune Packaging Ltd
Kenpoly Manufacturers Ltd	Elgitread (Kenya) Ltd
Kentainers Ltd	Elgon Kenya Ltd
King Plastic Industries Ltd	Eslon Plastics of Kenya Ltd
Kingway Tyres & Automart Ltd	Five Star Industries Ltd
L.G. Harris & Co. Ltd	General Plastics Limited
Laneeb Plastics Industries Ltd	Haco Industries Kenya Ltd
Metro Plastics Kenya Limited	Hi-Plast Ltd
Ombi Rubber Rollers Ltd	Jamlam Industries Ltd
Packaging Industries Ltd	Kamba Manufacturing (1986) Ltd
Plastics & Rubber Industries Ltd	Keci Rubber Industries
Polyblend Limited	Nairobi Plastics Industries
Polyflex Industries Ltd	Nav Plastics Limited
Polythene Industries Ltd	Ombi Rubber
Premier Industries Ltd	Packaging Masters Limited
Prestige Packaging Ltd	Plastic Electricons
Prosel Ltd	Raffia Bags (K) Ltd
Qplast Industries	Rubber Products Ltd
Sumaria Industries Ltd	Safepak Limited
Super Manufacturers Ltd	Sameer Africa Ltd
Techpak Industries Ltd	Sanpac Africa Ltd
Treadsetters Tyres Ltd	Silpack Industries Limited
Uni-Plastcis Ltd	Solvochem East Africa Ltd
Wonderpac Industries Ltd	Springbox Kenya Ltd

<b>Sector: Textile and Apparels (38)</b>	
Africa Apparels EPZ Ltd	MRC Nairobi (EPZ) Ltd
Fulchand Manek & Bros Ltd	Ngecha Industries Ltd
Image Apparels Ltd	Premier Knitwear Ltd
Alltex EPZ Ltd	Protex Kenya (EPZ) Ltd
Alpha Knits Limited	Riziki Manufacturers Ltd
Apex Appaels (EPZ) Ltd	Rolex Garments EPZ Ltd
Baraka Apparels (EPZ) Ltd	Silver Star Manufacturers Ltd
Bhupco Textile Mills Limited	Spinners & Spinners Ltd
Blue Plus Limited	Storm Apparel Manufacturers Co. Ltd
Bogani Industries Ltd	Straightline Enterprises Ltd
Brother Shirts Factory Ltd	Sunflag Textile & Knitwear Mills Ltd
Embalishments Ltd	Tarpo Industries Limited
J.A.R Kenya (EPZ) Ltd	Teita Estate Ltd
Kenya Trading EPZ Ltd	Thika Cloth Mills Ltd
Kikoy Co. Ltd	United Aryan (EPZ) Ltd
Le-Stud Limited	Upan Wasana (EPZ) Ltd
Metro Impex Ltd	Vaja Manufacturers Limited
Midco Textiles (EA) Ltd	Yoochan Kenya EPZ Company Ltd
Mirage Fashionwear EPZ Ltd	YU-UN Kenya EPZ Company Ltd
<b>Sector: Timber, Wood Products and Furniture (22)</b>	
Economic Housing Group Ltd	Rosewood Office Systems Ltd
Eldema (Kenya) Limited	Shah Timber Mart Ltd
Fine Wood Works Ltd	Shamco Industries Ltd

Furniture International Limited	Slumberland Kenya Limited
Hwan Sung Industries (K) Ltd	Timsales Ltd
Kenya Wood Ltd	Wood Makers Kenya Ltd
Newline Ltd	Woodtex Kenya Ltd
PG Bison Ltd	United Bags Manufacturers Ltd
Transpaper Kenya Ltd	Statpack Industries Ltd
Twiga Stationers & Printers Ltd	Taws Limited 64
Uchumi Quick Suppliers Ltd	Tetra Pak Ltd
<b>Sector: Pharmaceutical and Medical Equipment (20)</b>	
Alpha Medical Manufacturers Ltd	Dawa Limited
Beta Healthcare International Limited	Elys Chemical Industries
Biodeal Laboratories Ltd	Gesto Pharmaceutical Ltd
Bulks Medical Ltd	Glaxo Smithkline Kenya Ltd
Cosmos Limited	KAM Industries Ltd
Laboratory & Allied Limited	KAM Pharmacy Limited
Manhar Brothers (K) Ltd	Pharmaceutical Manufacturing Co.
Madivet Products Ltd	Regals Pharmaceuticals
Novelty Manufacturing Ltd	Universal Corporation Limited
Oss. Chemie (K) Pharm	Access Africa Ltd
<b>Sector: Metal and Allied (38)</b>	
Allied Metal Services Ltd	Booth Extrusions Limited
Alloy Street Castings Ltd	City Engineering Works Ltd
Apex Street Ltd	Rolling Mill Division Crystal Industries Ltd

ASL Ltd	Davis & Shirtliff Ltd
ASP Company Ltd	Devki Steel Mills Ltd
East Africa Foundry Works (K) Ltd	East Africa Spectre Limited
Elite Tools Ltd	Kens Metal Industries Ltd
Friendship Container Manufacturers	Khetshi Dharamshi & Co. Ltd
General Aluminum Fabricators Ltd	Nampak Kenya Ltd
Gopitech (Kenya) Ltd	Napro Industries Limited
Heavy Engineering Ltd	Specialized Engineer Co. (EA) Ltd
Insteel Limited Steel	Structures Limited
Metal Crown Limited	Steelmakers Ltd
Morris & Co. Limited	Steelwool (Africa) Ltd
Nails & Steel Products Ltd	Tononoka Steel Ltd
Orbit Engineering Ltd	Welding Alloys Ltd
Rolmil Kenya Ltd	Wire Products Limited
Sandvik Kenya Ltd	Viking Industries Ltd
Sheffield Steel Systems Ltd	Warren Enterprises Ltd
<b>Sector: Leather Products and Footwear (8)</b>	
Alpharama Ltd	CP Shoes
Bata Shoe Co. (K) Ltd	Dogbones Ltd
New Market Leather Factory Ltd	East Africa Tanners (K) Ltd
C & P Shoe Industries Ltd	Leather Industries of Kenya Limited
<b>Sector: Motor Vehicle Assembly and Accessories (17)</b>	
Auto Ancillaries Ltd Kenya	Vehicle Manufacturers Limited
Varsani Brakelining Ltd	Labh Singh Harnam Singh Ltd

Bhachu Industries Ltd	Mann Manufacturing Co. Ltd
Chui Auto Spring Industries Ltd	Megh Cushion industries Ltd
Toyota East Africa Ltd Mutsimoto	Motor Company Ltd
Unifilters Kenya Ltd	Pipe Manufacturers Ltd
General Motor East Africa Limited	Sohansons Ltd
Impala Glass Industries Ltd	Theevan Enterprises Ltd
Kenya Grange	Vehicle Industries Ltd
<b>Sector: Paper and Paperboard (48)</b>	
Ajit Clothing Factory Ltd	Conventual Franciscan Friers-Kolbe Press
Associated Papers & Stationery Ltd	Creative Print House
Autolitho Ltd	D.L. Patel Press (Kenya) Limited
Bag and Envelope Converters Ltd	Dodhia Packaging Limited
Bags & Balers Manufacturers (K) Ltd	East Africa Packaging Industries Ltd
Brand Printers	Elite Offset Ltd
Business Forms & Systems Ltd	Ellams Products Ltd
Carton Manufacturers Ltd	English Press Limited
Cempack Ltd	General Printers Limited
Chandaria Industries Limited	Graphics & Allied Ltd
Colour Labels Ltd	Guaca Stationers Ltd
Colour Packaging Ltd	Icons Printers Ltd
Colour Print Ltd	Interlabels Africa Ltd
Kenya Stationers Ltd	Jomo Kenyatta Foundation
Kim-Fay East Africa Ltd	Kartasi Industries Ltd
Paper Converters (Kenya) Ltd	Kenafric Diaries Manufacturers Ltd

Paper House of Kenya Ltd	Kitabu Industries Ltd
Paperbags Limited	Kul Graphics Ltd
Primex Printers Ltd	Label Converters
Print Exchange Ltd	Modern Lithographic (K) Ltd
Printpak Multi Packaging Ltd	Pan African Paper Mills (EA) Limited
Printwell Industries Ltd	Ramco Printing Works Ltd
Prudential Printers Ltd	Regal Press Kenya Ltd
Punchlines Ltd	SIG Combibloc Obeikan Kenya

**Source: Kenya Association of Manufacturers (KAM) Directory. June, 2016**