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The Effect of supply chain integration on operational performance of manufacturing organizations in Kenya

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The Effect of Supply Chain Integration on Operational Performance of Manufacturing Organizations in Kenya

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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6th June 2018

Approval

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ABSTRACT

Supply Chain Management is an approach to satisfy customer needs for products and services by integrating the business process of the firm with the entire value chain from raw material procurement to the product or service delivery to customers. The main objective of this study was to examine the effect of supply chain integration on operational performance of manufacturing organizations in Kenya. The specific objectives of the study were to examine the effect of internal integration on operational performance of manufacturing organizations in Kenya, to examine the effect of supplier integration on manufacturing organizations in Kenya and to explore the effect of customer integration on manufacturing organizations in Kenya. The study is part of literature which seeks to increase knowledge in the field of supply chain integration especially from the manufacturing perspective in Kenya.

The study utilized three theories: Resource Based View Theory, Social Exchange Theory and Information Processing Theory. Proportionate stratified random sampling technique was used to select a sample of 232 respondents from a total population of 553 manufacturing organizations while purposive sampling was used to select a manager or supervisor in the supply chain department to discuss in-depth information regarding the organizations supply chain. Data was analyzed using SPSS and descriptive statistics, correlation analysis and regression analysis conducted. A total of 232 questionnaires were administered but only 164, about 71% response rate was achieved.

The findings showed that supplier integration had a positive influence on operational performance followed by internal integration. Customer integration was determined to have a negative influence on operational performance. There was an association between both supplier integration and customer integration with internal integration. Based on the findings, it can be concluded that supply chain integration has a positive impact on operational performance. The organizations management should therefore invest more on integrating with their supply chain partners so as to improve operational performance of the organization.

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LIST OF ABBREVIATIONS AND ACRONYMS

AGOA	African Growth and Opportunity Act
ANOVA	Analysis of Variance
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
IPT	Information Processing Theory
JIT	Just In Time
KAM	Kenya Association of Manufacturers
KBV	Knowledge Based View
RBV	Resource Based View
SCO	Supply Chain Optimization
SET	Social Exchange Theory
SPSS	Statistical Package for the Social Sciences
TCE	Transaction Cost Economics
TQM	Total Quality Management

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INTRODUCTION

1.1 Background to the Study

Supply chain management (SCM) has emerged as a prominent area in providing organizations with strategies to build long-term competitiveness (Azadi, Saen & Zoroufchi, 2014; Mortensen, Freytag & Arlbjørn, 2008). Supply chain management promotes the integration of organizations that were previously independent, in order to improve organizational collaboration (Ajmera & Cook, 2009; Zhang, Gunasekaran & Wang, 2015). Research has shown that co-operation within the organization improves organizational performance. Extant literature highlights the need to understand supply chain management practices (SCMPs) which have increasingly become important in order to remain competitive in the global market with profitable growth (Okongwu, Brulhart & Moncef, 2015). The strategic nature of supply chain management practices explains the twin purpose of supply chain management: to improve the performance of an individual organization, and to improve the performance of the entire supply chain (Wong, Tjosvold, Wong & Liu, 1999).

Supply chain integration (SCI) is defined as the extent to which all activities of an organization and that of its suppliers, customers and other supply chain members are linked (Flynn, Huo & Zhao, 2010; Stonebraker & Liao, 2006; Naslund & Hulthen, 2012). There are two stages in SCI namely; internal integration between functions and external integration with trading partners. According to Trkman and Groznik (2006), internal integration creates close relationships between functions such as distribution and inventory or purchasing and raw material management. External integration has two directions: forward integration for physical flow of deliveries between suppliers, manufacturers, and customers and backward coordination of information technologies and the flow of data from customers, to manufacturers and suppliers (Schoenherra & Swink, 2012).

With increased globalization, organizations are moving towards integrating their supply chains (Naslund & Hulthen, 2012). This integration serves to improve the organizations

performance as globalization has led to an increase in demand for product variety as well as reduced product life cycles. This has enhanced the notion that competition is no longer between organizations but their supply chains as a whole (Wong et al, 1999; Schoenherra & Swink, 2012). With integration the ability of the organizations to design products is faster, the quality is improved due to increased collaboration and costs are lowered as more companies are involved in the production process (Gimenez & Ventura, 2005; Sabath & Whipple, 2004; Narasimhan & Kim, (2001); Stock, Greis & Kasarda, 1998).

1.1.1 Supply Chain Integration

In order to build alliances, organizations collaborate with supply chain partners so as to coordinate the activities of the supply chain. Supply chain collaboration and supply chain coordination are used to describe elements of supply chain integration (Leuschner, Rogers, & Charvet, 2013). Collaboration starts with the customers and extends back through the organization to its suppliers while coordination involves management of the forward physical flow of deliveries and the backward flow of information (Frohlich & Westbrook, 2001). Integration is defined as the unified control of a number of successive or similar economic or industrial processes formally carried on independently (Flynn, Huo, & Zhao, 2010). Organizations do not exist in isolation but interact with their surroundings to optimize their potential. Therefore, in order to gain competitive advantage, organizations are turning to supply chain integration to create trade alliances and networks that enable them to compete externally as though they were one unit. Integration exists at both the strategic and operational levels where it is used to enhance process efficiency and effectiveness (Näslund, 2012).

Supply chain integration takes place between three or more entities that are involved in the value adding processes required to achieve efficient and effective flow of products, services, finances, decisions and information from the source to customer while providing maximum value at low cost and high speed (Zhao, Huo, Flynn, & Yeung, 2008). SCI requires both internal integration and external integration. Internal integration involves the various departments of the organization while external integration occurs between the organization and its suppliers or customers (Schoenherr & Swink, 2012). This research will focus on

external supply chain integration and operational performance of the organization but also consider internal integration which is a prerequisite for both customer and supplier integration based on the notion that uncertainties in the environment must be internally absorbed by various functional areas in the organization (Flynn et al, 2010). Therefore, external integration extends from internal integration.

External integration is the degree to which a manufacturer partners with its supply chain partners to structure inter-organizational strategies and practices into synchronized processes. It comprises of supplier and customer integration (Flynn et al., 2010, Wong, Boon-itt, & Wong, 2011). A close relationship between the organization and its suppliers enables the suppliers understand the organizations needs and be able to adapt to changing requirements in a timely manner. There is increased information exchange between the organization and its suppliers which helps reduce waste and improves delivery performance as production planning can be accurately done (Flynn et al., 2010). Supplier integration is therefore developing joint collaboration with suppliers of the organization so as to better manage inter-firm business processes and enhance collaboration in planning and joint product development (Wong et al., 2011).

By integrating with its customers, the organization can improve the accuracy of its demand information which helps in the product design process. There is also increased responsiveness to customer needs which leads the organization to produce higher quality products at reduced costs and more flexibly (Flynn et al., 2010). Customer integration is the close collaboration and information sharing developed with key customers so as to provide the organization with strategic insights on opportunities and market expectations (Wong et al., 2011). Therefore, with external supply chain integration, organizations are able to design products faster, with high quality and at lower cost compared to a single organization on its own (Näslund, 2012).

Previous studies have shown that even though integration may exist within the organizations of a supply chain, these may not be extended to the partners of the supply chain (Lambert, Cooper & Pagh, 1998; Bagchi, Ha, Skjoett-Larsen & Soerensen, 2005; Fabbe-Costes &

Jahre, 2007; Richey, Chen, Fawcett & Adams, 2009). Literature available provides little empirical evidence that integration exists beyond the dyadic level. Lambert et al, (1998) observed that there was no evidence that supply chains were linked from the source of supply to the end user but that there were links between the various partners in the supply chain forming two-way relationships. Bagchi et al, (2005) discovered that in Europe there was limited evidence that companies established close integration with their supply chain partners especially if they had been in business for many years. Fabbe-Costes et al, (2008) discovered that only few studies documented integration beyond the dyadic level.

This study therefore seeks to identify whether supply chain integration exists beyond the organization and between the partners of the supply chain. In order to identify whether supply chain integration exists in the organization an examination of whether the manufacturing organizations have internal integration, supplier integration and customer integration will be done.

1.1.2 Operational Performance

Performance measurement is a very diverse subject and various parties with different functional backgrounds approach it differently (Neely, 2007). The finance and accounting perspective, views performance as a tool to manage the business and control its activities in terms of cash flow planning, profitability and asset management (Otley, 1999). Clarke, (1999) explored performance measurement from a marketing perspective and concluded that measures used for example market share or return on investment are no longer the issue. The greatest issue is to understand how the measures are interlinked in order to determine how they can be used effectively in management. From an operations point of view, performance measurement is used to determine the effectiveness and efficiency of the processes set up in the organization (Neely, 2007). All these views of performance measurement are valid but dependent on the area of interest. In this study, performance will be defined as the organization's ability to attain positive operational outcomes compared to its competitors.

There are many standards for measuring performance in manufacturing organizations. These may include short delivery cycles, dependable delivery promises, ability to introduce new

products quickly, flexibility in adjusting product volumes, superior product quality and reliability, low investments which leads to higher return on capital and low costs (Neely, 2007). These measures are operations oriented and can be classified into five operations performance objectives of quality, dependability, speed, cost and flexibility (Skinner, 1969).

Operational performance is a firm's performance measured against a standard or prescribed indicator of effectiveness, efficiency and environmental responsibility such as cycle time, productivity, waste reduction and regulatory compliance (Schoenherr & Swink, 2012). The dimensions of operational performance will be in terms of product quality, delivery reliability, production flexibility and production cost which when improved leads to improved organizational performance (Rosenzweig et al, 2003; Devaraj et al, 2007; Flynn et al, 2010)

The major tasks that contribute to improvement of operational performance include procurement, new product development, production, marketing and logistics (Wong et al., 2011). Integration within the organization and with supply chain partners serves to support these tasks and ensure that accurate supply and demand information is gathered. An organization with low level of supplier and customer integration is likely to obtain distorted and inaccurate information on supply and demand which in turn leads to poor production planning, high inventory levels and poor delivery reliability (Lee, Padmanabhan, & Whang, 1997) which in turn translates to poor operational performance for the organization.

The operations management theory of swift and even flow (Schmenner & Swink, 1998) can be used to describe how supply chain integration affects operational performance. The theory states that if there is swift and even flow of material through a process, the more productive the process is. Therefore, productivity of a process increases with the speed by which materials flow through the process. Supply chain integration ensures that there is swift flow of raw material and information throughout the supply chain through the various practices it encourages.

Schmenner and Swink (1998) explain how value addition, through-put time and variability affect productivity. Value added work is that which transforms materials into good product while non value-added work is anything that adds waste into the process. There are seven classic wastes in the production process namely overproduction, waiting, transportation, unnecessary processing steps, stocks, motion and defects (Hall, 1987). SCI eliminates most of the wastes within the supply chain because partners of the supply chain collaborate and share information hence reducing waste which in turn improves efficiency of the system.

Throughput time measures the speed with which the flow of materials for production of one unit is first worked on until it is completed and supplied to the customer or warehouse (Schmenner & Swink, 1998). If the system does not have any bottlenecks or blocks, through put time is minimized. SCI encourages minimization of throughput time by eliminating bottlenecks within the supply chain as there is free flow of information and planning can be done with the supply chain partners.

1.1.3 Manufacturing Industry in Kenya

The manufacturing industry in Kenya is large and serves both the local and export markets, mainly the Eastern African region (Kenya National Bureau of Statistics Economic Survey, 2014). This is increasing steadily due to political stability, improved power supply, increased supply of agricultural products for agro processing, improved tax incentives, and vigorous export promotion and liberal trade incentives to take advantage of the expanded market outlets of African Growth and Opportunity Act (AGOA), Common Market for Eastern and Southern Africa (COMESA) and East African Community (EAC) arrangements. Demand for locally manufactured products is however limited by their heightened costs compared to that of cheaper imported products. The increased costs are mainly due to poor infrastructure which leads to increased cost of production. In a bid to reduce these costs, manufacturers are looking to work in collaboration with other partners along the supply chain so as to ensure proper planning, reduced wastage and minimal production costs.

The manufacturing process is normally associated with long production and interface of manufacturing lines set-up. The long runs would result in high inventory levels of certain finished products and limited supplies of others (Nyamwange, Mutisya & Mulwa, 2015). Managers have to weigh the advantages and disadvantages of long versus short term production cycles. Today the trend is towards pull systems of manufacturing where the product is produced as a response to demand as opposed to being pushed to the market before demand is created. This practice will assist organizations have low inventory holding levels which in turn lowers logistical costs (Langley et al., 2008).

In order to facilitate pull systems of manufacturing, integration of the supply chain pays a big role. Through the integration, demand information is readily available and is reliable as the organizations collaborate and share the necessary information from the customers. This also ensures production is an accurate response to the markets demand avoiding wastage of time or resources (Zailani & Rajagopal, 2005).

1.2 Statement of the Problem

Supply Chain integration and its effects on performance is a widely studied topic worldwide with various conclusions depending on the level of integration of the organization. Fewer studies have been done in Kenya as regards SCI and performance, especially on operational performance. Das, Narasimhan, & Talluri (2006), Stank, Keller, & Closs (2001) and Flynn et al., (2010) investigated the effects of supply chain integration on performance and concluded that there is not necessarily a positive relationship, especially on operational performance.

Das et al., (2006) sought to demonstrate that increasing integration beyond a certain threshold did not always result in enhanced performance but instead decreased performance. By comparing the effects of various supplier integration practices employed by manufacturing organizations in the United States on manufacturing performance dimensions of cost reduction, quality improvement, cycle time reduction, new product introduction time and delivery, they found that the interdependence created by integration caused rigidity,

inflexibility and coordination issues that negatively affected performance. This implies that organizations have to define the level of integration that will optimize their performance.

Stank et al., (2001) identified customer and internal integration to be the most important differentiators of overall firm performance in their study of the relationship between logistics integration and performance. The research concluded that customer integration is the most critical competence associated with improved performance. This is because organizations that are set up to efficiently and effectively integrate with their customers are better able to meet their expectations in terms of speed of delivery, responsiveness and order flexibility.

Flynn et al., (2010), concluded that supplier integration did not contribute to operational performance directly, but by interacting with customer integration, operational performance was improved. The study was conducted in the Chinese manufacturing industry and concluded that there was a significant direct relationship between internal integration and operational performance. On considering both supplier and customer integration, customer integration was more directly related to operational performance unlike supplier integration.

In Kenya fewer studies have been done on supply chain integration in the manufacturing industry and its effect on operational performance. Barasa, Simiyu and Iravo (2015), studied the, they found that supply chain collaboration practices significantly contribute to performance of the companies and that the companies created extensive coordination by involving their suppliers in joint planning, product development and had clear policies to manage the relationships between their customers and suppliers. They also found that by standardizing means of communication, information and resource sharing can be improved. The study focused on steel manufacturing firms in Kenya but it is important to determine whether other manufacturing firms that employ the same practices have improved performance.

This study therefore sought to establish how the aspects of supply chain integration affected operational performance of manufacturing organizations and whether manufacturing organizations in Kenya undertake practices that support supply chain integration. This enabled the study to determine the effect of supply chain integration on operational performance.

1.3 Research Objectives

The main objective of this study was to examine the effect of supply chain integration on operational performance of manufacturing organizations in Kenya. The study was guided by the following specific objectives: -

i. To examine the effect of internal integration on operational performance in manufacturing organizations in Kenya.
ii. To examine the effect of supplier integration on operational performance of manufacturing organizations in Kenya.
iii. To explore the effect of customer integration on operational performance of manufacturing organizations in Kenya.

1.4 Research Questions

i. What is the effect of internal integration on operational performance of manufacturing organizations in Kenya?
ii. What is the effect of supplier integration on operational performance of manufacturing organizations in Kenya?
iii. What is the effect of customer integration on operational performance of manufacturing organizations in Kenya?

1.5 Justification of the Study

There are limited studies on supply chain integration in Kenya especially on its effects on operational performance of the organization. This study aims to identify the practices that encourage supply chain integration and whether the manufacturing organizations practice these. By identifying these practices, the management in various manufacturing

organizations can adopt them in order to enhance the operational performance of their organizations.

The study aims to determine whether supply chain integration creates shared value for all partners of the supply chain in terms of faster response to the rapidly changing market conditions which would lead to cost savings and customer satisfaction. Therefore, the study would be beneficial to all supply chain members from the suppliers, the companies and customers who participate in one way or another in moving the products from raw materials to finished goods in terms of highlighting the benefits they will obtain from their collaboration. The studies done on supply chain integration in Kenya, a developing country are limited and inconclusive as to whether firm performance is affected either, positively or negatively, therefore the study seeks to provide contribution to the knowledge bank on supply chain integration and operational performance.

1.6 The Scope of the Study

The study focused on manufacturing organizations who were members of the Kenya Association of Manufacturers at the time of the research. The companies are classified by sector namely building, mining and construction, chemical and allied, energy, electrical and electronics, food and beverage, and fresh produce.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

With the ever changing market conditions, both large and small organizations are constantly faced with scheduling challenges and timely delivery issues (Chakraborty & Sharma, 2007). In order to balance between cost competitiveness, many organizations choose to work more closely with their supply chain partners (Kumar & Liu, 2005; Gunasekaran & Ngai, 2005; Sarkis, Talluri, & Gunasekaran, 2007). This is because they have been perceived to be important strategic partners in enabling the organization to achieve both its short and long term goals of cost management, service delivery and product development.

This chapter reviewed related literature on the concept of supply chain integration and how this affects operational performance of an organization. Theories of supply chain integration are discussed which will lead to the understanding of the relationship between supply chain integration and operational performance of an organization.

2.2 Theories of Supply Chain Integration

Achieving and maintaining high levels of integration is complex and may demand unwarranted resources (Leuschner, Rogers & Charvet, 2013) hence before embarking on integration missions, organizations have to be satisfied that it would be beneficial to them. There are several organizational theories that support supply chain integration as they strive to explain the relationship between supply chain integration and organizational behavior. In the examination of the effects of supply chain integration on operational performance, this study utilizes resource based view theory, social exchange theory and information processing theory.

2.2.1 Resource Based View Theory

The resource-based theory emphasizes the organizations' internal dynamic competences and external environment as major determinants of success (Barney, 1991; Lockett & Thompson, 2001). In the resource-based theory, rent-producing resources determine the

profit level of organizations; however, for profits to be sustainable, the resources have to be scarce, difficult to substitute and difficult to trade in factor markets. The resource based view (RBV) theory states that the organization's performance is affected by firm-specific resources and capabilities and based on this theory resources are allocated unevenly within an industry (Warnier, Weppe, & Lecocq, 2013).

According to RBV, resources are defined as assets, capabilities, organizational processes, firm attributes, information and knowledge controlled by the organization that enable it to conceive of and implement strategies that improve its efficiency and effectiveness. The theory and evidence suggests that much of the variance in organizational performance comes from an uneven distribution of resources and capabilities across competing firms, while industry and market attributes play a relatively small role (Lockett and Thompson, 2001). The firm can provide value to customers in many ways, such as via superior production systems, lower cost structures and emphasis on customer service.

This theory helps the researcher understand productivity gains in the supply chain that are possible when trading partners undertake relation-specific investments that combine their resources in unique ways (Dyer & Singh, 1998). Relation specific investments include creating networks with supply chain partners who may provide the organization with access to resources, markets, information and technologies which enables them share risks and allows them to focus on their core business.

By integrating with suppliers and customers, the organization creates unique skills, knowledge and joint capabilities that are not easily replicated. This leads to improved product quality as there is faster identification and communication of challenges, joint problem solving and better understanding of capabilities of the supply chain partners (Deming, 1982). Joint idea generation and evaluation with both suppliers and customers can lead to improved product designs which also impacts on product quality (Schoenherr & Swink, 2012).

2.2.2 Social Exchange Theory

The social exchange theory (SET) which is a sociology and relational marketing theory (Emerson, 1962) is used to explain why organizations need close interaction with other organizations. The theory states that the motivation for integrating systems is the rewards it brings and the avoidance of punishment through being left out of key deals due to poor relations with supply chain partners. Shared experiences, values and goals create shared value which improves performance (Ketchen et al., 2007) as attitudes and behaviors are determined by the rewards of interaction minus the costs of that interaction (Griffith, Harvey, & Lusch, 2006).

The theory examines the markets within definite institutional and social structures and their complex exchange processes that are interdependent. The interactions within these institutions are governed by reciprocal relationships. These would only continue in the long run if the principle of reciprocity was respected. The concept of exchange leads to the power concept. Cohesion and dependence is implied in the relationships that encourage reciprocation (Emerson, 1969). Many organizations develop and participate in activities based on their expectation that such activities will be mutually beneficial and that the returns would be more than costs incurred. Once costs start outweighing the benefit, the organizations would think twice about their participation.

According to SET, power, trust and relationship commitment play an important role in supply chain relationships. Supply chain integration lowers transaction costs by building long term relationships and integrating inter-organizational processes (Zhao, Huo, Flynn & Yeung, 2007). Transaction costs include costs of contracting suppliers as well as monitoring customers. Search costs are reduced by establishing long-term relationships with fewer suppliers who are changed after long intervals. This also helps reduce contracting costs as negotiation costs and costs of writing contractual agreements are reduced. By having close relationships with customers, monitoring costs are reduced as compliance to contract need not be monitored regularly. Therefore, by collaborating with supply chain partners, enforcement costs, i.e. contracting and monitoring costs, are reduced.

2.2.3 Information Processing Theory

The information processing theory (IPT) advanced by Galibreth, (1973) states that an organizations main task is to cope with information and that more information has a positive impact on performance. Therefore, organizations that can transmit more and act on available information in a timely manner have greater advantage over their competitors who may be slow to act. Although, there is a level beyond which more information does not lead to better performance (Galibreth, 1973), organizations can manage information sharing to their advantage.

IPT identifies three concepts that affect performance. These are the information processing needs of the organization, its information processing capability and the fit between the two (Galbraith, 1973). The environment is constantly changing and is complex in nature, leading to uncertainty while the organization needs quality information despite these changes in order to make sound decisions, hence a balance has to be found between the two (Premkumar, Ramamurthy & Saunders, 2005). This balance is found by trying to reduce the uncertainty the organization is exposed to, by implementing mechanisms and information processing capabilities that enhance information flow within the organization and with its supply chain partners. For example, by redesigning business processes and promoting the use of integrated information systems, flow of information is improved and uncertainty is reduced as the organization carries out its operations (Premkumar et a.l, 2005).

IPT explains organizational behavior in terms of information that must be gathered, interpreted, synthesized and coordinated in order to make decisions (Schoenherr & Swink, 2012). While internal integration is characterized by interconnected information systems and tasks aimed at improving lateral relations like creation of cross functional teams, it also provides links by which externally sourced information can be internally absorbed. An organizations level of internal integration can therefore be viewed as the source of its capability to effectively recognize, evaluate, assimilate and apply the information it collects from its supplier and customer integration efforts.

An organization with high levels of internal integration is better able to transform and exploit the knowledge obtained from its external supply chain because through its established rules, procedures, systems and cross-functional relationships its internal workforce can easily and effectively share and access the information. This internal cooperation is required in order to promote effective learning and coordination that stems from external cooperation (Schoenherr & Swink, 2012). With internal integration decision making is improved as a wider range of employees can participate in joint evaluations and planning. Relevant information from external partners is also channeled most effectively and efficiently to the areas where it is most required (Swink et al., 2007).

Infrastructure that supports information processing in organizations includes information technologies and enterprise resource systems that span multiple agencies. These support integration efforts by ensuring new opportunities identified are shared between the organization and its supply chain partners potentially impacting performance by enabling better decision making which leads to improved quality of outputs produced.

2.3 Empirical Review

The empirical review is divided into two sub-sections. The first sub-section describes the various forms of integration that make up supply chain integration while the second sub-section discusses the relationship between supply chain integration and operational performance.

2.3.1 Supply Chain Integration

The degree to which an organization strategically collaborates with its supply chain partners and collaboratively manages intra and inter-organizational processes in order to achieve effective and efficient flows of products and services, information, money and decisions is known as supply chain integration (Zhao et al., 2008). The objective is to provide maximum value to the customer at low cost and high speed. Supply chain integration is a product of internal integration and external integration.

Internal integration involves the organizations internal processes. An organization structures its strategies, practices and processes in such a way that will enhance order fulfillment to its customers while interacting efficiently with its suppliers (Flynn et al., 2010). Internal integration enables the organization to absorb uncertainties in the environment and is enhanced by the various functional areas of the organization working in collaboration so as to be able to respond adequately and in a timely manner.

External integration comprises supplier and customer integration (Wong et al., 2011). Supplier integration is developing joint collaboration with suppliers of the organization so as to better manage inter-firm business processes and enhance collaboration in planning and joint product development (Wong et al., 2011). A close relationship between the organization and its supplier's enable the suppliers to understand the organizations needs and be able to adopt to changing requirements in a timely manner. There is increased information exchange which helps reduce waste and improves delivery performance as production planning can be accurately done (Flynn et al., 2010). Customer integration is the close collaboration and information sharing developed with key customers so as to provide the organization with strategic insights on opportunities and market expectations (Wong et al., 2011).

Based on the theories, organizations can develop competencies that enable them to form alliances with their supply chain partners and achieve supply chain integration. These competence areas include customer integration, internal integration, materials and service supplier integration, technology and planning integration and relationship integration as identified by Bowersox, Closs and Stank, 1999 cited by Stank et al., (2001). The competences developed evolve from the practices the organization and supply chain partners engage in to try and combat challenges that discourage integration.

Walker, Di Sisto, and McBain (2008) in their research identified fourteen challenges organizations encounter that hinder integration of their supply chains. Some of the challenges include different organizational cultures, varied metrics and measures for organizational goals, different customer needs and market segments, incorrect positioning of

work, design issues, not focusing on relationships with customers and suppliers, ineffective sales and operations processes, as well as unreliable databases.

In order to minimize the effect of the challenges, organizations undertake various practices to bring them closer to their supply chain partners. The strategies behind these practices align and link the organizations. Alignment involves developing common goals and objectives throughout the organizations, processes and functions in the supply chain. linkage is sharing of information and communicating what is needed for proper planning and decision making. With alignment, the organization is ensured of consistency in its direction when supply chain objectives are being made. Linkage makes sure necessary information is available for decision making by the various functions and entities of the supply chain. (Prajogo, & Olhager, 2012). Key supply chain execution processes include processes for order fulfillment, sales and operations planning and customer-facing processes as shown in Figure 2.1.

Figure 2.1: Key Supply Chain Execution Processes
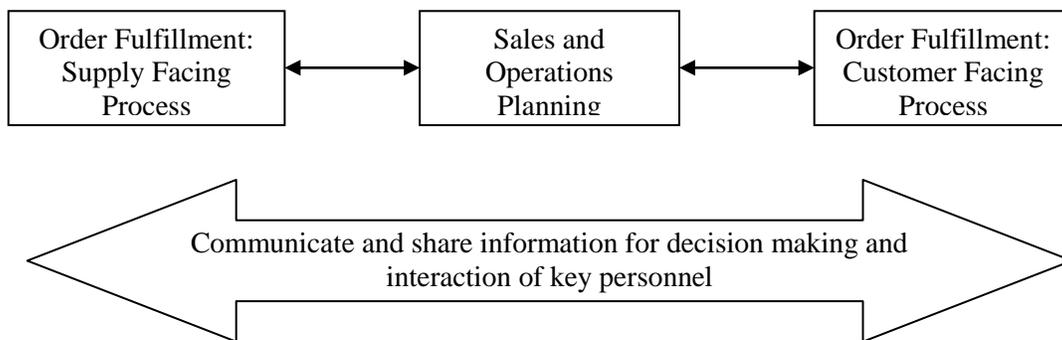
Adapted from Leenders, and Johnson, (2002).

For each of the three processes organizations engage in various practices to ensure coordination is enhanced. In order to develop supply-facing processes, the communication between the organization and its suppliers is regular and frequent. The communication relates to demand and supply conditions which may be enhanced by linked information systems and person to person interfaces between supply chain partners, participating in

collaborative decision making with key suppliers and establishing clear reward systems that encourage integration.

Frequent and regular communication between the organization and its suppliers as regards the market conditions enables the organizations to have visibility on demand and supply conditions in the market. As there is regular communication, organizations can improve relationships with their suppliers which they might formalize by entering into supplier relationship agreements (Estampe, Lamouri, Paris, & Brahim-Djelloul, 2013). This may serve as a guide for providing key suppliers with visibility for the future as well as enable them plan and prioritize customer demands. Relationship between the organization and its suppliers can also be improved by scheduling regular meetings either quarterly or semiannually depending on the business and type of projects undertaken by the organization.

To enhance information sharing between the organization and its suppliers, some may opt to allow strategic suppliers access to their databases. The information retrieved may be on quality, quantity and design aspects of products required by an organizations customer. Together with this, consultations may be held between suppliers' representative and the organizations representative to clarify any issues or changes made over time. Collaborative decision making is a product of joint problem solving and creation of cross functional teams. Areas where organizations can collaborate with their suppliers include project or product designs, forecasting, capacity planning and on process improvement (Flynn et al., 2010). This collaboration is beneficial to the organization because there is reduced design costs as better decisions are made, procurement is simplified and effort required is reduced. There is also improved quality designs and better reliability on project execution (Sundram, Chandran and Bhatti, 2016; Flynn et al., 2010). This is because the teams comprising of supplier and organization members are better able to address any issues that arise as regards the supply chain and work together towards a common goal.

Within the organization, sales and operations planning ensures decision makers reach a decision on a single operations plan that shares the critical resources in order to reach the organizations performance objectives (Prajogo, & Olhager, 2012). The major purpose of

sales and operations planning is to ensure internal integration is at its best with all the various functional areas within the organization working towards a common goal. It extends from planning and acquiring labor and materials, to gathering all the factors of production to achieve the production plan of the organization.

Customer facing processes include the practices the organization engages in together with its customers to ensure order fulfillment. Sometimes, depending on the nature of the product for example if a solution is being offered to the customer, it may engage the suppliers too. None of the supply chain partners fully control the interactions but work together to achieve their various goals. These include designing the process, decision making on resources allocated to operating the process and contributing information to the process (Jayaram, & Tan, 2010). These are process synchronization, collaboration and information sharing respectively.

In process synchronization, the organization aligns its processes with that of its key customers. It can be in terms of logistics, inventory management and return processes. After the order is confirmed, the organization takes responsibility for production and upon completion ships the product to the customer. A policy is in place to govern any orders the customers may want to return.

In collaboration, the organization focuses on relationship management with its key customers. Sometimes in order to ensure quality delivery of service, the organization will involve its main suppliers to ensure the customer needs are met and best possible option of production is made available to the customer (Closs, & Savitskie, 2003; Jayaram, & Tan, 2010). The organization is then able to influence design decisions which will eventually offer a low-cost solution for its customer. As the customer is involved throughout the process, there are minimal re-works and any problems encountered are solved jointly.

According to Gosling, Purvis, and Naim, (2010) customer facing processes are supported by good information systems hence investing in software that encourages information sharing between the organization and its customers will encourage integration. Investing in an ERP system will enable the organization to better manage its order fulfillment responsibilities and

any changes can be monitored and adjusted within a matter of minutes. Movement of goods can be monitored and any delays sorted immediately using radio frequency identification (RFID) and point of sale (POS) systems can be used for demand forecasting and just in time replenishments which improves production flexibility and delivery reliability (Turker, & Altuntas, 2014).

Sundram, Chandran and Bhatti, (2016) carried out a study to examine the relationship between various components of supply chain performance (SCP), supply chain practices and supply chain integration (SCI) in the Malaysia. They utilized survey data of 156 organizations in the manufacturing sector concentrating mainly on electronics companies. They found that the implementing of SCMPs had a significant impact on the effectiveness of the supply chain and a direct impact on the performance of electronics manufacturing companies. The findings suggest that SCI can be stimulated by SCMPs and managers can take advantage of this to influence their firm performance levels. In addition, they could identify which SCMPs will likely to benefit more in enhancing SCI. They concluded that supply chain managers in the manufacturing firm could use these key supply chain practices and transform them into industrial critical success factors. The conclusion was that SCMPs employed by organizations significantly affects SCI.

Kimondo, Mutuku, and Winja (2015) conducted a study to examine dynamics of supply chain management in the Kenyan construction industry. They adopted cross-sectional survey research design which establishes causal relationships between variables. The researchers used stratified random sampling in selecting 65 contractors based on the group they belonged and utilized both primary Questionnaires and secondary data comprising published documents and government publications. They found that suppliers and logistics partners delivering products and materials just in time, minimizing inventory holdings across the supply chain, configuring distribution networks to minimize total supply chain-wide inventory costs. They concluded that SCM best practices have a positive impact on construction project performance.

2.3.2 Effect of Supply Chain Integration on Operational performance

Even though supply chain integration has been a highly researched topic during the last 20 years, it has often been operationalized and measured differently (Leuschner et al., 2013). There is still little consensus on how to capture the essence of supply chain integration (Van der Vaart & Van Donk, 2008). Existing studies define integration in different ways and base the questions in their surveys on a limited number of indicators and operational measures (Fabbe-Costes & Jahre, 2007). Leuschner et al., (2013) suggest that authors, referees, and editors agree to a consistent standard of reporting for empirical survey-based research. In this connection, this study conducts an empirical analysis of previous studies on supply chain integration and performance.

There are five operations performance attributes that can be used to describe operational performance of an organization. These are quality, dependability, speed, cost and flexibility as described by Skinner, 1969. The performance attributes are multidimensional in that they encompass several dimensions. The organization may need to adapt quickly to changes in its environment and markets or availability of raw materials, and this ability determines the way the organization responds to its market. Measuring operational performance is not easy as the attributes are intangible. Organizations however can have in place indices that act as indicators of when a change needs to be made or that act as triggers that actions need to be taken.

A lot of researchers have studied supply chain integration and operational performance and have varied conclusions. Stank et al., (2001), studied the performance benefits of supply chain logistics integration. They concluded that while customer and internal integration overwhelmingly determined operational performance of the organization, other competencies like technological investments and relationship integration should be considered when determining performance of the organization.

2.3.2.1 Internal integration and operational performance

Internal integration recognizes that different functional areas and different departments within an organization should operate as an integrated process for the organization to meet its customer's requirements (Flynn et al, 2010). When internal functions are integrated there

is more cooperation in the organization and delivery of goods and services is affected as the elements of operational performance of cost, flexibility, quality and delivery reliability are affected.

While some researchers argue that internal integration leads to improved operational or logistics performance (Stank et al,2001; Saeed, Malhotra & Grover, 2005) others claim that internal integration enhances external integration and it is the base for any external integration (Flynn et al, 2010; Zhao, Huo, Selen & Yeung, 2011; Vickery, Jayaram & Droge, 2003; Williams, Roh, Tokar & Swank, 2013;).

Zhao et al, (2011) sought to prove that internal integration has a direct positive impact on external integration. Their research focused on the cultural context of organizations in China but did not focus on a particular industry. They suggested that future research on supply chain integration should be done in other contexts. Vickery et al. (2003), studied internal organization functions of the supply chain and concluded that they are as much a part of the supply chain as are the external functions. Williams et al, (2013) found that internal integration is a vital element in order to achieve external integration.

Schoenherr and Swink (2012) stated that internal integration forms a major component in achieving supply chain integration which in turn leads to improved performance for the organization. They argued that an organization that has high levels of internal integration has highly established rules, procedures and strong relationships between its departments. These processes help its employees to better exploit external knowledge obtained through external integration. Romano (2003) argued that the inadequacy of properly developed internal management systems within the organization is a major obstacle to fully integrating information and material flow across the supply chain network. Examples include lack of standardized operational processes, fragmented information flows and lack of integration of the various information systems used within the organization.

2.3.2.2 Supplier Integration and operational performance

The structural contingency theory states that external fit indicates consistency between an organizations structure and the strategy it pursues in response to its external environment (Pennings, 1987) which in this case is its suppliers and customers. Organizations normally respond to their environments by developing, selecting and implementing strategies that enable them to maintain a fit between their internal and external environments. Hence the notion that external integration extends from internal integration.

Supplier integration involves information sharing and coordination of activities with key suppliers so as to provide the organization with insights to supplier processes, capabilities and constraints which enables improved transaction planning, enhanced product and process design as well as effective planning and forecasting (Schoenherr & Swink, 2012). According to Das et al., (2006), information sharing has been enabled by mechanisms that support integration. These include electronic data interchange (EDI), application software like supply chain optimization (SCO) software and ERP systems, together with web based integration systems. Coordination has been enabled by supplier relationship development, cross functional involvement and joint problem solving. These mechanisms result in capability development which in turn leads to creation of organizational resources which give the organization competitive advantage according to the RBV theory.

Developing partnerships with suppliers enables them to better understand the organization and be able to anticipate its needs. The mutual exchange of information on products helps the organization develop production plans and produce goods on time hence improving on their delivery performance (Flynn et al., 2010). The relational ties created by knowledge based integration enables flexibility and gives the organization capability to adapt in uncertain environments. As a whole supplier integration reduces transaction costs due to increased coordination and information sharing. It also enables speedy decision making as more information is made available (Das et al., 2006). According to the RBV theory, creation of cross functional teams promotes knowledge transfer between organizations which may otherwise not be easily transferred hence encouraging joint problem solving (Das et al., 2006). This enables the organization to produce higher quality products and

services that are more responsive to customer requirements based on the interactions encouraged by integrating resources.

Fawcett and Magnan (2002) found in an empirical study among managers from purchasing, manufacturing and logistics in the USA that supply chain practice seldom resembles the theoretical ideal. The data indicate that most organizations were at early stages of inter-organizational collaboration. Very few, if any of the organizations were managing the entire supply chain from suppliers' supplier to customers' customer. In most cases, the responsibility for managing second-tier suppliers was handed over to first-tier suppliers. Zhang, Gunasekaran and Wang, (2015) sought to develop a conceptual integration model which consists of comprehensive elements that are important to academic research and industrial practices. They found that efficient supply chain integration placed all essential resources of all cooperating partners together and linked all functional processes in order to effectively use resources. The goal is to operate the whole supply chain as a corporate entity, to achieve effective and efficient flows of products and services, information and knowledge, finance and decisions so as to provide maximum value to the customers at low cost and high speed.

2.3.2.3 Customer integration and Operational Performance

Developing a close relationship with customers enables the organization to improve on accuracy of demand information, which leads to reduced product design and production planning time (Flynn et al., 2010). This reduces waste hence leading to better management of inventory hence lower production costs.

Customer integration is supported by the RBV theory which focuses on resources that give the firm competitive advantage as they present a product offering that is desired by the customers (Leuschner et al., 2013). Due to information sharing, quality of products and services may be improved in accordance to feedback from customers or market demand through technological investments made by the organization. This is also supported by the findings of Narasimhan et al. (2010) who state that customer integration affected quality and

new product flexibility. The increased interaction with the organizations customers enables it to refine the product as well as change products to suit the customers requirements.

TCE and SET also support customer integration in that organizations strive to create long term relationships with their customers enabling trust and communication improvement. This enables the organization to reduce opportunism and enhance governance therefore reducing transaction costs (Zhao et al., 2008). The critical activities of customer integration are coordination, process synchronization and information sharing (Zhao et al., 2008) which lead to increased efficiency within the supply chain enabling on time delivery of service hence improved customer satisfaction. Flexibility is also enhanced as there is timely information exchange which enables the organization adopt to the changes in customer demands (Koçoğlu et al., 2011).

Gimenez and Ventura (2005) found that internal integration and customer integration influence each other and that both impact the performance of the organization. However, their study focused on internal integration in terms of dyadic interface between logistics and marketing, and logistics and production. Their study viewed external integration in terms of customer integration only and did not consider supplier integration.

2.4 Research Gap

Various research has been done on supply chain integration and its effects on operational performance of the organization. The focus may have been varied depending on type of integration either internal, supplier or customer integration but the results are in agreement that SCI improves operational performance (Stank et al, 2001; Saeed et al, 2005; Zailani & Rajagopal, 2005; Wong et al, 2011). Others claim that internal integration is the basis of external integration which in turn improves operational performance of the organization (Vickery et al, 2003; Flynn et al, 2010; Zhao et al, 2011; Williams et al, 2013). They state that internal integration ensures that there is a smooth flow of information and materials through the organization to the supply chain partners and that the level of integration determines operational performance.

According to Zhang et al, (2015), if all partners of the supply chain were to operate it as a corporate entity and linked all functional processes there would be effective use of resources which would in turn improve operational performance of the organization. A study by Gimenez, van der Vaart and van Donk (2012) stated that their research on SCI was limited by the fact that they did not understand the interrelationship between levels of supplier, customer and internal integration. They suggested that supply chain researchers should consider the issue of interrelationships between supplier, customer and internal integration in future research. This research aims to fill the research gap by providing evidence on the effect of supply chain integration on operational performance of manufacturing organizations in Kenya.

2.5 Conceptual Framework

The conceptual framework depicts how the various practices of supplier and customer integration affect operational performance of the organization.

Figure 1.2: Conceptual framework

Independent variable   Dependent variable

Supply Chain Integration	Operational performance:
• Internal Integration	• Production cost
• Supplier Integration	• Production flexibility
• Customer Integration	• Delivery reliability
	• Product quality
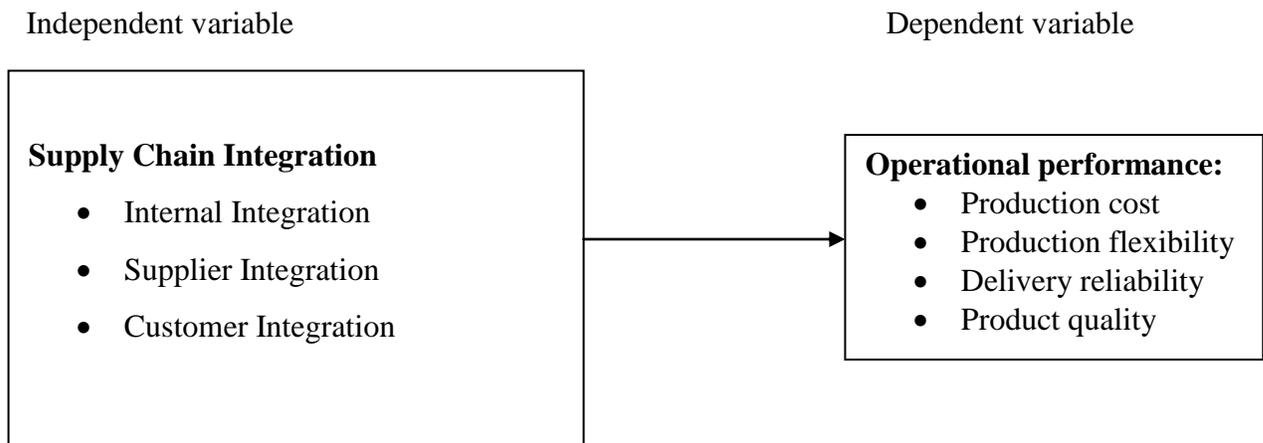
Source: Author (2018)

2.5.1 Operationalization

In this section, the researcher shows how the independent and dependent variables were measured.

Table 2.1: Operationalization of variables

Variables	Constructs	Operational Definition	Measurement Scales	Source
Independent variable: Supply Chain Integration	Internal Integration	This is the ability of an organization to organize its strategies, practices and processes to interact efficiently with its suppliers and fulfill customer requirements.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Gimenez (2005) Koufteros (2005) Flynn et al., 2010 Wong et al., 2011
	Supplier Integration	This is the ability of an organization to develop close collaboration with its suppliers so as to better manage inter-firm business processes.	A likert scale of five was used ; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Frolich & Westbrook, 2001 Koufteros, 2005 Das et al.,2006; Devaraj et al., 2007 Flynn et al., 2010 Wong et al., 2011
	Customer Integration	This is the ability of an organization to collaborate and share information with its key customers so as to improve the accuracy of its demand information.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Frolich & Westbrook, 2001 Koufteros, 2005 Devaraj et al., 2007 Flynn et al., 2010 Wong et al., 2011

Dependent variable: Operational Performance	Production cost	Ability to produce products with low material costs, have low inventory holding costs, be able to offer lower prices than competitors.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Ward & Duray, 2000 Boyer & Lewis, 2002
	Production flexibility	Ability to cope with a wide range of requirements or the ability to change quickly i.e change production volume, specification or product mixes.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Gupta & Somers, 1992 Chang et al, 2003
	Delivery reliability	This is the dependability & speed of delivery i.e. the time taken to receive raw materials, time taken to deliver product to customer and the reliability of deliveries.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Ward & Duray, 2000 Boyer & Lewis, 2002
	Product quality	This is conformance to specification i.e. production of products with low number of defects, reliable products and high quality products that meet customer needs.	A likert scale of five was used; 1-strongly disagree, 2- disagree, 3- neutral, 4- agree 5- strongly agree	Ward & Duray, 2000 Boyer & Lewis, 2002

Source: Author (2018)

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

In this chapter the research methodology used in the study has been described. The geographical area where the study was conducted, the study design, the population and sample are described. The instrument that was used to collect the data, including methods implemented to maintain validity and reliability of the instrument are also described.

3.2 Research Design

Descriptive research design was used to obtain information from the various organizations. Orodho (2003) described descriptive survey as a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. It can be used when collecting information about people's attitudes, opinions, habits or any of the variety of education or social issues (Orodho and Kombo 2003). The information collected is then quantified in order to draw conclusions on the subject under study. The research aimed at finding out the effects of supply chain integration on operational performance of manufacturing organizations in Kenya.

3.3 Target Population

The target population was manufacturing organizations dealing in metal and allied sector; food and beverage, energy and electrical, chemical and allied, pharmaceuticals; leather; plastic; textile; timber, wood and furniture; building, mining and construction and fresh produce. The target population are manufacturing companies in Kenya who are members of Kenya Association of Manufacturers (KAM). According to KAM (2015) report in total there are 553 manufacturing companies organized into six regional chapters. The regional chapters exist to develop and prioritise local advocacy agenda. The regional chapters have members as shown in table 3.1 with Nairobi and its surrounding having majority of its membership.

Table 3.1: The Target Population

Regional Chapter	Frequency	Percentage
Athi River	18	3%
Central Kenya	31	6%
Coast	73	13%
Eldoret	14	3%
Nakuru	18	3%
Nairobi and surrounding areas	399	72%
Total	553	100%

Source: Author (2018)

3.4 Sampling Design

This study combined two sampling techniques in order to effectively answer the research objectives (Teddlie & Yu, 2007). Proportionate stratified random sampling technique was used to select the required sample from the target population of 553 companies drawn from six regional chapters of the country, Athi River, Central Kenya, Coast, Eldoret, Nakuru and Nairobi and its surroundings.

The study used purposive sampling to select a manager or supervisor in supply chain management within the organizations to complete the questionnaires. The manager or supervisor was considered to be knowledgeable on the organizations processes and was preferably in management level.

Yamane (1967) provides a simplified formula to calculate sample sizes and hence this study used the formula to calculate the sample size in table 3.2. A 95% confidence level and P=.5 is assumed for the equation.

$$n = \frac{N}{1 + N(e)^2}$$

Where   n is the sample size
             N is the population size
             e is the level of precision.

$$n = \frac{N}{1 + N(e)^2} \qquad = \qquad \frac{553}{1 + 553\,(.05)^2} \qquad = 232$$

Therefore the sample size was 232 respondents selected from the target population. The sample size was selected from a list of organizations obtained from the KAM website which classified the organizations according to regional chapters. Every third company in the list was selected as a sample.

Table 3.2: Sample Design

Region	Population size	Sample size	Percentage
Athi River	18	7	3%
Central Kenya	31	14	6%
Coast	73	30	13%
Eldoret	14	7	3%
Nakuru	18	7	3%
Nairobi and surrounding areas	399	167	72%
Total	553	232	100%

Source: Author (2018)

3.5 Data Collection Instruments

A questionnaire was chosen as the data collection instrument for this study. A questionnaire is a printed self-report form designed to elicit information that can be obtained through the written responses of the subjects. Primary data was collected by use of questionnaires which was constructed in likert scale and comprised of both closed and open ended questions which included all possible answers/prewritten responses where the respondents are asked to choose among them.

The questionnaire was divided into two sections. Section one consisted of questions on general information about the organization and section two contained specific questions in regard to how internal, supplier and customer integration practices take place in the organization and how this affects operational performance of the organization.

Questionnaires were chosen as the data collection instrument because it ensures a high response rate, does not require a lot of time and energy to administer and is considered confidential because respondents are not required to disclose their identity. It reduces opportunity for bias because they are consistent and most questions in the questionnaire were closed ended, making it easy to compare the responses received from the respondents.

3.6 Data Analysis

The study analyzed the data collected using regression analysis. This model of analysis examines the simultaneous effects of the independent variables on a dependent variable. Quantitative data from the questionnaire were coded and analyzed using The Statistical Package for Social Sciences (SPSS). SPSS was used to run descriptive statistics such as frequency and percentages to present the quantitative data in form of tables and graphs based on the major research questions.

A multiple regression model was used to measure the effects of external supply chain integration on operational performance with only one dependent variable and three independent variables. The regression model will take the form as shown below:

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_{3} + \varepsilon$

Where:

Y = predicted value of the dependent variable y (Operational performance)

b_0 - b_3 are the sample estimates of the coefficients

X_1 = Internal integration (independent variable).

X_2 = Supplier integration (independent variable).

X_3 = Customer integration (independent variable).

The data analyzed were presented and interpreted using charts, graphs and simple frequency tables. The qualitative data generated from open ended questions were categorized in themes in accordance with research objectives and reported in narrative form along with quantitative presentation.

3.7 Data Quality

3.7.1 Validity of instrument

Validity shows how the interpretation of test scores obtained in a research work are supported by evidence and theory. The validity of an instrument is the extent to which it measures what it is supposed to measure. Validity is the accuracy and meaningfulness of inferences, which can be derived from the research results (Mugenda, 1999). It is the extent to which results from the data analysis represent the study variables.

The research instrument was validated in terms of content validity. This measures the extent to which the questionnaire questions reflected the various areas covered by the questionnaire.

3.7.2 Reliability of instrument

Reliability is the ability of a research instrument to consistently measure characteristics of interest over time (Allan, 2013). Reliability is concerned with consistency, dependability or stability of a test. The researchers measured the reliability of the questionnaire to determine its consistency in testing what they are intended to measure. The test re-test technique was used to estimate the reliability of the instruments. The study used Cronbach's alpha to measure the reliability. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. However, Field (2009) argues that a Cronbach's alpha value equal or greater than 0.5 is regarded to be an indication of reliability. Cronbach's alpha had a value of 0.634 meaning that there was internal consistency. This is shown in table 3.3.

Table 3.3: Cronbach's Alpha test

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.634	.685	4

Source: Survey Data (2018)

3.8 Ethical Considerations

Ethical considerations were taken into account when carrying out the research. These included informed consent, honesty and privacy. Participants to the research were informed on the purpose of the research and requested to participate. Honesty was observed by the researcher being open with the respondents and not obtaining their responses under false pretences. Privacy was maintained by ensuring anonymity of respondents and no reference was made to company specific information.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

Chapter four presents the findings and discussion of the effects of external supply chain integration on operational performance of manufacturing organizations in Kenya. The analysis and discussion in this chapter is based on the responses from research questionnaires as the primary research instrument employed in the study. This chapter presents the response rate, sample firms' characteristics, descriptive and inferential analysis of the data. The chapter is divided into different sections. The percentages, means, frequencies, standard deviations, are computed and presented. The descriptive data presented forms the basis for further inferences.

4.2 Response Rate

Response rate involves the computation of the response rate from the questionnaire returned from the respondents. The self-developed questionnaires were presented to the respondents who were staff within the supply chain of the organizations, possibly a manager of the supply chain or a senior supervisor within the organization with operational knowledge of the supply chain.

A total of 232 questionnaires were administered and collected at a later date. At the end of the study, only 164 questionnaires were returned with 68 not returned or filled wrongly hence regarded as spoilt. Returned questionnaires were coded and analyzed; the overall response rate was 71%. The relatively high response rate for this type of study was thought to be attributed mainly, to three factors: clear and simple designed questionnaires, respondents were briefed about the content and purpose of the survey and were guaranteed that their replies would be treated in strictest confidence. Lastly, the high response rate was also attributed to the respondents' enthusiasm or willingness to participate obviously, to what they considered as an interesting subject to put their views across considering that this is their field of expertise which will contribute to the improvement of the sector.

4.3 Organization Profile

This section covers general information or key areas that may or may not have a direct impact on the objective of study. The general background information provides a clear understanding and clarity on the sample population in the study. Some of the parameters that were examined included the number of years the organization has been in operation, the number of employees in the organization, the ownership status and the target market of the organization.

Table 4.1: Organization Profile

Characteristics	Options	Frequency	Percentage
Number of years organization has been in operation	Less than 5 yrs	5	3%
	6 – 10 yrs	31	19%
	11 – 20 yrs	28	17%
	21 – 30 yrs	44	27%
	Over 30 yrs	56	34%
Employee population in the organization	Below 99 employees	33	20%
	100 – 200 employees	59	36%
	201 – 400 employees	48	29%
	401 – 600 employees	14	9%
	Above 600 employees	10	6%
Ownership status	Foreign	39	24%
	Local	92	56%
	Part Foreign/ Local	33	20%
Target Market	Mainly foreign	58	35%
	Mainly local	86	53%
	Both foreign & local	20	12%

Source: Survey Data (2018)

Table 4.1, shows that a majority of the organizations had been in existence for more than 30 years (34%), had an employee population of more than 100 employees (80%), were locally owned (56%) and had a local target market (53%).

4.4 Descriptive Analysis

Descriptive statistics is a technique used in presenting and organizing data these include: tabulation, diagrams, graphs and certain numerical procedures all which aim at summarizing the material in a form which display its distinctive features that aid analysis. Descriptive statistics were used to quantitatively describe the important features of the variables using means and standard deviation.

To determine the extent to which supply chain integration was present in the organizations, the questionnaire was divided into three sections each addressing one form of integration, namely internal integration, supplier integration and customer integration. The fourth section of the questionnaire addressed operational performance. A 5 point likert scale was used to determine respondents' views where 1 meant strongly disagree, 2 meant disagree, 3 meant neutral, 4 meant agree and 5 meant strongly agree.

4.4.1 Internal integration Descriptive Statistics
To determine the effect of internal integration on operational performance in manufacturing organizations in Kenya, this section provided several statements related to internal integration practices that may be undertaken by organizations and required the respondents to rate their level of agreement in the context of their organization.

With regard to internal integration, the highest mean score was 3.74 while the lowest was 3.41. The highest practice was use of cross functional teams in product development. This meant that most organizations agreed that various departments were involved in the production phase and this ensured output was of good quality. This was followed by acceptance that there was data integration among internal functions. This ensures information within the organization is shared to the necessary departments hence any changes required may be made in a timely manner.

The overall mean score for internal integration was 3.59 with a standard deviation of 0.868. This implies that most manufacturing organizations had developed their internal integration practices as shown by table 4.2.

Table 4.2: Internal integration in manufacturing organizations in Kenya

Internal Integration							
	N	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
Use of cross functional teams in new product development	164	18	55	42	49	3.74	1.007
There is data integration among internal functions	164	42	12	68	42	3.67	1.119
There is a high level of responsiveness within the organization to meet other department needs	164	42	18	67	37	3.60	1.100
Real time integration and connection among all internal functions from raw material management, through production to sales	164	6	73	67	18	3.59	0.733
Use of enterprise system to integrate activities of various departments	164	0	79	79	6	3.55	0.568
Utilization of periodic interdepartmental meetings among internal functions	164	18	61	85	0	3.41	0.681
Overall mean & std. dev						3.59	0.868

Source: Survey Data (2018)

4.4.2 Supplier Integration Descriptive Statistics

The study also sought to determine the effects of supplier integration on operational performance of manufacturing organizations in Kenya. This section therefore requested the respondents to rate their views on the various statements provided related to supplier integration practices adopted by various organizations.

With regard to supplier integration, the highest mean score was 3.66 while the lowest was 3.48. The highest mean represents information sharing between the organization and its suppliers while the lowest mean represents joint planning with suppliers. This means the organization communicates with its suppliers but does not necessarily plan together. If the organization is in regular communication any updates are transmitted in a timely manner and organizations are able to deliver according to its schedule. The second highest ranked practice was high degree of strategic partnerships with its suppliers followed by supplier involvement in product development and use of information technology with major suppliers which had a mean score of 3.52. Strategic partnerships ensures collaboration which encourages integration between the organization and its suppliers.

The overall mean score was 3.56 with a standard deviation of 0.679. This implies that the respondents mostly agreed to the statements provided giving it an intermediate level of adoption compared with the other two variables of internal integration and customer integration. This is shown in table 4.3.

Table 4.3: Supplier integration in manufacturing organizations in Kenya

Supplier Integration							
	N	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
Our suppliers provide information to us in the production and procurement processes	164	12	37	109	6	3.66	0.667
Have a high degree of strategic partnerships with suppliers	164	6	61	85	12	3.63	0.675
Our suppliers are involved in the product development and design process	164	12	67	73	12	3.52	0.739
Use information technology to share information with our major suppliers	164	12	61	85	6	3.52	0.687
Have a high degree of joint planning to obtain rapid response in the ordering process with suppliers	164	6	79	73	6	3.48	0.631
Overall mean & std. dev						3.56	0.679

Source: Survey Data (2018)

4.4.3 Customer integration Descriptive Statistics

The study was also interested in establishing the effects of customer integration on operational performance of manufacturing organizations in Kenya. In this section, the respondents were requested to indicate their level of agreement with several statements regards practices within their organization that encourage customer integration.

With regard to customer integration, the highest mean score was 3.63 while the lowest mean score was 3.30. The highest mean score showed that most organizations had a high degree of joint planning and forecasting with their major customers to anticipate demand visibility. This was followed by decisions about order acceptance being made on a stable long term

predetermined supplier relationship, meaning that the decision to accept a customer's order was determined by whether the organization had established good relations with its suppliers hence was able to determine when and how the order could be fulfilled. The lowest ranked practice was that customers were involved in the product development process. This means that once the order was received the customer was not consulted until the finished product was ready. Many organizations seemed to provide finished goods to its customers based on standard products hence not much consultation was required as the production process was ongoing.

The overall mean score was 3.52 with a standard deviation of 0.582. This implied that customer integration was not as widely adopted by the organizations as was internal integration and supplier integration. This is shown in table 4.4.

Table 4.4: Customer integration in manufacturing organizations in Kenya

Customer Integration							
	N	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
Have a high degree of joint planning and forecasting with major customers to anticipate demand visibility	164	6	63	95	0	3.63	0.556
Decisions about a customer's order acceptance or rejection are made on a stable long-term predetermined supplier structure	164	6	55	103	0	3.59	0.563
Use information technology to exchange information with major customers	164	12	49	103	0	3.55	0.629
Customers provide information to assist in the procurement and production processes	164	12	79	73	0	3.55	0.629
Customers are involved in the product development process	164	21	88	55	0	3.30	0.533
Overall mean & std. dev						3.52	0.582

Source: Survey Data (2018)

The descriptive statistics for the supply chain integration variables may be summarized as follows: - Internal integration had the highest overall mean and standard deviation of 3.59 and 0.868 respectively, followed by supplier integration with 3.56 and 0.679 respectively and finally customer integration with 3.52 and 0.582 respectively.

4.4.4 Operational Performance Descriptive Statistics

With regards to operational performance, the highest mean score was 3.63 while the lowest mean was 2.74. The highest mean represented the organizations ability to rapidly change

production volume and the organizations ability to provide on time delivery to customers. The two represent production flexibility and delivery reliability aspects of operational performance. The lowest mean score was 2.74 which mainly relates to quality attributes of the organization. This is shown in the table 4.5.

Table 4.5: Operational Performance in manufacturing organizations in Kenya

Operational Performance							
	N	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
The organization is able to rapidly change production volume	164	38	10	90	26	3.63	1.009
The organization provides on time delivery to customers	164	21	24	117	2	3.63	0.718
The organization produces products with low inventory holding costs	164	38	12	88	26	3.62	1.011
The organization provides reliable delivery to customers	164	20	23	118	3	3.61	0.722
The organization produces consistent quality products with low defects	164	33	3	127	1	3.59	0.813
Raw materials are delivered quickly or on short lead-times	164	29	20	111	4	3.55	0.809
The organization produces products with low material costs	164	25	33	98	8	3.54	0.809
The organization has lower prices than competitors	164	50	23	91	0	3.25	0.896
The organization produces high quality products that meet customer needs	164	61	0	103	0	3.25	0.659
The organization produces customized products	164	103	0	61	0	2.74	0.970
The organization has capability to make rapid product mix changes	164	103	0	61	0	2.74	0.970
The organization offers reliable products that meet customer needs	164	20	83	61	0	2.74	0.970

Source: Survey Data (2018)

4.5 Effect of Supply Chain Integration on Operational Performance

The study was aimed at determining the effects of supply chain integration on operational performance of manufacturing organizations. Supply Chain Integration was considered in terms of internal integration, supplier integration and customer integration. Both correlation and regression analysis were conducted.

4.5.1 Spearman's rho Correlation Analysis

Spearman's rho correlation analysis was carried out on the independent variables in order to determine their association with the dependent variable and the strength of the relationship if present. The results are shown in table 4.6.

Table 4.6: Spearman's rho correlation analysis results

Correlations

			Operational Performance	Internal Integration	Supplier Integration	Customer Integration
Spearman's rho	Operational Performance	Correlation Coefficient	1.000	.164[*]	.295[**]	.151
		Sig. (2-tailed)	.	.035	.000	.054
		N	164	164	164	164
	Internal integration	Correlation Coefficient	.164[*]	1.000	.549[**]	.350[**]
		Sig. (2-tailed)	.035	.	.000	.000
		N	164	164	164	164
	Supplier integration	Correlation Coefficient	.295[**]	.549[**]	1.000	.479[**]
		Sig. (2-tailed)	.000	.000	.	.000
		N	164	164	164	164
	Customer integration	Correlation Coefficient	.151	.350[**]	.479[**]	1.000
		Sig. (2-tailed)	.054	.000	.000	.
		N	164	164	164	164

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

In table 4.6, spearman's rho correlation was used to determine the association between the dependent and independent variables. The correlation coefficients range from -1 to 1 meaning very weak to very strong relationship. 0.00 to 0.19 is considered very weak, 0.20 to

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0.39 is weak, 0.40 to 0.59 is moderate, 0.60 to 0.79 is strong and 0.80 to 1.0 is very strong (Yue, Pillon & Cavadias, 2002). Based on the results, both internal integration and supplier integration had a weak positive monotonic relationship with operational performance rs = 0.164 and rs = 0.295 respectively. There is correlation between internal integration and both supplier and customer integration at rs = 0.549 and rs = 0.350 respectively.

4.5.2 Regression Analysis

Multiple regression was performed in order to further explain the relationship between the dependent and independent variables. Operational performance was the dependent variable while internal integration, supplier integration and customer integration were the independent variables.

From the results in table 4.7, the following regression equation was produced.

$$Y = 2.008 + 0.049 \, x_1 + 0.437 \, x_2 - 0.118 \, x_3$$

Where:-

2.008 = value of operational performance when supply chain integration values are zero.

0.049 = coefficient of internal integration. For every unit increase in internal integration, operational performance increases by 0.049 holding all other variables constant.

0.437 = coefficient of supplier integration. For every unit increase in supplier integration, operational performance increases by 0.437 holding all other variables constant.

-0.118 = coefficient of customer integration. For every unit increase in customer integration, operational performance decreases by 0.118 holding all other variables constant.

Table 4.7: Supply Chain Integration and operational performance regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.330[a]	.109	.092	.59131

a. Predictors: (Constant), Customer Integration, Internal Integration, Supplier Integration.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.832	3	2.277	6.514	.000[b]
	Residual	55.943	160	.350		
	Total	62.775	163			

a. Dependent Variable: Operational Performance.

b. Predictors: (Constant), Customer Integration, Internal Integration, Supplier Integration

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.008	.514		3.906	.000
	Internal Int.	.049	.074	.058	.657	.512
	Supplier Int.	.437	.132	.325	3.322	.001
	Customer Int.	-.118	.170	-.062	-.694	.489

a. Dependent Variable: Operational Performance

Source: Survey Data (2018)

In table 4.7, the first section highlights the model summary that shows R to be 33% which explains how well the model explains the data. R^2 explains the extent to which the independent variables explain the dependent variable. This means that 10.9% of operational

performance was explained by internal integration, supplier integration and customer integration.

The second section presented the analysis of variance (ANOVA). The significant value represented by p, shows if any independent variables affect the dependent variable. When the p-value is less than 0.05 it shows that the independent variables significantly affected the dependent variable. In this case the p-value was .000 which shows that the model was significant.

The third section of table 4.7 shows how significantly the independent variables affect the dependent variable. The level of significance increases when the p-value is less than 0.05. the p-values for the independent variables are 0.512, 0.001 and 0.489 for internal integration, supplier integration and customer integration respectively. As the p-value for supplier integration is the only one less than 0.05, this shows that supplier integration significantly affects operational performance.

4.6 Chapter Summary

This chapter explains how data was analyzed in order to meet the research objectives. The first objective was to examine the effect of internal integration on operational performance of manufacturing organizations in Kenya. The means and standard deviations were computed and the results showed that internal integration had both the highest mean and standard deviation of the three independent variables. This was followed by supplier integration and finally customer integration.

The second objective was to examine the effect of supplier integration on operational performance of manufacturing organizations in Kenya. A multiple regression was done and this showed that supplier integration significantly influenced operational performance as compared to internal integration and customer integration. The third objective was to explore the effect of customer integration on operational performance of manufacturing organizations in Kenya and it was established that there was a negative relationship between customer integration and operational performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study and the conclusions reached. The overall objective of the study was to examine the effect of supply chain integration on operational performance of manufacturing organizations in Kenya. This was broken down to address the three main areas of supply chain integration in relation to operational performance. These are internal integration, supplier integration and customer integration.

5.2 Discussion of the findings

This section discusses the findings of the study for each of the objectives.

5.2.1 Effect of internal integration on operational performance

Using descriptive statistics, it was established that internal integration had the highest mean score as well as standard deviation. This shows that most organizations rated highly the various statements related to internal integration meaning that this was the most developed aspect of supply chain integration among the manufacturing organizations in Kenya. This is consistent with other studies that have reached similar conclusion (Stank et al, 2001; Droge et al, 2004; Flynn et al, 2010) reinforcing the importance of internal integration in improving operational performance.

Most organizations indicated that they used cross functional teams in new product development. This was followed by data integration among internal functions, high level of responsiveness to other department's needs, real time integration and connection among internal functions and use of enterprise systems. Organizations with high levels of internal integration as shown by the responses indicate highly established rules, procedures and strong relationships between departments (Schoenherr & Swink, 2012). This enhances supply chain integration and in turn leads to improved operational performance for the organization. This is validated by the correlation analysis which indicated that internal integration, though somewhat weakly affected operational performance in the organization.

An association between internal integration and both supplier integration and customer integration is brought out. It is observed that internal integration affects supplier integration and to a lesser extent customer integration. This indicates that internal integration may form a foundation upon which supplier and customer integration are built (Flynn et al., 2010: Zhao et al., 2011; Williams, 2013).

The regression analysis also shows that for a unit increase in internal integration operational performance is also improved. This shows that manufacturing organizations in Kenya had internal integration which enhanced operational performance.

5.2.2 Effect of supplier integration on operational performance
Supplier integration is seen to have the second highest mean and standard deviation of the three aspects of supply chain integration. This means that although present the practices that encouraged supplier integration were not as developed as those that supported internal integration. The findings of the study established that supplier integration had the greatest impact on operational performance of the organizations. This is shown by regression analysis that indicates that for a unit increase in supplier integration, operational performance is positively affected by 0.437 points. The result is similar to that reached by Devaraj et al., (2007), that supplier integration positively affected operational performance.

This may be due to highly established relationships between organizations and their suppliers in the supply chain as shown by the means and standard deviations computed. Collaboration with suppliers in terms of production information sharing, strategic partnerships and participation in product development and design processes were the highest ranked practices. Zhang et al. (2015) found that by cooperating with supply chain partners, functional processes are linked and this in turn leads to effective use of resources. This may lead to improved efficiencies as well as cost savings which improves operational performance of the organization.

5.2.3 Effect of customer integration on operational performance

Customer integration yielded the least mean and standard deviation as compared to internal integration and supplier integration. This means that in most manufacturing organizations the practices that encouraged collaboration with the customers were not as developed as those that encouraged internal integration and supplier integration.

The study found that most organizations had joint planning and forecasting with major suppliers but that the customers were not so much involved in the product development process. This may explain the low rating of the quality aspects of operational performance because as Narasimhan et al., (2010) stated, though product quality is impacted by all factor inputs of materials, design specifications and manufacturing process capabilities, it is ultimately defined by the customer. The major objective of SCI is to provide maximum value to the customer (Flynn et al., 2010) hence the manufacturing organizations should pay more attention to the customer facing practices so as to further develop supply chain integration.

The study found that customer integration somewhat negatively affected operational performance as indicated by -0.118 in the regression equation. This contradicts the findings of Flynn et al., (2010) who found that customer integration positively impacted operational performance of the organization.

5.3 Conclusion

The study presented a literature review on the three forms on supply chain integration, namely, internal integration, supplier integration and customer integration and how it affects operational performance. The relationship between supply chain integration and operational performance was analyzed using spearman's rho correlation and multiple regression analysis.

According to the study, supply chain integration has a significant effect on operational performance. This is shown by the significance level of 0.000 to an extent of 10.9%. Supplier integration has a positive impact on operational performance with internal

integration having a weak positive impact. Customer integration has the least impact on operational performance with the association tending to the negative. The findings are consistent with those of Wong et al., (2011) and Flynn et al., (2010) who concluded that supply chain integration positively affected operational performance of the organization especially when examined as a whole and not in isolation of aspects of internal, supplier and customer integration.

5.4 Recommendations

The following recommendations may be drawn from the study. First, managers in organizations should strive to better understand their supply chains and the various activities that enhance collaboration. This may lead to improved efficiencies which in turn improve their operational performance as well as improved financial performance.

That manufacturing organizations should closely work together with suppliers in order to increase the level of integration which in turn increases the operational performance through linking both suppliers and the organization with advanced information system to facilitate the flow of materials, information, and experiences, in addition to control the inventory movement.

Further, it is recommended that managers should pay greater attention to the practices that promote customer integration through the involvement of various stakeholders within the supply chain to enable formulation of strategies that would improve operational performance by leveraging on both internal integration and supplier integration.

This research contributes to existing literature by expanding on the knowledge of the effect of supply chain integration on operational performance of manufacturing organizations in Kenya. This provides a basis further research that may be carried out by interested parties.

5.5 Limitations of the study

There were several limitations encountered in the course of the study. First supply chain integration is not fully embraced by many organizations Kenya in that they practice collaboration with their supply chain partners for mutual benefit without necessarily aiming for integration. The research questions therefore needed to be formulated in a way that did not bias the research but ensured that the objectives were met.

As there are many manufacturing organizations in Kenya, a criterion needed to be set that would not compromise the study by selecting a biased population. The danger in doing this was that the various organizations had different processes in place hence varied responses were received regarding the information requested.

The research also relied on opinions of the respondents which is subjective based on their years of experience and type of organization.

5.6 Suggestions for future research

This study recommends that further research should be carried out on supply chain integration in other sectors apart from manufacturing organizations within the country. This is would enable further development of the body of knowledge of supply chain management practices in Kenya.

Various dynamics affect the supply chain in relation to performance of organization. For example, technology is rapidly changing and this may greatly affect the way organizations interact with their partners. As the environment constantly changes, the various factors may affect the operations of any organization and this provides an avenue for new studies to be carried out.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

SECTION A: ORGANIZATION INFORMATION (Tick where appropriate)

1. Please indicate the name of your organization (optional)

   …………………………………………………………………………………..

2. How many years has the organization been in operation?

   Less than 5 years ( )   6 -10 years ( )   11 – 20 years ( )

   21 – 30 years ( )   Over 30 years ( )

3. What is the size of the organization (total number of employees)?

   Below 99 employees ( )   100 -200 ( )   201 - 400 ( )

   401 - 600 ( )   Above 600 ( )

4. What is the ownership status of the organization?

   Wholly foreign owned   ( )

   Wholly locally owned   ( )

   Joint venture   ( )

   Other ……………………………………………

5. What is the target market of the organization in percentage?

   Mainly foreign   ( )

   Mainly local   ( )

   Both foreign and local ( )

SECTION B: INTERNAL INTEGRATION

6. To what extent do you agree with the following statements:- Where 1= Strongly Disagree , 2= Disagree, 3= Neutral , 4 = Agree and 5 = Strongly Agree

Statement	1	2	3	4	5
There is data integration among internal functions					
Use of enterprise system to integrate activities of various departments					
There is a high level of responsiveness within the organization to meet other department needs					

Utilization of periodic interdepartmental meetings among internal functions				
Use of cross functional teams in new product development				
Real time integration and connection among all internal functions from raw material management, through production to sales				

Generally how do you describe the relationship between company integration and external supply chain integration--- -- ---

SECTION C: SUPPLIER INTEGRATION

7. To what extent do you agree with the following statements as regards customer integration :- Where 1= Strongly Disagree , 2= Disagree, 3= Neutral , 4 = Agree and 5 = Strongly Agree

Statement	1	2	3	4	5
Use information technology to share information with our major suppliers					
Have a high degree of strategic partnerships with suppliers					
Have a high degree of joint planning to obtain rapid response in the ordering process with suppliers					
Our suppliers provide information to us in the production and procurement processes					
Our suppliers are involved in the product development and design process					

Does supplier integration improve or hamper performance in your organization?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………..

Explain your answer

…………………………………………………………………………………..…………

…………………………………………………………………………………………………

SECTION D: CUSTOMER INTEGRATION

8. To what extent do you agree with the following statements as regards supplier integration :- Where 1= Strongly Disagree , 2= Disagree, 3= Neutral , 4 = Agree and 5 = Strongly Agree

Statement	1	2	3	4	5
Decisions about a customer's order acceptance or rejection are made on a stable long-term predetermined supplier structure					
Use information technology to exchange information with major customers					
Have a high degree of joint planning and forecasting with major customers to anticipate demand visibility					
Customers provide information to assist in the procurement and production processes					
Customers are involved in the product development process					

Does customer integration improve or hamper performance in your organization?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………..

Explain your answer

…………………………………………………………………………………..…………

…………………………………………………………………………………………………

…………………………………

SECTION E: OPERATIONAL PERFORMANCE

9. State the extent to which the following statements are true as regards the performance of your organization (Where 1= Strongly Disagree, 2= Disagree, 3= Neutral , 4 = Agree and 5 = Strongly Agree).

Statement	1	2	3	4	5
Product Costs					
The organization produces products with low material costs					
The organization produces products with low inventory holding costs					
The organization has lower prices than competitors					
Production Flexibility					
The organization is able to rapidly change production volume					
The organization produces customized products					
The organization has capability to make rapid product mix changes					
Delivery Reliability					
Raw materials are delivered quickly or on short lead-times					
The organization provides on time delivery to customers					
The organization provides reliable delivery to customers					
Product Quality					
The organization produces consistent quality products with low defects					
The organization offers reliable products that meet customer demands					
The organization produces high quality products that meet customer needs					

APPENDIX II: LIST OF MANUFACTURING ORGANIZATIONS

1. Acme Containers Limited
2. Adpack International Limited
3. African cotton Industries Ltd
4. African Cotton Industries Ltd
5. Afro Plastics (K) Limited
6. Agri Pro-Pak Ltd
7. Allied East Africa Ltd
8. Alloy Steel Casting Ltd
9. Allpack Industries Limited
10. Alpha Fine Foods Ltd
11. Alpha Knits Ltd
12. Alpine Coolers Limited
13. Apex Steel Ltd
14. Aquamist Limited
15. ASL Limited - Steel Division
16. ASP Company Limited
17. Associated Battery Manufacturers (EA) Ltd
18. Associated Paper & Stationery Ltd
19. Associated Vehicle Assembers Ltd
20. Athi River Mining Ltd
21. Auto Springs Manufacturers Ltd Company
22. Automotive and Industial Battery Manufacturers
23. Avery East Africa Ltd
24. Bags and Balers Manufacturers (K) Ltd
25. Bamburi Special Products Ltd
26. Basco Products (K) Ltd
27. Basf East Africa Limited
28. Baumann Engineering Limited
29. Bayer East Africa Limited
30. Beiersdorf East Africa Limited
31. Beta Healthcare International
32. Bhachu Industries Limited
33. Bidco Oil Refineries
34. Blue Nile Wire Products Ltd
35. Bobmil Industries Ltd
36. BOC Kenya Limited
37. British American Tobacco Kenya Limited
38. Brollo Kenya Limited
39. Brookside Dairies Ltd
40. Brush Manufacturers
41. Buyline Industries Limited

42. C & P Shoe Industries Ltd
43. Cables & Plastics Limited
44. Cadbury Kenya Limited
45. Canon Chemicals Limited
46. Capwell Industries Ltd
47. Carbacid (CO2) Limited
48. Cempack Solutions Ltd
49. Centrofood Industries Limited
50. Chandaria Industries Limited
51. Chemicals and Solvents (EA) Ltd
52. City Clock (K) Ltd
53. City Engineering Works (K) Limited
54. Colour Labels Ltd
55. Colour Packaging Limited
56. Colourprint Limited
57. Complast Industries Limited
58. Comply Industries Ltd
59. Compulynx Limited
60. Continental Products
61. Cook N Lite Ltd
62. Coopers Kenya Limited
63. Corrugated Sheets Limited
64. Cosmos Limited
65. Crown Berger Kenya Ltd
66. Crown Gases Ltd
67. Crystal Industries Limited
68. D.L Patel Press Ltd
69. Deepa Industries Limited
70. Del Monte Kenya Ltd
71. Desbro Kenya Limited
72. Devki Steel Mills Ltd
73. Diamond Industries Limited
74. Doshi Enterprises Limited
75. DPL Festive Ltd
76. East Africa Glassware Mart Ltd
77. East Africa Packaging Industries Limited
78. East African Breweries Limited
79. East African Malt Ltd (EAML)
80. East African Seed Co. Ltd
81. Eastern Chemicals Industries
82. Eastern Produce Kenya Ltd
83. Edible Oil Products
84. Eldoret Grains Ltd

85. Elgon Kenya Ltd
86. Elite Tools
87. Ellams Products Ltd
88. Elys Chemical Industries Limited
89. Eslon Plastics of Kenya Ltd
90. Excel Chemicals Ltd
91. Farmers choice Ltd
92. Flamingo Tiles (Kenya) Limited
93. Frigoken Ltd
94. Furniture International Limited
95. Galaxy Paints and Coating Co Ltd
96. General Plastics Limited
97. General Printers Limited
98. Glacier Products
99. Glaxo Smithkline Kenya Ltd
100. Gonas Best Ltd
101. Grand Paints Ltd
102. Graphics and Allied Ltd
103. Guaca Stationers Ltd
104. Highlands Mineral Water Company Ltd
105. Hi-Plast Limited
106. Impala Glass Industries Ltd
107. Insteel Limited
108. Interlabels Africa Ltd
109. International Energy Technik Ltd
110. Johnson Diversey East Africa
111. Kaluworks Limited
112. Kamba Manufacturing (1986) Ltd
113. Kamili Packers Ltd
114. Kamyn Industries Limited
115. KAPI Limited
116. Kartasi Industries Limited
117. Kenafric Diaries Manufacturers Limited
118. Kenblest Limited
119. Kenbro Industries Limited
120. Ken-Knit (Kenya) Ltd
121. Kenpoly Manufacturers Limited
122. Kensalt Ltd
123. Kentainers Limited
124. Kenwest Cables limited
125. Kenya Builders and Concrete Ltd
126. Kenya General Industries Ltd
127. Kenya Meat Commission

128. Kenya Nut Company
129. Kenya Ports Authority
130. Kenya Seed Company Ltd
131. Kenya Shirts Manufacturing Company Ltd
132. Kenya suitcase Manufacturers Ltd
133. Kenya Vehicle Manufacturers Ltd
134. Kenya Wine Agencies Limited
135. Kenya Wood Limited
136. Keroche Industries Ltd
137. Kevian Kenya Limited
138. Kim-Fay East Africa Ltd
139. King Plastic Industries Ltd
140. Laboratory and Allied Limited
141. Laminate Tube Industries Ltd
142. Laneeb Plastic Industries Ltd
143. Mabati Rolling Mills Ltd
144. Mafuko Industries Ltd
145. Malindi Salt Works
146. Manipal Internationnal Printing Press Ltd
147. Manji Food Industries Limited
148. Maridadi Flowers Ltd
149. Match Masters Ltd
150. Menengai Oil Refineries Ltd
151. Metal Crowns Ltd
152. Metro Plastics Kenya Limited
153. Metsec Limited
154. Midco Textiles (EA) Ltd
155. Milly Fruit Processors Ltd
156. Milly Glass Works Ltd
157. Mombasa Cement Ltd
158. Mombasa Maize Millers
159. Mombasa Polythene Bags Ltd
160. Morani Ltd
161. Mount Kenya Bottlers Ltd
162. Mzuri Sweets Ltd
163. Nairobi Bottlers
164. Nairobi Flour Mills Ltd
165. Nairobi Plastics Ltd
166. Nesfoods Industries Ltd
167. Newline Ltd
168. Nutro Manufacturers EPZ Ltd
169. Oasis Limited
170. Orbit Chemicals Industries Limited

171. Osho Chemicals Industries Ltd
172. Packaging Industries Ltd
173. Packaging Manufacturers (1976) Ltd
174. Paperbags Limited
175. Patco Industries Limited
176. Pembe Flour Mills Ltd
177. Pipe Manufacturers Ltd
178. Plastcs and Rubber Industries Ltd
179. Polythene Industries Ltd
180. Power Technics Limited
181. Premier Flour Mills Ltd
182. Pwani Oil Products Ltd
183. Pyramid Packaging Limited
184. PZ Cussons EA Ltd
185. Raffia Bags (K) Ltd
186. Rafiki Millers Ltd
187. Rai Plywoods (Kenya) Limited
188. Rift Valley Bottlers Ltd
189. Rosewood Furniture Manufacturers
190. Rubber Products Ltd
191. Sadoline Paints (E.A.) Ltd
192. Safepak Limited
193. Saj Ceramics Ltd
194. Sanpac Africa Ltd
195. Savanna Cement
196. Silpack Industries Limited
197. Spinknit Limited
198. Spinners & Spinners Ltd
199. Squaredeal Uniforms Centre Ltd
200. Stallion Stationary Manufacturers Ltd
201. Standard Rolling Mills Ltd
202. Statpack Industries Ltd
203. Steelwool (Africa) Ltd
204. Summit Fibres Limited
205. Sunflag Textile and Knitwear Mills Ltd
206. Supa Brite Ltd
207. Superfoam Ltd
208. Tetra Pak Ltd
209. The Breakfast Cereal Company (K) Ltd
210. Thermopak Ltd
211. Timsales Ltd
212. Tononoka Steel Ltd
213. Top Park Limited

214. Treadsetters Tyres Ltd
215. Tri-Clover Industries (K) Ltd
216. Trufoods Ltd
217. Twiga Chemical Industries Limited
218. Twiga Stationers and Printers Ltd
219. Umoja Rubber Products Limited
220. Uneeco Paper Products Ltd
221. Unga Group Ltd
222. Uni-Plastics Limited
223. United Bag Manufacturers Ltd
224. Vajas Manufacturers Ltd
225. Valley Confectionery Limited
226. Viking Industries Ltd
227. Vitafoam Products Limited
228. Vivo Energy Kenya Ltd
229. Wanji Food Industries Limited
230. Welding Alloys Limited
231. Westminister Paints and Resins Ltd
232. Wire Products Limited