

**INFLUENCE OF SUPPLY CHAIN CAPABILITIES ON
FIRM PERFORMANCE OF MANUFACTURING
ENTITIES IN KENYA**

ERIC NAMUSONGE

**DOCTOR OF PHILOSOPHY
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**Influence of Supply Chain Capabilities on Firm Performance of
Manufacturing Entities in Kenya**

Eric Namusonge

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Philosophy in Supply Chain Management in the Jomo Kenyatta
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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

Signature: _____ Date: _____

Eric Namusonge

This thesis has been submitted for examination with our approval as university supervisors.

Signature: _____ Date: _____

**Prof. Elegwa Mukulu, PhD
JKUAT, Kenya**

Signature: _____ Date: _____

**Dr. Mike Iravo, PhD
JKUAT, Kenya**

DEDICATION

This thesis is dedicated to my family for their encouragement and continuous support throughout my studies.

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Special appreciation goes to God for providing me with the strength and knowledge to work on the things I can influence, and granting me serenity to accept the things that I cannot influence.

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ACRONYMS AND ABBREVIATIONS

3PL	Third Party Logistics
AMR	Advanced Market Research
B2B	Business to Business
DC	Dynamic capabilities
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
GLRT	Global Logistics Research Team
GoK	Government of Kenya
IEA	Institute of Economic Affairs
ICT	Information Communication Technology
IT	Information Technology
ISO	International Organization for Standards
JIT	Just In Time
KAM	Kenya Association of Manufacturers
KMO	Kaiser-Meyer –Olkin
OpP	Operational Performance
PRTM	Pittiglio Rabin Todd & McGrath
QM	Quality Management
RBV	Resource Based View
RBVF	Resource-Based View of the Firm
ROI	Return On Investment

SCC	Supply-Chain Council
SCM	Supply Chain Management
SCQM	Supply Chain Quality Management
SMEs	Small and medium enterprises
TCA	Transaction cost analysis
VIF	Variance Inflation Factor
VRINN	Valuable, Rare, Imperfectly mobile, Not imitable, and Not substitutable

DEFINITION OF TERMS

- Capabilities:** Capabilities are those attributes, abilities, organizational processes, knowledge, and skills that allow a firm to achieve superior performance and sustained competitive advantage over competitors (Morash, 2001).
- Core competence:** Core competencies are the main strengths or strategic advantages of a business including the combination of pool knowledge and technical capabilities that allow a business to be competitive. Is what an organization uses to sustain a competitive advantage (Quinn, 1999).
- Firm performance:** Firm performance refers to how well an organization achieves its market-oriented goals as well as its financial goals (Malina & Selto 2004).
- Inventory:** Inventory refers to the working capital of an organization; it is classified as a current asset. The inventory of company includes its raw materials; work in process; supplies used in operations as well as finished goods (Muller, 2011).
- Information Communication Technology (ICT):** ICT can be defined as a family of technologies used to process, store and disseminate information, facilitating the performance of information-related human activities, provided by, and serving both the public at-large as well as the

institutional and business sectors (Salomon & Cohen, 1999).

Inventory Management:

Inventory management is an approach to manage the product flow in a supply chain as well as maintaining optimum levels of inventory, to achieve the required service level at an acceptable cost (Emmett 2011).

Logistics:

Logistics is the management of the flow of goods and services from the point of origin to the point of final destination. The positioning of resources at the right time, right place, right quantity and right cost (Rushton, 2005).

Logistics Management:

Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flows and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements (CSCMP, 2010).

Manufacturing:

Manufacturing is the creation of value in form of products to be offered to the customers with an aim of satisfaction of needs. It is the art of transformation of raw materials into either intermediate goods or final products through mechanized process (McIvor, 2005).

- Manufacturing Entity:** A manufacturing entity is an organization that undertakes the art of transformation of raw materials into either intermediate goods or final products through mechanized process (KAM, 2015).
- Procurement:** It is acquisition by purchase, rental, lease, hire purchase, license, tenancy, franchise or by any other contractual means of any type of works, assets, services or goods including livestock or combination (GoK, 2005).
- Strategy:** A strategy is a comprehensive action plan providing long-term direction and guiding resource utilization to accomplish organizational goals with sustainable competitive advantage (Lysons & Farrington, 2006).
- Supply chain:** A supply chain is defined as a network of firms involved in upstream and downstream flows from sub-supplier to ultimate customer (Mentzer *et al.*, 2001). Supply chain management is, "a set of three or more entities organizational or individuals directly involved in the upstream and downstream flow of products, services, finances, and/or information from source to customer" (Mentzer *et al.*, 2001).
- Supply chain capabilities:** Supply chain capabilities are the abilities to perform or achieve certain actions through a set of controllable and measurable functions and

processes. They are the building blocks for enhanced firm performance and overall success (Morash, 2001).

ABSTRACT

The purpose of this study was to examine the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya. Supply chain capabilities are the abilities to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services. The manufacturing function is often driven by the supply chain capabilities. The purpose of manufacturing is to produce value in form of products and services, through different processes and activities, which are performed by a network of organizations both upstream and downstream. These processes form an integrated supply chain where raw materials are converted into final finished products for the end consumer. Manufacturing is extremely important for the modernization of any country. It is the main activity that split the developed world from the developing one. In order to succeed as a brand manufacturer, it is important to create and maintain an efficient and effective supply chain all the way to the consumer. Therefore the performance of a manufacturing entity is influenced by the supply chain capabilities in place. Studies have been conducted in other countries relating to supply chain competence, components, practices and organizational performance in relation to manufacturing entities. However, in developing countries, more specifically in Kenya limited research has been conducted in this area. This study addresses this knowledge gap. The study was a descriptive survey as it was concerned with describing the characteristics of manufacturing entities with regards to supply chain capabilities. The population of interest for this study was manufacturing firms within Nairobi and its environs. A sample of 69 manufacturing entities was randomly selected to participate in this study. Both primary and secondary data was used for the study. Primary data was collected using questionnaires covering on the influence of supply chain capabilities on firm performance while secondary data consisted of publications and literature related to supply chain management. The data analysis methods that were employed are qualitative and quantitative techniques. In addition, a multiple regression model on the influence of supply chain capabilities versus firm performance was applied to examine the relationship between the variables. The study found out that procurement capability, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technologies capabilities influenced the firm performance of manufacturing entities in varying proportions with information communication technology capabilities having the most influence on performance. The study recommends that the management of manufacturing entities should exploit supply chain capabilities on the day to day operation with the aim of ensuring and maintaining a competitive edge over other market competitors thus attaining superior firm performance. In addition, the study recommends that management of the manufacturing entities should adopt and implement the supply chain capabilities in a hierarchical order starting with the capabilities that have the highest degree of influence on firm performance. Hierarchical implementation would enable easier monitoring and evaluation of the process and better resource allocation on the supply chain capabilities. Also, further research can be conducted on the influence of supply chain capabilities but in different sectors other than manufacturing.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Manufacturing is viewed as the leading edge of modernization and skilled job creation, as well as a fundamental source of various positive spillovers (Tybout, 2000). The main objective of manufacturing is to produce value in form of goods and services, through different processes and activities, which are performed by a network of organizations both upstream and downstream. These processes form an integrated supply chain where raw materials are converted into final finished products for the final consumer (Zhu & Sarkis, 2006). Supply chain management (SCM) advocates for the integration and coordination of business processes and strategy alignment throughout the supply chain for purposes of satisfying end-consumers in the supply chain.

The manufacturing process leads to value creation through the value chain process. Value creation requires organizations to perform a set of activities to produce products or services that are perceived by customers to satisfy their needs. Increasing the value of these activities will enhance the competitive position of the firm. Over time, companies have focused on developing a supply chain management strategy that streamlines activities involved in their internal and external processes to be more responsive to customer needs, reduce operational costs and to increase the financial performance of the firm. Christopher (2005) underscores that supply chain is a network of organizations from upstream (supplier end of the supply chain) through downstream (customer end of the supply chain) with integrated processes that produce value in the form of products and services for the consumer.

Porter (1998) argues that linkage between suppliers' value chains and a firm's value chain provides the firm with opportunities to improve its competitive position. An effective supply chain management can create short-term economic benefits as well as a

long-term competitive advantage (Folinas *et al.*, 2004). To improve the firm's performance through supply chain management, organizations must plan to integrate cross-functional activities within the firm and effectively link them externally with the processes of their business partners, suppliers and customers in the supply chain (Bechtel & Jayaram, 1997; Lambert *et al.*, 1998).

Supply chain management has become an increasingly important factor in economics and business circles globally. This is shown by the growing interest on the subject by the government, civil society, professional organizations, and institutions of higher learning, the private sector and the general public. Supply chain is now a core business improvement effort for most companies, as senior management directives in the area are becoming commonplace. With its growing importance, those companies pursuing supply chain improvement are discovering a new set of goals for its purpose: to improve performance: profitability, earnings per share, market share and customer satisfaction (Poirier & Bauer, 2006).

Supply chain management practices are the set of forces used by organizations to compete in industries that are marked by excessive and aggressive competition. The development has shown the use of innovative efforts to reduce cost, manage shorter product life cycles, resource globalization, cope with increased demand for customization, and intensive quality initiatives (Taylor, 2004). Since 1980s the term supply chain management and logistics was used synonymously. Later on it was realized that supply chain management is more than logistics. The term logistics is concerned with customer service, inventory management, transportation, warehousing, information systems and lot size considerations (Lambert, 2001). On the other hand supply chain management is, "a set of three or more entities (organizational or individuals) directly involved in the upstream and downstream flow of products, services, finances, and/or information from source to customer" (Mentzer *et al.*, 2001).

In conjunction with the Global Supply Chain Forum, Lambert *et al.* (1998) offer the following definition of SCM: Supply Chain Management is the integration of key

business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders. These processes include customary logistics activities such as warehousing, inventory control, and transportation management, as well as non-traditional logistics activities like purchasing, production support, packaging, and customer order processing. SCM is based on the concept that integration across business operations is essential to customer satisfaction, value creation, exceptional returns, and long-run competitive advantage.

Enhanced by the “value chain” concept, both top managers and leading researchers have grasped the notion that SCM is critically important to competitive positioning. The current view is that a manufacturing enterprise managed as a value or “supply” chain is capable of concurrently lowering cost and increasing service to achieve differentiation (Morgan, 1997). The term SCM is deficient in that it overlooks the base concept (Bechtel & Jayaram, 1997); “supply chain” seems to indicate that supply activities initiate and propel the process. The marketing concept should be at the core of SCM because customer satisfaction should be the supply chain’s ultimate priority and organizing mechanism (Bovet & Sheffi, 1998). Current paradigms regarding SCM depict it as a set of processes that are administered collectively with the goal of achieving the best overall system for adding value. These new approaches place the customer as the starting point and the endpoint, providing the target for system creation (Bechtel & Jayaram, 1997).

1.1.1 Global perspective of supply chain capabilities

The supply chain is an entire network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer. Supply chain capabilities are the abilities to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services. The capabilities may entail aspects such as procurement capability, inventory management capabilities, administrative capabilities, logistics capabilities, integrated logistics management services capabilities, distribution and warehousing capabilities and transport capabilities (Morash, 2001).

The term “capabilities” reflects the major role of strategic management in adapting, integrating and reconfiguring resources, organizational skills and functional competencies to respond to the challenges of the external environment. Capabilities, which are complex bundles of skills and accumulated knowledge, determine a company’s capacity of general efficiency and ability (Morash *et al.*, 1996). When they are employed through organizational processes they enable firms to coordinate activities and efficiently use assets (Day, 1994). Morash *et al.* (1996) refer to capabilities as “those attributes, abilities, organizational processes, knowledge, and skills that allow a firm to achieve superior performance and sustained competitive advantage over competitors”. It is management’s task to exploit and leverage firm specific assets and capabilities.

Supply chain capabilities are the building blocks for enhanced firm performance and overall success (Morash, 2001). When an organization’s supply chain capabilities are directly aligned with its way to play, the company enjoys a coherence premium: that is, superior performance and an extremely strong market position. With supply chain capabilities in place operational excellence can also be achieved. Capabilities exist at different levels, where a first-order capability can directly improve performance and a second-order or dynamic capability can improve the first-order capabilities. In this case supply chain capabilities would be considered as first-order capabilities.

Day (1994) suggests there is an explicit link between proficiency concerning supply chain capabilities and exceptional profitability. He classifies them into three categories; Outside-in processes capabilities refers to the group of capabilities that enables the company to compete by forecasting and acting on changes in markets through the development of sound relationships with suppliers, channel members, and customers; Inside-out processes capabilities are those internal capabilities that enable the firm to exploit opportunities in the environment. In other words, they facilitate the company acting on information in a manner that brings value to customers and assures the organization viability in the long run; Spanning processes capabilities relate to the processes that support the anticipated needs of patrons being fulfilled by the business. They do so primarily through integrating the outside-in and inside-out capabilities.

1.1.2 Supply chain capabilities in Kenya

In Kenya the field of supply can be termed as being in its nascent stage. However, the concept of supply chain capabilities and firm performance is not entirely new. Bolo (2011) in a study entitled “*An empirical investigation of selected strategy variables on firms performance: A study of supply chain management in large private manufacturing firms in Kenya*” discussed the effect of selected strategy variables on corporate performance in supply chain management. The selected strategy variables entailed core competencies of supply chain, core capabilities of supply chain, strategy and strategy implementation. Focusing on the core competencies and core capabilities of supply chain it was determined that core capabilities and competencies do have effect on corporate performance in large private manufacturing firms in Kenya. The independent effect of core competencies and core capabilities on firm’s performance may also create competitive advantage for a firm, but nevertheless, over time may be imitated by competitors (Bolo, 2011). To make the economy more vibrant and to improve productivity, proper corporate structure and governance need to be put in place where SCM competencies, strategy, capability, can be used to create synergy. The progress development of the supply chain capabilities individually over time can lead to a snowball effect in terms of overall supply chain capabilities enhancement thus resulting in a synergetic effect on firm performance. Therefore, in Kenya the area of supply chain capabilities ought to be developed so as to bring out its full potential to the manufacturing sector in terms of firm performance.

1.1.3 Firm performance

Firm performance refers to how well an organization achieves its market-oriented goals as well as its financial goals. Two other aspects must be considered when attempting to define performance: its time frame and its reference point. It is possible to differentiate between past and future performance; past superior performance does not guarantee that it will remain superior in the future (Carneiro, 2005). Another issue related to time is the duration of the interval (short, medium or long term) considered. The reference against which performance is being measured, such as the industry average, the results of main

competitors, an established target, or past performance (Carneiro, Silva, Rocha, & Dib, 2007), is also important. Comparisons in relation to targets and past performance indicate the efficiency and evolution of the company.

Firm performance was divided into constructs of operational and organizational performance, which was identified as a typical way of measuring firm performance in past studies on supply chain fit. Gunasekaran *et al.* (2001, 2004) provide extensive reviews of typical operational performance (OpP) measures, which cover typically lead times, on-time deliveries, work-in-process inventories, finished goods inventories and in-stock rates. Typical organizational performance measures are firm average profit, profit growth, market share growth and sales (Inman *et al.*, 2011).

1.1.4 Manufacturing sector in Kenya

Manufacturing is one of the key sectors for the EAC Partner States both in terms of its contribution to GDP and employment creation. In 2012, the average contribution of manufacturing to GDP among the Partner States was between 8 and 10 percent. Kenya reported an increase in employment in the manufacturing sector of 2.4 percent. (East African Community, 2013). The manufacturing sector has a great potential on promoting economic growth and competitiveness in Kenya. In 2013, Kenya reported a growth of 3.5 per cent compared to the previous year; also the country registered a significant growth in employment in the sector and the level of capital investment in the industry increased by more than 100 percent in the same year (East African Community, 2013). In comparison to the other EAC Partner states, the performance and contribution of the manufacturing sector to the GDP is relatively low.

However, the average contribution of manufacturing value added to GDP declined in 2014 and was estimated at 8.0 percent (East African Community, 2015). In 2015, the contribution of manufacturing value added to GDP increased to 10.3 percent and can be attributed to the reduction in cost of inputs such as petroleum products (East African Community, 2016). The sector has experienced the fluctuations over the years under different financial conditions. Efforts which include policies are being developed

towards improving productivity and competitiveness of enterprise to capture greater market share in East Africa. Kenya has potential in outsourcing in its competitive environment with relatively low cost structure as well as support from the government and non-government organizations (GOK, 2007).

The Kenyan manufacturing industry continues to grow from strength to strength despite challenges in the operating environment. Currently the manufacturing industry in Kenya contributes 14% to the country's gross domestic product and employs over two million people (KAM, 2015). However, the growth in the sector can be enhanced by the employment of supply chain capabilities by manufacturing firms thus it would result in a great contribution to the organizational performance. This in turn would lead to a significant improvement of the entire sector to the GDP.

1.2 Statement of the problem

Manufacturing is extremely important for the modernization of any country. It is the main activity that split the developed world from the developing one. Although there is no universal definition, nevertheless, developing countries are in general countries which have not achieved a significant degree of industrialization relative to their populations. In most cases, a developing country will have a medium to low standard of living (Mamaghani, 2010). Manufacturing establishes for a better welfare for the citizens. Tybout (2000) suggests that the manufacturing sector is well taken care of by policy makers because it is the tool for modernization, employs skilled workforce, and results. The business environment has changed dramatically in the last few years, especially in developing countries. Small and medium enterprises (SMEs) are extremely important for the economic growth of any country and constitute more than 90 percent of the total number of enterprises (www.gdrc.org, 2014).

According to an economic survey of 2016 undertaken by the Kenya National Bureau of Statistics (KNBS, 2016), The manufacturing sector's contribution to Gross Domestic Product (GDP) improved marginally to 10.3 per cent in 2015 compared to 10.0 per cent in 2014. The sector grew from 3.2 per cent recorded in 2014 to 3.5 per cent in 2015. The

growth was partly attributed to reduced cost of inputs such as petroleum products and electricity. However, this growth is significantly lower in comparison to developing countries that are more conversant with the employment of supply chain competencies to the operations such as China, Japan, Malaysia, Korea and Singapore. According to the United Nations Industrial Development Organization (UNIDO, 2015), China's manufacturing output rose by 6.5 per cent in the fourth quarter of 2015. Among other developing countries, a strong growth of 12.4 per cent was registered by Viet Nam. Industrial production also grew by 5.3 per cent in Bosnia and Herzegovina in the fourth quarter of 2015 on a year-to-year basis.

In order to succeed as a brand manufacturer, it is important to create and maintain an efficient and effective supply chain all the way to the consumer (Kumar, 2008). Therefore, the performance of a manufacturing entity is influenced by the supply chain capabilities in place. Inadequate supply chain capabilities would have adverse effects to the organizational operations especially in manufacturing and production entities which deal with numerous operations and rely on supply chain. Insufficient supply chain capacities can lead to delays in requisition and distribution of goods and services thus hindering the organizational functions. On the other hand, proficiency in supply chain capabilities can substantially improve a firm's competitive advantage and performance.

A study by Ganeshkumar and Nambirajan (2013) on Supply Chain Management Components, Competitiveness and Organizational Performance found that supply chain competitiveness strongly influences the organizational performance of the manufacturing firms, while the competitiveness of the manufacturing firms is strongly influenced by supply chain competence and supply chain practices of the manufacturing firms. Hence, manufacturing firms concentrating on improving their supply chain competence and supply chain practices can significantly improve their performance as the former impacts the latter indirectly through their impact on competitiveness.

Ellinger *et al.* (2012) has found out that supply chain competence exerts a significant effect on organizational performance of manufacturing firms at the global level and

Vanichchinchai *et al.* (2011) has indicated that a supply chain component exerts a significant effect on organizational performance of Thai manufacturing firms. Huo (2012) has found that supply chain components exert a significant effect both directly and indirectly, on organizational performance of Chinese manufacturing firms and Hsu *et al.* (2007) has found that supply chain competence and practices exert a significant effect on organizational performance of global manufacturing firms and Ou *et al.* (2010) has found that supply chain components exert a significant effect on organizational performance of Taiwan manufacturing firms and Lin *et al.* (2005) have found that supply chain components exert a significant effect on organizational performance of Taiwan and Hong Kong manufacturing firms and Cook *et al.* (2011) has found that 17.4 per cent of organizational performance of North American manufacturing enterprises depends on supply chain practices.

A number of studies have, therefore, been conducted in other countries relating to supply chain competence, components, practices and organizational performance in relation to manufacturing entities such as the ones by Ellinger *et al.* (2012), Cook *et al.* (2011) and Huo (2012). However, in developing countries, more specifically in Kenya limited research has been conducted in the area of supply chain capabilities and firm performance of manufacturing entities. This study therefore, aims to examine the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya and the extent to which each capability influences the firm performance. The ranking of the variables based on the degree of influence might enable manufacturing entities to focus on the most crucial capabilities that influence firm performance.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study was to examine the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya.

1.3.2 Specific objectives

The study was guided by the following specific objectives:

1. To determine the influence of procurement capabilities on firm performance of manufacturing entities in Kenya.
2. To establish the influence of inventory management capabilities on firm performance of manufacturing entities in Kenya.
3. To assess the influence of logistical capabilities on firm performance of manufacturing entities in Kenya.
4. To evaluate the influence of customer service capabilities on firm performance of manufacturing entities in Kenya.
5. To evaluate the influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya.

1.4 Research questions

1. What is the influence of procurement capabilities on firm performance of manufacturing entities in Kenya?
2. What is the influence of inventory management capabilities on firm performance of manufacturing entities in Kenya?
3. What is the influence of logistical capabilities on firm performance of manufacturing entities in Kenya?
4. What is the influence of customer service capabilities on firm performance of manufacturing entities in Kenya?
5. What is the influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya?

1.5 Hypotheses derived from Literature Review

The study was guided by the following hypothesis:

H₁: There is a significant correlation between procurement capabilities and firm performance of manufacturing entities in Kenya.

H₂: Inventory management capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

H₃: There is a significant relationship between logistical capabilities and firm performance of manufacturing entities in Kenya.

H₄: Customer service capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

H₅: Information Communication Technology (ICT) capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

1.6 Importance and justification of the study

1.6.1 Justification of the study

Supply Chain Management is a multifunctional subject, which is an important determinant of success or failure of any manufacturing entity. It is absolutely essential for management of manufacturing enterprises to be thoroughly aware about all the essential components of supply chain management, supply chain capabilities and understand the impact that it might exert on the overall efficiency of the organization (Ganeshkumar & Nambirajan, 2013).

A lot of research and study has been conducted in the field of supply chain management and other related areas. However, there is limited information on supply chain capabilities and the influence of these capabilities on firm performance especially in developing countries. Therefore this study may unveil relevant information that may also assist in gaining more insight supply chain management, supply chain capabilities and the influence on firm performance of manufacturing entities in Kenya.

1.6.2 Significance of the study

The study may be beneficial and relevant to the following parties:

a) Manufacturing organizations

The study may provide information to the management of manufacturing organizations that may enable them to conduct their functions and duties in a

more efficient and effective manner. This in turn may lead to better performance and profitability in the industry. It may also provide insight on the various supply chain practices that can be adopted so as to achieve a competitive advantage and operational excellence.

b) Suppliers

The study may enable suppliers understand how manufacturing entities conduct their operations with regards to supply chain management, thus they may be in a better position to also plan their operations in terms of lead time, logistics, tendering and quoting.

c) Academicians and other researchers

Academicians and other researchers may benefit from this research since it provides more insight on supply chain management especially in the Kenya context. This research may be used as a basis of further study in the future. This study's recommendations would generate more research in the field of supply chain management in the public sector. It may also create ways of resolving emerging problems in this field.

d) Policy makers

The study may be relevant to policy makers in the private and public sector by providing information on supply chain capabilities. The information may enable them to formulate better policies with regards to procurement, inventory management, logistics, distribution and warehousing, customer service and supply chain management.

e) Supply chain professionals

Supply chain professionals may gain through acquiring new knowledge on supply chain capabilities and practices at a time when supply chain management is evolving under challenges that are particularly being faced by the industry. The finds may also assist in growth and development of supply chain management in the country.

f) Community

The study may benefit the entire community. By enhancing the supply chain function and reducing inefficiencies more finances will be available for other projects. In addition the community may benefit from better production and manufacturing processes which in turn may lead to superior goods and services in the market.

g) Donor community

The donor community fund most governmental and non-governmental projects and operations in developing countries. This study may enable them to understand the supply chain functions and other aspects of procurement; therefore, they may be in a better position to make more strategic decisions on funding.

1.7 Scope of the study

This study focused on the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya. The supply chain capabilities that were considered in this study are: procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and Information and communication capabilities. This was supported by Koester and Rash (2005) who proposed that procurement and customer management are supply chain capabilities that affect the performance of an organization. In addition, Morash (2001) identified customer service, distribution flexibility and logistics as factors that are strongly related to firm excellence and performance. The study focused on manufacturing firms which are located in Nairobi and its environs. Most of the manufacturing in Kenya is undertaken in the Nairobi region. Based on the available data, more than eighty percent of the manufacturing firms are located in the Nairobi and its surrounding area (KAM, 2015).

1.8 Limitations

The organizations confidentiality policy restricted most of the respondents from answering some of the questionnaires since it was considered to be against the

organization confidentiality policy to expose the organization confidential matters. The suspicion normally associated with any kind of a research study. This was solved by assuring the respondent of utmost confidentiality and disclosing the academic purpose and intention of the study.

Furthermore, some of the manufacturing entities lacked a proper structured procurement and supply chain departments. As such, some respondents were operations managers, accountants and procurement officers. A snowball effect was that the understanding of the questions and concepts was at times hampered. To overcome this, the researchers had to walk through the questionnaire with the respondents.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the relevant literature of the study by reviewing both theoretical and empirical literature from professionals and other researchers as it relates to the supply chain capabilities and firm performance of manufacturing entities in Kenya. It includes the theoretical framework, conceptual framework, review of variables, gaps in research and a summary of the chapter.

2.2 Theoretical Framework

According to Maaloe's (2002) theories can be classified into grand theories (particular science with specific concepts, e.g. philosophy of science); middle-range theories (worked connections between a set of concepts represented by socio-economic theories applied in various managerial disciplines); and small-scale theories (limited number of concepts presented as propositions such as the "fit" model of products and supply chain by Fisher, 1997).

This section focused especially on Maaloe's (2002) suggestion that middle-range theories can be used to reflect connections between a set of concepts that represent key decisions of Supply chain management. A number of experts in the field of supply chain management have tried to provide theoretical foundations for some areas of supply chain management by adopting organizational theory.

2.2.1 Dynamic capabilities theory

The dynamic capabilities approach (Helfat *et al.*, 2007) constitutes an extension to the resource-based perspective. Dynamic capabilities theory was first introduced to explain firm performance in dynamic business environments, focusing on the capabilities that firms employ to reach competitive advantage (Beske, Land, & Seuring, 2014). Similarly,

manufacturing functions have been found to be a major contributor to the firm's profitability and in fostering supply management capabilities which facilitates long-term strategic advantage. Manufacturing and the function of Dynamic Capabilities both seemingly work towards the same goal; achieving sustainable competitive advantage in dynamic business environments.

The DCT sets out to explain how competitive advantage is achieved. Teece *et al.* (1997) argue that successful companies in the global market place are able to demonstrate timely responsiveness to market dynamics and speedy product innovation. Additionally, successful companies are able to effectively coordinate and redeploy internal and external competence. The ability to achieve competitive advantage in this context is referred to as the DC (Teece *et al.*, 1997). The term "dynamic" refers to as "the capacity to renew competences so as to achieve congruence with the changing business environment; this is relevant in situations where time to market is critical and the nature of competition is difficult to determine". Capabilities are referred to as "the key role of strategic management in appropriately adapting, integrating and reconfiguring, internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment".

The approach explains that the way organizations develop firm specific competences to respond to changes in the business environment is ultimately related to the firm's business processes, market positions, and opportunities (Teece, 2014). These three factors form the basis for determining DC's. *Processes* encompass the way things are done in organizations and they have three roles; coordination, learning and reconfiguration. *Positions* define specific endowments of technology, intellectual property, complementary assets, customer base, and its external relations with suppliers and complementors. *Paths* refer to the strategic alternatives available to the firm; these are defined by path dependencies and technological opportunities. The organizational processes that are shaped by a firms asset positions and paths, explain the essence of the firms DC's and its competitive advantage. The competitive advantage that is accompanied by these capabilities can be attributed to the fact that firm specific assets

such as values, culture and organizational experience cannot be traded in the market. This implies that distinctive competences and capabilities must be built within the firm (Teece *et al.*, 1997). The fact that DC's cannot be bought suggests that a firm's behavior is unique and hard to replicate. Teece *et al.* (1997) argue that competitive advantage through competences can only generate rents if they are based on a collection of routines, skills, and complementary assets that are difficult to imitate.

The DCT views competition in Schumpeterian terms, where firms are constantly seeking to create "new combinations" and competitors in the marketplace are continuously attempting to improve their competences or to imitate the competence of their most qualified competitors. Rivalry is thus inevitable in Schumpeterian terms, which implies that a firm's ability to improve or develop new types of competences is imperative in developing long-term competitive advantage. Teece (2007) suggests that the DC framework includes the key variables and relationships that need to be manipulated to create, protect, and leverage intangible assets so as to achieve superior performance and avoid bankruptcy. It is argued however that achieving this change is difficult and that long run success is likely to require achieving necessary internal creative destruction to help sustain performance. This brings into light the role of reconfiguration as the process of creative destruction will require the firm to reconfigure routines and processes to form new and improved ones.

Helfat *et al.* (2007) argue that the processes that comprise DC's are assumed to include both organizational and managerial processes aimed at identifying needs and opportunities for change and at accomplishing that change. Véronique, Ambrosini and Bowman (2009) explain that the approach helps explain how a firm's resource stock evolves over time and thus how advantage is sustained. DC's thus consider the firm to be a collection of "heterogeneous path-dependent resources" which allow firms to generate competitive advantage. Eisenhardt and Martin (2000) explain that DC's vary with the level of competition in the market. In moderately dynamic markets where change occurs in the context of stable industry structure DC's reflect routines. They are "complicated, detailed, analytic and stable processes with predictable outcomes".

However in high velocity markets where industry structure fluctuates, DC's are "simple, experiential, unstable processes that rely on quickly created new knowledge and iterative execution to produce adaptive, but unpredictable outcomes". DC's in the context of competition can thus be seen as responses to the need for change or new opportunities (Easterby-Smith, Lyles, & Peteraf, 2009) and these responses are deeply embedded in the firms' individuality. The manufacturing function does not operate in a vacuum; it operates in an ever changing environment. Like any other environment it presents numerous threats and opportunities. Therefore, in an attempt to maintain a competitive advantage over other firm; manufacturing entities should develop firm specific competences relevant to the environment of operation and employ the dynamic capabilities theory in the daily operations.

2.2.2 Agency theory

As organizations increasingly rely on extended networks of suppliers to produce and deliver products and services to customers, it becomes increasingly difficult to control what happens in supply chains outside their boundaries with respect to the quality of supplied materials. Note, for instance, the recent recalls of products ranging from vehicles to toys to drugs and food. These recalls emphasize the need to pay close attention to quality management (QM) issues in supply chains (Roth *et al.*, 2008). The focus on supply chain management research and practices today is zeroing in on innovation, agility, and flexibility (Ketchen & Hult, 2007), but the recalls are continual reminders of the vital importance of supplier quality, a strategic necessity for achieving customer satisfaction and sustainability (Sroufe & Curkovic, 2008). The lack of an effective QM system in a firm's supply chain network increases the risks of supply chain disruption and may cause serious damage to its operation, its business performance, and its public image (Roth *et al.*, 2008).

Traditionally, firms employ such approaches as regulations, contracts and quality inspection to control the quality of supplied materials and parts, but these tactics alone are neither sustainable nor effective in the long run (Roth *et al.*, 2008). Firms may also need to establish cooperative relationships with suppliers for QM and improvements.

These cooperative relationships benefit not just both parties but the whole supply chain (Flynn & Flynn, 2005). Manufacturing entities are not any different, regulations, controls, contracts and quality inspection control of supplier is highly fundamental to the operations. These aspects can be better understood and management by gaining competence in establishing long term relationships with supplier via the agency theory.

The agency theory has been widely used across a variety of disciplines, but little work has been undertaken with regard to how agency theory might be used to explain relations between organizations within the supply chain. Agency theory is concerned with agency relationships. Two parties have an agency relationship when they cooperate and engage in an association wherein one party (the principal) delegates decisions and/or work to another (an agent) to act on its behalf (Rungtusanatham *et al.*, 2007). The important assumptions underlying agency theory are that: Potential goal conflicts exist between principals and agents; each party acts in its own self-interest; Information asymmetry frequently exists between principals and agents; Agents are more risk averse than the principal and efficiency is the effectiveness criterion (Ekanayake, 2004; Rungtusanatham *et al.*, 2007).

Two potential problems arising from these assumptions may arise in agency relationships: an agency problem and a risk-sharing problem. An agency problem appears when agents' goals differ from the principals' and it is difficult or expensive to verify whether agents have appropriately performed the delegated work (i.e. moral hazard). This problem also arises when it is difficult or expensive to verify that agents have the expertise to perform the delegated work (i.e. adverse selection) that they claim to have. A risk-sharing problem arises when principals and agents have different attitudes towards risk that cause disagreements about actions to be taken (Rungtusanatham *et al.*, 2007).

In agency relationships, typically, the principal will seek to minimize the agency costs, such as, specifying, rewarding and monitoring, and policing the agent's behavior, while the agent works towards maximizing rewards and reducing principal control (Fleisher,

1991). Efficient management of agency problems such as information acquisition (or communication), preference mismatch (or conflict of interest), effort (or moral hazard) and capability (or adverse selection), mainly associated with the agent (Fleisher, 1991), is also imperative to any principal-agent relationship.

In order to resolve agency and risk-sharing problems in principal-agent relationships, agency theory prescribes two formal (and ideal) types of management mechanisms to govern these relationships (Rungtusanatham *et al.*, 2007). One is outcome-based management mechanism. With this mechanism both principals and agents can observe outcomes, and the principals reward agents based on measured performance outcomes (Ekanayake, 2004). The outcome-based management mechanism emphasizes results regardless of how the agents achieve them (Choi & Liker, 1995). The other management mechanism is behavior-based. When this mechanism is taken, principals can use behavior controls to monitor agents' behaviors and efforts which otherwise are unknown to the principals.

The behavior-based management mechanism emphasizes tasks and activities in agents' processes that lead to the outcomes of the agents (Ekanayake, 2004). Accordingly, a critical issue in agency theory is determining which management mechanism, outcome-based or behavior-based, is more efficient in managing agency relationships "under varying levels of outcome uncertainty, risk aversion, information and other variables" (Eisenhardt & Martin, 2000). When making this decision, managers must consider the trade-off between:

- a) The costs of acquiring the information necessary for monitoring the agent behavior.
- b) The costs of measuring outcomes and transferring risk to agents (Rungtusanatham *et al.*, 2007).

In a supply chain relationship the buying firm acts like a principal that delegates the authority of production and/or services to the supplier, the supplier being the agent, so

both parties are engaged in an agency relationship (Zsidisin & Ellram, 2003). Along with the delegation of production and services, the responsibility of maintaining satisfactory quality of the supplied products and services is also delegated to suppliers, so buying firms need to ensure that suppliers provide products and/or services that conform to the quality requirements stipulated in the supply contracts.

Moreover, competition these days is becoming supply chain versus supply chain rather than firm versus firm (Ketchen & Hult, 2007), so firms are working to increase customer satisfaction and gain competitive advantage by finding ways to improve the whole supply chain, from suppliers to end consumers. Strategic QM of supply chains not only ensures the quality of supplies, but also enhances the capabilities of suppliers' QM.

The assumptions and prescriptions of agency theory fit naturally with the issues inherent in SCQM. In the process of managing supplier quality, buyers in agency relations are, as we have pointed out, faced with potential problems. By their nature, buyers expect suppliers to provide good quality and to improve the quality of supplied products and/or services, but suppliers may be reluctant to invest substantially in quality, especially if they perceive that buyers are reaping all the benefits. The difference in interests between buyers and suppliers will result in the two parties concerning themselves only with their self-interests. At this point moral hazard and adverse selection problems are likely to arise. When buying firms cannot constantly monitor the process at suppliers' sites, which is usually difficult or expensive to do so, suppliers may conceal their difficulties in delivering the quality demanded by buyers (i.e. adverse selection) and slight efforts to control and improve the product and process quality as expected (i.e. moral hazard) (Swink & Zsidisin, 2006).

In agency theory, the principal will seek to minimize the agency costs, such as, specifying, rewarding and monitoring, and policing the agent's behavior, while the agent works towards maximizing rewards and reducing principal control. By undertaking the above the agent in which in this case is the manufacturing firm will focus on operating in an agile and lean manner thus enhancing the supply chain capabilities that may be

already in existence within the entity such as procurement, information communication and logistics.

2.2.3 Resource-Based View Theory

Firms are becoming increasingly cognizant of the interdependencies that naturally exist between a firm's internal operational processes and those of suppliers and customers (Watts & Hahn, 1993). In order to improve performance at the operational level, more and more firms are developing explicit linkages with suppliers and with customers and the benefits of such linkages. By "supply chain linkages, we refer to explicit and/or implicit connections that a firm creates with critical entities of its supply chain in order to manage the flow and/or quality of inputs from suppliers into the firm and of outputs from the firm to customers. These linkages are created by implementing practices that include, for example, the involvement of suppliers and customers in product design activities, the investment in enterprise resource planning systems to allow information sharing across the supply chain, JIT II, Web-based system contracting, etc (Rungtusanatham *et al.*, 2003).

In order to have a proper understanding of these supply chain linkages, supply chain performance, and organizational performance; borrowed and applied theories from other disciplines such as industrial economics and complexity science can be employed to provide rich insights to better understand the benefits that firms derive from linkages with suppliers and with customers. More specifically in this case the resource-based view of the firm (RBVF) is borrowed and applied from the strategic management discipline.

The RBVF has been successfully applied to develop insights into other forms of inter-firm relationships such as alliance (Dyer & Singh, 1998; Lorenzoni & Lipparini, 1999). Hence, the application of the RBVF may be useful in advancing conceptual and pragmatic understanding of the operational performance impact of supply chain interactions. The RBVF is a theoretical perspective that attempts to describe, explain, and predict how firms can achieve a sustainable competitive advantage through

acquisition of and control over resources. Resources, according to the RBVF, include both tangible (e.g. equipment) and intangible (e.g. process knowledge) assets (Grant, 1991) that facilitate the production and delivery of goods and services. Firms seek to acquire and exert either permanent or semi-permanent control over resources that can provide a competitive advantage over competitors. Because firms may exert different levels of control over different types of resources, they would differ in terms of the collective whole – commonly referred to as bundle of resources (Barney, 1991) or resource endowment – that would be available to them (Amit & Schoemaker, 1993). These differences, in turn, should lead to different product and/or service attributes that ultimately account for the firms' competitive position (Schulze, 1994).

Barney (1991) and Peteraf (1993) have discussed, in more specific terms, the five explicit characteristics of a resource that would allow firms to attain a sustainable competitive advantage. First, the resource must be valuable in that it improves firm efficiency and/or effectiveness. Second, the resource must be rare so that by exercising control over it, the firm can exploit it to the disadvantage of its competitors. Third, the resource must be imperfectly imitable to prevent competitors from being able to easily develop the resource in-house. Fourth, the resource must be imperfectly mobile to discourage the ex-post competition for the resource that would offset the advantages of maintaining control of the resource. Fifth and last, the resource must not be substitutable; otherwise, competitors would be able to identify different, but strategically equivalent, resources to be used for the same purpose.

How a particular resource fits within a firm's resource endowment or interacts with a firm's other resources can also reduce imitability and deter mobility. More specifically, the embedding of a resource within a complex social network would likely make the resource even more difficult to replicate; this phenomenon is commonly referred to as "social complexity". Wernerfelt (1995), in explaining social complexity, has argued, for example, that the social complexity of a team effect, especially for successful teams that interact within a system of facilities, decreases the likelihood of such teams being successful in other contexts – an argument that may explain the failures of quality circles

outside of Japan. Of course, the intangibility of a desirable resource, as well as legally imposed restrictions and regulations (e.g. patents and licenses, industrial espionage laws), also serves to protect the resource from being readily duplicated or traded.

RBVF theorists have begun to explore how such resources can create and sustain a competitive advantage. For example, Grant (1991) equated the concept of organizational capability to core competence and to organizational routines (Prahalad & Hamel, 1990). In doing so, he explicitly argued that organizational routines – defined as “regular and predictable patterns of activity and sequence of coordinated actions” (Grant, 1991) – deploy rent-yielding resources, thus creating a competitive advantage. Amit and Schoemaker (1993), making the same argument, extended the definition of capability as “information-based, tangible and intangible processes that provide enhanced productivity of its resources, as well as strategic flexibility and protection for its final product or service”.

In summary, the major tenet of the RBVF as follows: To compete, each firm seeks to acquire, control, and bundle resources with capabilities; Resources are tangible or intangible assets that are key inputs into the production and delivery of goods or services; Capabilities are organizational routines or mechanisms that enable a firm to acquire and deploy resources to facilitate the production and delivery of goods or service; Resources and capabilities that are valuable to the firm, rare to come by, imperfectly mobile, not imitable by competitors, and not substitutable (or simply VRINN) provide the firm with a sustainable competitive advantage.

According to the RBVF, when a firm controls resources that are VRINN, the firm gains a sustainable competitive advantage. When a firm creates linkages with suppliers and with customers, the resulting connections, to the extent that these links exclude competitors from forming the same connections with the same critical suppliers and/or customers for the same purpose, should provide competitive benefits to the firm. Because these connections, per our definition of supply chain linkages, facilitate the management of the flow and/or quality of materials into (i.e. raw materials) and out of

(i.e. finished goods and services) the firm, the benefits should accrue directly to operational performance (Rungtusanatham *et al.*, 2003).

Consistent with the RBVF perspective, supply chain linkages that guarantee availability of quality materials from suppliers to a firm or from a firm to customers represent a VRINN resource and can create an operational performance advantage for the firm. However, we believe that such operational performance advantage tends to be temporary and, in order for a firm's supply chain linkages to provide a sustainable operational performance benefit, a firm must continually seek to protect the integrity of the VRINN properties of its supply chain linkages. Therefore, we can state the first two RBVF-motivated propositions about supply chain linkages as follows:

- a) In the short-run, a firm's supply chain linkages represent a VRINN resource that provides superior, but temporary, operational performance advantages to the firm.
- b) The extent to which a firm is able to continually protect the integrity of the VRINN properties of its supply chain linkages will determine whether or not the firm will enjoy sustainable superior operational performance advantages from such connections with suppliers and with customers.

In conclusion, this theory is relevant to manufacturing entities as it advocates for better control of capabilities and resources that are VRINN. The firm can gain a sustainable competitive advantage by proper control and management of supply chain capabilities such as Information communication technology which is a key resource to any organization.

2.2.4 Transaction cost theory

Supply chain management is a rapidly evolving area of interest to academics and business management practitioners alike. Aspects of marketing, economics, logistics and organizational behavior are all important for developing insights into how and why different supply chain management arrangements emerge and for understanding the consequences of these arrangements for industry efficiency and competitiveness (Hobbs, 1996). This section discusses a theoretical framework for the study of supply chain

management which is drawn from the economics literature. The Transaction cost analysis (TCA) represents one possible approach to understanding and evaluating supply chain management and has the potential to be combined in an interdisciplinary setting with the insights provided by the marketing, logistics and organizational behavior literatures.

Transaction costs are simply the costs of carrying out any exchange, whether between firms in a marketplace or a transfer of resources between stages in a vertically integrated firm, when the neoclassical assumption of perfect and costless information is relaxed. They arise wherever there is any form of economic organization, i.e. within a vertically integrated firm, in a market or in a command economy (in which market transactions are largely absent).

It is useful to divide transaction costs into three main classifications: information costs, negotiation costs, and monitoring (or enforcement) costs. Firms and individuals face costs in the search for information about products, prices, inputs and buyers or sellers. Negotiation costs arise from the physical act of the transaction, such as negotiating and writing contracts (costs in terms of managerial expertise, the hiring of lawyers, etc.), or paying for the services of an intermediary to the transaction (such as an auctioneer or a broker). Monitoring or enforcement costs arise after an exchange has been negotiated. This may involve monitoring the quality of goods from a supplier or monitoring the behavior of a supplier or buyer to ensure that all the pre-agreed terms of the transaction are met. Also included are the costs of legally enforcing a broken contract, should the need arise (Hobbs, 1996).

Supply chains are a typical form of such intermediate arrangements, where some coordination occurs among the different companies. Hence, single transactions are neither completely one-off market based, nor do the single companies operate under the same organizational roof, i.e. an integrated hierarchical company. The boundaries for this coordination are typically reached where non-specific commodities are sourced. In such cases, no specific inter-organizational relationship is required, and hence, neither is

SCM. On the other extreme, if very close coordination among different business processes is required, this might be performed in a hierarchical solution, i.e. within one company, thereby avoiding the risk of having to work with a supplier and/or customer (Grover & Malhotra, 2003).

The main purpose of TCA is to explain why transactions in a certain institutional arrangement operate with more or less efficiency (Williamson, 1990). Transaction costs are used to measure efficiency, and accrue from the handling of goods and services. In this case, TCA allows a comparison of the costs of different institutional arrangements. The central hypothesis of TCA is that a transaction is much better organized and handled when the characteristics of the institutional arrangements are equivalent to the transaction requirements.

Building on this thought, Williamson's (1990) goal was to achieve a micro-analytic framework to explain and systematize transactions. High transaction costs result from different environmental conditions. Williamson (1990) developed an "organizational failure framework." Transactions are classified by certain determinants, which allow the cost minimal organizational structure for the coordination of business activities to be selected. The framework can be comprehended as a comparative heuristic analysis. The environmental conditions taken into account are specificity, uncertainty, and frequency of transactions.

Uncertainty means the predictability of the number of modifications by performance properties like quality, time, price or volume during a transaction. The more these modifications vary in time, the higher the uncertainty. Williamson (1990) characterized this as parametric uncertainty and distinguished it from behavioral uncertainty. Specificity describes the level of uniqueness. Specificity exists when an investment is made that cannot be used in different organizational settings. Specificity is defined as the difference between the intended use and the second best use of the resource. The higher such differences are, the higher the specificity. To analyze the specificity in more detail, Williamson (1990) distinguishes four types of specificity: Location specificity

includes investments in local facilities; Specificity of capital equipment; Specificity in human capital and Specificity in material assets.

A high frequency guarantees a fast amortization of investments. Williamson (1990) argues that the advantage of a coordination form is dependent on the correlation of these three factors influential to the transaction costs. For this, he differentiates fixed and variable transaction costs. Fixed transaction costs occur through the implementation of the coordination form. Markets have low-fixed transaction costs due to the already-existing legal system that can be used by companies. The implementation of a hierarchy requires high-fixed transaction costs. Variable transaction costs develop through every added transaction. The amount of variable transaction costs is dependent on specificity. The market, on the one hand, can be used for almost every transaction, while creating high-variable transaction costs. Comparatively, hierarchy causes low-variable transaction costs due to long-term contracts.

2.2.5 Supply chain capability maturity model

The maturity model represents a methodology which applications are related to definition, measurement, management and business processes control that have been shown to be very similar management approaches concepts to BPR (Business Process Reengineering), attracting a growing interest not only of companies but also of researchers, directly involved in this area (Chan & Qi, 2003; Gunasekaran *et al.*, 2001). Performance measurement is a fundamental concept in process management that is critical for organizations to identify and maintain competitive advantage through superior processes.

Various measurement and benchmarking techniques and methodologies such as Balanced Score-card, EVA model and ISO certification have emerged over the last decade to help managements assess their capabilities and shortcomings, and accordingly develop their strategies to enhance their competitive positions. Most of these initiatives have focused on developing performance measurement and control systems for organizational-level processes and have been very successful in process improvement in

many companies. Technological advances have brought to the fore new opportunities for inter-organizational collaboration and greater efficiency in supply chains. Unfortunately, there are no techniques or methodologies to aid in the systematic measurement and benchmarking of these inter-organizational supply chain processes (Viswanadham & Gaonkar, 2009).

a) Methodology to measure Supply Chain Capability

The organizational-centric methodologies for performance evaluation are inadequate to capture the complex and dynamic nature of interactions between supply chain partners, because they focus solely on the internal processes of organizations. In order to measure the performance of entire supply chains requires to extend these techniques to: Define a methodology for measuring inter-organizational or B2B processes and Define a methodology for measuring the performance of a supply chain by encapsulating the capability of the constituent organizations of the chain and the capability of the processes between them (Viswanadham & Gaonkar, 2009).

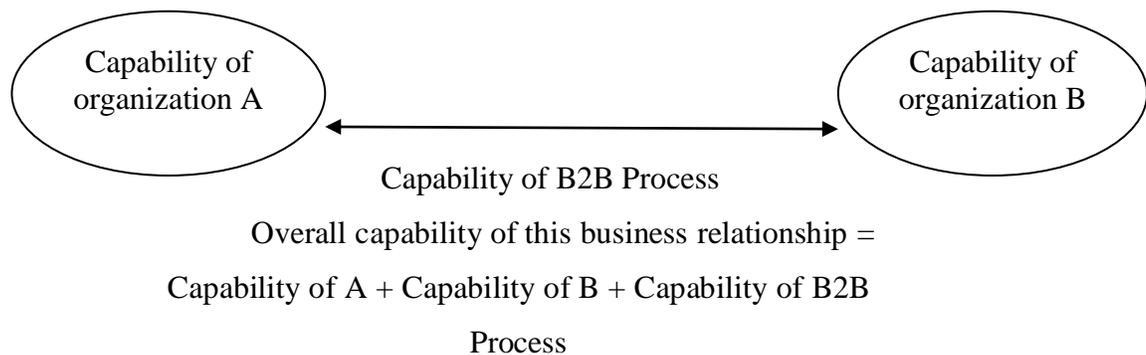


Figure 2.1: Capability of business relationship (Source: Viswanadham, N., & Gaonkar, R. S. (n.d.). Supply chain capabilities maturity model. Retrieved on 28th July 2015, from: <http://drona.csa.iisc.ac.in>.)

Even though, the capability of a business relationship may be defined as explained above, it will happen that the capabilities measured from one end will differ from that

measured at the other, due to the differing characteristics and impacts of the B2B processes in either of the directions. Hence, the measurement of the capability will always be subjective to the choice of the location at which the performance is being measured. It is also to be mentioned that the exact techniques for the capability measurement of individual businesses and B2B processes will be similar to those currently prevalent. Furthermore, within any given supply chain at any given point three capabilities can be measured. They are the capabilities of the in-bound processes, the capabilities of the organization it-self and finally the capabilities of the out-bound processes (Viswanadham & Gaonkar, 2009).

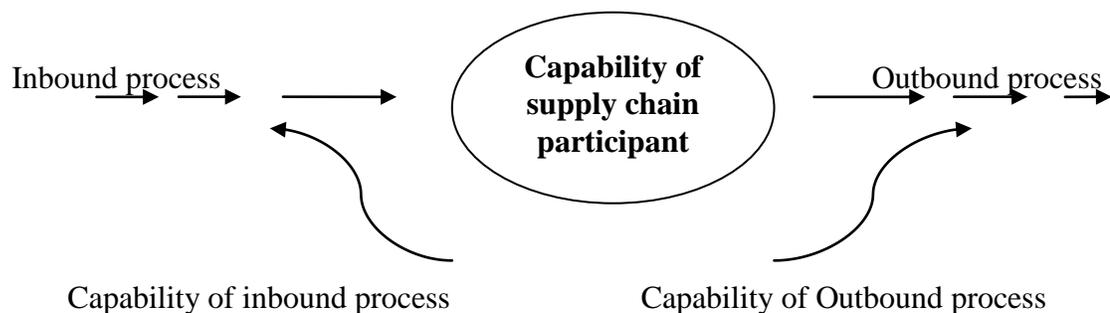


Figure 2.2 Capability of B2B process (Source: Viswanadham, N., & Gaonkar, R. S. (n.d.). Supply chain capabilities maturity model. Retrieved on 28th July 2015, from: <http://drona.csa.iisc.ac.in>.)

The capabilities of the in-bound processes can be evaluated from the capabilities of all the supply chain participants upstream and the capabilities of the B2B upstream processes between them. The capability of the supply chain participant can be evaluated using techniques similar to those that are commonly practiced now. As regards the capabilities of the out-bound processes they can be determined from the capabilities of the supply chain partners downstream and their B2B processes running downstream. This concept can be further extended such that at the customer end, all supply chain processes can be deemed to be in-bound processes and the capability of the entire supply chain can be determined from the capability of the in-bound processes at the customer end (Gunasekaran *et al.*, 2001).

b) Level of maturity

Based on the characterization of the capabilities of a given supply chain using the methodology given above, it would be helpful to classify them into certain levels of maturity, as such a classification can aid in identifying areas or processes for improvement relevant to the particular level of maturity. Hence, such a classification would aid an organization in identifying a road map in their evolution up the maturity ladder. One of the commonly used models in Software development is the Capability Maturity Model from Carnegie Mellon University. The model can be used in the classification and characterization of organizational and B2B processes in a supply chain. Various factors will be considered during the classification of the supply chain processes. Some of the important issues to be considered are: Effectiveness and Efficiency of Processes as measured from performance metrics such as number of defect-less deliveries; Organization Structure and the responsiveness of the organization; Human Resource Capabilities and the fit between the people manning the processes and Learning and Strategy Development Capabilities and the ability to transform (Viswanadham & Gaonkar, 2009). Based on the above analysis the supply chain and B2B processes can be characterized into any one of the 5 capability levels as indicated in Table 2.1

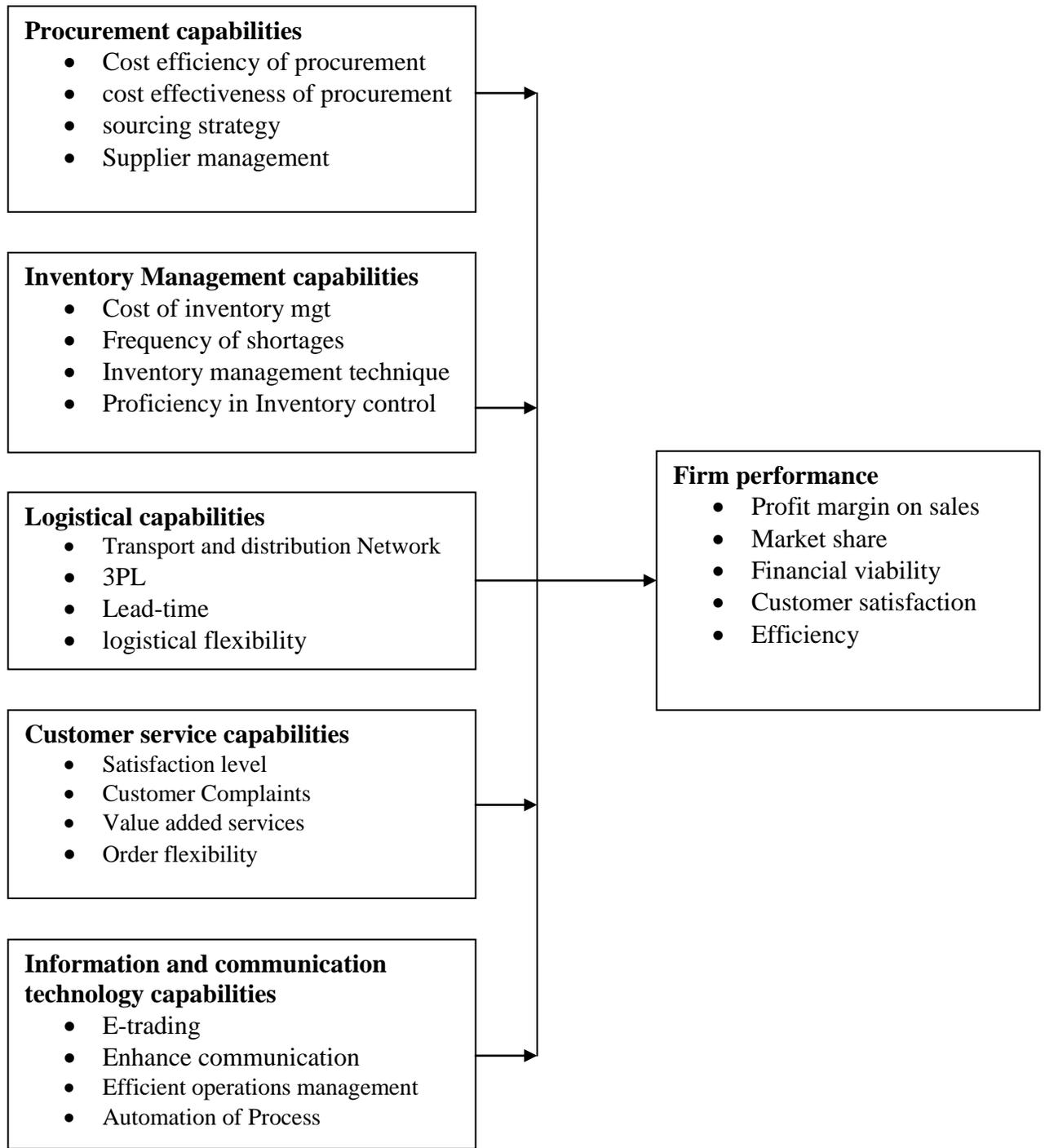
Table 2.1 Characterization of supply chain and B2B processes

Level	Characteristics
Level 5: World Class	Recognized as best of breed, flexible, nurtures core competencies and has learning capability.
Level 4: Best-in-Class	All processes are effective, efficient, benchmarked, and defect-free.
Level 3: Effective and Efficient	Well-defined, cost-effective processes that accomplish end user satisfaction efficiently.
Level 2: Effective	Processes are well defined and customer requirements are met, but may not be met efficiently.
Level 1: Chaotic	Processes are not well defined and not well managed. Run by traditions and experiences; no consistency or repeatability.

2.3 Conceptual framework

A conceptual framework is very important in any research being undertaken. It shows the relationship between the dependant variable and the independent variable (Shields & Nandhini 2013). According to Mathieson (2001), a conceptual framework is a virtual or written product, one that explains, either graphically or in narrative form, the main concepts to be studied and the presumed relationships among them. Conceptual framework, according to Stratman and Roth (2004) are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify his research question and aim (Locke & Latham, 2002). This study adopted a conceptual framework to describe the relationship between supply chain capabilities and firm performance of manufacturing entities. The independent variables are procurement capabilities, inventory management capabilities, logistical capabilities, customer service

capabilities and information communication technology capabilities that influence the dependent variable which is firm performance as illustrated on Figure 2.3.



Independent variable

Dependent variable

Figure 2.3 Conceptual framework

2.4 Empirical Review of Variables

This section dealt with literature with regard supply chain capabilities. Based on Day's (1994) framework, three categories of SCM capabilities: outside-in (physical supply), inside-out (physical distribution), and spanning processes were analyzed. However, the purpose of this study was to focus on procurement capabilities, inventory management logistical practices, customer service, distribution practices and information communication technology (Morash, 2011; Koester & Rash, 2005). This review sought to investigate the impact of supply chain capabilities on firm performance.

2.4.1 Procurement capabilities

Procurement has been designated as a critical activity by academics and top managers at manufacturers such as Honda of America (Fitzgerald, 1995). From a spanning perspective, purchasing provides the “nuts and bolts” – materials, machinery, supplies, and outside services – the organization requires to act on information regarding customer needs. This function determines how much to buy, the supplier(s) chosen, the level of quality delivered, the price paid, and when and where the goods will be presented.

Purchasing's impact on a firm, however, goes far beyond “buying things” (Fawcett & Fawcett, 1995). Purchasing personnel serve in an important boundary-spanning role for the organization as they are the main link to outside suppliers. They also function as integrators in that they interface extensively with other areas of the firm, including warehousing, inventory management, inbound traffic, and outbound transportation (Vonderembse *et al.*, 2006). How well purchasing performs regarding all of these areas has major ramifications concerning the supply chain's overall ability to satisfy clients and its performance.

Ceasing to be a secondary business function, procurement has played a fundamental role in organization's management by being responsible for purchasing specific resources from the external part of the enterprise required by internal operations. In the literature, procurement and purchasing are sometimes discussed as interchangeable terms;

however, there are authors (Lysons & Farrington, 2006; Miemczyk *et al.*, 2012) who distinguish procurement as an evolution of purchasing which was fundamentally focused on cost-reduction in the past. Consequently, procurement is no longer considered a simple business function accountable for planning, implementing, evaluating and controlling purchase decisions (Szwejczeniowski *et al.*, 2005; Paulraj & Chen, 2007); it also encompasses the management of resources and suppliers (Lindgreen *et al.*, 2013).

Therefore, procurement has enlarged its scope to achieve a competitive advantage in the current volatile market. In doing so, it seeks to align and synchronize internal requirements to external resources so as to reach the company's target (Chicksand *et al.*, 2012). In this context, authors such as Castaldi *et al.* (2011) define procurement as a boundary spanning function, which looks at both sides of the extended enterprise to find good and reasonable solutions for them (Lindgreen *et al.*, 2013).

Internally, procurement managers provide information (such as suppliers' capacity, logistics data, pricing and discounts and new products information) to other functions and internal customers taking responsibility to supply procurement with their needs (Szwejczeniowski *et al.*, 2005). Thus, cross-functional integration between procurement and other functions is fundamental to increase visibility of the flows and, consequently, allow for more reliable decision making from managers (Chiang *et al.*, 2012). In this regard, Foerstl *et al.* (2013) point out, in one of their study's propositions, the importance of developing a cross-functional team in purchasing and supply management

Externally, procurement is responsible for product or service cost, timeframes of delivery, product quality and general supply decisions, such as supplier selection and supplier relationship (Szwejczeniowski *et al.*, 2005; Castaldi *et al.*, 2011). Likewise, the aforementioned cross functional integration, the relationship between buyer and supplier also requires collaboration and information sharing between managers from the both sides. In fact, it normally involves much more than just a sales-procurement relationship between buyer and supplier (Castaldi *et al.*, 2011).

Procurement plays a vital role in supply chain management. According to Koester and Rash, (2005) there are significantly greater benefits to be gained in the area of procurement with regards to supply chain management and organizational performance. They are:

a) Strategic Sourcing

Strategic sourcing inherently focuses on both direct and indirect material items that make up the lion's share of costs and productivity problems. The more strategic aspects include in-sourcing/outsourcing and the management of contract manufacturing. Total cost management evaluates unit price, logistics and freight costs, import/export fees, taxes, service models and the cost of poor quality.

b) Supplier Management

Supplier management programs proactively manage supplier relationships and performance to ensure supply objectives are achieved. Proactive supplier management typically yields 10 to 15 percent savings for the purchasing categories addressed and then additional year-over-year savings of three to five percent. Moreover, the goals of a supplier management program may be critical to operations and sales. The success of supplier management programs is highly dependent upon executive sponsorship, cross-functional input, measurable performance metrics and process enablement. Many of today's supply chain management and e-procurement applications offer supplier management functionality.

In summary, procurement capabilities have become widely recognized as an important function, responsible for increasing competitiveness within an unstable environment (Lawson *et al.*, 2009), influencing positively the organization profitability (Alinaghian *et al.*, 2011) and contributing as much as other functions to business continuity (Ellegaard & Koch, 2012). It is, therefore, evident that procurement plays a fundamental role in any organization. By doing so, this function is capable of managing relevant internal and external organizational issues which may help improve organizational performance.

2.4.2 Inventory management capabilities

The inventory of company includes its raw materials; work in process; supplies used in operations as well as finished goods (Muller, 2011). Managing an inventory is aimed at satisfying customer requirement while minimizing total operational cost. Emmett (2011) defines inventory management as an approach to manage the product flow in a supply chain, to achieve the required service level at an acceptable cost.

Inventory management basically implies controlling the business stock or controlling the flow of goods and services as per their demand. Controlling inventory is need of the hour as it formulates the business success/failure as competition is intense, growing day-by-day. Knowledge about inventory management to academics and managers is vital for reducing costs, enhancing product quality, service enhancement, improving competitive ability and operational flexibility through pull systems (Suri, 1998).

For proper inventory management, services of middlemen or intermediaries are required which is often known as supply chain. Supply chain in simple words means sequence of partners/members/intermediaries engaged or involved to supply and manage the flow of manufactured products to the ultimate customers. These partners/members/intermediaries are known as channel functionaries encompassing suppliers, manufacturers, wholesalers, retailers and the ultimate customers. These members collaborate and work together by forming a chain to ensure the goods to the markets (customers) known as supply chain. Supply chain is often known as all the parties/channel members involved in satisfying the end customers (Chalotra, 2013).

In lean supply chain thinking, inventory is regarded as one of the seven “wastes” and, therefore, it is considered as something to be reduced as much as possible. Similarly, in agile supply chains, inventory is held at few echelons, if at all (van Hoek *et al.*, 2001), with goods passing through supply chains quickly so that companies can respond rapidly to exploit changes in market demand (Christopher & Towill, 2001). There have been various supply chain taxonomies based on these concepts and most stress the need for inventory reduction within each of the classifications. For example, Vonderembse *et al.*

(2006) state that a lean supply chain “generates high (inventory) turns and minimizes inventory throughout the chain” in an agile supply chain companies “make in response to customer demand” and in a hybrid supply chain companies “postpone product differentiation and minimize functional components inventory”. There is thus an emphasis on inventory reduction in each of these supply chain classifications.

Whilst inventories provide some security against fluctuations in the level of customer demand, there is concern that they may reduce the ability of supply chains to respond to changes in the nature of that demand. Inventories in international supply chains may, therefore, act as a buffer against one risk whilst increasing another type of risk. For example, Etienne (2005) lists factors such as speed to market for new products, responsiveness to new technology (leading to potential obsolescence of existing inventory), responsiveness to market niches, feedback time for quality issues, and “feed forward” time (e.g. speed of signal to the market, through actual use, that the product has been improved).

The potential disadvantages of holding inventory are widely recognized and a number of inventory reducing strategies have been put forward. These include: A reduction in production lead-times, for example, by means of shorter set-up times and smaller manufacturing runs (Harrison & van Hoek, 2005); the use of production postponement, enabling inventory of common components to be held rather than a multitude of finished goods lines (van Hoek, 1998); The visibility of end consumer demand to all supply chain participants, to reduce excess inventories caused by demand amplification up the supply chain (Christopher, 2005); Total cycle time compression, in both information and material flow lead times; The centralization of inventory. For example, the level of safety stocks can be reduced by centralizing inventory in a single European distribution centre rather than holding inventory in several national distribution centres; the virtual warehousing concept, whereby all inventory across many locations is regarded as one common inventory pool (Landers *et al.*, 2000). This may be associated with the transshipment of goods between warehouses at the same echelon level in the supply chain (Herer *et al.*, 2002); Cross-docking goods to speed the flow of goods through the

supply chain (Apte & Viswanathan, 2000). In this sense, cross-docking is defined as receiving goods at a warehouse and quickly transferring to dispatch vehicles, without putting the goods away into stock.

The success of SCM is dependent on adopters developing specific capabilities (Chandra & Kumar, 2000) including designing flexible organization, developing a trusting relationship with its suppliers, seeking total supply chain collaboration, enhancing communication to reduce uncertainty and inventory levels, outsource non-core competencies, implement build-to-order manufacturing, reduce inventory and reduce costs. The alignment of supply chain strategy, inventory management and product characteristics are extremely important for the successful operations of a company (Srinivas, 2013).

2.4.3 Logistical capabilities

Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flows and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third-party logistics services providers (Neil, 2011).

Logistics capability is that part of a firm's resources – including all assets, competencies, organizational processes, firm attributes, information, knowledge, etc. – which allow it to conceive of and implement strategies that improve efficiency and effectiveness (Barney, 1991). Logistics capability has been widely studied and measurement scales have been developed to link capability with competitive advantage and superior firm performance (Zhao *et al.*, 2001; Ellinger *et al.*, 2000; Morash *et al.*, 1996; Global Logistics Research Team – GLRT at Michigan State University, 1995).

These studies found that logistics activities affect performance with regards to revenue enhancement as well as cost reduction. The use of logistics capability as a means to create differentiation was also investigated (Daugherty *et al.*, 1998). These researchers found that logistics capability makes a major contribution to corporate strategy and performance and sometimes provides competitive advantage.

The capability of the logistics system is a critical part of the firm's success in times of time- and quality-based competition (Mentzer *et al.*, 2004). A review of the research indicates that logistics capabilities can be grouped in a variety of ways. Perhaps one of the most comprehensive examinations of logistics capabilities was conducted by the Global Logistics Research Team at Michigan State University (1995). In-depth interviews and surveys were used to identify seventeen universal logistics capabilities that were subsequently grouped into four competencies: positioning, integration, agility, and measurement.

Morash *et al.* (1996) also conducted a review of logistics capabilities and used two major "value disciplines" (closeness or intimacy and operational excellence) as a way to categorize logistics capabilities. The first value discipline, labeled "demand oriented" emphasizes external dimensions of the customer, customer interfaces, and goals and objectives. Its logistics capabilities are associated with customer service time advantages, and responsiveness to markets. The second value discipline, known as the supply-oriented or operations oriented approach, is related to the firm's operational capabilities and it emphasizes product availability, convenience, and low total distribution cost. In contrast, research by Mentzer *et al.* (2004) explored the role and structure of logistics capabilities in the context of theories of the firm. They conceptualized logistics capabilities that lead to competitive advantage as being in four broad categories: Demand-management interface capabilities (customer service and logistics quality); Supply-management interface capabilities (low cost distribution and low cost supply); Information-management capabilities (information sharing and information technology) and Coordination capabilities (internal and external).

Stank *et al.* (2005), broadly classified the logistics capabilities that encompasses four categories that incorporate elements of the two previous classification schemes: customer focus, time management, integration, information exchange, and evaluation. The researchers note that “these capabilities may also represent resource expertise in other functional areas such as manufacturing, marketing, and purchasing. They become key logistics capabilities, however, when they are engendered through movement and storage process activities across the supply chain”. Of interest to this research are two of the capabilities: integration and information exchange.

Integration is credited with creating internally interwoven processes that cannot be easily replicated (Daugherty *et al.*, 1998). Stank *et al.* (2005) noted that integration is needed to unify the organization’s efforts to meet its goals. Moreover, integration of logistics has been shown to lead to increased firm performance (Kahn & Mentzer, 1996). The communication aspects of interdepartmental activities are represented by interaction, while collaboration is portrayed as departments’ willingness to work together.

The external provision of logistics services, commonly known as 3PL, is part of an ongoing trend toward outsourcing logistics activities by manufacturers, distributors and retailers. The term “logistics outsourcing” is often equated with contract logistics, 3PL, and logistics-services providers. Firms use third parties mainly to emphasize core competencies, cost reduction, flexibility, etc. The use of third party outsourcing due to low-logistics capability or they might opt not to use of third parties due to strong logistics. There exist different areas of logistics services that a firm may outsource to third-party service providers. Research shows that traditional logistics activities such as outbound transportation, freight bill auditing/payment, warehousing, inbound transportation, and freight consolidation/distribution are the most frequently outsourced services (Lieb, 2002). The employment of 3PL in a manufacturing firm may influence the performance of an organization.

Logistics capabilities, specifically, have been demonstrated to be a source of competitive advantage for the firm (Zhao *et al.*, 2001). While the concepts of logistics and supply

chain management are related to each other, they have distinct differences. Supply chain management can be viewed as a network of logistics systems and related activities of the individual supply chain members (Coyle *et al.*, 2009). The capabilities of individual logistics systems are a critical part of the success of a supply chain, particularly for time- and quality-based competition (Mentzer *et al.*, 2004). Research has shown that logistics capabilities, specifically, can be used to adapt, integrate and reconfigure resources, organizational skills and functional competencies to achieve superior performance (Morash *et al.*, 1996; Mentzer *et al.*, 2004).

2.4.4 Customer service capabilities

Changes in global customer behavior require an agile answer from a company and its partners in a supply chain. Nowadays, companies' campaigns in various markets are concerned with services which integrate fast delivery and friendly contact with customers. The cost strategies have become options which are easily imitable by competitors, so companies do not represent differentiation for the customer (Quinn, 1994; Tixier *et al.*, 1998). A number of observers have emphasized that products offer few competitive advantages, but customer service provides a major differentiation. The importance attached to customer service is justified by strong competitive pressures, which are translated, in particular, into increased customer requirements regarding a company's capacity to coordinate operations and information flows, from its raw materials acquisition to its after-guarantee policy, after-sales service and maintenance (Loomba, 1996).

Customer service takes its support from logistics (Naoui, 2014). For managers, customer service now appears to be one of the main sources of competitive advantage which companies can offer; which, moreover, explains its place in the new concerns of the logistics function (Brockmann, 1999). Indeed, if the service quality offered to customers has been associated long enough to the marketing function concerned, it constitutes, more and more, one of the logistics major step (Tchokogue' *et al.*, 1999). In this way, the role that organizational size plays in determining adoption rates of total quality management is important (Haar & Spell, 2008). Recognized as a real process, SCM is a

major challenge for industrial and commercial enterprises that places customer requirements and satisfaction, in an ever shorter time, at the heart of their managerial concerns (Croom *et al.*, 2000).

Supply chain management has radically transformed the economic and business strategy models (Tarondeau *et al.*, 2008). Therefore, to capture this complexity, enterprises create new logistics systems to improve service levels, reduce costs and ensure an ever greater reactivity that meets the new requirements (Dornier, 2006). The adoption of an SCM approach that focuses on logistics appears to be a performance tool, since the ambition is to meet the following objectives: improving service levels, cost reduction and value creation while managing customer relationships, both upstream and downstream (Carbone *et al.*, 2006). This is an integrated approach, without which activities can be considered as being essentially marketing concerns (Tchokogue' *et al.*, 2001).

Proper management of customer service would lead to customer satisfaction which in turn will result in repeat purchases and later enhance the firm's performance with regards to total sales volumes. The ability to generate higher levels of customer satisfaction is regarded as an important differentiator and has therefore become a key element of many firms' business strategies. Customer satisfaction is a measure of how the products and services provided by a company meet or exceed customer expectations (Olsen & Johnson, 2003). Improving levels of customer satisfaction is important for firms due to the influence that customer satisfaction has on economic performance (Fornell *et al.*, 2006). At the microeconomic level, customer satisfaction is associated with increases in market share and profitability (Anderson, Fornell & Lehmann, 1994). Research shows that firms with higher levels of customer satisfaction generate higher return on investment (Anderson, Fornell & Lehmann, 1994), productivity (Anderson *et al.*, 1997), market value added (Fornell, 2001; Ittner & Larcker, 1998), shareholder value (Anderson *et al.*, 2004; Gruca & Rego, 2005), and stock market performance (Fornell *et al.*, 2006).

Furthermore, increasing and maintaining high levels of customer satisfaction enhances customer loyalty and serves as a safeguard against increasing price competition and the commoditization of products (Anderson, Fornell & Lehmann, 1994). The general consensus is that higher customer satisfaction leads to higher levels of repurchase intent, customer advocacy, and customer retention (Lam *et al.*, 2004; Mittal & Kamakura, 2001). In turn, higher satisfaction and loyalty leads to improved revenue, profitability, and cash flows (Ittner & Larcker, 1998; Heskett *et al.*, 1994; Reichheld & Teal, 1996). Improved revenue, profitability and cash flows are some of the parameters that can be used to measure firm performance.

2.4.5 Information and communication technology capabilities

It is more than obvious that the introduction of new technologies in Information and Communication (mostly referred to as ICT) has changed our lives, privately and professionally. Also the way business is conducted has changed through the introduction and widespread use of ICT. It is indisputable that information and communication technology has an enormous effect on contemporary business (Zhang 2011). On the one hand, applications of ICT have resulted in many new business models often put under the umbrella of “new economy” or more skeptically the dotcom boom. Some of these have resulted in stable companies, like Amazon. ICT has resulted in a plethora of new tools that might support operations management and supply chains. Virtually no large business exists without having some type of ERP system or using EDI; email and internet are common for almost every company; while new technologies such as RFID emerge. The influence of ICT has been as an inspiration for new business and as an enabler of a fast flow of information to support operations and supply chain management.

Information Communication Technology can be defined as a family of technologies used to process, store and disseminate information, facilitating the performance of information-related human activities, provided by, and serving both the public at-large as well as the institutional and business sectors (Salomon & Cohen, 1999). The role of Information Communication Technology (ICT) is viewed as critical within the economic

challenges faced by government and businesses, whether small or large. ICT's importance is often conflated with viable and competitive businesses (Levy & Powell, 2003).

Different theoretical lenses have been applied, resulting in different basic mechanism and choices for particular aspects of SCM. Some authors (Ray *et al.*, 2004; Jeffers *et al.*, 2008) start from a process-oriented view of value creation. That perspective results in models, where SCM mediates the effect of ICT on SC performance. Another theoretical point of departure is the resource-based view (RBV) of the firm (Barney, 1991) resulting in the idea that ICT is a firm's resource. Performance improvement in that theoretical perspective stems from the interaction between ICT and SCM. In other words, SCM is modeled as a moderator of the relationship ICT and SC performance. A final line of thinking is closely related to contingency theory. This view follows the central idea of the contingency theory that the effectiveness of certain practices, such as the use of ICT and SCM, might depend on environmental characteristics (Flynn *et al.*, 2010) as organizational size or uncertainty in demand.

The effective use of ICT provides companies with competitive advantage. In SCM, ICT is highly regarded as a major enabler in achieving effective SCM. As a supply chain spans many organizations in delivering products to customers both upstream and downstream and many functional areas within a company, the implementation of IT allows companies to increase communication and coordination of various value adding activities with their partners and between functions within their own operations (Simchi-Levi *et al.*, 2003). In addition, advance development of the Internet technology offers significant opportunities for cost reduction, increasing flexibility, increasing response time, and improving customer services (Lancioni *et al.*, 2000; Lee & Whang, 2001).

The extant literature shows the role of ICT as an enabler in effective SCM. William *et al.* (1997) find ICT as a strong predictor for logistics integration. Other studies warn that the benefit of IT in SCM do not come from the capabilities of ICT itself, instead the significant benefits come from the combination of its application with corporate strategy

and the nature of relationship between companies. Sanders and Premus (2002) empirically found that ICT provides significant contribution to organizations' performance and competitive advantage when it is well linked with firms' competitive priorities. Through case study research, Chae *et al.* (2005) found that the impact of ICT in supply chain collaboration depends on the existing nature of relationship between partners. ICT will improve collaboration and coordination between supply chain members in the environment where trust and long-term commitment between partners exist.

2.4.6 Firm performance

There are various definitions of performance such as: the ongoing monitoring and reporting of program accomplishments, particularly progress towards target goals which is conducted by program or agency management (Nadkarni & Narayanan 2007). Malina and Selto (2004) defined performance as a set of tools that are developed for making better decisions within an organization. Firm performance refers to how well an organization achieves its market-oriented goals as well as its financial goals.

Two other aspects must be considered when attempting to define performance: its time frame and its reference point. It is possible to differentiate between past and future performance; past superior performance does not guarantee that it will remain superior in the future (Carneiro, 2005). Another issue related to time is the duration of the interval (short, medium or long term) considered. The reference against which performance is being measured, such as the industry average, the results of main competitors, an established target, or past performance (Carneiro, Silva, Rocha, & Dib, 2007), is also important. Comparisons in relation to targets and past performance indicate the efficiency and evolution of the company. However, they are not suitable for comparing companies from different sizes and industries. Using the average value of the industry or of the main competitors as the baseline indicates companies' competitive position and may be more useful for strategic analyses.

Firm performance has a direct influence on the stakeholders since they possess ownership and control of the entity; therefore, it is prudent to consider the stakeholders approach in defining and understanding firm performance. The stakeholder theory offers a social perspective to the objectives of the firm and, to an extent, conflicts with the economic view of value maximization. The use of stakeholders' satisfaction as firm performance was also adopted by a large number of different authors: (Richard *et al.*, 2009). Besides offering a way to decide what performance is in a comprehensive way, the use of this theory allows one to resolve the issue of differentiating between performance antecedents and outcomes. Performance measures assess the satisfaction of at least one group of stakeholders. This conceptualization of firm performance is applicable across different companies, as remarked by Carneiro, Silva, Rocha, and Dib (2007), allowing one to differentiate between high and low performers in the eyes of each stakeholder.

Freeman (2010) defines a stakeholder as “any group or individual who can affect or is affected by the achievement of the organization’s objectives”. Other primary stakeholders are suppliers and customers, since they have a direct exchange relationship with the firm. Secondary stakeholders have indirect relationships with the firm, but are clearly affected by its actions, mainly in terms of the social or environmental consequences. In addition, it can be argued that each stakeholder has its own agenda in relation to the company and values a particular set of goals (Fitzgerald & Storbeck, 2003). Pleasing all parties equally may be an unachievable task, so managers need to prioritize.

Superior financial performance is a way to satisfy investors and can be represented by profitability, growth and market value (Cho & Pucik, 2005). These three aspects complement each other. Profitability measures a firm's past ability to generate returns (Glick *et al.*, 2005). Growth demonstrates a firm's past ability to increase its size. Increasing size, even at the same profitability level, will increase its absolute profit and cash generation. Larger size also can bring economies of scale and market power, leading to enhanced future profitability. Market value represents the external assessment

and expectation of firms' future performance. It should have a correlation with historical profitability and growth levels, but also incorporate future expectations of market changes and competitive moves.

Customer and employee satisfaction are two further aspects to consider. Customers want companies to provide them with goods and services that match their expectations (Fornell, Johnson, Anderson, Cha, & Bryant, 1996). To do that, companies must understand their needs, avoid defects and improve the perceived quality and value added by their offerings. Customer satisfaction increases the willingness-to-pay and thus the value created by a company (Barney & Clark, 2007). Employees' satisfaction is related to investments in human resources practices. This group tends to value clearly defined job descriptions, investment in training, career plans and good bonus policies (Harter, Schmidt, & Hayes, 2002). The satisfaction of these stakeholders, translates itself into a firm's ability to attract and retain employees and lower turnover rates. Customer satisfaction can be measured by aspects such as number of customers, frequency of customer complaints and number of referrals.

Firm performance was divided into constructs of operational and organizational performance, which was identified as a typical way of measuring firm performance in past studies on supply chain fit. Gunasekaran *et al.* (2001, 2004) provide extensive reviews of typical operational performance (OpP) measures, which cover typically lead times, on-time deliveries, work-in-process inventories, finished goods inventories and in-stock rates. Typical organizational performance measures are firm average profit, profit growth, market share growth and sales (Inman *et al.*, 2011).

The short-term objectives of SCM are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain. Financial metrics have served as a tool for comparing organizations and evaluating an organization's behavior over time. Any organizational initiative, including supply chain management, should ultimately lead to enhanced organizational performance. A number of prior studies have measured

organizational performance using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position. Aspects such as market growth rate, order cycles and order levels can be used to ascertain the market share and overall competitiveness of a firm.

According to Ganeshkumar and Nambirajan (2013) firm performance can be measured by the following factors: Market share, Sales growth, Profit margin, Overall product quality, Overall competitive position, Average selling price, Return on investment and the Return on sales. The approach in measuring firm performance can be divided into two categories which are financial measures and non-financial measures. Alternatively, firm performance can be measured by financial measures and strategic measures. Non-financial measures include aspects such as customer satisfaction, employee satisfaction, environmental performance, social performance, efficiency, effectiveness and relevance. In line with the above literature, financial measures and non-financial measures will be adopted to measure organizational performance in this study.

2.5 Critique of existing Literature

Das *et al.* (2006), Germain *et al.* (2008), Bozarth *et al.* (2009) and Wong *et al.* (2011) suggested that the assumed positive effect of Supply Chain Integration (SCI) on performance is not always that straightforward. They and others suggest two possible mechanisms that put considerable doubt about the direct and positive association between SCI and performance. First, it has been suggested that SCI consists of different aspects or dimensions (Das *et al.*, 2006; Fabbe-Costes & Jahre, 2008; Van derVaart & Van Donk, 2008) and that these dimensions are possibly interconnected (Chen & Paulraj, 2004; De Leeuw & Fransoo, 2009). Therefore, some aspects might only indirectly influence performance. So far, little empirical work has been done to investigate these interconnections.

It is worth noting that earlier studies on supply chain competencies have paid little attention to conceptualizing prominent practices that help the chain members to

understand performance drivers. The focus is usually on internal business practices from a single company's perspective (Basnet *et al.*, 2003; Knuckey *et al.*, 2002). That is to say that a host of previous research studies have been employed in studying firms' boundaries, vertical integration decisions, the rationale for conducting an acquisition, the networks and other hybrid governance forms without an emphasis on the role played by supply chain capabilities.

In measuring supply chain performance, performance measurement research focuses on analyzing performance measurement systems that are already in use, categorizing performance measures and then studying the measures within a category, and building rules of thumb or frameworks by which performance measurement systems can be developed for various types of systems (Beamon,1999). In a host of reviewed empirical studies (Wiengarten *et al.* (2010), Datta and Roy (2013), Tukamuhabwa *et al.* (2011), Zang and Cao (2011), all these seem to follow this trend. Benchmarking is another important method that can be used in performance measure evaluation. Benchmarking can be useful in that it can serve as a means of identifying improvement opportunities.

2.6 Research gaps

Previous studies have adequately described and expounded on the relation between supply chain management, supply chain competencies, supply chain integration and firm performance. However, not much work has been published in Kenya in regard to the influence of supply chain capabilities on firm performance. Based on the literature reviewed the following gaps can be identified. Koester and Rash, (2005) suggested that there are significantly greater benefits to be gained in the area of procurement with regards to supply chain management and organizational performance, Srinivas, (2013) indicated that inventory management and product characteristics are extremely important for the successful operations of a company and Heskett *et al.*, (1994) identified that higher satisfaction and loyalty leads to improved revenue, profitability, and cash flows. Other research gaps identified by the research are as follows. Tan (2002) has indicated in his research work that there is a direct relationship among supply chain competence and organizational performance, while Wisner (2003) proved that there is

relationship between quality commitment and understanding of the supply chain dynamics and hence on business performance and Chow *et al.* (2008) found that supply chain competence has a very positive effect on organizational performance in US and Taiwan manufacturing enterprises.

Koh *et al* (2007) and Tatoglu *et al* (2015) observed in their studies that high levels of supply chain practices have high impact on operational performance, while Bhatnagar and Sohal (2005) identified the impact of location decision framework and its resultant effect on the supply chain uncertainties and manufacturing practices and Hsu, Tan, Kannan and Keong Leong (2009) identified the direct relationship between operation's capability and supply chain management practices and its resultant impact on the organizational performance, while Bayraktar *et al* (2009) has validated that supply chain practices positively impact the operational performance of manufacturing enterprises. Li *et al* (2005) has found the existence of a direct relationship between organizations with high levels of SCM practices and its market competitive advantage and organizational performance, while Ou, Liu, Hung and Yen (2010) has identified that customer-firm-supplier relationship management and its resultant impact on the internal contextual factors, shall exert positive effects on organizational performance and Wong and Wong (2011) has identified the resultant positive influence of knowledge management capabilities on supply chain practices, while Sundram, Ibrahim and Govindaraju (2011) have found existence of direct relationship among supply chain practices and competitiveness. Based on the above literature there is an existing relationship between supply chain capabilities and firm performance. Bolo (2011) focused on the synergetic effect of supply chain competencies, capabilities and strategy and suggested that they influence firm performance in manufacturing firms in Kenya. However, the studies mentioned were mostly conducted in the developed world. Thus, the need to validate these findings in the context of the developing countries and in specific the private sector is highly fundamental. This study sought to fill these gaps by addressing the current research hypothesis.

2.7 Summary of review literature

This chapter explicitly dealt with reviewing relevant literature on supply chain management. In particular the chapter concentrates on the theoretical framework, conceptual framework, firm performance and supply chain capabilities such as: procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information and communication technology capabilities. Under the theoretical framework, the chapter focused on the dynamic capabilities theory, agency theory, resource based view theory, transactional cost theory and the supply chain capability maturity model with reference to supply chain and firm performance. Based on the literature provided above, supply chain capabilities strongly influences the organizational performance of the firms, while the competitiveness of the firms is strongly influenced by supply chain competence and supply chain practices of the entity. Firm performance encompasses how well an organization achieves its market-oriented goals as well as its financial goals. Firm performance has a direct influence on the stakeholders since they possess ownership and control of the entity; therefore, it is prudent to consider the stakeholders approach in defining and understanding firm performance. Hence, manufacturing firms concentrating on improving their supply chain capabilities and supply chain practices can significantly improve their performance as the former impacts the latter indirectly through their impact on competitiveness. Further, the chapter provided a critique of existing literature with an aim of enhancing knowledge in the field of study and research gaps were identified.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the type of research design and methodology that was applied in the study. It also included: specification of the population, sampling techniques and sample size, data collection methods and data analysis and presentation. The pilot study, reliability and validity of the research instruments were also discussed. The research under took a positivism philosophy while undertaking the research, this entailed perceiving the study in a highly objective manner.

3.2 Research design

The research design constitutes the blue print for the collection, measurement and analysis of data (Kothari, 2005). The research design used was a mixed research design which covers qualitative (descriptive) and quantitative research design. In this regard qualitative research design applies to qualitative data while quantitative research design applies to quantitative data in the questionnaire. More specifically a descriptive survey was employed as it was concerned with describing the characteristics of manufacturing entities with regards to supply chain capabilities. This research design was deemed suitable based on the nature of the study. According to Mugenda and Mugenda (2003) a descriptive survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. According to Orodho (2003), descriptive survey is 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 & Kombo, 2002). The research analyzed the influence of supply chain capabilities on firm performance.

3.3 Target population

Population refers to an entire group of persons or elements that have at least one thing in common. Population also refers to the larger group from which a sample is taken (Orodho, 2003). A population can also be defined as including all people or items with the characteristic that a researcher wishes to understand. According to Ngechu (2004), a population is a well defined or set of people, services elements, events, group of things or households that are being investigated. The target population represents all cases of people or organizations which possess certain characteristics; it is the larger group from which is taken (Mugenda & Mugenda, 2003). Population studies are more representative because everyone has an equal chance to be included in the final sample.

According to the Kenya Association of Manufacturers (KAM, 2015), there are about 850 manufacturing firms in Kenya. Over 80 percent of these manufacturing entities are based in Nairobi. The population of interest for this study was manufacturing firms within Nairobi and its environs. Therefore, the total population number was 680 manufacturing firms.

3.4 Sampling frame

A sampling frame is a list of all items where a representative sample is drawn for the purpose of research. According to Orodho (2003) a sampling frame is a list of all those within population who can be sampled. In this study, the sampling frame constituted of the list of manufacturing companies that are classified by the Kenya Association of Manufacturers in the 11th Edition of Kenya Manufacturers & Exporters Directory, 2015.

3.5 Sampling and sample size

A sample is a set of observations drawn from a population by a defined procedure .The sample represents a subset of manageable size. Samples are collected and statistics are calculated from the samples so that one can make inferences or extrapolations from the sample to the population.

According to Cooper and Schindler (2006) every sample must have a non-zero probability of selection. Taking a non-zero probability of selection of 0.101 the sample size was:

$$0.101 = \frac{\text{Sample size}}{680}$$

This gave a sample size of sixty nine respondents. The study therefore involved 69 manufacturing firms in Nairobi. A sample of sixty nine manufacturing entities was randomly selected to participate in this study. Therefore, the sampling technique used was random sampling. The mechanical technique aided by a computer random selection was used to randomly select the sample. The study picked the head of department of Supply Chain Management or procurement of each of the manufacturing firms to take part in the study.

3.6 Data collection methods

According to Mugenda and Mugenda (2003) data collection is the means by which information is obtained from the selected subject of an investigation. Data was collected using secondary and primary sources. Secondary data involves the data which is valid to the problem under the study but was originally meant for another study (Kothari 2004).

3.6.1 Primary data

Primary data is defined as first hand information received from a respondent. Primary data was collected using questionnaires covering on the influence of supply chain capabilities on firm performance which were self-administered to the respondents, who were the departmental heads with the aid of research assistants. The questionnaires were filled by the respondents and collected on a later date. The use of questionnaires was preferred as it ensured confidentiality is upheld, save on time, and easy to administer (Mugenda & Mugenda, 2003). The questionnaire as a tool of data collection is ideal because the researcher will be able to collect information from a large sample. It also gives a greater feeling of anonymity hence encouraging open responses to sensitive questions and free from biasness and so accurate and valid data can be gathered.

The questionnaire contained both structured and unstructured questions. The open-ended questions were used to limit the respondents to give variables in which the researcher is interested, while unstructured questions were used in order to give the respondents room to express their views in a more pragmatic manner (Kothari, 2005). The close ended questions requires a response on a five point likert scale, indicating to what extent each capability influences firm performance. The questionnaire contained six sections. section A covered the respondents general information, section B measured the influence of procurement capabilities on firm performance of manufacturing entities and section C measured the influence of logistical practices on firm performance of manufacturing entities. In addition, section D measured the effect of customer service on firm performance of manufacturing entities and section E measured the influence of Information and communication technology on firm performance of manufacturing entities. Finally section F measured firm performance.

3.6.2 Secondary data

Data that has been already collected and passed through the statistical process is secondary data (Kothari, 2004). For this thesis, the majority of secondary data was collected from international established journals and books that present academic research, but some information was sourced from reports and articles from niche magazines. However, only the articles from recognized journals and the books was used in statements or referred to in this thesis. The additional secondary data was used to develop a wider platform of background knowledge within the topic. Secondary data played an important part of building knowledge to be able to develop a solid background on supply chain capabilities and firm performance. The only limitation and disadvantage of secondary data is that it is not sufficient enough to answer research questions. In addition, the validity and accuracy of the secondary data can always be questioned.

3.7 Pilot study

According to Orodho (2003) a pilot test is necessary for testing the reliability of data collection instruments. Cooper and Schindler (2001) explained reliability of research as

determining whether the research truly measures that which it was intended to measure or how truthful the research results are. A pilot study is thus conducted to test the weakness in design and instrumentation to provide proxy data for selection of a sample. Reliability refers to the consistency of a measure. A test is considered reliable if the same result is arrived at repeatedly (Kothari 2004). A pilot test was conducted using questionnaires administered to 10% of the manager of manufacturing entities within the sample frame.

3.7.1 Reliability

Reliability is consistency of measurement or stability of measurement over a variety of conditions in which basically the same result should be obtained. Abbott and McKinney (2013) stated that reliability is the extent to which a given measuring instrument produces the same result each time it is used. The typical methods of estimating test reliability in behavioral research include test-retest reliability, alternative forms, split halves, inter-rater reliability and inter consistency (Drost, 2011). This study adopted the internal consistency method to estimate test reliability. Internal consistency is tested using the Cronbach's alpha.

Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalizability will be used to test reliability of the questionnaires. According to Zinbarg (2005), cronbach's alpha of a greater than 0.8 is acceptable for research instruments. cronbach's alpha which was popularized by Cronbach (1951) as quoted by Drost (2012), measures consistency within the instrument and questions how well a set of items measures a particular behavior or characteristics within the test. Suppose that we measure a quantity which is a sum of K components (K -items or *testlets*):

$$X=Y_1 + Y_2 + \dots X_K$$

Cronbach's α is defined as

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^K \sigma_{Y_i}^2}{\sigma_X^2} \right) \dots\dots\dots \text{Equation One}$$

where σ_X^2 is the variance of the observed total test scores, and $\sigma_{Y_i}^2$ the variance of component i for the current sample of persons.

If the items are scored 0 and 1, a shortcut formula is

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^K P_i Q_i}{\sigma_X^2} \right) \dots\dots\dots \text{Equation Two}$$

Where P_i is the proportion scoring 1 on item i , and $Q_i = 1 - P_i$. This is the same as KR-20.

Alternatively, Cronbach's α can be defined as

$$\alpha = \frac{K\bar{c}}{(\bar{v} + (K-1)\bar{c})}$$

Where K is as above, \bar{v} the average variance of each component (item), and \bar{c} the average of all co-variances between the components across the current sample of persons (that is, without including the variances of each component).

3.7.2 Validity

The validity of the questionnaire was determined using various methods, so as to ensure that what is supposed to be measured and performed is achieved with minimal deviation. The validity the tests that were conducted are: Content validity, face validity and construct validity.

- a) **Content validity:** The questionnaire was formulated and operationalized as per the study variables to ensure adequacy and representativeness of the items in each variable in relation to the purpose and objectives of the study. Further, content validity will verify through expert opinion from supervisors and practitioners.

- b) **Face validity:** In this case the questionnaire was subjected to expert analysis and opinion from at least two external experts who will thoroughly check the representativeness of the research instrument at face value.
- c) **Construct validity:** Construct validity is the degree to which, a test measure an intended hypothetical construct (Mugenda & Mugenda, 2003). Using a panel of experts familiar with the construct is a way in which this type of validity can be assessed; the experts can examine the items and decide what the specific item is intended to measure (Kothari, 2005). Construct validity was achieved through restricting the questions to the conceptualization of the variables and ensuring that the indicators of each variable will fall within the same construct. The purpose of this check is to ensure that each measure adequately assessed the construct it is purported to assess.

3.8 Data collection procedures

The study entailed collecting both primary and secondary data. According to Morris (2001) data collection procedure is the process of gathering pieces of information that are necessary for research process. Primary data presents the actual information that was obtained for the purpose of the research study. The researcher booked appointments with the heads of departments from the sample manufacturing entities to seek authority to conduct this research in their organization.

The researcher also presented a letter from Jomo Kenyatta University of Agriculture and Technology to the heads of departments as proof that this study was only be meant for academic purposes only. As a strategy aimed at minimizing the time taken to carry out this research, the researcher adopted both self-administration and drop and pick technique in questionnaire administration.

3.9 Data analysis and Presentation

Data analysis seeks to make general statements on how categories or themes of data are related ((Mugenda & Mugenda, 2003). According to Creswell (2007), data analysis is the process of bringing order, structure and meaning to the mass of information

collected. The data analysis methods that were employed are qualitative and quantitative techniques.

3.9.1 Qualitative analysis

Qualitative data was analyzed using content analysis. Content analysis entails categorizing the responses of the open ended questions based on emerging themes within an aim of making a conclusion.

3.9.2 Quantitative analysis

Quantitative data was analyzed using descriptive and inferential statistical methods and tools. Descriptive analysis involves the use of mean and standard deviation. In addition, a multiple regression model on the influence of supply chain capabilities versus firm performance was applied to examine the relationship between the variables. The model will treat firm performance as the dependant variable and the independent variables are: procurement capabilities, inventory management, logistical practices, customer service and Information communication technology.

Prior to measuring the respondents' response on influence of supply chain capabilities on firm performance, the research will conduct a measure of reliability and factor analysis. The response on the influence of supply chain capabilities on firm performance was measured by computing the indices based on the responses derived from the Likert-scaled questions. Quantitative data analysis was aided by the Statistical Package for Social Sciences (SPSS) version twenty four to generate those measures. Since percentages are the most widely used descriptive analysis (Creswell, 2007). SPSS Version 24 has a descriptive statistics feature that assists in variable response comparison and gives a clear indication of the response frequencies.

The relationship equation is represented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where:

Y=Dependent variable (firm performance)

X_{1-n} = Independent variables

X_1 =Procurement capabilities

X_2 =Inventory management capabilities

X_3 =Logistical capabilities

X_4 =Customer service capabilities

X_5 =Information Communication Technology capabilities

β_0 = constant

ε = Stochastic term

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ and β_5 Regression co-efficient to be estimated

3.9.3 Variable definition and measurement

Table 3.1 Variable definition and measurement

Variable	Measurement
Firm performance	Likert scale 1 - 5
Procurement capabilities	Likert scale 1 - 5
Inventory management capabilities	Likert scale 1 - 5
Logistical capabilities	Likert scale 1 - 5
Customer service capabilities	Likert scale 1 - 5
Information communication technology capabilities	Likert scale 1 - 5

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The study sought to investigate the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya. Specifically the study looked at procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technology capabilities. The main objective of this chapter was to provide the analyses of the results, interpretation of the results and findings. In this chapter, qualitative analysis of the open-ended questions was undertaken. Also, several steps were embarked on towards ensuring building of a good quantitative model, as well as key general guidelines for structuring a quantitative model. Data was analyzed, results interpreted on the basis of the overall objectives of the study.

4.2 Reliability analysis

A sample of 10 % of the targeted population was used in trying to determine the reliability of the data collecting instrument. Seven questionnaires were distributed to different manufacturing entities within Nairobi. All seven questionnaires were filled and later collected. The researcher coded the questionnaire and carried out reliability analysis using Cronbach Alpha. Table 4.1 shows the output from the analysis. The table shows the reliability of statements measuring each individual variable.

Table 4.1 Reliability Statistics

Reliability statistics	No. of items	Cronbach's Alpha value
Procurement capabilities	4	0.706
Inventory management capabilities	5	0.746
Logistical capabilities	6	0.760
Customer service capabilities	4	0.722
ICT Capabilities	4	0.758

4.3 Instrument Response Rate

Orodho (2003) defines response rate as the extent to which the final data sets includes all sample members and is calculated as the number of respondents with whom interviews are completed and divided by the total number of respondents in the entire sample including non-respondents. The researcher distributed a total of 69 questionnaires. Out of the 69 questionnaires, 59 were filled and returned, representing a 86% return rate as shown in Table 4.2 which was a good representation and sufficient to make generalizations. This response rate confirms to Mugenda (2008) stipulation that a response rate of 50% is adequate for analysis; a rate of 60% is good and a response rate of 70% and over is excellent.

Table 4.2 Response rate

	Questionnaires Distributed	Questionnaires Received	% Response
Manufacturing Firms	69	59	86

4.4 Background information

The demographic characteristics of the respondents from manufacturing entities was collected and reviewed. The analysis was based on the information that the respondents provided in the questionnaire. The firm's respondents age bracket, length of service and level of education were captured and the results shown in Table 4.3.

Table 4.3 Firm Demographics

Main Factor	Factor Level	Frequency	Percentage (%)
Age Bracket	20 years and Below	5	8
	21-30 Years	27	47
	31-40 Years	18	31
	Above 40 Years	8	14
Length of Service	Less than 5 Years	29	49
	5-10 Years	20	34
	10-15 Years	10	17
	Over 15 Years	0	0
Level of Education	Diploma	10	17
	Undergraduate Degree	36	62
	Postgraduate Degree	12	21

4.4.1 Age bracket

Majority of the respondents (47%) were in the age bracket of 21-30 years, 8% were below 20 years, 31% were in the age bracket of 31-40 years and 14% were above 40 years. Kenya's constitution defines youth as all individuals in the republic who have attained the age of 18 years but have not attained the age of 35 (GOK, 2010). The Institute of Economic Affairs (IEA) and Friedrich-Ebert-Stiftung (2010) observe that currently, 78.31% of Kenyans are below 34 years old. It can also be said that professionals in the procurement and supply chain profession are largely young people owing to the fact that the field is still in its nascent stages. This information on

demographics is vital as Bloom *et al.* (2003) correctly point out that people's economic behavior and needs vary at different stages of life, changes in a country's age structure can [and do] have significant effects on its economic performance.

4.4.2 Length of service

The respondents were also probed on their length of service as per when the interview was conducted. Majority (49%) of the respondents had worked for a period of less than five years in the manufacturing firms in Kenya, 34% had worked for a period of 5-10 years and 17% had worked for a period of 10-15 years. This find complements the finds on the age of the respondents since majority of the respondents had worked for a period of less than five years. This was captured to determine whether the respondents had stayed in the organization long enough to be well conversant with information the study intended to gather.

4.4.3 Level of education

The study sought to establish the respondents' level of education. 17% of the respondents had diplomas, 62% of the respondents had undergraduate degrees while 21% of the respondents had post graduate degree. This was highly expected since the respondents were at a senior management level where the skills, knowledge and competencies are supposed to be high. Nevertheless, the well educated respondents mean that they were well informed and furnished this study with better information which added value.

4.5 Reliability and Factor Results

The study conducted factor analysis to select a subset of variables from a larger set, based on the original variables with the highest correlations with the principal component factors. Factor analysis is the name given to a group of statistical techniques that can be used to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). The approach involves condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information

(Baets, 2002). In more technical terms factor analysis addresses the problem of analyzing the structure of the interrelationships (correlations) among a large number of variables (e.g test scores, test items, questionnaire responses) by defining a set of common underlying dimensions, known as factors. Factor analysis is an interdependence technique in which all variables are simultaneously considered, each related to all others.

Reliability is the extent to which results are consistent over time and an accurate presentation of the total population under study is referred to as reliability and if the results of a study can be produced under a similar methodology, then the research instrument is considered to be reliably (Orodho, 2003). Reliability is consistency of measurement (Bollen, 1989), or stability of measurement over a variety of conditions in which basically the same results should be obtained. The internal consistency method was adopted because it is more stable than the other methods (Bryman, 2012; Cooper & Schindler, 2011). To measure the reliability of the gathered data, Cronbach's alpha was applied.

4.5.1 Factor and reliability analysis of procurement capabilities

The constructs was refined by utilizing principal component analysis on the initial items comprising each construct. Each principal component analysis extracted factors, and factor loadings greater than 0.5 were retained for each principal component extracted (Hair *et al.*, 2010). To assess the factorability of items, the researcher examined this indicator (i.e. Kaiser Meyer-Olin Measure of Sampling Adequacy). For every EFA, it was found that manifest variables have KMO Measures of Sampling Adequacy above the threshold of 0.6 (Kaiser, 1974). Additionally, the reliability and internal consistency of the items constituting each construct was estimated.

Table 4.4 indicates that the Cronbach's alpha value of all procurement capabilities items remained as 0.838 since all the item had a factor loading value of more than 0.5 and there were no item which were removed.

Table 4.4 Factor and reliability analysis of procurement capabilities

Procurement Capabilities	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Cost efficiency of procurement	0.696	.869	112.478	0.838	68.09%
Cost effectiveness of procurement		.896	0		
Sourcing Strategy		.803			
Supplier management		.722			

4.5.2 Factor and reliability analysis of Inventory management capabilities

Table 4.5 shows the Cronbach's alpha values of inventory management capabilities and factor loading of the five inventory management capabilities statements. The higher the absolute value of the loading, the more the factor contributes to the variable. Table 4.5 illustrates that the Cronbach's alpha value of inventory management capabilities with a factor loading value of more than 0.5. Therefore, the study considered all the five inventory management capabilities statements.

Table 4.5 Factor and reliability analysis of Inventory management capabilities

Inventory management capabilities	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Inventory mgt. cost of inventory management	0.679	.740	94.325	0.795	56.29%
Frequency of shortages Inventory Management Technique		.652	(0.000)		
Proficiency in Inventory Control		.812			
Capability to undertake forecasting and quantification		.759			
		.778			

4.5.3 Factor and reliability analysis of Logistical capabilities

Reliability and factor analysis was conducted in all sub dimensions of logistical capabilities as indicated in Table 4.6. The values of loading factors were above 0.5. The Cronbach's alpha values reached the threshold of 0.7 indicating strong consistency, thus verifying reliability.

Table 4.6 Factor and reliability analysis of Logistical capabilities

Logistical capabilities	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Transport and distribution network	0.846	.670	133.16	0.844	57.36%
Third party logistics		.635	0		
Lead-time		.825			
Logistical Flexibility		.778			
order processing		.787			
Logistical cost incurred		.827			

4.5.4 Factor and reliability analysis of Customer service capabilities

A confirmatory factor analysis by extraction method of principle components was conducted for all items and factor loadings were above 0.5 as indicated in Table 4.7. The Cronbach's alpha values reached the threshold of 0.7 indicating strong consistency, thus verifying reliability. To assess the factorability of items, the researcher examined this indicator (Kaiser Meyer-Olin Measure of Sampling Adequacy). For every EFA, it was found that manifest variables have KMO Measures of Sampling Adequacy above the threshold of 0.6 (Kaiser, 1974). This is illustrated in Table 4.7.

Table 4.7 Factor and reliability analysis of Customer service capabilities

	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Customer Service					
Capability-	0.777	.876	94.09	0.817	66.36%
satisfaction level					
Customer		.609	(0.000)		
Complaints					
Value added		.840			
services					
Order flexibility		.901			

4.5.5 Factor and reliability analysis of ICT capabilities

Each of the constructs was refined by utilizing principal component analysis on the initial items comprising each construct. Each principal component analysis extracted factors, and factor loadings greater than 0.5 were retained for each principal component extracted (Hair *et al.*, 2010). To assess the factorability of items, the researcher examined this indicator (i.e. Kaiser Meyer-Olin Measure of Sampling Adequacy). For every EFA, it was found that manifest variables have KMO Measures of Sampling Adequacy above the threshold of 0.6 (Kaiser, 1974). Additionally, the reliability and internal consistency of the items constituting each construct was estimated. The table fore mentioned indicates that the Cronbach's alpha value of all inventory management practice items remained as 0.81 since all the item had a factor loading value of more than 0.5 and there were no item which were removed as shown in Table 4.8.

Table 4.8 Factor and reliability analysis of ICT capabilities

	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
ICT-E-trading	0.631	.716	92.131	0.81	65.07%
Enhanced communication		.845	(0.000)		
Efficient operations management		.871			
Automation of process		.786			

4.5.6 Factor and reliability analysis of firm performance

On firm performance of manufacturing entities, reliability and factor analysis results are presented in Table 4.9, Table 4.10, Table 4.11, Table 4.12 and Table 4.13. The overall firm performance of manufacturing entities was measured using profit margin on sales, market share, financial viability, customer satisfaction and efficiency. The results showed that the firm performance indicators of manufacturing entities had the Cronbach's alpha values above 0.7 and the factor loading value is greater than 0.5.

Table 4.9 Factor and reliability analysis of Profit Margin on sales

Profit Margin on sales	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Profit margin on sales-our organization is profitable	0.516	.892	44.73	0.71	76.35%
the profit margin has increased steadily over the years		.912	(0.000)		
profitability has stagnated		.701			
our organization is currently breaking even		.866			

Table 4.10 Factor and reliability analysis of market share

market share	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Market share-we regularly monitor the market share of the organization	0.653	.704	85.72	0.749	60.57%
the number of customers served by the organization has increased		.880	(0.000)		
our organization has opened other branches		.622			

our distributors are
ordering more units .876

Table 4.11 Factor and reliability analysis of Financial Viability

Financial Viability	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
We regularly monitor our financial performance	0.665	.959	50.24	0.729	67.30%
we maintain a reasonable cash reserves for use in difficult times		.676	(0.000)		
our suppliers are paid without delay		.616			
our revenues are higher than our expenses		.828			
we do not take short term loans to meet recurrent expenditure		.809			

Reliability and factor analysis was conducted in all sub dimensions of profit margins on sales, market share and financial viability as indicated in Table 4.9, Table 4.10 and Table 4.11. The values of loading factors were above 0.5. The Cronbach's alpha values reached the threshold of 0.7 indicating strong consistency, thus verifying reliability. Since the entire item had a factor loading of 0.5 and above, the entire profit margins on sales, market share and financial viability items were retained by the study and used for subsequent data analysis. In addition, for every EFA, it was found that manifest variables have KMO Measures of Sampling Adequacy which were satisfactory.

Table 4.12 Factor and reliability analysis of Customer Satisfaction

Customer Satisfaction	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Customer satisfaction-our customer numbers have been growing faster	.677	.741	66.15	0.718	70.45%
We often receive customer complaints through letters, emails, Facebook and twitter		.580	(0.000)		
We hardly receive compliments about our services		.759			
Our customers are happy with what we charge for our products		.804			
We have many repeat customers		.773			

Reliability and factor analysis was conducted in all sub dimensions of customer satisfaction. Table 4.12 indicates that the Cronbach's alpha value of all customer satisfaction items remained as 0.718 since all the item had a factor loading value of more than 0.5 and there were no item which were removed.

Table 4.13 Factor and reliability analysis of Measurement of efficiency

Measurement of efficiency	KMO	Component loading	Bartlett's (sig)	Cronbach's Alpha	Variance explained
Efficiency-the organization operates on low production cycle time	0.558	.801	16.81	0.704	66.48%
our organization maintains a reasonable staff ratio		.691	(0.000)		
the organization has a low response rate		.806			
Backlogs are common in the organization		.884			

A confirmatory factor analysis by extraction method of principle components was conducted for all items and factor loadings were above 0.5 as indicated in Table 4.13. The Cronbach's alpha values reached the threshold of 0.7 indicating strong consistency, thus verifying reliability. Therefore all the indicators were maintained for further analysis.

4.6 Descriptive analysis of the study variables

The purpose of descriptive statistics is to enable the researcher, to meaningfully describe a distribution of scores or measurements using indices or statistics. The type of statistics or indices used depends on the types of variables in the study and the scale of measurements. The researcher in this study used measures of central tendency to present the study findings. The general objective of this study was to investigate the influence of supply chain capabilities on firm performance of manufacturing entities in

Kenya. The study analyzed descriptive statistics for the following observed variables: procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technology capabilities.

4.6.1 The influence of procurement capabilities on firm performance of manufacturing entities in Kenya

Respondents were asked different questions with an aim to establish the influence of procurement capabilities on firm performance of a manufacturing entity in Kenya. Their responses were rated on a 5 points likert-scale in which they either stated Not at all, small extent, moderate extent, large extent and very large extent. Thus, in this study the scale of not all and small extent meant disagree while large and very large extent meant agreed. The results were, expressed as percentages, as shown in Table 4.14.

Table 4.14 Measurement of Procurement capabilities

Procurement Capabilities	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
Cost efficiency of procurement influences our firms performance	5	19	24	33	19	3.41	1.16
Cost effectiveness of procurement	3	10	33	36	17	3.53	1.01
The Sourcing Strategy in place affects our organization performance	7	10	27	34	22	3.54	1.15
Ability to undertake Supplier management influences our performance	5	15	20	39	20	3.54	1.13

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The respondents were asked whether the cost efficiency of procurement influence their firms performance, 33% of the responded indicated that cost efficiency of procurement influences the firm's performance to a large extent, 19% of the respondents indicated that cost efficiency of procurement influences the firms performance to a very large extent. Therefore, majority (52%) of the respondents agreed that cost efficiency of procurement influences firm performance. However, 24% of the respondents indicated that cost efficiency influences the firm's performance to a moderate extent. In particular, 19% and 5% of the respondents indicated that cost efficiency influences the firm's performance to a small extent and not at all respectively. According to majority (53%) of the respondents, cost effectiveness of procurement influences firm performance. More specifically, 36% and 17% of the respondents indicated to large extent and a very large extent respectively. Cost effectiveness of procurement had a moderate influence on firm performance according to 33% of the respondents while 13% of the respondents disagreed on the statement.

The respondents were asked whether the sourcing strategy in place influences their organization's performance, 34% indicated that the sourcing strategy in place influences the organization's performance to a large extent, 22% of the respondents indicated that the sourcing strategy in place influences the firm's performance to a very large extent and 27% suggested that the sourcing strategy influences the firm's performance to a moderate extent. Therefore, majority (56%) of the respondents agreed that the sourcing strategy in place influence firm performance. When probed on the influence of supplier management on firm performance, 39% indicated that the ability to undertake supplier management influences the performance to a large extent, 20% indicated that ability to undertake supplier management influences the performance to a very large extent and 20% of the respondents disagree on the statement. Therefore, majority (59%) of the respondents agreed that the ability to undertake supplier management influences firm performance.

In summary, the respondents indicated that procurement capabilities influence the performance of manufacturing firms. This information is illustrated in Table 4.14. These

findings are supported by Koester and Rash (2005) who found out that there are significantly benefits to be gained in the area of procurement with regards to supply chain management and organizational performance. In addition, the findings are supported by Lawson *et al.* (2009), Alinaghian *et al.* (2011) and Ellegaard and Koch (2012) who found out that procurement capabilities have become widely recognized as an important function, responsible for increasing competitiveness, influencing positively the organization performance and contributing as much as other functions to business continuity.

4.6.2 The influence of inventory management capabilities on firm performance of manufacturing entities in Kenya

The respondents were probed on various indicators of inventory management capabilities of firm performance. Their responses were rated on a 5 points likert-scale in which they either stated Not at all, small extent, moderate extent, large extent and very large extent. In this study the scale of not all and small extent meant disagree while large and very large extent meant agreed. The results were, expressed as percentages, as shown in Table 4.15.

Table 4.15 Measurement of Inventory management capabilities

Inventory Management Capabilities	NAT (%)	SE (%)	ME (%)	LE (%)	VL E (%)	Mean	Std. Deviation
The cost of inventory management influence the performance	2	21	24	31	22	3.52	1.11
Frequency of shortages affects the performance of our organization	2	16	19	35	29	3.74	1.10
Inventory Management Technique used influence the performance	0	9	32	46	14	3.65	0.83
Proficiency in Inventory Control	2	5	40	35	19	3.64	0.91
Capability to undertake forecasting and quantification	2	9	23	41	25	3.79	0.99

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

Inventory management is vital for reducing costs, enhancing product quality, service enhancement, improving competitive ability and operational flexibility. The researcher probed the respondents on various aspects with regards to inventory management capabilities.

The respondents were asked whether the cost of inventory management influences the firm performance, 31% of the responded indicated that the cost of inventory management influences the firm's performance to a large extent, 22% of the respondents indicated that the cost of inventory management influences the firm's performance to a very large extent. Majority (53%) of the respondents were in agreement that the cost of

inventory management influences the firm's performance. In addition, majority (64%) of the respondents indicated that the frequency of shortages influences the performance of the organization. More specifically, 35% and 29% of the respondents indicated to a large extent and to a very large extent respectively on the same aspect, 19% of the respondents indicated that frequency of shortages moderately influences firm performance while 18% of the respondents disagreed.

According to majority (60%) the respondents, the inventory management technique used by the firm influences the performance. 46% of the respondents indicated that the inventory management technique used influence the performance to a large extent, 14% of the respondents indicated that the inventory technique used influences the performance to a very large extent. On proficiency in inventory control, 35% indicated that proficiency in inventory control influences the firm performance to a large extent while 19% of the respondents suggested that proficiency in inventory control influences the firm performance to a very large extent. Therefore, majority (54%) of the respondents agreed that proficiency inventory control influences firm performance. In addition, majority (66%) of the respondents agree that the capability to undertake forecasting and quantification influences the firm performance, 41% stated that capability to undertake forecasting and quantification affect the firm performance to a large extent. While 25% of the respondents indicated that the capacity to undertake forecasting and quantification influences the firm performance to a very large extent, 23% indicated moderate and 11% of the respondents disagreed on the matter.

The study revealed that inventory management capabilities influence the firm performance. All the indicators had response of above 3.5 out of the five possible points. This information is illustrated in Table 4.15. Chandra and Kumar (2000) arrived at a similar conclusion where they observed that the success of SCM and organizational performance is dependent on developing specific capabilities including designing flexible organization, developing a trusting relationship with its suppliers, seeking total supply chain collaboration, enhancing communication to reduce uncertainty and

inventory levels, outsource non-core competencies, implement build-to-order manufacturing, reduce inventory and reduce costs.

4.6.3 The influence of logistical capabilities on firm performance of manufacturing entities in Kenya

Respondents were probed on various indicators with an aim to establish the influence of logistics capabilities on firm performance of a manufacturing entity in Kenya. Their responses were rated on a 5 points likert-scale. In this study the scale of not all and small extent meant disagree while large and very large extent meant agreed. Table 4.16 shows the distribution of their responses.

Table 4.16 Measurement of logistical capabilities

Logistical Capabilities	NAT	SE	ME	LE	VLE	Mean	Std. Deviation
	(%)	(%)	(%)	(%)	(%)		
Transport and distribution network	0	21	10	35	35	3.83	1.13
Third party logistics	7	11	35	33	14	3.37	1.08
Lead-time	2	21	16	40	22	3.6	1.11
Logistical Flexibility	2	7	33	41	17	3.66	0.91
The Order processing procedure affects the performance of our firm	2	5	26	40	28	3.86	0.95
Logistical cost incurred affects the performance of our organization	2	5	24	38	31	3.91	0.96

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

From Table 4.16, the respondents indicated that the transport and distribution network influences the firm performance with a mean response of 3.83 out of five points, 35% of the respondents suggested that transport and distribution network influences firm performance to a large extent while another 35% of the respondents indicated that it

influences firm performance to a very large extent. Consequently, majority (70%) of the respondents agreed that the transport and distribution networks influence the firm performance. In addition, 33% of the respondents indicated that third party logistics influences performance to a large extent, 14% indicating that third party logistics influences firm performance to a very large extent and 35% of the respondents indicated that third party logistics influences performance to a moderate extent.

The study further revealed that 62% of the respondents agreed that lead-time influences the firm performance. More specifically, 40% respondents indicated that lead-time influence firm performance (with a mean response of 3.6). In particular, 22% of the respondents indicated to a very large extent, 16% indicated to a moderate extent, 21% of the respondents indicated to a small extent and 2% of the respondents indicated not at all on this aspect. In addition, 58% of the respondents agreed that logistical flexibility influences a firm performance. Explicitly, 41% of the respondents stated that logistical flexibility influences firm performance to a large extent, 17% of indicated that logistical flexibility influences firm performance to a very large extent, 33% suggested that its influences is moderate and a very small percent (2%) of the respondents indicated that logistical flexibility does not influences firm performance.

According to majority (68%) the respondents, the order processing procedure influences the performance of their firm, 40% of the respondents indicated that the order processing procedure influences the firm performance to a large extent while 28% of the respondents suggested that order processing procedure influences the firm performance to a very large extent. When probe on the influence of the logistical cost incurred on the performance of their organization, a large number of the respondents (69%) agreed that logistical cost incurred influences the firm's performance. out of the 69% of the respondents, 38% of the respondents indicated that logistical cost incurred influence the performance of the organization to a large extent and 31% indicated that logistical cost incurred influences the firms performance. another 24% of the respondents suggested that it influences firm performance on a moderate extent.

The study revealed that logistical capabilities influence the firm performance. This was evident since all the indicators had a response of 3.6 and above out of the five possible points. These finding concurred with the study of Zhao *et al.* (2001) who noted that logistics capabilities, specifically, have been demonstrated to be a source of competitive advantage for the firm thus enhance performance.

4.6.4 The influence of customer service capabilities on firm performance of manufacturing entities in Kenya

Respondents were probed on various indicators with an aim to establish the influence of customer service capabilities on firm performance of a manufacturing entity in Kenya. Table 4.17 illustrates the distribution of their responses.

Table 4.17 Measurement of Customer service capabilities

Customer Service Capabilities	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
Satisfaction level	0	7	22	22	48	4.12	0.99
Customer Complaints	8.6	19	29	26	17	3.24	1.20
Value added services and additional features	1.8	14	26	30	28	3.68	1.09
Order flexibility	1.7	12	22	31	33	3.81	1.08

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

Majority of the respondents (70%) indicated that satisfaction level influences firm's performance, more specifically 48% indicate that it influences firm performance to a very large extent and 22% of the respondents indicated that the satisfaction level influences firm performance to a large extent. Another 22% and 7% of the respondents indicated that the satisfaction level influences firm performance to moderate extent and small extent respectively. The researcher asked the respondents if customer complaints influenced the performance of the organization. A moderate number (43%) of the

respondents suggested that customer complaints influence firm performance. Notably, 29% of the respondents indicated that customer complaints influence firm performance to a moderate extent, 19% indicated that it influences firm performance to a small extent and 8.6% suggested that customer complaints have no influence on firm performance.

According to a large number (68%) of the respondents value added services and additional features influences firm performance, 30% indicated that value added services and additional features influences firm's performance to a large extent, where as 28% of the respondents indicated that value added services and additional features influences a firm's performance to a very large extent. Only 1.8% of the respondents indicated that value added services and additional features have not influence on a firms' performance. A firms' order flexibility influences its performance, this was indicated by majority (64%) the respondents as they state that order flexibility influences a firm performance to a very large extent and large extent. a moderate number (22%) of the respondents indicated that order flexibility influences firm performance to a moderate extent, 12% suggested that it influence firm performance to a small extent and 1.7% of the respondents suggested that order flexibility has no influence on the performance of a firm.

According to study findings, customer service capabilities influence the firm performance of a manufacturing entity. This was evident in the computation of the mean response of each indicator which was relatively high. Also the study coincided with the findings of Lam *et al.* (2004) and Mittal and Kamakura (2001) that the general consensus is that higher customer satisfaction leads to higher levels of repurchase intent, customer advocacy, and customer retention.

4.6.5 The influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya

The study sought to establish the influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya. Table 4.18 shows the distribution of their responses.

Table 4.18 Measurement of ICT capabilities

Information Communication Technology Capabilities	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
E-trading	9	12	35	32	12	3.26	1.11
Enhanced communication	0	5	39	30	26	3.77	0.91
Efficient and effectiveness of operations management	0	7	26	33	33	3.93	0.94
Computerization and Automation of process	4	11	28	26	32	3.72	1.13

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The effective use of ICT provides companies with competitive advantage. In SCM, ICT is highly regarded as a major enabler in achieving effective SCM. On E-trading the 35% of the responded indicated that it influences firm's performance to a moderate extent, 32% of the respondents suggest that E-trading influences a firm's performance to a large extent while 12% indicate that E-trading influences a firm's performance to a very large extent. When probe on the influence of enhanced communication on the firm performance of manufacturing entities, 56% agreed that enhanced communication influences firm's performance, 39% suggested that enhanced communication influences firm's performance to a moderate extent and 5% of the respondents indicated that enhanced communication does not influence firm performance.

Efficient and effectiveness of operations management influences the firm performance of a manufacturing entity. Majority (66%) of the respondents indicated that efficient and effectiveness of operations management influences firm performance to a large extent and a very large extent, 26% of the respondents indicated that efficient and effectiveness

of operations influences firm performance moderately. In addition, majority of the respondents 58% agreed that computerization and automation influences firm performance. More specifically, 32% of the respondents indicated that computerization and automation of process influences firm's performance to a very large extent while 26% indicated that the computerization and automation of processes influences a firm's performance to a large extent. A moderate number of the respondents indicated that computerization and automation influences firm performance to a moderate extent and 11% of the respondents indicated that it influences firm performance to a small extent.

The study revealed that Information Communication Technology (ICT) capabilities influence the firm performance of a manufacturing entity. This was evident in the computation of the overall mean response which was relatively high (73.4%), with an overall mean response of 3.67. This finding is supported by Sanders and Premus (2002) who found out that ICT provides significant contribution to organizations' performance and competitive advantage when it is well linked with firms' competitive priorities.

4.6.6 Firm performance of manufacturing entities in Kenya

The study sought to determine the rating of firm performance of manufacturing entities in Kenya using the following indicators: Profit margin on sales, market share, financial viability, customer satisfaction and efficiency. Respondents were asked to indicate the extent to which they agreed with the opinion statements given in regard to the rating of firm performance in their manufacturing firms. This was on a likert scale of not at all, small extent, moderate, large extent and very large extent. In this study the scale of not all and small extent meant disagree while large and very large extent meant agreed.

a) Profit margin on sales

The respondents were asked whether their organization was profitable, 52% of the respondents agreed that the organization was profitable, 40% of the respondents indicated that the moderate and 9% of the respondents disagreed. Similarly, 52% of the respondents agreed that the profit margin of the organization had increased steadily over

the years, 30% indicated moderate and 18% of the respondents disagreed that the profit margins had increased steadily over the years.

A large number (57%) of the respondents disagreed that profitability of the organization has stagnated, 27% were neutral on their response on the stagnation of profitability while 4% of the respondents agreed that the profitability of the organization has stagnated. The respondents were further probed on whether their organization is currently breaking even, 37% of the respondents disagreed, 31% were neutral over the issue and 31% of the respondents agreed that currently their organizations are breaking even as shown in Table 4.19.

Table 4.19 Measurement of profit margin on sales

Profit Margin on sales	NAT	SE	ME	LE	VLE	Mean	Std.
	(%)	(%)	(%)	(%)	(%)		Deviation
Our organization is profitable	0	9	40	26	26	3.67	0.96
The profit margin has increased steadily over the years	2	16	30	33	19	3.53	1.04
Profitability has stagnated	30	27	27	13	4	2.32	1.15
Our organization is currently breaking even	26	11	31	24	9	2.8	1.31

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The study indicated that manufacturing firms in Kenya were mostly profitable; the profit margins had increased steadily over the years, profitability had not stagnated and the profits were surpassing the breaking even point. Therefore, the manufacturing entities in Kenya with high profit margins on sales would be deemed as being enabled by supply chain capabilities.

b) Market Share

According to the study 55% of the respondents indicated that they regularly monitor the market share of their organization, 21% of the respondents indicated moderate and 24% of the respondents disagreed that they regularly monitor the market share of their organization. In order to determine if the market share of the manufacturing entities had increased, the respondents were probed on whether the number of customers served by the organization had increased. Based on the respondents, 68% agreed that the number of customers served by the organization had increased while 10% disagreed.

The respondents were probed on whether their organizations had opened other branches with an aim of determining market share growth, 30% of the respondents agreed while 49% disagreed. This result may be attributed to the fact that the decentralization of manufacturing is highly costly and poses many managerial challenges. Additionally, majority (64%) of the respondents indicated that distributors were ordering more units while 10% disagreed on the statement. This is shown in Table 4.20.

Table 4.20 Measurement of market share

Market share	NAT	SE	ME	LE	VLE	Mean	Std.
	(%)	(%)	(%)	(%)	(%)		Deviation
We regularly monitor the market share of the organization	3	21	21	29	26	3.53	1.19
The number of customers served by the organization has increased	3	7	22	35	33	3.86	1.07
Our organization has opened other branches	33	16	22	16	14	2.62	1.44
Our distributors are ordering more units	3	7	26	38	26	3.76	1.03

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

From the result, the study found that manufacturing firms in Kenya regularly monitor the market share of the organization; the number of customers served by the organizations had increased, though majority of manufacturing entities did not open other branches there distributors ordered more units. This showed that manufacturing firms in Kenya that regularly monitor the market share of the organization and experience a continuous increase in the number of customer and an increase in the number of units ordered by the distributors have generally a high market share and therefore, they are regarded to have enhanced performance.

c) Financial viability

Majority (70%) of the respondents agreed that they regularly monitor their financial performance of the organization while a small number (4%) of the respondents disagreed on the statement. The researcher observed that 55% of the respondents agreed that the organization maintains a reasonable cash reserve for use in difficult times 30% of the respondents indicated moderate and 14% of the respondents disagreed. In addition, the respondents were probed on whether their suppliers are paid without delay, 66% of the respondents agreed that their suppliers are paid without delay, 28% of the respondents indicated moderate and 7% of the respondents disagreed.

The study sought to find out whether within the manufacturing entities, revenues are higher than expenses. A large number (60%) of the respondents agreed that the organizations revenues are higher than expenses, 29% of the respondents indicate moderate while 10% of the respondents disagreed. Finally, majority (57%) of the respondents agreed that their organizations do not take short term loans to meet recurrent expenditure, 40% of the respondents indicate moderate while 17% of the respondents disagreed on the statement as shown in Table 4.21.

Table 4.21 Measurement of financial viability

Financial Viability	NAT	SE	ME	LE	VLE	Mean	Std. Deviation
	(%)	(%)	(%)	(%)	(%)		
We regularly monitor our financial performance	2	2	26	17	53	4.19	1.00
We maintain a reasonable cash reserves for use in difficult times	7	7	30	25	30	3.64	1.20
Our suppliers are paid without delay	2	5	28	35	31	3.88	0.98
Our revenues are higher than our expenses	5	5	29	29	31	3.76	1.11
We do not take short term loans to meet recurrent expenditure	7	10	26	40	17	3.5	1.11

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The study found out that, manufacturing firms in Kenya regularly monitor financial performance, they maintain a reasonable cash reserve, paid suppliers without delay, have revenues that are higher than expenses and they don't take short term loans to meet recurrent expenditure. This showed that manufacturing firms in Kenya that have regularly monitor financial performance, they maintain a reasonable cash reserve, paid suppliers without delay, have revenues that are higher than expenses and they don't take short term loans to meet recurrent expenditure are more financially viable and they can be deemed to have enhanced performance as a result of supply chain capabilities.

d) Customer satisfaction

The study established that 57.6% of the respondents agreed that customer numbers had grown faster, 32.2% of the respondents indicated moderate while 20.3% of the respondents disagreed that customer numbers had grown faster. The researcher observed that 53.4% of the respondents agreed that they often received customer complaints, 25.9% of the respondents indicated moderate while 20.7% of the respondents disagreed on the statement. Further, 26.3% of the respondents agreed that they hardly received compliments about their services, 28.1% indicated moderate and 45.6% of the respondents disagreed on the statement.

Majority (72.9%) of the respondents agreed that their customers are happy with what they charge for their products, 23.7% of the respondents indicated moderately and 3.4% of the respondents disagreed on the matter. the study sought to find out the frequency of repeat customer, majority of the respondents agreed that they had many repeat customer, 15.3% indicated moderate while 6.8% of the respondents disagreed. This is illustrated in Table 4.22.

Table 4.22 Measurement of customer satisfaction

Customer Satisfaction	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
Our customer numbers have been growing faster	10.1	10.2	32.2	25.4	32.2	3.8	1.01
We often receive customer complaints through letters ,emails ,Facebook and twitter	6.9	13.8	25.9	37.9	15.5	3.41	1.12
We hardly receive compliments about our services	35.1	10.5	28.1	15.8	10.5	2.56	1.39
Our customers are happy with what we charge for our products	1.7	1.7	23.7	47.5	25.4	3.93	0.85
We have many repeat customers	3.4	3.4	15.3	30.5	47.5	4.15	1.03

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The study found out that, manufacturing firms in Kenya had customer numbers growing faster, often received complaints via post and social media, received compliments about their services, customers were happy with what they charged for their products and had many repeat customers. This indicated that manufacturing entities that had customer numbers growing faster, often received complaints via post and social media, received compliments about their services, customers were happy with what they charged for their products and had many repeat customers are regarded to have a higher degree of customer satisfaction level as a result of supply chain capabilities.

e) Efficiency

According to the study, 37% of the respondents agreed that the organization operated on low production cycle time, 41% of the respondents indicate moderate while 22% of the respondents disagreed on the statement. Majority (75%) of the respondents agreed that their organization maintains a reasonable staff ratio, 16% indicated moderate and 8% disagreed on the matter. In addition, 30% of the respondents agreed that the organization had a low response rate, 35% indicate moderate and 36% of the respondents disagreed. Based on the study, 29% of the respondents agreed that backlogs were common in the organization, 24% of the respondents indicate moderate while 47% of the respondents disagreed as shown in Table 4.23.

Table 4.23 Measurement of efficiency

Efficiency	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
The organization operates on low production cycle time	13	9	41	30	7	3.11	1.09
Our organization maintains a reasonable staff ratio	3	5	16	53	22	3.86	0.95
The organization has a low response rate	24	12	35	28	2	2.71	1.17
Backlogs are common in the organization	31	16	24	22	7	2.59	1.33

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

The study found out that, manufacturing firms in Kenya relatively operated on low production cycle time, maintained a reasonable staff ratio, had a relative low response rate and backlogs were not common in the organization.

4.6.7 Supply chain capabilities

The general objective of this study was to investigate the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya. However, the study further sought to determine the extent to which each supply chain capability influenced firm performance and provide a ranking of the variables. The study probed the respondents on the extent to which procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information technology capabilities influenced firm performance of manufacturing entities. The Table 4.24 illustrates the results.

Table 4.24 Supply chain capabilities

Supply Chain Capabilities	NAT (%)	SE (%)	ME (%)	LE (%)	VLE (%)	Mean	Std. Deviation
I Think that procurement capabilities influence performance	0	5	28	24	43	4.05	0.96
I Think inventory management capabilities influence the performance	0	16	22	33	29	3.76	1.05
I Think that Logistical capabilities influences firm performance	0	3	33	35	29	3.9	0.87
I Think that customer service capabilities influences procurement performance	0	5	29	31	35	3.95	0.93
I Think information communication technology capabilities influences performance	2	2	25	36	36	4.02	0.92

Key: NAT-Not at all; SE-Small Extent; ME- Moderate Extent; LE-large Extent; VLE-Very Large Extent

According to the respondents, 67% of the respondents agreed that procurement capabilities influenced performance, 28% indicated moderate while a small number (5%) of the respondents disagreed. Similarly, 62% of the respondents agreed that inventory management influenced performance, 22% indicated moderate and 16% of the respondents disagreed that inventory management influenced performance. In addition,

64% of the respondents agreed that logistical capabilities influenced firm performance, 33% indicated moderate and only 3% of the respondents disagreed on the statement.

The researcher further probed the respondents on the extent of influence of customer service, 66% of the respondents agreed that customer service capabilities influenced firm performance, 29% indicated moderate while only 5% of the respondents disagreed. When asked on the extent of influence of information communication technology, majority (72%) of the respondents agreed that information communication technology influenced firm performance, 25% of the respondents indicated moderate and only 4% disagreed on the statement. Therefore, based on the findings, information communication technology influenced firm performance of manufacturing entities the most followed by procurement capabilities, customer service capabilities, logistical capabilities and inventory management capabilities respectively.

4.7 Quantitative Results

4.7.1 Correlations of study variables

Correlation is often used to explore the relationship among a group of variables (Pallant, 2010), in turn helping in testing for multicollinearity. Multicollinearity is the undesirable situation where the correlations among the independent variables are strong. In other words, multicollinearity misleadingly bloats the standard errors. Thus, it makes some variables statistically insignificant while they should be else significant (Martz, 2013). Tolerance of a respective independent variable is calculated from $1 - R^2$. A tolerance with a value close to 1 means there is little multicollinearity, whereas a value close to 0 suggests that multicollinearity may be a threat (Belsley, Kuh & Welsch, 2004).

The reciprocal of the tolerance is known as Variance Inflation Factor (VIF). Equally, the VIF measures multicollinearity in the model in such a way that if no two independent variables are correlated, then all the VIF values will be 1, that is, there is no multicollinearity among factors. But if VIF value for one of the variables is around or greater than 5, then there is multicollinearity associated with that variable (Martz, 2013).

Absence of multicollinearity allows the study to utilize all the independent variables. Table 4.25 indicates the test results for multicollinearity, using both the VIF and tolerance. With VIF values being less than 5 and collinearity tolerance being less than 0.1 it was concluded that there was no presence of multicollinearity in this study.

Table 4.25 Collinearity test

Variables	Collinearity Statistics	
	Tolerance	VIF
Logistic capabilities	.593	1.686
Inventory Management	.548	1.823
Procurement capabilities	.587	1.703
Customer service	.561	1.781
Information Technology	.640	1.562

a. Dependent Variable: Firm performance

4.7.2 Heteroscedasticity test of study variables

Heteroscedasticity in a study usually happens when the variance of the errors varies across observation, Long and Ervin (2000). Breusch-Pagan and Koenker was used to test the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. Breusch-Pagan and Koenker test the null hypothesis that heteroskedasticity not present (homoskedasticity) if sig-value is less than 0.05, reject the null hypothesis.

A large chi-square value greater than 9.22 would indicate the presence of heteroscedasticity (Sazali, Hashida, Jegak & Raduan, 2009). In this study, the chi-square value was 5.582 indicating that heteroskedasticity was not a concern as illustrated in Table 4.26.

Table 4.26 Heteroscedasticity test results

Test	Test value	sig
Breusch-Pagan	5.582	.349

4.7.3 Testing of Outliers of the study variables

Outliers were tested univariately on both independent and dependent variable because the independent and dependent variable constructs were in continuous scales. Univariate outliers are extreme values for a single variable. Outliers within the firm performance constructs were dropped. That is, cases or observations showing characteristics or values that are markedly different from the majority of cases in a data set (Kline, 2005; Hair *et al.*, 2010) are normally dropped. This is because they distort the true relationship between variables, either by creating a correlation that should not exist or suppressing a correlation that should exist (Abbott & McKinney, 2013). Consequently, multivariate testing of outliers on the dependent variable using Mahalanobis d-squared, produced reasonable boxplots as shown (Appendix iii) where all the constructs are symmetrical and with no outliers identified. Multivariate outliers are an unusual combination of scores on a number of variables (Tabachnick & Fidell, 2007).

4.7.4 Normality Tests of the Study Variables

The normality of data distribution was assessed by examining its skewness and kurtosis (Kline, 2005). A variable with an absolute skew-index value greater than 3.0 is extremely skewed while a kurtosis index greater than 8.0 is an extreme kurtosis (Kline, 2005). Cunningham (2008) stated that an index smaller than an absolute value of 2.0 for skewness and an absolute value of 7.0 is the least violation of the assumption of normality. The results of the normality test of the dependent variable indicated skewness and kurtosis in the range of -1 and +1 as shown in Table 4.27. This implies that the assumption of normality was satisfied.

Table 4.27 Normality test of the study variables

Variable	Statistic	Statistic	Std. Error
Customer service	Mean	3.71	.13427
	Std. Deviation	1.03136	
	Skewness	-.311	.311
	Kurtosis	-.993	.613
Firm performance	Mean	3.42	.12267
	Std. Deviation	.94228	
	Skewness	.079	.311
	Kurtosis	-.242	.613
Information Technology	Mean	3.67	.13131
	Std. Deviation	1.00858	
	Skewness	-.526	.311
Inventory Management	Mean	3.67	.13501
	Std. Deviation	1.03704	
	Skewness	-.066	.311
Logistic capabilities	Mean	3.71	.13131
	Std. Deviation	1.00858	
	Skewness	-.599	.311
	Kurtosis	.150	.613
Procurement capabilities	Mean	3.51	.13131
	Std. Deviation	1.00858	
	Skewness	-.141	.311
	Kurtosis	-.696	.613

To corroborate the skewness and kurtosis results, the graphical analysis results showed the line representing the actual data distribution closely follow the diagonal in the normal Q-Q plot as shown in Figures 4.1 to 4.5, suggesting normal distribution (Hair, Tatham, Anderson & Black, 2006). In q-q plot, or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, where, a sensibly straight line suggests a normal distribution (Pallant, 2007). By and large, if the points in a q-q plot depart from a straight line, then the assumed distribution is called into question (Aas & Haff, 2006).

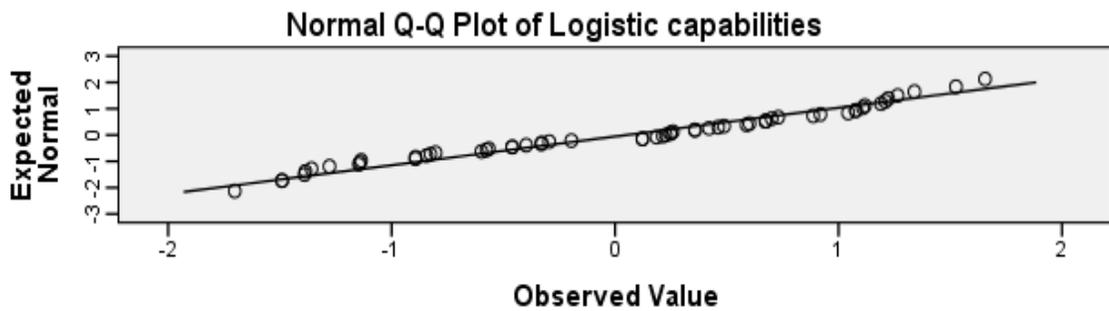


Figure 4.1 Q-Q plot of logistical capabilities

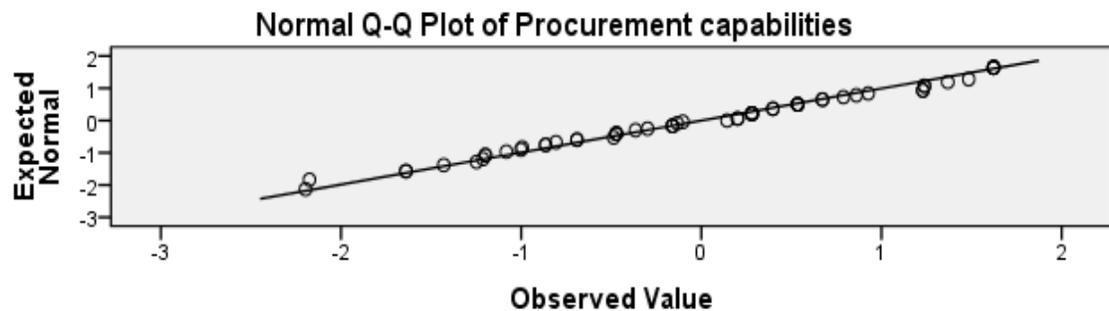


Figure 4.2 Q-Q plot of procurement capabilities

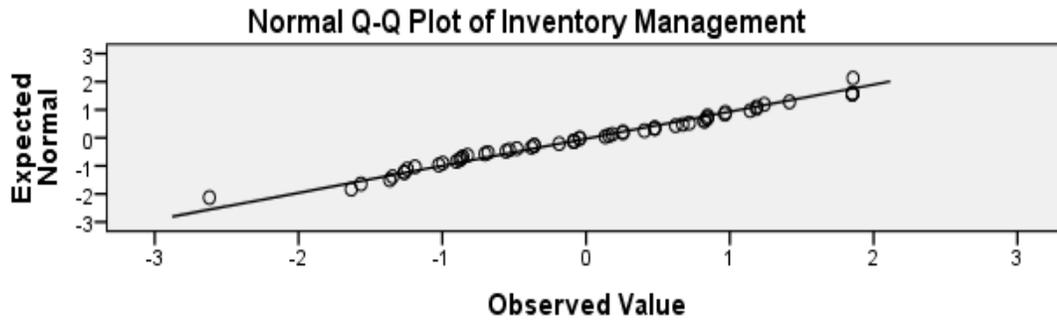


Figure 4.3 Q-Q plot of procurement capabilities

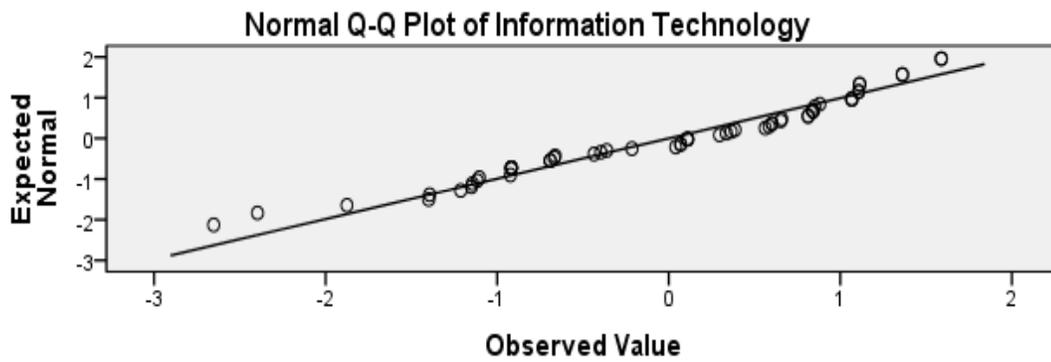


Figure 4.4 Q-Q plot of information communication technology capabilities

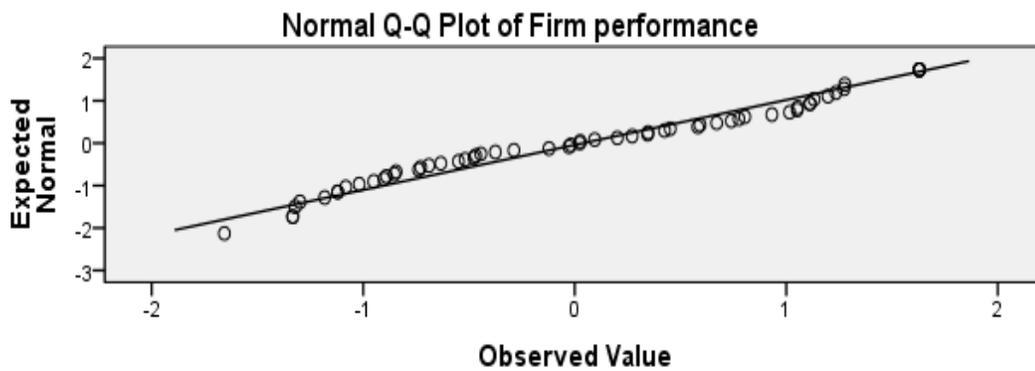


Figure 4.5 Q-Q plot of firm performance capabilities

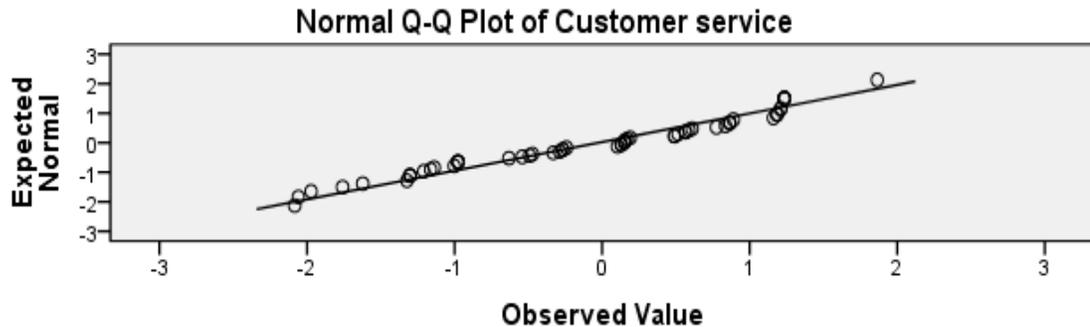


Figure 4.2 Q-Q plot of customer service capabilities

4.7.5 Multiple regression results

The research used multiple regression analysis to determine the linear statistical relationship between the independent and dependent variables of this study. The entire five hypotheses as stated in chapter one of this study were tested using regression models.

- a) Test of hypothesis 1:** There is a significant correlation between procurement capabilities and firm performance of manufacturing entities in Kenya.

A correlation analysis for the construct procurement capabilities was conducted to find out how procurement capabilities correlated with firm performance. Correlation coefficient can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. A value of 0.00 means that there is no relationship between variables being tested (Orodho, 2003). Table 4.28 shows that the Pearson correlation coefficient was 0.661. These findings indicate that there is a positive linear relationship between procurement capabilities and firm performance.

Table 4.28 Correlation analysis for construct procurement capabilities

		Firm performance	Procurement capabilities
Firm performance	Pearson	1	.661**
	Correlation		
	Sig. (2-tailed)		.000
	N	59	59
Procurement capabilities	Pearson	.661**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	59	59

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

The researcher conducted regression analysis so as to determine the influence of procurement capabilities on firm performance of manufacturing entities in Kenya. The hypothesis to test for this specific objective was:

H₁: There is a significant correlation between procurement capabilities and firm performance of manufacturing entities in Kenya.

The linear regression model shows $R^2 = 0.427$ which means that 42.7 percent change of performance of the manufacturing entities in Kenya can be explained by a unit change of procurement capabilities. The result is shown in Table 4.20.

Table 4.29 Model Summary of procurement capabilities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661 ^a	.436	.427	.71354

a. Predictors: (Constant), Procurement capabilities

Out of the results there is an indication that one unit change in procurement capabilities translates to 42.7 percent change in performance of manufacturing entities in Kenya.

Therefore, the procurement capabilities have an influence on how manufacturing entities perform. These findings concur with Koester and Rash, (2005) who found out that there are significantly greater benefits to be gained in the area of procurement with regards to supply chain management and organizational performance.

Further test on ANOVA shows that the significance of the F-statistic 0.00 is less than 0.05 as indicated in Table 4.30. This implies that there is a positive significant relationship between procurement capabilities and firm performance.

Table 4.30 ANOVA of procurement capabilities

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	22.477	1	22.477	44.1	.000 ^b
					46	
	Residual	29.021	57	.509		
	Total	51.498	58			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Procurement capabilities

Further test on the beta coefficients of the resulting model, the constant $\alpha = 0.238$, if the independent variable of procurement capabilities is held constant then there will be a positive performance of the manufacturing entity in Kenya by 0.238. The regression coefficient for procurement capabilities was positive and significant ($\beta = 0.617$) with a t-value=6.644 (p-value<0.001). As shown in Table 4.31.

Table 4.31 Coefficients of procurement capabilities

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.238	.093		2.559	.013
	Procurement capabilities	.617	.093	.661	6.644	.000

a. Dependent Variable: Firm performance

This implies that for every 1 unit increase in procurement capabilities, performance of the manufacturing entities in Kenya is predicted to increase by 0.6.17 units and therefore H₁ is accepted. This result revealed that procurement capabilities contributed positively towards the performance of organizations.

b) Test of hypothesis 2: Inventory management capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

A correlation analysis for the construct inventory management capabilities was conducted to find out how inventory management capabilities correlated with firm performance. Table 4.32 shows that the Pearson correlation coefficient was 0.566. These findings indicate that there is a positive linear relationship between inventory management capabilities and firm performance. The finding of this study agrees with the literature reviewed in this study that the success of SCM is dependent on adopters developing specific capabilities (Chandra & Kumar, 2000) including designing flexible organization, developing a trusting relationship with its suppliers, seeking total supply chain collaboration, enhancing communication to reduce uncertainty and inventory levels, outsource non-core competencies, implement build-to-order manufacturing, reduce inventory and reduce costs.

Table 4.32 Correlation analysis for construct inventory management capabilities

		Firm performance	Inventory Management
Firm performance	Pearson	1	.566**
	Correlation		
	Sig. (2-tailed)		.000
	N	59	59
Inventory Management	Pearson	.566**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	59	59

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

The researcher conducted regression analysis so as to determine the influence of inventory management capabilities on firm performance of manufacturing entities in Kenya. The hypothesis to test for this specific objective was:

H₂: There is a significant correlation between inventory management capabilities and firm performance of manufacturing entities in Kenya.

The linear regression model shows $R^2 = 0.308$ which means that 30 percent change of performance of the manufacturing entities in Kenya can be explained by a unit change of inventory management capabilities. The result is shown in Table 4.33.

Table 4.33 Model Summary of inventory management capabilities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.566 ^a	.320	.308	.78393

a. Predictors: (Constant), Inventory Management

Out of the results there is an indication that one unit change in inventory management capabilities translates to 30 percent change in performance of manufacturing entities in Kenya therefore, inventory management capabilities has an influence on how manufacturing entities perform.

Further test on ANOVA shows that the significance of the F-statistic 0.00 is less than 0.05 as indicated in Table 4.34. This implies that there is a positive significant relationship between inventory management and firm performance.

Table 4.34 ANOVA of inventory management

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.469	1	16.469	26.798	.000 ^b
	Residual	35.029	57	.615		
	Total	51.498	58			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Inventory Management

Further test on the beta coefficients of the resulting model, the constant $\alpha = 0.221$, if the independent variable of inventory management capabilities is held constant then there will be a positive performance of the manufacturing entity in Kenya by 0.221. The regression coefficient for inventory management capabilities was positive and significant ($\beta = 0.514$) with a t-value=5.177 (p-value<0.001) as shown in Table 4.35.

Table 4.35 Coefficients of inventory management

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.221	.102		2.167	.034
	Inventory Management	.514	.099	.566	5.177	.000

a. Dependent Variable: Firm performance

This implies that for every 1 unit increase in inventory management capabilities, performance of the manufacturing entities in Kenya is predicted to increase by 0.514 units and therefore H₂ is accepted. This result revealed that inventory management capabilities contributed positively towards the performance of organizations.

c) Test of hypothesis 3: Logistical capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

A correlation analysis for the construct inventory logistical capabilities was conducted to find out how logistical capabilities correlated with firm performance. Table 4.36 shows that the Pearson correlation coefficient was 0.708. These findings indicate that there is a positive linear relationship between logistical capabilities and firm performance. Therefore, this study concurs with the findings of Morash *et al.* (1996) and Mentzer *et al.* (2004) who established that logistics capabilities, specifically, can be used to adapt, integrate and reconfigure resources, organizational skills and functional competencies to achieve superior performance.

Table 4.36 Correlation analysis for construct logistical capabilities

		Firm performance	Logistic capabilities
Firm performance	Pearson Correlation	1	.708**
	Sig. (2-tailed)		.000
	N	59	59
Logistic capabilities	Pearson Correlation	.708**	1
	Sig. (2-tailed)	.000	
	N	59	59

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

The researcher conducted regression analysis so as to determine the influence of logistical capabilities on firm performance of manufacturing entities in Kenya. The hypothesis to test for this specific objective was:

H₃: There is a significant correlation between logistical capabilities and firm performance of manufacturing entities in Kenya.

The linear regression model shows $R^2 = 0.492$ which means that 49.2 percent change of performance of the manufacturing entities in Kenya can be explained by a unit change of logistical capabilities. The result is shown in Table 4.37.

Table 4.37 Model Summary of logistical capabilities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708 ^a	.501	.492	.67172

a. Predictors: (Constant), Logistic capabilities

Out of the results there is an indication that one unit change in logistical capabilities translates to 49.2 percent change in performance of manufacturing entities in Kenya therefore, logistical capabilities has an influence on how manufacturing entities perform.

Further test on ANOVA shows that the significance of the F-statistic 0.00 is less than 0.05 as indicated in Table 4.38. This implies that there is a positive significant relationship between logistical capabilities and firm performance.

Table 4.38 ANOVA of logistical capabilities

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	25.779	1	25.779	57.135	.000 ^b
	Residual	25.719	5	.451		
			7			
	Total	51.498	5			
			8			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Logistic capabilities

Further test on the beta coefficients of the resulting model, the constant $\alpha = 0.301$, if the independent variable of logistical capabilities is held constant then there will be a positive performance of the manufacturing entity in Kenya by 0.301. This result is in harmony with the literature reviewed in this study that logistics capability has been widely studied and measurement scales have been developed to link capability with competitive advantage and superior firm performance (Zhao *et al.*, 2001; Ellinger *et al.*, 2000; Morash *et al.*, 1996; Global Logistics Research Team – GLRT at Michigan State University, 1995). The regression coefficient for logistical capabilities was positive and significant ($\beta = 0.728$) with a t-value=7.559 (p-value<0.001) as shown in Table 4.39.

Table 4.39 Coefficients of logistical capabilities

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.301	.088		3.420	.001
	Logistic capabilities	.728	.096	.708	7.559	.000

a. Dependent Variable: Firm performance

This implies that for every 1 unit increase in logistical capabilities, performance of the manufacturing entities in Kenya is predicted to increase by 0.728 units and therefore H_3 is accepted. This result revealed that logistical capabilities contributed positively towards the performance of organizations.

d) Test of hypothesis 4: There is a significant correlation between Customer service capabilities and firm performance of manufacturing entities in Kenya.

A correlation analysis for the construct customer service capabilities was conducted to find out how customer service capabilities correlated with firm performance. Table 4.40 shows that the Pearson correlation coefficient was 0.661. These findings indicate that there is a positive linear relationship between Customer service capabilities and firm performance.

Table 4.40 Correlation analysis for construct customer service capabilities

		Firm performance	Customer service
Firm performance	Pearson Correlation	1	.639**
	Sig. (2-tailed)		.000
	N	59	59
Customer service	Pearson Correlation	.639**	1
	Sig. (2-tailed)	.000	
	N	59	59

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

The researcher conducted regression analysis so as to determine the influence of customer service capabilities on firm performance of manufacturing entities in Kenya. The hypothesis to test for this specific objective was:

H₄: There is a significant correlation between customer service capabilities and firm performance of manufacturing entities in Kenya.

The linear regression model shows $R^2 = 0.398$ which means that 39.8 percent change of performance of the manufacturing entities in Kenya can be explained by a unit change of Customer service capabilities. The result is shown in Table 4.41.

Table 4.41 Model Summary of customer service capabilities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639 ^a	.409	.398	.73092

a. Predictors: (Constant), Customer service

Out of the results there is an indication that one unit change in customer service capabilities translates to 39.8 percent change in performance of manufacturing entities in

Kenya therefore, customer service capabilities has an influence on how manufacturing entities perform.

Further test on ANOVA shows that the significance of the F-statistic 0.00 is less than 0.05 as indicated in Table 4.42. This implies that there is a positive significant relationship between customer service capabilities and firm performance.

Table 4.42 ANOVA of customer service capabilities

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.046	1	21.046	39.394	.000 ^b
	Residual	30.452	57	.534		
	Total	51.498	58			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Customer service

Further test on the beta coefficients of the resulting model, the constant $\alpha = 0.252$, if the independent variable of customer service capabilities is held constant then there will be a positive performance of the manufacturing entity in Kenya by 0.252. The regression coefficient for customer service capabilities was positive and significant ($\beta = 0.5.84$) with a t-value=6.276 (p-value<0.001) as shown in Table 4.43. this findings concurs with the literature review in this study that proper management of customer service would lead to customer satisfaction which in turn will result in repeat purchases and later enhance the firm's performance with regards to total sales volumes. The ability to generate higher levels of customer satisfaction is regarded as an important differentiator and has therefore become a key element of many firms' business strategies. Customer satisfaction is a measure of how the products and services provided by a company meet or exceed customer expectations (Olsen & Johnson, 2003).

Table 4.43 Coefficients of customer service capabilities

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.252	.095		2.653	.010
	Customer service	.584	.093	.639	6.276	.000

a. Dependent Variable: Firm performance

This implies that for every 1 unit increase in customer service capabilities, performance of the manufacturing entities in Kenya is predicted to increase by 0.584 units and therefore H_4 is accepted. This result revealed that customer service capabilities contributed positively towards the performance of organizations.

e) Test of hypothesis 5: Information communication technology capabilities have a significant influence on firm performance of manufacturing entities in Kenya.

A correlation analysis for the construct information communication technology capabilities was conducted to find out how information communication technology capabilities correlated with firm performance. Table 4.44 shows that the Pearson correlation coefficient was 0.639. These findings indicate that there is a positive linear relationship between information communication technology capabilities and firm performance. These findings are in harmony with the literature review in this study that the effective use of ICT provides companies with competitive advantage. In Supply chain management, ICT is highly regarded as a major enabler in achieving effective SCM and enhanced firm performance (Simchi-Levi *et al.*, 2003).

Table 4.44 Correlation analysis for construct procurement capabilities

		Firm performance	Information Technology
Firm performance	Pearson	1	.639**
	Correlation		
	Sig. (2-tailed)		.000
	N	59	59
Information Technology	Pearson	.639**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	59	59

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

The researcher conducted regression analysis so as to determine the influence of information communication technology capabilities on firm performance of manufacturing entities in Kenya. The hypothesis to test for this specific objective was:

H₅: There is a significant correlation between information communication technology capabilities and firm performance of manufacturing entities in Kenya.

The linear regression model shows $R^2 = 0.397$ which means that 39.7 percent change of performance of the manufacturing entities in Kenya can be explained by a unit change of information communication technology capabilities. The result is shown in Table 4.45.

Table 4.45 Model Summary of information communication technology capabilities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639 ^a	.408	.397	.73150

a. Predictors: (Constant), Information Technology

Out of the results there is an indication that one unit change in information communication technology capabilities translates to 39.7 percent change in performance

of manufacturing entities in Kenya therefore, information communication technology capabilities has an influence on how manufacturing entities perform.

Further test on ANOVA shows that the significance of the F-statistic 0.00 is less than 0.05 as indicated in Table 4.46. This implies that there is a positive significant relationship between information communication technology capabilities and firm performance.

Table 4.46 ANOVA of Information communication technology

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.997	1	20.997	39.240	.000 ^b
	Residual	30.501	57	.535		
	Total	51.498	58			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Information Technology

Further test on the beta coefficients of the resulting model, the constant $\alpha = 0.238$, if the independent variable of information communication technology capabilities is held constant then there will be a positive performance of the manufacturing entity in Kenya by 0.238. The regression coefficient for information communication technology capabilities was positive and significant ($\beta = 0.597$) with a t-value=6.264 (p-value<0.001) as shown in Table 4.47. These findings concur with Flynn *et al.* (2010) who found out that performance improvement in that theoretical perspective stems from the interaction between ICT and SCM. In other words, SCM is modeled as a moderator of the relationship ICT and SC performance.

Table 4.47 Coefficients of information communication technology

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.238	.095		2.505	.015
	ICT capabilities	.597	.095	.639	6.264	.000

a. Dependent Variable: Firm performance

This implies that for every 1 unit increase in information communication technology capabilities, performance of the manufacturing entities in Kenya is predicted to increase by 0.597 units and therefore H_5 is accepted. This result revealed that information communication technology capabilities contributed positively towards the performance of organizations.

4.7.6 Overall regression model

Multiple regression analysis was used to determine whether independent variables; procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technology influence the dependent variable which is the firm performance of manufacturing entities. The table below illustrates the coefficients of overall regression model.

Table 4.48 Coefficients of overall regression model

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.162	.078		2.078	.042
	Procurement capabilities	.278	.073	.273	3.814	.000
	Inventory Management	.218	.079	.204	2.767	.008
	Logistic capabilities	.280	.071	.298	3.916	.000
	Customer service	.222	.081	.218	2.732	.008
	ICT capabilities	.241	.071	.215	3.389	.001

a. Dependent Variable: Firm performance

The estimated multiple regression model to estimate performance is

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where:

Y=Dependent variable (firm performance)

X_{1-n} = Independent variables

X₁ =Procurement capabilities

X₂ =Inventory management capabilities

X₃ =Logistical capabilities

X₄ =Customer service capabilities

X₅ =Information Communication Technology capabilities

β₀= constant

Thus

$$\text{Firm performance } Y = 0.162 + 0.278X_1 + 0.218X_2 + 0.280X_3 + 0.222X_4 + 0.241X_5$$

The coefficients $\beta_1=0.278$, $\beta_2=0.218$, $\beta_3=0.280$, $\beta_4=0.222$ and $\beta_5=0.241$ are significantly different from 0, with p values 0.042, 0.000, 0.008, 0.000 and 0.001 respectively, and are less than $p=0.05$ as summarized in Table 4.48.

The regression analysis shows a strong relationship, $R^2=0.601$ which shows that 60 percent of change in performance of manufacturing entities in Kenya can be explained by a change of one unit of all the predictor variables jointly as shown in Table 4.49.

Table 4.49 Model Summary of overall regression model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.797 ^a	.635	.601	.59532

a. Predictors: (Constant), Information Technology, Procurement capabilities, Inventory Management, Customer service, Logistic capabilities

b. Dependent Variable: Performance of manufacturing entities

Further test on ANOVA shows that the significance of the F-statistic 0.000 is less than 0.05 since p value, $p=0.00$, as indicated in Table 4.50 below.

Table 4.50 ANOVA of overall regression model

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	32.715	5	6.543	18.462	.000 ^b
Residual	18.783	53	.354		
Total	51.498	58			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Information Technology, Procurement capabilities, Inventory Management, Customer service, Logistic capabilities

This implied that there is a positive significant relationship between independent variables and firm performance of manufacturing entities. Thus, supply chain capabilities such as procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication

technology capabilities influence the firm performance of manufacturing entities in Kenya.

CHAPTER FIVE

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

This chapter provides a discussion on the thesis summary based on the earlier established research questions. It further discusses major findings, conclusions and eventually provides directions in the form of recommendations.

5.2 Summary

The overall objective of this study was to investigate the influence of supply chain capabilities on firm performance of manufacturing entities in Kenya. In particular the study sought to determine the influence of procurement capabilities on firm performance, to examine the influence of inventory management capabilities on firm performance, to establish the influence of logistical capabilities on firm performance, to determine the influence of customer service capabilities on firm performance and to analyze the influence of information communication technology on firm performance.

Specific Objective 1: Influence of procurement capabilities on firm performance of manufacturing entities in Kenya

Procurement is the acquisition of goods and services with an aim of satisfying individual and organization goals. Procurement capabilities are the set of competencies, skills and knowledge in the field of procurement that are necessary in undertaking the function. In this study procurement capabilities were measured using cost efficiency of procurement, cost effectiveness of procurement, sourcing strategy and ability to undertake supplier management. The study found out that the cost efficiency of procurement influences the firm performance and also the cost effectiveness of procurement influences the firm performance. It was also established that the sourcing strategy in place influence the firm performance. Similarly, the study noted that the ability to undertake supplier management influenced the firm performance of manufacturing entities.

Moreover, the study found out that there was a positive significant linear relationship between procurement capabilities and firm performance of manufacturing entities in Kenya. The study implied that there was a strong relationship between procurement capabilities and firm performance of manufacturing entities. Therefore, the study found out that procurement capabilities influence the performance of a manufacturing entity in Kenya. Procurement capabilities influences the firm performance in that procurement is a key driver of the supply chain, therefore proficiency in procurement would result in enhanced performance of the entire supply chain thus enhanced organizational performance.

The study also established that procurement capabilities can be enhanced in an organization with an aim achieving long term organizational success by instituting other procurement aspects such as e-procurement and global sourcing. Also capacity building was identified as a factor that could lead to enhanced procurement capability.

Specific Objective 2: Influence of inventory management capabilities on firm performance of manufacturing entities in Kenya

Inventory management is the process of controlling the business stock or controlling the flow of goods and services as per their demand. The ability to effectively and efficiently manage the inventory of an organization can be termed as inventory management capability. In this study inventory management capabilities were measured using the cost of inventory management, frequency of shortages, inventory management technique, proficiency in inventory control and the ability to undertake forecasting and quantification. The study established that the cost of inventory management influenced the firms' performance. The frequency of shortages had a negative influence on the firms' performance. In addition, the inventory management technique employed by the organization had an influence on the firm performance and proficiency in inventory control contributed to the firm's performance. Likewise, the ability to undertake forecasting and quantification influenced the firm performance.

In addition, the result showed that inventory management capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya using Pearson correlation coefficient. The study indicated that there was a positive correlation between inventory management capabilities and firm performance. Therefore, inventory management capabilities influence the firm performance of manufacturing entities in Kenya. Further, the study determined that Manufacturing Resource Planning, Material Requirements Planning and Just-in-time were the most suitable inventory management techniques applicable in the manufacturing sector.

Specific Objective 3: Influence of logistical capabilities on firm performance of manufacturing entities in Kenya

Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flows and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. Logistics capability is that part of a firm's resources – including all assets, competencies, organizational processes, firm attributes, information, knowledge, which allow it to conceive of and implement strategies that improve efficiency and effectiveness. In this study inventory management capabilities were measured using transport and distribution network, third party logistics, lead-time, logistical flexibility, order processing procedure and the logistical cost incurred. In regard to transport and distribution networks, the study established that it influences firm performance. The study determined that third party logistics had a moderate influence on the firm performance while the lead-time influences firm performance of manufacturing entities. Likewise, logistical flexibility and the order processing procedure undertaken by a manufacturing entity influenced its performance. Also, it was established that the logistical cost incurred influenced the performance of the manufacturing entities in Kenya.

Moreover, the study found out that there was a positive significant linear relationship between logistical capabilities and firm performance of manufacturing entities in Kenya. The study implied that there was a strong relationship between logistical capabilities and

firm performance of manufacturing entities. Therefore, the study found out that logistical capabilities influence the performance of a manufacturing entity in Kenya.

Specific Objective 4: Influence of customer service capabilities on firm performance of manufacturing entities in Kenya

Customer service is the provision of service to the customers before, during and after a purchase. Customer service capability is the dexterity to master customer service and deliver it to the customers in a superior manner than your competitors do. In this study customer service capabilities were measured using satisfaction level, customer complaints, value added services and additional features and order flexibility. The study found out that the customer satisfaction level influenced the firm performance and also the order flexibility influenced the firm performance. It was also established that the value added services and additional features influenced the firm performance. In addition, the study found out that customer complaints negatively influenced the firm performance of the manufacturing entity

Further, the study showed that customer service capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya. This relationship was established by use of Pearson correlation coefficient and the study showed that there was a fairly positive relationship between customer service capabilities and firm performance of manufacturing entities in Kenya. Hence, customer service capabilities influence the firm performance of manufacturing entities in Kenya.

Specific Objective 5: Influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya

It is indisputable that information and communication technology has an enormous effect on contemporary business. Information Communication Technology is a set of technologies used to process, store and disseminate information, facilitating the performance of information-related human activities, provided by, and serving both the public at-large as well as the institutional and business sectors. In this study supply information communication technology was operationalized using e-trading, enhanced

communication, efficient and effectiveness of operations management and computerization and automation of processes. The study determined that e-trading influenced the firm performance of manufacturing entities. Also enhanced communication influenced the firms' performance. The study further established that the efficiency and effectiveness operations management as a result of use of information communication technology influenced the firm performance. Likewise, it was established that computerization and automation of processes had an influence on the firm performance of manufacturing entities in Kenya.

Moreover, the study showed that information communication technology capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya. This relationship was established by use of Pearson correlation coefficient and the study showed that there was a fairly positive relationship between information communication technology capabilities and firm performance of manufacturing entities in Kenya. Thus, information communication technology capabilities influence the firm performance of manufacturing entities in Kenya. In addition, the study found out that information communication technology capability was the most crucial factor to the success of the manufacturing function.

5.3 Conclusions

Specific Objective 1: Influence of procurement capabilities on firm performance of manufacturing entities in Kenya

Based on the results of the study, it could be concluded that procurement capabilities had a positive significant influence on the firm performance of manufacturing entities in Kenya. The study showed that there was a strong relationship between procurement capabilities and firm performance of manufacturing entities in Kenya and hence it could be concluded that if procurement capabilities are embraced by management of manufacturing firms, it could increase the firm performance of the manufacturing in Kenya. From the study finds, it could be concluded that manufacturing firms in Kenya strive to enhance their procurement capabilities by ensuring cost efficiency of

procurement, ensuring cost effectiveness of procurement, strategic sourcing and undertaking supplier management.

Specific Objective 2: Influence of inventory management capabilities on firm performance of manufacturing entities in Kenya

On inventory management, it could be concluded that manufacturing firms in Kenya complement their inventory management capabilities by focusing the cost of inventory management, inventory management technique, proficiency in inventory control and ability to undertake forecasting and quantification. Also Manufacturing Resource Planning, Material Requirements Planning and Just-in-time are the most suitable inventory management techniques applicable in the manufacturing sector. Based on the findings it could be concluded that inventory management capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya using Pearson correlation coefficient. The study found out that inventory management capabilities if adopted could increase the firm performance of manufacturing entities in Kenya.

Specific Objective 3: Influence of logistical capabilities on firm performance of manufacturing entities in Kenya

With regards to logistical capabilities, it could be concluded that logistical capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya. This relationship was established by Pearson correlation coefficient. The study revealed that there was a strong positive relationship between logistical capabilities and the firm performance of manufacturing entities Kenya. Thus, logistical capabilities make a major contribution to competitive advantage, corporate strategy and firm performance. From the study findings, it could be concluded that manufacturing firms in Kenya paid a significant attention to logistical matters such as transport and distribution network, third party logistics, lead-time, logistical flexibility, order processing procedure and the logistical cost. Therefore, the study concludes that logistical capabilities can enhance the firm performance of manufacturing entities in Kenya.

Specific Objective 4: Influence of customer service capabilities on firm performance of manufacturing entities in Kenya

Based on the findings of the study, it could be concluded that manufacturing entities in Kenya recognize customer service as a determinant factor of firm performance. From the findings customer service capabilities were evident in the firms' operations; they basically entailed aspects such as a concern customer satisfaction level, value added services and additional features and order flexibility. Besides that, customer complaints were considered to have a significant influence on the firm performance. However, on the issue of customer service capabilities, it could be concluded that customer service capabilities had a positive significant linear relationship with the firm performance of manufacturing entities in Kenya. This relationship was established by Pearson correlation coefficient. The study revealed that there was a fairly positive relationship between customer service capabilities and the firm performance of manufacturing entities in Kenya. Therefore, customer service capabilities could enable manufacturing firms to improve its relations with the customer which in turn could lead to higher levels of customer satisfaction thus enhanced firm performance.

Specific Objective 5: Influence of Information Communication Technology (ICT) capabilities on firm performance of manufacturing entities in Kenya

Lastly, it could be concluded that information communication technology capabilities have a positive significant linear relationship with the firm performance of manufacturing entities Kenya. This relationship was established using Pearson correlation coefficient. The study inferred that there was a strong positive relationship between information communication technology capabilities and the firm performance of manufacturing entities in Kenya. Therefore, if information communication technology capabilities were implemented throughout the entire supply chain it could result in enhance firm performance of a manufacturing entity. Also, the study concludes that manufacturing firms in Kenya continuously strive to ensure that e-trading is implemented, communication enhanced, efficient and effectiveness of operations management and computerization and automation of processes. In addition, the study

found out that information communication technology capability was the most crucial factor to the success of the manufacturing function. Thus, the study concluded that information communication technology capabilities can enhance the firm performance of manufacturing entities.

5.4 Recommendations

The study established that procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technology capabilities positively influence the firm performance of manufacturing entities in Kenya. Therefore, the study recommends it would be appropriate for the management of manufacturing entities to exploit the procurement capabilities, inventory management capabilities, logistical capabilities, customer service capabilities and information communication technology capabilities on the day to day operation with the aim of ensuring a competitive advantage over other market competitors thus attaining superior firm performance. Mastering the supply chain capabilities can lead to other operational benefits such as efficiency and effectiveness in other support function such as human resource, finance, auditing and marketing.

In addition, based on the conclusions the study recommends that the management of the manufacturing entities should implement the supply chain capabilities in a hierarchical order. The hierarchical order in implementation of the supply chain capabilities could be based on the degree of influence that each capability has on the overall organizational performance. This would enable the manufacturing entity to focus on the supply chain capabilities with the most positive influence on performance and prioritize resources appropriately. It is prudent to note that there are other supply chain capabilities such as supplier partnership; outsourcing, cycle time compression, continuous process flow, and information technology sharing that also influence firm performance. Therefore, the implementation of supply chain capabilities in a pecking order would enable the firm realize the benefits of specialization. Based on the finds of the study, it is recommended that the supply chain capabilities should be implemented in the following order information communication technology capabilities, procurement capabilities, customer

service capabilities, logistical capabilities and inventory management capabilities respectively.

Also, the study recommends that the management of the manufacturing entities in Kenya could adopt the supply chain capabilities conceptual framework which was developed and translates the theory into practical guidance for managers. Or alternatively they could modify the existing framework with an aim of developing another supply chain capabilities conceptual framework that conforms to the specific organizational structure. This conceptual framework could provide specific competencies for enabling superior firm performance in manufacturing entities and enhance the organizations' adaptability to the ever changing business environment. Basically, the supply chain capability framework would provide the management of manufacturing entities with a guide and a systematic plan for the development and implementation of supply chain capabilities and at the same time facilitate in the prioritization of resources accordingly.

The study recommends that in an attempt to enhance procurement capabilities via strategic sourcing, the management of the manufacturing entities could focus on developing strategic supplier partnership. Strategic supplier partnerships leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits. It emphasizes direct, long-term association and encourages mutual planning and problem solving efforts. Strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products. In the long run strategic supplier partnership could result in lean and agile procurement which in turn could enhance performance.

The study established that customer service capabilities influence the firm performance of manufacturing entities in Kenya. However, the degree of influence is relatively low in comparison with other supply chain capabilities. The implementation of customer service requires limited resources in comparison with other supply chain capabilities. Therefore, a manufacturing entity can gain more mileage by critically exploiting its

customer service capabilities. The study recommends that the management of manufacturing entities in Kenya could adopt customer relationship management. Customer relationship entails the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction. Committed relationships are the most sustainable advantage because of their inherent barriers to competition.

Finally the study recommends that the management of manufacturing firms in Kenya should enhance their use of ICT and upgrade to e-procurement. Procurement systems processes can be improved effectively and transparency of the supply chain can be enhanced. Therefore, e-procurement system is more pivotal than other e-trading application. Based on the findings information communication technology capabilities and procurement capabilities have the highest degree of influence on firm performance. Thus, upgrading to e-procurement would result in a synergetic effect on the firm performance.

5.5 Areas for further research

Future studies may be conducted on the influence of supply chain capabilities on firm performance but under different social, economical and political conditions. In addition, the study focused on five supply chain capabilities which are procurement, inventory management, logistical capability, customer service capability and information communication technology. Thus, empirical work that actually demonstrates the whole of supply chain capabilities is beyond the scope of five capabilities identified in the study. Therefore, similar study can be conducted using different capabilities to influence firm performance of manufacturing entities. Finally, further research can be conducted on the influence of supply chain capabilities but in different sectors other than manufacturing such transport and logistics.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

To the respondent

Dear Sir,

RE: COLLECTION OF DATA

I'm a student at Jomo Kenyatta University of Agriculture and Technology (JKUAT) currently pursuing a Doctor of Philosophy (PhD) in Supply Chain Management. As a partial requirement of this degree, I am undertaking a research study on the *Influence of Supply Chain Capabilities on Firm Performance of Manufacturing Entities in Kenya*.

Therefore, I kindly seek your assistance and cooperation in filling the attached questionnaire. The information received will be used for the purpose of this research only. All the information will be treated with utmost confidentiality.

Kind regards,

Eric Namusonge.

APPENDIX II: QUESTIONNAIRE

INSTRUCTION: *Please answer all the questions honestly and exhaustively by putting a tick (✓) or numbers in the appropriate box that closely matches your view or alternatively writing in the spaces provided where necessary.*

NB: This information will be used strictly for academic purposes only and will be treated with utmost confidence.

PART A: Background Information

Department

Job Designation

Please tick your age bracket:

20 years or below [] 21-30 years [] 32-40 years [] Above 40 years []

How long have you been employed by this organization?

Less than 5 years [] 5-10 years [] 10-15 years [] Over 15 years []

Please indicate your highest level of education:

Diploma [] Undergraduate degree [] Post Graduate Degree []

Others (please specify).....

PART B: Procurement capabilities

Please indicate the extent to which the following Procurement capabilities affect the firm performance of a manufacturing entity. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Procurement capabilities	1	2	3	4	5
Cost efficiency of procurement					
Cost effectiveness of procurement					
Sourcing strategy					
Supplier Management					

Kindly suggest how manufacturing firms in Kenya should employ procurement capabilities to enhance performance and for long term organizational success?

.....

PART C: Inventory management capabilities

Please indicate the extent to which the following Inventory management factors affect the firm performance of a manufacturing entity. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Inventory Management	1	2	3	4	5
Cost of Inventory Management					
Frequency of Shortages					
Inventory Management Technique					
Proficiency in Inventory control					
Capability to undertake Forecasting and quantification					

Kindly suggest the inventory management method or technique that you think is most suitable for a manufacturing entity?

.....

PART D: Logistical capabilities

Please indicate the extent to which the following logistical practices and elements affect the firm performance of a manufacturing entity. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Logistical practices	1	2	3	4	5
Transport and distribution networks					
Third party Logistics					
Lead-time					
Logistical flexibility					
Order processing					
Logistical cost incurred					

Kindly suggest and expound on other logistical practices that influence the performance of manufacturing firms?

.....

PART E: Customer service capabilities

Please indicate the extent to which the following customer service factors affect the firm performance of a manufacturing entity. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Customer service	1	2	3	4	5
Satisfaction level					
Customer complaints					
Value added services					
Order flexibility					

Other than the above stated customer service factors, which other factors relating to customer service influences the performance of a manufacturing firm?

.....
.....
.....

PART F: Information communication Technology capabilities

Please indicate the extent to which the following Information communication technology (ICT) factors influence the firm performance of a manufacturing entity. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Information communication Technology (ICT)	1	2	3	4	5
E-trading					
Enhanced communication					
Efficient operations management					
Automation of process					

Kindly explain your perception on ICT and the manufacturing industry?

.....
.....
.....

PART G: Firm performance

Please indicate the extent to which the following factors best applies in your organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

a) Profit margin on sales

Statement	1	2	3	4	5
Our organization is profitable					
The profit margin has increased steadily over the years					
Profitability has stagnated					
Our organization is currently breaking even					

b) Market Share

Statement	1	2	3	4	5
We regularly monitor the market share of the organization					
The number of customers served by the organization has increased					
Our organization has opened other branches					
Our distributors are ordering more units					

c) Financial viability

Statement	1	2	3	4	5
We regularly monitor our financial performance					
We maintain a reasonable cash reserves for use in difficult times					
Our suppliers are paid without delay					
Our revenues are higher than our expenses					
We do not take short term loans to meet recurrent expenditure					

d) Customer satisfaction

Statement	1	2	3	4	5
Our customer numbers have been growing faster					
We often receive customer compliments through letters, emails, facebook and tweeter					
We hardly receive compliments about our services					
Our customers are happy with what we charge for our products					
We have many repeat customers					

e) Efficiency

Statement	1	2	3	4	5
The organization operates on low production cycle time					
Our organization maintains a reasonable staff ratio					
The organization has a low response time					
Backlogs are common in the organization					

To what extent do you think the following supply chain capabilities influence the performance of a manufacturing entity? Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent)

Supply chain capabilities	1	2	3	4	5
I think that Procurement capabilities influence performance					
I think Inventory management capabilities influences the performance					
I think that Logistical capabilities influences firm performance					
I think that Customer service capabilities influences performance					
I think Information Communication Technology capabilities influences performance					

In your opinion, are there any other supply chain capability variables or factors that influence the performance of a manufacturing entity? If yes, kindly state it or them?

.....

.....

.....

THANK YOU FOR YOUR KIND COOPERATION

APPENDIX III: LIST OF MANUFACTURING FIRMS STUDIED

1. Allied East Africa Ltd
2. Apex steel Ltd
3. Aucma Digital Technology Africa Ltd
4. Bags & Balers Manufacturers (K) Ltd
5. Bamburi Cement Ltd
6. Basco Products (K) Ltd
7. Belat Enterprises
8. Brand Printers Ltd
9. Brookside Dairy Ltd
10. Budget Shoes Ltd
11. Cadbury Kenya Ltd
12. Carbacid (CO₂) Ltd
13. Carton manufacturers Ltd
14. Chemicals and Solvents (EA) Ltd
15. Colour Packaging ltd
16. Cooper K- Brands Ltd
17. Corrugated Sheets Ltd
18. Crystal Industries Ltd
19. Daima Energy services Ltd
20. Dawa Ltd
21. East Africa Glassware Mart Ltd
22. East African Breweries Ltd
23. East African Cables Ltd
24. East African Malt Ltd
25. East African Packaging Industries Ltd
26. Elite tools
27. Elson Plastics of Kenya Ltd
28. Essential Manufacturing
29. Flamingo Tiles (Kenya) Ltd

30. Galaxy Paints & Coating Co. Ltd
31. General aluminum Fabricators Ltd
32. General Motor East Africa Ltd
33. General Plastics Ltd
34. Glaxo Smithkline Kenya Ltd
35. Haco Tiger Brands (E.A) Ltd
36. Henkel Kenya Ltd
37. Impala Glass Industries Ltd
38. Kenafric Bakery
39. Kenpoly Manufacturers ltd
40. Kentainers Ltd
41. Kenya power Ltd
42. Kenya Trading (EPZ) ltd
43. Kenya Wine Agencies Ltd
44. Kenya wood Ltd
45. Kikoy Co. Ltd
46. Master Fabricators Ltd
47. Nairobi Bottlers Ltd
48. Nairobi Plastics Ltd
49. Nestle Foods Kenya Ltd
50. New Kenya Co-operative Creameries Ltd
51. Polythene industries Ltd
52. Rafiki Miller Ltd
53. Razco Ltd
54. Shamco industries
55. Stallion Stationary Manufacturers
56. Toyota Kenya Ltd
57. unifilters Kenya limited
58. Vajas manufacturers Ltd
59. Warren Enterprises

**APPENDIX IV: MULTIVARIATE TESTING OF OUTLIERS FOR THE
DEPENDENT VARIABLE**

Outliers

