

**SUPPLY CHAIN IMPROVEMENT APPROACHES AND
PERFORMANCE IN LARGE SCALE MANUFACTURING FIRMS
IN NAIROBI COUNTY**

BY

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DECLARATION

This research project is our original work and has never been presented for any degree in this or any other university.

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DEDICATION

I dedicate this project to God for the success. To my entire family especially my parents: Peter and Mercy for encouraging me through out and supporting me financially. To my fiancé Steve Maina, who have struggled a lot to make the person I am today. May the Lord bless you!

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ABSTRACT

The objective of the study was three fold: to determine improvement approaches followed by large scale manufacturing firms, to evaluate the effects of supply chain improvement approaches on performance and establish possible challenges faced by large scale manufacturing firms in implementation of improvement approaches. Data was unruffled using questionnaires and evaluated by means of frequencies and mean tools, where the response rate was 87.6%. The findings indicated that a strong relationship of various SC improvement approaches as adopted by large scale manufacturing firms has a strong positive impact on Supply Chain performance. Companies adopted lean systems, Kaizen, IT, business process re-engineering, were more efficient and effective. However, although the SC have contributed significantly to the firms performance, more needs to be done to invest in IT and infrastructure to improve the quality of goods and cut down on costs; and also training of staff to improve their productivity. The study established that supply chain management stresses on all aspects of providing products and services to consumers. The research established that BPR, IT, Benchmarking, Lean manufacturing and Kaizen would be considered in making sure that performance is achieved.

LIST OF ACCRONYMS AND ABBREVIATIONS

ATS	Applied Technology System
BPR	Business Re-engineering Process
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
GE	General Electric
HR	Human Resource
IT	Information Technology
JIT	Just In Time
KAM	Kenya Association of Manufacturers
MDG	Millennium Development Goals
NGOs	Non-Governmental Organizations
SC	Supply Chain
SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference

UNIDO United Nations Industrial Development Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Organizations need to keep improving the way they do things so as to remain competitive. The benefits attained from the improvement include cost reduction, operations efficiencies, coordination of activities and short lead times (Leenders, Ragu and Rao, 2010). Supply chain involves all functions, facilities, and activities involved with flow and transportation of products and services to consumers as well as information flow (Ganeshanet, Nayeri and Reza, 2005). In the current competitive global market, supply chain vividly requires a lot of improvement and best practices to ensure effective and efficient operations in the organization.

According to Farrington (2012), supply chain can be defined as that network that involves firms, through the upstream and downstream linkages in unlike activities and processes thus producing value in form of products (goods and services) to the consumers. Some of the supply chain characteristics are; they are networks, the linkages are upstream and downstream, they are processes and linkages. SC involves activities involved in the movement of products and services from raw materials stage to the last stage that can be used by the consumer. SCM insists on the integration of SC activities and information flows involved with them to attain a competitive advantage on continuity and reliability (Zuckerman, 2004).

Supply Chain Management entails managing a series of related and interconnected businesses that are in the provision of products and services which customers or end users require (Harland, 1996). SCM practices are increasingly becoming an important feature in the attainment of competitive advantage in most service organizations in the global markets today. The number of competitors is increasing and expanding both locally and globally, organizations not only have to re-establish their operations to produce goods and services of increased quality which will greatly differentiate them from others and make them respond to the changing market dynamics through the management of SC efficiently and effectively (Stock and Boyer, 2009) .

There exist uncertainties surrounding SC side which are key drivers for the right supply chain strategy. Stable manufacturing processes are usually greatly automated and longterm supply contracts are prevalent in an ever changing supply process; the manufacturing process repulses a lot of improvements and is usually subject to breakdown and uncertainties (Lee, 2004).

1.1.1 Supply Chain Improvement Approaches

Supply chain improvement approaches are the attempts that the supply chain uses so as to comprehend the complexity of the processes with the purpose of coordinating the activities with the goal of ensuring efficiency and effectiveness in the enterprise and also customer satisfaction in the Non-Governmental Organizations (Slack *et al.*, 2010). It means refining and reinvesting the supply chain so as to increase profit, reduce waste and improve customer satisfaction. These are attempts to comprehend the complexity of SC

processes and focus on coordination of activities throughout the chain. Therefore emphasis is on use of supply chain model to improve the supply chain activities; sourcing strategy, supplier rating and qualification, supplier award programs, supply base reduction as long-term contracts.

Some of the approaches used include: Supply Chain Operations Reference Model (SCOR), E-business, Information sharing, Six sigma, Channel alignment, Use of JIT, Business Process Re-engineering, Operational efficiency, and Lean manufacturing (Slack *et al.*, 2010). World over, companies have been trying to improve their supply chain due to: consumer behavior changes, advances in technology, changes in economic regulation, increasing power of retailers and trade globalization.

If supply chain improvement approaches can be included in the entire strategy of organizations, it can be used to advance the performance by improving the efficacy of available assets and resources. Similarly, balancing the needs of the staff that are at the center of the manufacturing sector with the needs of SC function is a complex task. This task has become increasingly challenging of late as a result of increased involvement of various stakeholders in manufacturing both locally and internationally.

1.1.2 Supply Chain Performance

Neely *et al.* (2005) defines performance as the practice of computing the efficiency and effectiveness of an achievement. Success is the level at which a consumer's necessities are encountered while competence quantifies exactly how sparingly a company's assets

are used in provision of a specified level of customer contentment. According to Lysons *et al.* (2012), a SC is a series of firms that encompasses the various linkages in the various accomplishments that yield value in the forms of products and services used by the consumers. Therefore, SC performance is the extent to which the end users are content and how well a firm manages its costs within the supply chain (Poole, 1989). As a crucial management tool, supply chain performance measurement offers the required support for performance development in the quest for supply chain superiority. According to Stevens (2009), performance of a SC is characterized by its capability of remaining responsive without losing the integration throughout the chain.

Enhancing supply chain performance is a consistent procedure that calls for both scientific performance measurement systems furthermore a system to start ventures for acknowledging key performance pointer objectives. The strategy for accomplishing KPI objectives can be alluded to as 'KPI achievement', which joins arranging with performance, and fabricates ventures for the fulfillment of performance objectives into normal every day work. To gauge SC performance, there are an arrangement of parameters that catch the impacts of real working of supply chains on incomes and expenses of the whole system. These variables as drivers of supply chain performance are continually coming about because of SC change approaches. After identifying the key performance indicators, directors are required to accomplish improvements thorough the various processes in the supply chain. According to the outcomes of particular key performance indicators achievement, supervisors can develop recent reports on KPIs to link different strategies of supply chain management (Cai *et al.*, 2008). Supply chain

performance can be measured in the context of the following SC processes: (a) planning, (b) sourcing, (c) assembling, and (d) delivering. These processes are considered at various stages of management: strategic, tactical and operational levels (Stewart, 1995; Gunasekaran *et al.*, 2004).

The other standard that has been established is the Supply Chain Operations Reference (SCOR). This model has been built to assist in the construction of an efficient SC performance measurement and enhancement instrument. In this standard, a stable performance measurement method at different levels, comprising five main supply chain processes, (Plan, Source, Make, Deliver and Return), was established (Lockamy and McCormack, 2004).

1.1.3 Large Scale Manufacturing Firms in Nairobi

Meanwhile self-rule, the Kenyan budget has continued to be principally agricultural, with the development enduring a fundamental share of the country's improvement policies. The developed segment's share of GDP has continued to be 15-16% whilst that of the industrial sector has continued to be slightly above 10% over the last two decades. Manufacturing services justifies the highest share of industrial creation output and form the heart of the industry (KAM, 2013).

Kenya's manufacturing industry is largely agro-based and considered by the lesser assessment addition, hire and capability operation and transfer capacities somewhat due to fragile linkage to other segments (Ngui, 2008). The intermediary and investment

imports industries are comparatively undersized, indicating that the country's manufacturing sector is largely import-dependent (World Manufacturing Production, 2014). What's more, the segment is amazingly divided with more than 2,000 assembling units along these lines separated into a few wide sub-sectors. The main three assembling subsectors represent half of the area's GDP, 50% of export and 60% of formal work. Around half of assembling firms in the nation utilize 50 specialists or less. A good number of manufacturing firms in Kenya is family -controlled and functioned. However, the majority of Kenya's factory-made merchandises i.e. about 95% are elementary supplies like foodstuff, drinks, construction resources and basic elements. Just about 5% of manufactured items, such as pharmaceuticals, are skill-intensive (KAM, 2013). Industrial corporations in Kenya generally focus on being competent and reliable in their industrial approaches to advance their returns and confirm that they yield conservational produces that increase reliance and assurance of customers (Bolo and Wainaina, 2011).

The 2010-2015 strategic plans is viewed as an instrument that gives and guides the organization in refocusing on its mandate through proper implementation of the necessary supply chain management practices. In line with the Procurement and Disposal Act of 2005, procurement and supply chain planning should be established in every public sector organization to increase efficiency and effectiveness of the SCM global objectives. This industry therefore seeks to aim at satisfactorily achieving and delivering services and ensuring proper implementation of the SCM practices available to achieve its strategic plans (Procurement Plan, 2010). The SC of the organization has achieved numerous challenges in the recent past due to the poor interpretation and the application

of proper SCM practices (Karani, 2014). This study seeks to look into the impact of supply chain practices on large manufacturing firms in Kenya.

1.2 Statement of Research Problem

The concepts of supply chain improvement approaches have received increasing attention from scholars, consultants and business experts. A majority of firms have begun to recognize that SCM is the key to building a sustainable competitive advantage. Despite this increased attention, the literature has not been able to offer much guidance in helping the approaches in SC improvement (Perona, 2011).

Global studies have been undertaken in the area of organizations procurement practices, both internationally and locally. Internationally, there have been several studies of SCM implementations within manufacturing firms (Sandberg and Abrahamsson 2010) and large retailer organizations (Sandberg, 2007) that have established the significance of SCM. Outside the borders, one of major issues facing the U.S.A manufacturing industry is 3rd party logistics that involves relationships between buyers and sellers. There has been a tremendous growth of 3rd party from 10 billion in 1990s to 100 billion in 2003. This is an indication of a vibrant manufacturing industry. Berman (2006) stresses the need for customer loyalty that can be achieved through collaboration. Outsourcing as a concept that has been adopted by U.S manufacturers, companies can produce with no factories for example, Nike. The practice, when properly managed, leads to improvement because it helps companies remain focused on their core activities while those others are efficiently run by skilled personnel to whom the outsourcing is contracted. According to Chopra *et*

al. (2010), Wal-Mart practices the three logistical and three cross-functional drivers successfully to accomplish supply chain performance. It pioneers cross docking system that enables it to keep low levels of inventory.

Kenya is the most industrially developed country in the East African region, but it's yet to produce results that match its potential (UNIDO, 2009). The manufacturing industry has to put in more effort to ensure that it performs better and contributes more to the country's GDP. For the manufacturing companies, supply chain improvement approaches play a major role on their performance given the nature of competition in the environment that they operate in both locally and internationally. Therefore a study on the level at which this sector has adopted the various supply chain management which have lately proved to be a source of competitive advantage on supply chain performance is important.

The manufacturing sector makes a key contribution to the Kenyan economy and currently employs over 250,000 people representing about 13% of the entire population, with another 1.4 million people employed in the informal sector of the industry. The Kenya Association of Manufacturers (KAM 2013) posits that removing price controls, foreign exchange controls and the introduction of investment incentives have not resulted in main changes in overall supply chain performance. The linkages of the study parameters in SCM in Kenya are weak and as a result, there's little inter-industry integration in the country. This has resulted into constantly low manufacturing value addition in the sector

(KAM 2013). Growth in the sector was, however hindered by depressed domestic demand, skyrocketing oil prices and transportation costs.

Locally, Wainaina (2009) found out that corporations today are mainly focused on becoming competent and flexible in their industrial processes. Due to competition, an organization requires diverse approaches to complete the movement of products from the source to the consumer. Nevertheless, they have not been able to come up with the precise policies required to achieve this noble task in SCM. Dajissa (2011) found out that the performance of supply chain was being influenced by quality of service, supplier management, supplier relationship, supplier selection, time service delivered and the internal assessment of criticality of business activities. The study concentrated more on the outsourcing of services.

Mwingi (2011) found out that the performance of the Oil firms to fulfill various customer demands or to improve the efficiency of a firm itself can be affected by regulations and there is need to develop a more robust customer relationship that help in reducing the lead times. The study failed to come out clear on the effect of the supply chain performance in manufacturing firms. Kyengo (2012) found out that the overall performance of the oil marketing firms was greatly influenced by the capacity of the firm to deliver products to the widely dispersed customers on time. The study was not on a manufacturing sector.

Based on above studies, it is evident that though studies have been done on supply chain field, limited studies have been done on the effect of supply chain practices on the performance of manufacturing firms. This hence leads to the following research questions: i) What are the effects of SC improvement approaches adopted by large-scale manufacturing firms in Nairobi? ii) Do the approaches lead to better performance? iii) What are the challenges faced through the implementation of improvement approaches in large scale manufacturing firms in Nairobi?

1.3 Objectives of the Study

- i. To establish improvement approaches used by large scale manufacturing firms in Nairobi.
- ii. To establish the effect of SC improvement approaches on performance of large-scale manufacturing firms in Nairobi.
- iii. To establish the challenges faced in the implementation of improvement approaches in large scale manufacturing firms in Nairobi.

1.4 Value of the Study

The findings of the study are expected to be of great value to stakeholders of large manufacturing firms through adoption of improvement approaches thus getting competitive value.

The study is expected to contribute immensely to the existing literature in the field of supply chain improvement approaches. It will help the academicians by gaining exploratory insight about supply chain improvement approaches therefore their

knowledge. The findings of this study will be used as a reference point by other researchers in future for further research on the same field. They could also utilize the findings as a secondary source of information in the course of their studies.

To the consultant, the study will help them understand and appreciate outsourcing and other practices within the industry so as to apply them when consulting to their clients.

To the government in terms of using the information thus attracting investors mainly involved in the legal framework. Other non-manufacturing institutions will also benefit from the findings of this study as it will shed more light on the effect of SC improvement approached on performance.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section lays emphasis on review of theoretic, conceptual and empirical literature along the study's conceptualization. First, the chapter presents literature on theoretical underpinnings of the study followed by conceptual and empirical literature on supply chain improvement and its approaches in manufacturing firms.

2.2: Theoretical Literature Review

The debates on the SC improvement approaches of large scale manufacturing firms in Nairobi can be addressed in light of three theories in literature: relational view theory, competitive advantage theory and the systems theory.

2.2.1 Relational View Theory

The relational view of the firm was progressed by Dyer and Singh (1998) who supported how exchange trade connections can be created into collective incorporations and the basic elements for such reconciliations. The key introduction of this theory is that a relational lease and competitive advantage can be produced through esteem including activities empowered by between firm asset and schedule. As per Richard and Devinney (2005), the particular attributes of such relational incorporations incorporate information trades between parties, correlative key and authoritative asset blends, relationship

particular resource ventures, and viable relational governance. They facilitate point that the systems that therefore save socially inferred performance benefits incorporate causal equivocality, time pressure diseconomies, between authoritative resource between connectedness, accomplice shortage, asset unification, and institutional situations.

Taking a gander at the work of Dwyer, Schurr and Oh (1987) and Morgan and Hunt (2002) on community oriented between inter-organizational connections and in addition the social perspective of the firm, they conceptualize how logistics incorporations work to deliver rents. They recommend that streams of vital data between accomplices symbolize the trading of integral key assets and this trade is portrayed when pressure diseconomies and is encouraged by resource interconnectedness amongst accomplices, and that these corresponding key assets create social lease. Taking everything into account, this theory advocates for synergistic change inside the production network driven by exchange trade and this can prompt to vital data trade between accomplices in the chain that is commonly advantageous to all gatherings. Connection joining e.g. data trade between gatherings in the chain, vital asset mix and connection particular ventures can promote quicken the reconciliation procedure in a production network either inside the organization or with different organizations.

2.2.2 Competitive Advantage Theory

Competitive advantage occurs when a firm attains or develops characteristics that allow it to do well than its participants. Competitive advantage is based on theory that pursues to discourse some of the demerits of reasonable advantage. Michael Porter suggested the theory

in 1985. Competitive advantage theory implies that organizations should follow rules that generate superior merchandises to trade at high rates in the marketplace. Porter stresses production evolution as the effort of general plans. Competitive advantage respites on the concept that economical effort is everywhere and ordinary properties are not essential for a healthy economy. The supplementary theory, competitive advantage can lead countries to focus on transferring principal goods and raw resources that setup countries in low-wage thrifts due to terms of trade. Competitive advantage tries to correct for this matter by emphasizing maximizing scale economies in imports and facilities that acquire best charges (Scott and Westbrook, 2009).

The word competitive advantage is the capacity added through qualities and properties to achieve a superior level than others in a similar industry (Chacarbahi and Lynch, 2011). The study of such advantage has attracted insightful research interest due to modern-day issues regarding superior supply chain improvement approaches of firms in the present competitive market conditions.

The strategic role of the supply chain improvement approaches can be considered further as a new knowledge area in the research domain, given the concurrent increased importance of widespread inter-firm networks and cross-sectional business activities in finance, marketing and operations studies. Indeed, SCIA are potentially a powerful lever for competitive advantage so as to increase SCIA surplus by reducing costs, increasing sales volume and market share with compact customer satisfaction and relations (Ferguson, 2011; Ketchen and Giunipero, 2014).

2.2.2 Systems Theory

Theory can be defined as a consistent group of propositions that are used as principles to explain some class of phenomena. A system is an integration of elements that function together for the purpose of achieving some objective. Systems theory, therefore, uses system structure as a means of explaining phenomena. Systems theory was first applied to science. In 1956, economist Boulding advocated an overall organizations model as the basics of discipline “on which to hang the flesh and blood of particular disciplines.” Systems theory was then applied to business very broadly, and then gradually refined to focus on management in general, and then on such business areas as manufacturing and marketing. The theory offers the potential of providing a framework for organizing the various supply chain functions and providing a mechanism for a systematic approach to solving supply chain problems.

In Supply Chain Improvement Approaches context systems theory brings together different components of complex supply chain to form a subsystem which is a larger system of supply chain networks (Fowler, 2000). It can further help to identify interdependencies between constitutes of the system and a better understanding of the undercurrents of the supply chain hence advance planning, implementation, and organization of supply chain management.

2.3 Supply Chain Improvement Approaches

Supply Chain improvement is a collective and wholesome process that; increases efficiency in the supply chain, eliminates bottlenecks in the supply chain, cut-costs and

keeps them at a minimum, improves customer satisfaction through speedy delivery, promotes high productivity through the use of best practices in the field and improves information flow (Nyamwange, 2010). This study looks at the following supply chain management approaches Information technology, Lean manufacturing, Benchmarking and business reengineering.

2.3.1 Information Technology Adoption

IT is the commonest single type of technology within the SC and includes any device used to collect, influence, store, and/or distribute information (Slack *et al.*, 2010). The role of Information technology has been changing throughout the years in that business operations have changed too (Ghiassi and Spera, 2003, Shore 2001), from Electronic Data Interchange (EDI) frameworks and Enterprise Resource Planning (ERP) systems to web for supporting SCM (Pant *et al.*, 2003, Shore, 2001). Because of the high respect and usefulness of the web, numerous specialists have valued the advantages that can be gotten from using to correspondence and systems management in SC (Lancioni *et al.*, 2003).

The use of internet and other online enablers have allowed transactions to perform on a real time basis. Electronic SCM has streamlined and optimized operations in the SC by ensuring maximum sales growth and ensuring constant low cost supplies. Even though the internet in SC management can add value in a variety of ways such as saving costs, improving quality, delivery and support, and offering greater competitive advantage (Kalakota and Whinston, 1996), implementing a web-based SC system will lead to achievement of flexible coordination between a company and its customers and suppliers

along the SC. White (1996), indicated that combined use of IT with supply chain enables both the customers and suppliers to share critical information on a timely basis to facilitate effective, real time decision making.

2.3.2 Lean Manufacturing

As per Engstrom *et al.* (2013), lean is a management theory that upgrades client esteem through waste expulsion and steady advancement in a system, by applying lean standards, practices and strategies. The attention on lean performance and research had been on a solitary organization without augmentation to the total inventory network. Lean supply chain management is not by any means for assembling organizations, however by foundations that need to make more productive their procedures by dispensing with waste and non-esteem included activities.

Organizations have different territories in their SC where waste can be perceived as time, expenses or stock. To make a leaner supply chain, organizations need to look at each region of the inventory network (Murray, 2013). As per the UK Essay (2003), since the 1980s, a few organizations in various parts of industry have over and over been acquainting programs proposed with progress both efficiency and quality. A few researchers have placed incline fabricating as the best creation framework and one that can be executed in any industry and process (Bonavia and Marin, 2006 and Lee-Mortimer, 2006).

2.3.3 Benchmarking

Benchmarking is the practice of determining the presentation of one's corporation beside the best either within the equivalent industry as defined by Spendolini (1992). Additionally it was redefined by Fitzsimmons *et al.* (2006) as an instrument to advance managerial performance and effectiveness in corporate existence. The idea of benchmarking offers predictions for industries to become accustomed to knowledge from other similar procedures to one's specific presentation. In order to carry out dealer's improvement, the usage of benchmarking process is approved, as a device for constant development in value and enactment (Datakumar *et al.*, 2003).

Benchmarking is largely distributed into three normally used essentials today. The first proposes Process Benchmarking which has received the maximum observant consideration and has advanced over the years (Naylor, 2002, Anderson *et al.*, 2005 and Beretta *et al.*, 1998). The second component is the Performance Benchmarking that is linked among the stages of accomplished presentation in diverse processes (Heizer *et al.*, 2011). Slack *et al.* (2007) explains that firms can create development strategies centered on the results of the reasonable benchmarking. Lastly, Strategic Benchmarking that is all about requirements to advance a general presentation by perceiving and investigating the long-term policies and additional methods that have enabled high enactment in the formation for it to be successful.

2.3.4 Business Process Reengineering

The thought of business process re-engineering started in the early 1990s when Michael Hammer suggested that it would be relative to use technology to automate work. It has been defined as the essential reconsidering and fundamental restructure of corporate procedures to attain vivid advancements in serious current procedures of performance such as costs, first-class provision and promptness. According to Hammer and Champy (1990), the BPR emphases on procedures and not on responsibilities, contracts or people. The process seeks to redesign the strategic and value added methods that go beyond organizational extremes. Lean theories, process flow charting, critical scrutiny in method study and customer forecast-operations all build into the BPR concept. It was the potential of IT to allow the primary redesign of processes, which acted as a means of bringing these concepts together (Nyamwange, 2010). In today's changing world, the only constant thing is change. In a world that is ever more driven by the 3C's that is customer, competition and change, firms are on the lookout for new business propositions in the quest for solutions into their problems. Some of these solutions include the BPR. For example, Wal-Mart reduces restocking time from as high as 6 weeks to just 36 hours. Hewlett-Packard's assembly time for server computers touches new low –four minutes the reason behind this BPR (Whitman *et al.*, 1999).

2.3.5 Kaizen

Brunet and New (2003) emphasis the fact that the magnitude of Kaizen is regularly presented as a unique fundamental principle of the Lean Management and Total Quality Management (TQM). Slack *et al.* (2007) describes Kaizen as the involvement and

utilization of workforce in process development, by forming and offering strategic network for personnel and staffs to contribute to the organization's progress and achievement. Aken *et al.* (2010), enlightens that Kaizen is a Japanese word for 'Continuous Improvement'. According to Brunet and New (2003), Kaizen viewpoint has been entrenched in the minds of entrepreneurs and has been executed all over the world in order to advance in creative standards and refining workers morale and comfort.

It is presumed that Kaizen theory contains three key concepts. The first component states that for one to yield good results, the organization should generate sound procedures; hence (process orientation) (Berger, 1997). Consecutively, the second component emphasized by Imai (1986) states that for one to maintain and advance standard presentation, inventions and determination should be used together. Lastly, it is assumed that involvement of staffs in the business leads in the aspiration for excellence and efficiency in the long run.

2.3.6 The 5S

It is fitting for the supply management reason in an incline setting to assemble incline thoughts and terms into the improvement of supply arrangement. The 5S's are incline ideas coming about because of the Japanese words: Seiri (Sort), Seiton (Set in order), Seiso (Shine or virtue), Seiketsu (Standardize), and Shitsuke (Sustain) (Hirano, 1996). Companies endorsing the incline generation thought frequently actualize the 5S procedure to present request into the workshop subsequently supporting incline creation. The 5S is a demonstrated model for setting up and maintaining an incline generation environment. The organization among purchasing/supply and the general management of processes may be enhanced by using a mutual terminology amassed around ideas conversant to the managerial leader and those of other sections.

2.4 Supply Chain Performance

The SC performance items speak to a scope of supply chain attributes including process durations, conveyance precision, conveyance timeliness, and return costs. At the point when measured in together, these measures give a sign of the level of store supply chain performance over an organization (Neely *et al.*, 1995). A standout amongst the hugest undertakings amid the arranging stage is creating execution estimations and reporting strategies. The outsourcing organization must step up with regards to devise measures that bolster the organization's business objectives for the outsourcing system.

Gunasekaran *et al.* (2004) presents various features that initiate in the operational performance capacity systems, and which can thus be used in estimation of these dimension systems. These comprises of completeness, universality, measurability, and reliability. In addition to examining the procedures established on their usefulness, benchmarking is an alternative method used in presentation measure appraisal. Benchmarking can be useful in that it can provide a means of categorizing development chances.

In order to learn the huge number of performance events presented, investigators have had to place them in different categories. Neely *et al.* (2005) presents some of the alliances in the literature, for instance; superiority, time, flexibility, and cost. This classification is a helpful device in organizational analysis. For instance, an ideal model may be built to advance a particular distinguishing system. The exemplary may then evaluate industrial lead time presentation by varying the system's pattern. By doing so, a solitary sort of measure has been picked, time, yet in this class, diverse exact measures of time might be utilized. Along these lines, measures inside a classification can be assessed and broke down, so performance measure determination in a classification might be made less demanding.

Gunasekaran (2004) indicates that there exist three levels of supply chain measures: Strategic level measures: These include Lead time against industry norm, Quality level, Cost saving initiatives, and Supplier pricing against market. Tactical level measures: These include the Efficiency of purchase order cycle time, Booking in processes, Cash flow, Quality assurance methodology and Capacity flexibility. Operational level measures include capacity in day to day technical representation, observance of

developed schedule, ability to avoid complaints, and achievement of defect-free deliveries.

In conclusion, supply chain improvement approaches have become increasingly important aspects in the success of manufacturing performance (Gottfredson *et al.*, 2005). Whilst the supposed objective of Supply chain improvement in the supply chains is to achieve the efficiency and effectiveness, it is not clear whether the SC choices of organizations are constantly tactically associated with their economic policy as a whole. There is supply chain similarity across all five competitive priorities (costs, flexibility, innovation, quality and interval) and considerable relation to SC performance. It has also been established that the level of supply chain performance in a firm is positively and significantly related to the firm's business performance.

2.5 Challenges to Implementation of Supply Chain Improvement

Fruitful performance of SCM is viewed as particularly subject to the requirement for separating obstructions inside inner offices and business methods, as well as crosswise over organizations inside the whole store network (Vollman *et al.*, 1997). Its prosperity is likewise associated with the testing improvement of another culture in view of strengthening and on-going and shared learning and preceded with progression.

Absence of legitimate planning and poor vision are impetuses of disappointment by SCs, however their belongings might be ease to be seen, their definitive effect is annihilating. Managerial trouble or many-sided quality so far as that is concerned incorporates uneven

SC procedures, structures and primary contrasts in SCPs' business culture (Fawcett *et al.*, 2008). In the managerial many-sided quality class Fawcett *et al.* (2008) noticed the accompanying obstructions all together of significance; IS/IT inadequacy, authoritative structure, need production network estimation and poor organization together rules. These difficulties are both at big business and SC level and accordingly the need to manage them at both fronts. The most noticeably bad hindrance IS/IT inadequacies mean disappointment in upper hand by the whole SC.

Operationalization of sustainable development is seen as a challenge in terms of inertia and interpretation. “A fear of change connected to difficulties of interpretation, the complexity involved, and the underlying business logic with its clear focus on financial aspects, all contribute to the inertia in reaching sustainable supply chains” (Abbasi and Nilsson, 2012, p.526).

Variety of mentality and culture at the organizational, national and global levels is another test for feasible supply chain. The change must be basic, innovative and incorporative of manageability points of view and presumptions.

2.6 Empirical Studies

Ou, Liu, Hung, and Yen (2010) did a study on effects of supply chain management approaches on operational performance. They found out that external customer-firm-supplier relation management directly influences firm internal appropriate factors that as a result have positive effects on operational performance. Their finding indicates

that successful execution of SCM practices directly improves operational performance, and also indirectly boosts customer contentment and financial performance of the organization. The study however did not take into account the effects of supply chain management on organizational performance as a whole.

Chizzo (2008) did a study on the effects of sharing information on the performance of the SC. He found that whilst information sharing is essential, the significance of its impact on the performance of a SC is dependent on what information is shared, when, how, and with whom. This finding uncovers the requirement for the reconciliation to be particularly custom fitted to those inventory network individuals that are occupied with exercises that will prompt to a cooperative energy. The study did not however look at other aspects in supply chain improvement such as business re-engineering and benchmarking and their effects on performance.

Kamau (2011) directed a study on buyer supplier relationship and organization performance where he discovered that there is a reasonable relationship between the two factors. He discovered that numerous assembling firms have received different e-procurement practices. This means there is absence of study did locally to draw out a comprehension of the complete arrangement of Supply chain change methodologies and how they can permit an association better its performance.

Kyengo (2012) did a research on the effects of supply chain improvement on organizational performance of oil marketing firms. He found out that the overall performance of the organization was greatly influenced by the capacity of the firm to deliver products to the

widely dispersed customers on time. The study was however not done in large manufacturing firms

Kamau (2013) also did a study on the influence of effective product designs and their influence on supply chain performance. He came into the conclusion that supply chain management led to the introduction of more products in the firm, effective product and process designing, increased sales resulting to a huge market share. His study however did not look at the effects of SC improvement approaches and their effect on organizational performance.

2.7: Summary of the Literature Review

Scholar	Focus of Study	Methodology	Major Findings	Major contribution	Knowledge gaps
Chizzo (2008)	Effects of information sharing on the performance of the supply chain	Case study approach and purposive sampling	Information sharing is important, in ensuring firm performance	This outcome reveals the need for the integration to be precisely custom-made to those supply chain associates.	Supply chain improvement such as BPR and benchmarking and their effects on
Kamau (2013)	Influence of effective product designs and their influence on supply chain performance	Literature based review	SCM led to the introduction of more products in the organization	Study emphasized that actual product and process designing, improved sales leading to a large market share	Study however did not look at the effects of supply chain improvement approaches and their effect on organizational
Kyengo (2012)	Examined effects of supply chain improvement on organizational performance of oil marketing	Qualitative and Quantitative analysis	Performance of the organization was greatly influenced by the capacity of the firm to deliver products to the widely dispersed customers.	He found out that the overall performance of the organization was greatly influenced SCIA	The study was however not done in large manufacturing firms

2.8 Conceptual Model

The schematic diagrams below will not only guide the study but will also illustrate the interrelationship among the key parameters in the study as illustrated in Fig. 2.1.

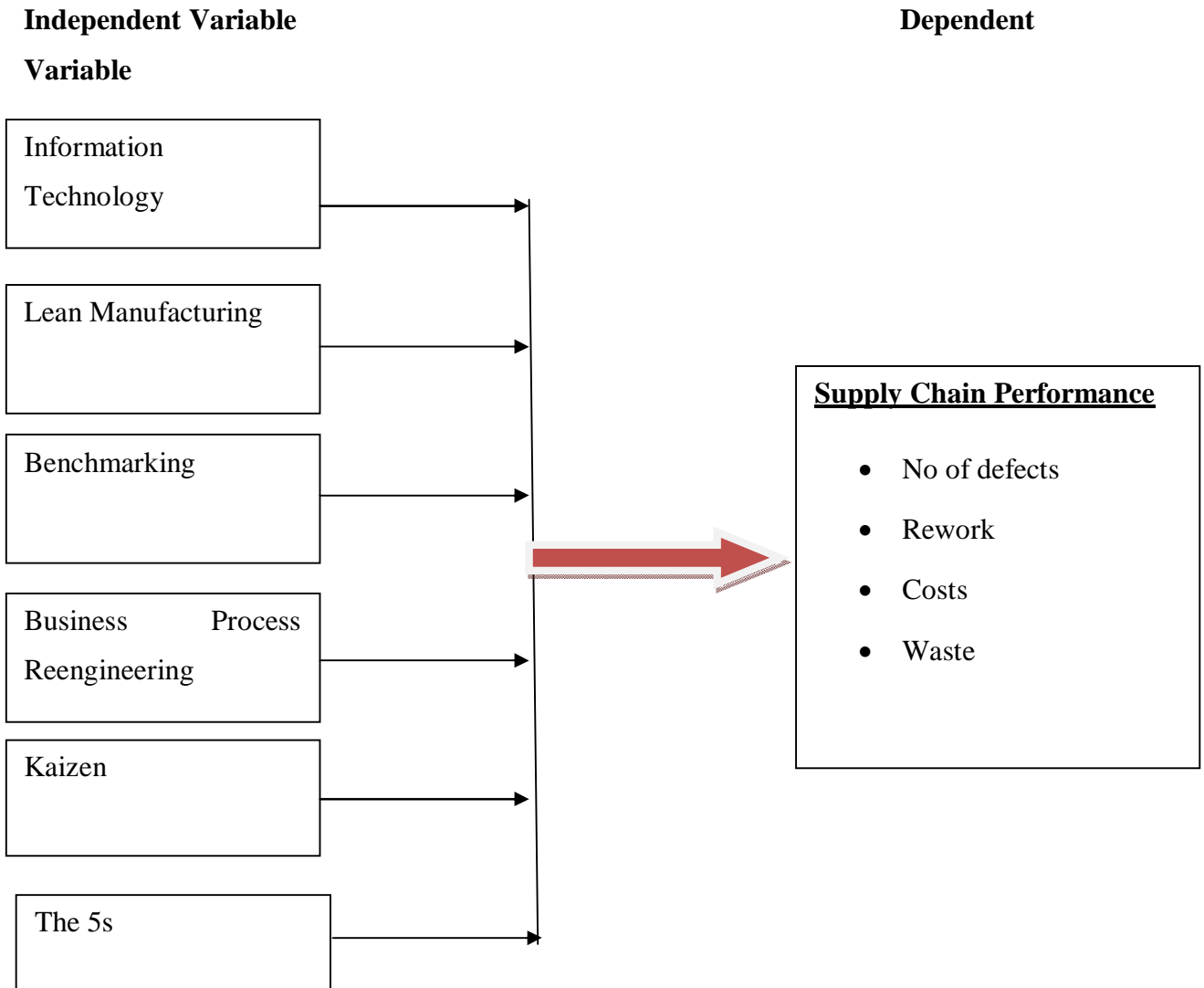


Figure 2.1: Conceptual Model

Source: Researcher (2016)

Hypothesis: There is a relationship between SCIA and supply chain performance

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section sets out the study method used so as to achieve the objectives of this study. The settings of the research, the population of interest, sample sizing and design, data collection mechanisms and information analysis methods were adopted.

3.2 The Research Design

The study used descriptive research design to get relevant information concerning the relationship between the independent and the dependent variables. Descriptive research design describes the current state of the phenomena; it describes ‘what exist’ with regards to parameters or circumstances in a situation (Mugenda and Mugenda, 2008).

3.3 Population of the Study

The population used for the study was all the large-scale manufacturing companies in the city of Nairobi, Kenya. According to the Kenya Association of Manufacturers (2015), there are 230 large scale manufacturing firms in Nairobi (Appendix II). The study considered Nairobi because this was where most of the large scale manufacturing firms in various sectors were concentrated and thus providing a population where a proportionate sample was derived. Large scale manufacturing firms generate a lot of waste materials.

3.4 Sample Design

This research incorporated two sampling techniques, simple random sampling and stratified sampling. Stratified random sampling was accepted since the population was heterogeneous; hence the population will be divided into homogenous strata in order to enable sampling to be conducted separately in each stratum. The target population comprised of twelve strata; each being a sector in the large scale manufacturing firms. Hence a sample was drawn from the two hundred and thirty large scale manufacturing firms in Nairobi County, Kenya. Kothari (2012), a representative sample should be at least 10% of the target population. Forty Five (45) respondents were thus considered appropriate for the study as it cut above the threshold (Mugenda and Mugenda, 2008).

Table 3.1: Sample Population

Sectors	Target population(N)	Sample (n)
Construction, Building & Mining	6	1
Foods, Tobacco and Beverage	100	10
Chemicals and related products	62	6
Electrical and Energy	42	4
Rubber and Plastics	54	5
Textiles, Apparel	38	4
Furniture, Wood and Timber Products	22	2
Medical Equipment and Pharmaceuticals	20	2
Hard Metal and Allied	38	4
Footwear and leather products	8	1
Motor vehicle accessories and assembly	17	2
Paper, Paperboards and related products	48	5
Total	455	45

3.5 Data Collection

Primary data was taken and used in the study where a prepared questionnaire was given to collect information that was organized in two parts: Part A; Respondents profile and Part B; Supply chain improvement approaches, Part C; Effects Of SC Approaches, Part D; Challenges faced in the implementation of SCIA and Part E; Financial Performance of the firm.

Questionnaires are popular since the investigator directly controls the types of data at the time of information gathering. Respondents were issued with descriptive wordings with regards to the management involvement in the supply chain improvement in a Likert scale that was used to score. This is because Likert scale is an essential tool used to rate feedback gotten from respondents on various parameters (Kothari, 2012). Likewise, according to Cooper *et al.* (2011), Likert Scale is the most commonly used variation of the submitted rating scales; which states the favorable or unfavorable attitude towards the object of interest. The questionnaire was administered through drop and pick, targeting managers responsible for planning in the organization.

3.6 Data Analysis

The information or data was analyzed on account of agreement with the objectives by use of statistical tools such as the Statistical Package for Social Scientists (SPSS) to interpret research findings. The study also adopted the ANOVA to test the significance of the variables on the dependent parameter at 95% confidence. Tables, figures and charts will

be used for data presentation. After the analysis and interpretation of data, a final report was drawn to provide a summary of the findings. Demographic data, which is in part A of the questionnaire, was analyzed using frequencies and percentages and expressed by pie charts, tables, bar graphs or column charts.

Descriptive statistics i.e. the mean, SD or Standard Deviation, and skewness measures or kurtosis were used to quantify SC Performance, Improvement approaches used by the large scale manufacturing firms in Nairobi and challenges faced in the implementation of improvement approaches in large scale manufacturing firms in Nairobi. Inferential statistics was analyzed by use of correlation and regression analysis (Effect of SC Improvement approaches on performance in large scale manufacturing firms in Nairobi).

The study used the following multiple regression model.

Where Y = Performance

ϵ = Constant (Co-efficient of intercept)

X_1 = Information Technology

X_2 = Lean Manufacturing

X_3 = Benchmarking

X_4 = Business process reengineering

X_5 = Kaizen

X_6 = 5S

e=represents the error term. B_1 B_6

3.7: Summary of the Data Analysis

Objective	Section of the questionnaire	Data analysis techniques
To acquire the general information of the respondents	Part A: Demographic and Respondent's Profile	Frequency and percentages with representations in figures and tables
To evaluate the relationship between supply chain improvement approaches and performance	Part B: Supply Chain Improvement Approaches	Descriptive analysis Inferential statistics
To establish the association between SC improvement approaches and performance	Part C: Effect of Supply chain improvement approaches on performance	Quantitative analysis

Source: Research findings

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

The section analyses the interpretation and presentation of data received from the field. Inferential and descriptive statistics were used to analyze these findings.

The study targeted a sample of 45 respondents from large scale manufacturing firms in Nairobi County, Kenya. Of the questionnaires issued, 39 completed and gave back the questionnaire; resulting to a response rate of 86.7%. This response rate was viewed as palatable in concocting conclusions for the study. Weisberg, Krosnick and Bowen (2006) prescribed a reaction rate of 70%. As indicated by Mugenda and Mugenda (2008), a response of half is viewed as adequate for investigation and reporting; a rate of 60% is viewed as great and that of 70% or more as magnificent. In view of this confirmation, the reaction rate was viewed as great.

To ascertain validity, the research paper was issued to experienced personnel to assess the significance of every item in the paper as far as the objectives were concerned. These were rated on a scale of between 1 and 4, with 1 being “very relevant” and 4 being “not very relevant”. From there on, legitimacy was resolved utilizing the Content Validity Index (CVI), which was landed at by summing together the things evaluated 3 and 4 by the specialists and isolating the aggregate by the quantity of things in the survey. A CVI

record of 0.704 was accomplished. As per Oso and Onen (2009), a legitimacy estimation of no less than 0.70 is viewed as adequate and consequently the selection of the examination instrument considered substantial for the study.

The questionnaire items responded to had Likert Scale. Cronbach's alpha was calculated to ascertain reliability using SPSS, whereby the alpha coefficient values range from 0 to 1 and may be used to depict reliability of factors of dichotomous (i.e. questions having two possible solutions) and multi point questionnaire or rating scale between 1 and 4, 1 being "Poor" and 4 being "Excellent", a higher scale indicating more reliability. Cooper and Schindler (2008) indicated 0.70 to be an acceptable reliability coefficient. Our alpha coefficients were greater than 0.70 and thus we drew a conclusion that the instruments had an acceptable reliability coefficient and thus appropriate for the study.

4.2 Demographic Information

The study sought to determine the demographic data from the respondents in the extensive scale producing firms in Kenya. The demographic data of the respondents includes their gender, age bracket, years worked in the firm, and highest education level. The findings from the analysis were illustrated in the following subsections.

4.2.1 Respondents' Gender

The study sought to establish the respondents' gender. The results from the analysis are illustrated in the below figure.

Table 4.2: Gender of the Respondents

The table below explains the number of males and females that were involved in the research

Gender	Frequency	Percentage
Male	20	51.28
Female	19	48.72

From the analysis of findings, the study noted that the male respondents were at 51.3% while the female respondents were 48.7% of the total respondents. The study thus established that there were more male respondents than the female respondents but the discrepancy was not sufficient to create any prejudice on the study on the impact of SC improvement approaches and performance in large scale manufacturing firms in Nairobi County.

4.2.2: Age brackets of the Respondents

We also sought to determine the respondents’ age brackets. The below figure illustrates the results from the analysis.

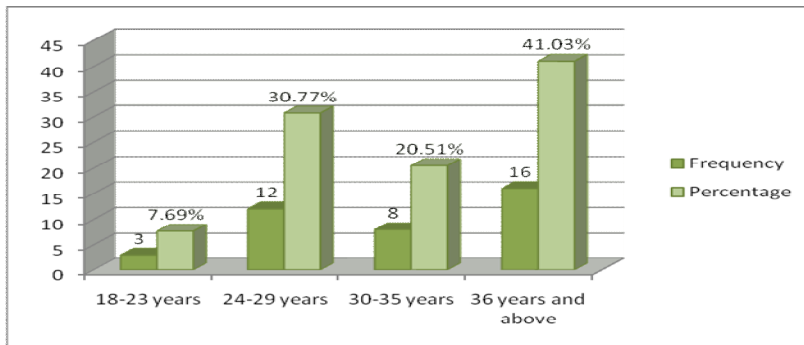


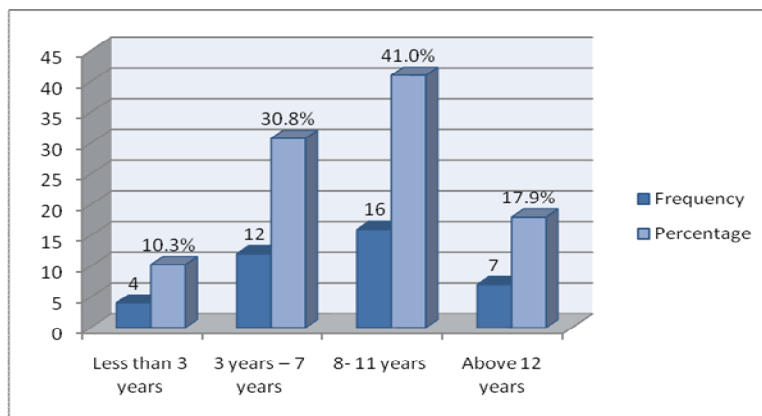
Fig 4.2: Respondents’ Age Bracket

The study showed that majority (41.0%) of the respondents indicated they had worked in the large scale manufacturing firms for a period of 36 years and above. Closely after were respondents who indicated that they were aged between 24-29 years and above. From the analysis also, it was established that 20.5% of the respondents indicated their age to be between 30-35 years while 7.7% of the indicated their age to be between 18-23 years. The study thus inferred that most of the respondents were aged 30 years and above.

4.2.3: Number of years worked in the organization

The study found it paramount to determine the years worked by the respondents in their respective organizations. The results from the analysis of findings are illustrated in figure below as shown.

Figure 4.2: Years worked in the organization



From the analysis, it was noticed that majority (16, 41%) of those that responded indicated that they had worked between 8 and 11 years in the large manufacturing firms. This was closely followed by respondents who indicated that they had worked for a

period between 3 to 7 years with a frequency of 12 which calculated to 30.8% of the total respondents. 17.9% of the total respondents indicated that they had worked for over 12 years while 10.3% indicated that they had worked for less than three years.

4.2.4 Highest Education Level

We sought to determine the respondents' education level. The figure below illustrates our findings.

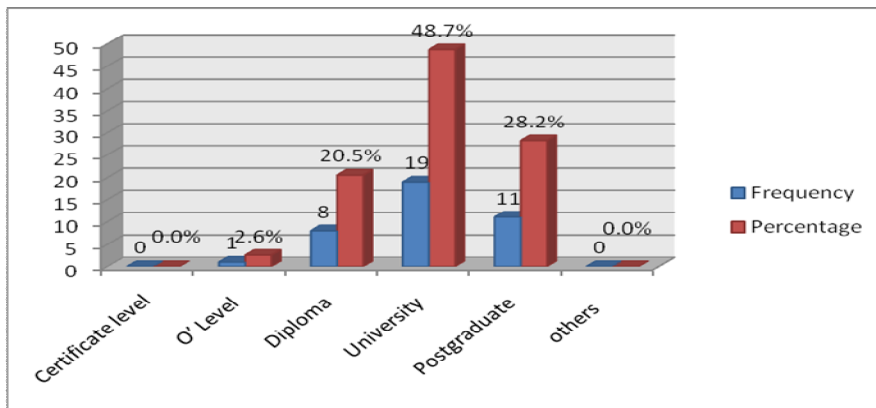


Figure 4.3: Level of Education

From the above analysis, we determined that most respondents (48.7%) had a degree. This was followed by 28.2% of the respondents who indicate that they had a post graduate education. The study also established that 20.5% of the respondents indicated that they had a college diploma. None of the respondents indicated to having certificate level and others. Majority of the respondents thus noted that they were well educated to offer important information on the study of supply chain improvement approaches and the performance of the manufacturing firms in Nairobi, Kenya.

4.3 Descriptive Statistic

Our study went ahead to determine the impact of supply chain improvement approaches and large-scale manufacturing firms' performance in Nairobi County. The respondents were asked to rate how they felt about different variables related to the supply chain improvement approaches in a 5-point Likert scale. The range was between 'Strongly Agree' (5) and 'Strongly Disagree' (1). The score of 1 indicated "strongly disagree", 2 "disagree", 3 "neutral", 4 "agree" and five represented "strongly agree"

4.3.1: Effects of Information Technology on the Performance of Large-scale Manufacturing Firms in Kenya

The table below sought to establish whether information technology had a significant influence on the large-scale manufacturing firms in Nairobi, Kenya. The below table 4.5 indicates the findings from the respondents.

Table 4.3: Information Technology

Effect of IT	Mean	Standard deviation
Role of I.T. in SCM has dramatically transformed in current years thus changing business operations	4.578	0.823
IT is the most common single type of technology within the SC	4.512	0.461
Data Interchange systems and Enterprise Resource Planning systems have been developed as subsidiary of SCM	4.138	0.665
Applying IT to communication and systems management in SC enhances accountability in the process	4.129	0.589
The use of internet and other online enablers have allowed transactions to perform on a real time basis.	4.058	0.577
Electronic SCM has streamlined and optimized operations in the SC by ensuring maximum sales growth and ensuring constant low cost supplies	4.010	0.966
SC system leads to achievement of flexible coordination amongst a firm and its clients and providers besides the supply chain	3.612	0.835

From the findings in the SPSS analysis, the statement, Information technology plays a significant role in improving efficiency and overall performance of large manufacturing firms in Kenya. It was noted that a majority of the respondents strongly agreed (M=4.58, S.D = 0.59) that IT role in SCM has dramatically changed of late, transforming businesses. A significant number of the respondents also strongly agreed (M=4.51, S.D = 0.46) to the statement; IT is the most common single type of technology within the SC.

The study also noted that a majority of the respondents agreed (M= 4.14, S.D= 0.67) EDI and ERP systems have been developed for supporting Supply Chain Management. Generally it was clear that information technology had a significant influence on large-scale manufacturing firms' performance on Nairobi County.

The findings were seen to be in accordance to a study done by Slack *et al.*, (2010) who asserted that I.T. is the commonest single-type technology within the supply chain.

4.3.2: Effects of Lean Manufacturing on the Performance of Large-scale Manufacturing Firms in Kenya

The table below sought to establish the effects of lean manufacturing on performance in the large manufacturing firms. The findings are illustrated in the table 4.4 as shown.

Effects of lean manufacturing	mean	Standard deviation
Lean Manufacturing provides the best manufacturing systems that can be executed by any industry.	4.596	0.096
Lean manufacturing through continuous system improvement and waste elimination enhances customer value	4.221	0.4814
Lean manufacturing streamlines processes through elimination of wastes and non-value add activities	3.587	0.3859

Based on the responses from the respondents, it's clear that the respondents concluded that lean manufacturing had significant influence on performance of large scale manufacturing firms. This inference was realized by responses of statements relating to lean manufacturing in the respondents. It was established from the analysis that most respondents strongly agreed (M=4.60, S.D= 0.10) on the statement; Lean Manufacturing provides the best manufacturing systems that can be executed by any industry. It was also established that a significant number of the respondents strongly agreed (M=4.22, S.D=

0.48) Lean manufacturing through continuous system improvement and waste elimination enhances customer value

It was also noted that a significant number of the respondents agreed (M=3.59, S.D=0.39) that lean manufacturing streamlines processes through elimination of wastes and non-value ad activities. Generally it was established that a good number of those that responded noted that lean manufacturing had a significant impact on performance of the large scale manufacturing firms in Kenya. In comparison, according to Engstrom *et al.* (2013), Lean manufacturing streamlines processes through elimination of wastes and non-value added activities.

4.3.3: Effect of Benchmarking on Performance

The table below sought to establish the effects of benchmarking on the performance of large scale manufacturing companies in Nairobi County, Kenya. The findings are illustrated in the table 4.8 below.

Table 4.5: Effect of Benchmarking on Performance

Effect of Benchmarking	Mean	Standard deviation
Benchmarking improves organizational performance and competitiveness in business	4.219	0.418
Benchmarking aids in measurement of a firm's performance against the best in same or other industry	4.036	0.494
Benchmarking gives businesses opportunities to adjust knowledge from other similar processes to one's own methods and performance	3.962	0.656

From the scrutiny of the descriptive statistics, it was clear that most respondents alleged that benchmarking has a significant outcome on the performance of the large scale manufacturing firms. This was noted by the reactions produced using the respondents of explanations identified with benchmarking. For example, it was noticed that greater part of the respondents emphatically concurred (M=4.22, S.D= 0.42) Benchmarking improves organizational performance and competitiveness in business life.

It was also noted that respondents agreed (M=4.04, S.D=0.49) that Benchmarking aids in measurement of a firm's performance against the best in same or other industry. Also noted was that most respondents agreed (M=3.96, S.D=0.66) that Benchmarking gives businesses opportunities to adjust knowledge from other similar processes to one's own methods and performance. Generally, it was also noted that benchmarking had a significance influence on performance large scale manufacturing firms.

The study findings were noted to be collaborated by Slack *et al.* (2007) who indicates that firms can have development plans established on the results of the economical benchmarking and that tactical benchmarking which encompasses the obligation to increase production by observing and scrutinizing the long-term policies and additional methods that have aided on the high presentation of the firm so as to perform.

4.3.4: Effect of Business Process Re-engineering on Performance

The table below sought to determine the effect of business process re-engineering on performance. Figure 4.6 below illustrates the findings

Table 4.6: Business Process Reengineering on Performance

Effect of BPR on Performance	Mean	Standard deviation
The idea of BPR originated in the early 1990s	4.503	0.668
BPR is important in ensuring performance of firms	4.338	0.865
BPR does do away with the need to work.	4.213	0.403
Lean theories, process flow charting, serious scrutiny in the technique revision and consumer forecast-operations all contribute to the BPR model	4.078	0.984

It was noted from the analysis that business process reengineering as a supply chain improvement approaches had a major effect on the performance of the large manufacturing firms in Nairobi County. This was noted factual by the high mean values calculated on statements relating to business process reengineering and performance of the large manufacturing firms. For instance, it was noted that majority of the respondents strongly agreed (M=4.50, S.D=0.66) that the business process re-engineering idea originated in early 1990's.

Also noted was that most respondents strongly agreed (M=4.34, S.D=0.86) that in today's ever changing world, BPR is important in ensuring performance of firms. The study also noted that most respondents agreed (M=4.08, S.D=0.98) that Lean theories, process flow charting, serious scrutiny in the technique revision and consumer forecast-operations all contribute to the BPR model. Generally it was established that business

process reengineering and supply chain improvement approach had a significant effect on large manufacturing firms' performance in the country.

The study findings were illustrious to be in line with Nyamwange (2010), who asserted that it was the potential of I.T. to allow the primary process redesign, which acted as a catalyst to bringing these ideas together.

4.3.5: Effects of Kaizen on Performance

The below table sought to determine whether Kaizen had any influence on performance.

Table 4.5 below indicates the findings from the respondents

Table 4.4: Kaizen

Effect of Kaizen on performance	Mean	Standard deviation
Kaizen is usually presented as one of the underlying principles of lean management and Total Quality Management	4.835	0.823
Kaizen ensures workforce participation and mobilization in process improvement	4.321	0.356
Kaizen helps in creation of a main channel for employees and staffs to add value to the firm's expansion and achievement	4.223	0.345
Management should be focused in creation of sound processes in order to produce good results	4.118	0.577
Involving employees in the firm brings intrinsic desire for long-term productivity and quality	4.072	0.966
Kaizen is often presented as one of the underlying principles of Lean Management and Total Quality Management	4.010	0.615

From the findings in the SPSS analysis, the statement, Information technology plays a crucial role in increasing efficiency and large-scale manufacturing firms' performance in Kenya. It was noted that most respondents strongly agreed (M=4.84, S.D=0.82) that Kaizen is usually presented as one of the essential principles of lean management and Total Quality Management. A significant number of the respondents also strongly agreed (M=4.32, S.D= 0.62) to the statement; Kaizen ensures workforce participation and mobilization in process improvement. The study also established that majority of the respondents agreed (M=4.12, S.D=0.58) that management should focus on creation and ensuring sound processes in order to produce good results.

Generally it was clear that Kaizen is a significant concept in supply chain improvement and should be considered to ensure performance. The study findings were in agreement with Brunet and New (2003) who noted that the Kaizen idea has been embedded in businessmen thoughts and has continued to be implemented all over the world so as to advance creative values as well as increasing staff self-esteem and protection, bearing in mind the key point which is to make minor and instant developments in the procedures and sustaining high values in the office.

4.3.6: Effects of 5S on the Performance Large Manufacturing Firms in Kenya

The study sought to determine the effects of 5S on the performance of large-scale manufacturing firms. Table 4.8 below illustrates the findings.

Table 4.5: Effects of 5S on the performance

Effect of 5S on performance	Mean	Standard deviation
It is suitable for the supply management function in a lean environment to incorporate the terminology and lean concepts into the growth of supply strategy	4.432	0.481
Firms that adopt the lean production philosophy often apply the 5S practice to enhance order to the workplace and thus support lean production	4.423	0.585
5S is proven in organizing and maintaining a lean production environment	4.299	0.993
5S is an appealing model for the growth of supply chain approach in a lean manufacturing environment	3.992	0.848

Based on the replies from the respondents, it was clear that most respondents saw that 5S also had significant influence on performance in large scale manufacturing firms. This inference was realized by responses of statements relating to 5S in the respondents. From the analysis, it was established that most respondents strongly agreed (M=4.43, S.D=0.48) on the statement: It is suitable for the supply management function in a lean environment to incorporate the terminology and lean concepts into the growth of supply strategy.

Also noted from the analysis of the findings majority strongly agreed (M=4.42, S.D=0.59) that firms that adopt the lean production philosophy often apply the 5S practice to enhance order to the workplace and thus support lean production. Also

established from the analysis was that a majority of the respondents agreed (M=3.99, S.D=0.85) that 5S is an appealing model for the growth of supply chain approach in a lean manufacturing environment. Generally it was established that the 5S has an important effect on large-scale manufacturing firms' performance in Kenya. The study findings were in accord with Hirano, (1996) who noted that Companies that adopt the lean production philosophy often implement the 5S process to bring order to the workplace and thereby support lean production.

4.4 Relationship between SCIA and Performance

Table 4.6: Correlation Matrix-

The tables explains relationship that exists between the variables

SCIA		IT	LMR	BM	BPR	KZN	5S	P
IT	Pearson's Correlation	1						
	Sig (2-tailed)	.						
Lean manufacturing	Pearson's Correlation	0.316	1					
	Sig.(2-tailed)	0.542	.					
Benchmarking	Pearson's Correlation	0.260	0.308	1				
	Sig.(2-tailed)	0.619	0.003	.				
BPR	Pearson's Correlation	0.092	0.673	0.147	1			
	Sig.(2-tailed)	0.862	0.043	0.031	.			
Kaizen	Pearson's Correlation	0.858	0.533	0.602	0.831	1		
	Sig.(2-tailed)	0.013	0.001	0.008	0.005			
5S	Pearson's Correlation	0.818	0.543	0.372	0.536	0.406	1	
	Sig.(2-tailed)	0.013	0.001	0.008	0.005	0.009		
Performance	Pearson's Correlation	0.841	0.645	0.872	0.936	0.933	0.64	1
	Sig.(2-tailed)	0.003	0.005	0.004	0.005	.009	.008	
	N	39	39	39	39	39	39	39

From the table above; LMR represents Lean Manufacturing, BM represents benchmarking, KZN represents kaizen and P represents Performance.

The study used correlation analysis to establish the effect of supply chain improvement approaches and performance in large scale manufacturing firms. Two-tailed Pearson correlation (R) was used to establish the same at 95% confidence level. From the results, the R-value between Information technology and performance was ($r=0.84$, $p=.003$). This signifies a strong and positive linear association between performance and information technology. Lean manufacturing had a correlation ($r= 0.65$, $p=.005$) with performance. This also depicts a strong positive linear relationship between lean manufacturing and performance.

Also noted was that benchmarking had a correlation ($r= .87$, $p=.004$) with performance which indicated a significant, positive and linear relationship between performance and benchmarking. Business process re-engineering had a correlation ($r=0.94$, $p=.005$) with performance. This also depicts a strong positive linear relationship between business process re-engineering and performance. Also noted was that Kaizen had a correlation ($r=0.93$, $p=.009$) which indicated a significant, positive and linear relationship between performance and Kaizen. From the findings, a correlation ($r=.65$, $p=.008$) was noted between 5S and performance of the large scale manufacturing firms which also indicated a positive and linear relationship between 5S and the dependent variable which was performance.

4.5 Multicollinearity

Table 4.7: Collinearity Statistics

The table below tries to explain if there is any correlation between the independent variables

SCIA	Tolerance	VIF
IT	0.544	1.838
Lean manufacturing	0.469	2.132
Benchmarking	0.513	1.949
BPR	0.934	2.120
Kaizen	0.494	4.098
5S	0.383	2.611

Multi-collinearity test was conducted to establish if the independent variables were correlated. Multi-collinearity affects regression model and its lack, thereof, a key assumption for regression. The study performed variance inflation factor “VIF” for multicollinearity. A value less than 0.1 suggest multi-collinearity while values of VIF exceeding 10 usually indicate multi-collinearity. The tolerance values were greater than 0.1 and those of VIF were less than 10. This then indicates no multi-collinearity among the independent variables.

4.6 Regression Analysis

The study conducted multiple regression analysis of:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4 + \beta_5\chi_5 + \beta_6\chi_6 + \varepsilon$$

β_0 is the regression model constant; $\beta_1 - \beta_6$ are the regression coefficients. Y is the performance depicted by the ratio of the amount subscribed/amount issued to the extent oversubscribed. χ_1 is information technology, χ_2 is lean manufacturing; χ_3 is benchmarking; χ_4 is business process reengineering, χ_5 is Kaizen; χ_6 is 5S; and ε is the error term obtained from the F-significance from ANOVA.

Table 4.11: Model Goodness of Fit

R	R Square	Adjusted Square	R Std. Estimate Error	Durbin Watson
0.951	0.904	0.518	0.47885	2.050

a. Predictors: (Constant), IT, lean manufacturing, BPR, benchmarking, Kaizen, 5S

b. Dependent Variable: performance

Table 4.11 above presents the regression model goodness of fit to establish if regression analysis is suited for the data. Pearson Correlation value of 0.95 was established depicting that the independent variables (IT, lean manufacturing, BPR, benchmarking, Kaizen, 5S) had a very good linear relationship with the dependent variable (performance). An R-square value of 0.904 was established depicting that 90.4 % of the IT, lean manufacturing, BPR, benchmarking, Kaizen, 5S influences the performance in the large scale manufacturing firms. A Durbin Watson test for autocorrelation value of

2.050 was established depicting no (serial) autocorrelation within the regression model residuals. Thus, the random (non-stationary) data was used in the regression analysis.

Table 4.12: Analysis of Variance (ANOVA)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3.222	6	0.537	2.343	0.001
Residual	7.328	32	0.229		
Total	10.55	38			

ANOVA analysis was conducted to establish the significance of the regression model.

Significance; $F(6, 32) = 2.343, P=0.001$

Table 4.8: Regression Coefficient

SCIA	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.132	1.355		1.500	0.574
IT	0.607	0.209	1.634	2.901	0.011
Lean manufacturing	0.146	0.062	0.127	3.335	0.048
Benchmarking	0.374	0.149	.308	3.514	0.031
BPR	0.127	0.058	0.112	3.994	0.026
Kaizen	0.428	0.089	0.439	3.652	0.030
5S	0.527	0.032	0.502	3.881	0.028

The study established the following regression model:

Performance = 2.13 + 0.61 Information technology + 0.15 Lean Manufacturing + 0.37 Benchmarking + 0.13 BPR + 0.43 Kaizen + 0.53 5S

The study established that when Information technology, lean manufacturing, business process reengineering, benchmarking, Kaizen, 5S are zero, the performance would be 2.13. It also established that holding other factors constant, a unit increase in lean manufacturing would yield a 0.15 increase in performance; a unit increase in IT would lead to a 0.61 increase in performance, a unit increase in benchmarking would result in a 0.37 increase in performance while a unit increase in BPR would yield a 0.13 increase in performance; a unit increase in Kaizen would result in a 0.43 increase in performance while a unit increase in 5S would yield a 0.53 increase in performance.

From the coefficients, it was established that each of the variables; (IT, Lean manufacturing, BRR, benchmarking, Kaizen, 5S) were significant in explaining performance of the large scale manufacturing companies in Nairobi County, Kenya.

4.7 Challenges Faced in the implementation of SC Improvement Approaches in Manufacturing firms

Table 4.12: Challenges Faced In Implementing SC improvement approaches.

Challenges	Mean	Std. deviation
Transportation costs	4.546	0.8941
Response of customer emails within 24hrs	4.517	1.028
Product availability at all times	4.515	0.4648
Prediction of future cost with certainties	4.417	0.2534
Achievements of desired financial objectives at all times	4.413	0.9484
Prediction of market fluctuations of demand and supply with certainty	4.403	0.6291
Having skilled expertise on right jobs.	4.327	0.0394
Resistance to change	4.216	0.9304
Cost control	4.156	0.452
Supporting creativity within the value chain	4.148	0.3958
Leveraging process benchmarking and diagnostics	4.108	0.8493
Creating savings	3.954	0.0483
Enhancing improvement in operational output through use of new technology	3.948	0.3895

In examining the possible challenges the manufacturing firms experienced when implementing the SC improvement approaches, the respondents were asked to rate some possible limitation on a 1-5 scale where 1 – Strongly Disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree. As indicated in the above table, the key challenges to effective implementation of supply chain approaches in manufacturing firms are Transportation cost (M=4.55, S.D=0.89), Response of customer emails within 24hrs (M=4.52, S.D=1.0), Product availability at all times (M=4.52, S.D=0.46), Prediction of future cost with certainties (M=4.42, S.D=0.25).

Christopher (1986) writes that firms are under pressure due to rising transportation costs. This also relates to KAM (2002), where the sector continues to be depressed due to increased oil prices which lead to high transport cost. Slack *et al.* (2010) provides a solution through use of metrics. Therefore the need for cost control as advocated for in the literature review is of great importance by use of potential metrics.

Managers need to narrow down onto the critical few that drive total supply chain costs within their organization. This will enable them measure how successful the manufacturing firms achieve the desired objectives as this enhances performance and enable them have competitive advantage over their competitors. Poor infrastructure on the other hand may lead to delays in goods and services delivery which may result to high competition and switch of customers to the competitors. There is a need for manufacturing firms to ensure efficiency and improvement of infrastructure.

4.8 Solutions to the Challenges Facing Manufacturing Firms

The respondents were to give possible solutions to the challenges facing their manufacturing firms. Most of the respondents pointed out that they can overcome these challenges by reducing high cost of transport and training of staff. This means that training of staff is important as this will help them be up to date in the new technology required for better improvement in the SC management and practices.

Improving the high cost of transport is also of great importance as it increases revenue of manufacturing firms, this will also help in reducing the cost of manufacturing products

and enhance on quality of the products produced. Other possible measures suggested by the respondents included, sourcing of human capital, improvement of infrastructure and technology, improving quality of goods, clear documentation and having high responsibility to customers.

On staff training, Murphy *et al.*, (2008) advise that with growing market demand, talents need to be developed to enhance competencies. On technology, Ghiassi and Spera (2003) posit that IT transforms business operations. Aquilano *et al.* (2010) gives an example of Campbell Soup, established a link between retailers through the use of EDI enhances competitiveness and elimination of discounts.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1: Introduction

This part gives an outline of the discoveries, conclusion from section four, furthermore gives the conclusions and proposals of the study in light of the goals of the study. The goals of this study were to decide change approaches utilized by substantial scale fabricating firms in Nairobi, to determine the effects of SC improvement approaches on large-scale manufacturing firms' performance in Nairobi and to establish the challenges faced in the implementation of improvement approaches in large scale manufacturing firms in Nairobi. The summary of findings, conclusions and recommendations are illustrated in the following sub sections.

5.2: Summary of the Findings

The study focused on an example size of forty five filled in and gave back the surveys making a reaction rate of eighty seven percent. To set up legitimacy, the exploration instrument was given to specialists who were experienced to assess the pertinence of everything in the instrument in connection to the targets. The same were evaluated on the size of one (exceptionally pertinent) to four (not extremely significant). A CVI of a point seven was gotten. Oso and Onen (2009), express that a legitimacy coefficient of in any event point seven is worthy as a substantial research subsequently the selection of the exploration instrument as legitimate for this study.

From the examination of discoveries, it was seen that greater part of the respondents demonstrated that they had worked somewhere around 8 and 11 years in the substantial scale producing firms. This was nearly trailed by respondents who showed that they had worked for a period between 3 to 7 years. Lion's share of the respondents subsequently noticed that they were accomplished to give pertinent data on the investigation of store network change methodologies and expansive scale assembling firms' execution in Kenya.

From the findings in the SPSS analysis, the statement, Information technology plays a significant role in increasing the efficiency and performance of large manufacturing firms in Kenya. It was noted that majority of the respondents strongly agreed that applying IT to communication and systems management in SC enhances accountability in the process. It was clear that information technology had a significant influence on performance of the large scale manufacturing firms in Nairobi County.

It was established from the examination that most respondents emphatically concurred on the announcement; Lean assembling is the most ideal creation framework, one that can be actualized in any industry and process. Generally it was also established that majority of the respondents noted that lean manufacturing had a major effect on the performance of the large scale manufacturing firms in Kenya.

From the analysis of findings, the values of tolerance were greater than point one and those of VIF were less than ten. This showed lack of multicollinearity among

independent variables. An R-square value of a point nine was established depicting that this relationship was very strong and the Information technology, lean manufacturing, business process reengineering, benchmarking, Kaizen, 5S influences ninety percent of the performance in the large scale manufacturing firms.

The study findings were seen to be in line with Gottfredson *et al.*, (2005) supply chain improvement approaches have become increasingly important aspects in the success of manufacturing performance While the implied objective of Supply chain change in supply chains is to determine a competitive advantage, it is not clear whether the supply chain choices of firms are dependably deliberately adjusted to their general focused system. There is supply chain coinciding over each of the five focused needs (cost, adaptability, inventiveness, quality and time) and noteworthy connection to store network execution.

5.3: Conclusion

From the findings it can be concluded that Information technology, lean manufacturing, business process reengineering, benchmarking, Kaizen and the 5S were important components of supply chain improvement approaches in enhancing performance of the large scale manufacturing firms in Nairobi County, Kenya. The study inferred that it is suitable for the supply administration work in an incline domain to coordinate incline ideas and wording into the improvement of supply procedure.

The study also concluded that lean manufacturing is the best production system and one that can be implemented in any industry and any process. The study also established that the use of internet and other online enablers have allowed transactions to perform on a real time basis. Electronic SCM has streamlined and optimized operations in the SC by ensuring maximum sales growth and ensuring constant low cost supplies.

5.4: Limitations of the Study

Some challenges were encountered by the researcher in the course of the study, especially amid the procedure of information accumulation. Because of deficient assets, the researcher directed this study under limitations of finance and in this manner gathered information from one urban focus. A portion of the respondents had inclination when giving data for reasons, for example, exploitation in the occasion the exploration discoveries went bad.

One other limitation of this study was the time engaged in the collection, analysis and interpretation of data. The voluminous data required plenty of time to collate and check for quality. This is especially so because the required data was not available in one file, format or location and had to be collated from several different sources.

5.5: Recommendations

The study established that the supply chain improvement approaches has enabled the large scale manufacturing firms to improve their performance and it is recommended that the banks ought to put in place approaches that brings efficiency and effectiveness in the

supply chain so that the organization can have competitive edge over its competitors while improving their performance especially their service delivery to their customers at the same time.

The study discovered that the vast scale fabricating firms that have received the supply chain improvement approaches have on general enhanced performance. It is along these lines prescribed that the study includes more prominent exhaustiveness of the inventory network change methodologies and upgrades our comprehension of the supply chain improvement approaches and their effect on hierarchical performance. From the discoveries, a great relationship in a supply chain is required for upgraded organizational performance.

5.6: Recommendations for Further Studies

The study was undertaken on the supply chain improvement approaches and performance in the large scale manufacturing firms in Nairobi County, Kenya. The study recommends that a further study should be carried out to find ways through which public institutions could enhance supply chain integration in order to improve their service and performance to the public. A further study should be carried out to establish the challenges of improving supply chain in public institutions and consequently how this impacts on their performance and service delivery in the public sector.

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APPENDIX 1: 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.

SECTION A: Respondents Profile

In order to ensure confidentiality do not put down your name on the questionnaire but please answer the questions as honestly and objectively as possible.

1. Please indicate your gender

Male [] Female []

2. Indicate your age bracket

18-23 years [] 24-29 years []

30-35 years [] above 36 years []

3. Indicate the number of years you have worked in the organization

Less than 3 years 3 years – 7 years

8- 11 years Above 12 years []

4. Indicate the highest level of education

O' Level [] Certificate level []

Diploma [] University []

Postgraduate [] others []

SECTION B: Supply Chain Improvement Approaches

To what extent has your firm implemented the following Supply Chain Improvement Approaches in its work place, using a five point scale below, Please tick appropriately against each Statement. The scale stand for the following: 1 = No Extent at All; 2= Small Extent; 3= Moderate Extent; 4= Great Extent; 5= Very Great Extent

Supply Chain Improvement Approaches	Extent				
	No extent at all	Small Extent	Moderate Extent	Great Extent	Very Great Extent
	(1)	(2)	(3)	(4)	(5)
Information Technology					
Lean manufacturing					
Benchmarking					
Business process reengineering					
Kaizen					
5S					

SECTION C I: Effects of Information Technology on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5
IT is the most common single type of technology within the SC					
The role of IT in SCM has changed dramatically in recent years, transforming business operations					
Data Interchange (EDI) systems and Enterprise Resource Planning (ERP) systems have been developed for supporting SCM					
Applying IT to communication and systems management in SC enhances accountability in the process					

The use of internet and other online enablers have allowed transactions to perform on a real time basis.					
Electronic SCM has streamlined and optimized operations in the SC by ensuring maximum sales growth and ensuring constant low cost supplies					
SC system leads to achievement of flexible coordination between a company and its customers and suppliers along the SC					

SECTION C II: Effects of Lean Manufacturing on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly Agree =5, Agree =4, Moderately Agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5
Lean manufacturing enhances customer value through waste elimination and continuous improvement in a system					
Lean manufacturing streamlines processes by eliminating waste and non-value added activities.					
Lean manufacturing as the best possible production system and one that can be implemented in any industry and any process					

SECTION C III: Effects of Benchmarking on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5

Benchmarking aids in measuring the performance of one's company against the best in the same or another industry					
Benchmarking is a tool to improve organizational performance and competitiveness in business life					
Benchmarking provides opportunities for businesses to adapt learning from other comparable operations to one's own performance or methods					

SECTION C IV: Effects of Business Process Reengineering on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5
The idea of business process re-engineering originated in the early 1990s					
Rather than using technology to automate work, it would be better applied to do away with the need for the work in the first place					
In today's ever changing world, the only thing that does not change is the change itself.					
Lean concepts, process flow charting, critical examination in method study and customer forecast-operations all contribute to the BPR concept					

SECTION C V: Effects of Kaizen on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5
Kaizen is often presented as one of the underlying principles of Lean					

Management and Total Quality Management					
Kaizen ensures participation and mobilization of workforce in process improvement					
Kaizen aids in creating and providing main channel for employees and workers to contribute to the organization's development and success					
In order to produce good outcome, management should be focused on creating sound processes					
Involvement of employees in the organization results in intrinsic desire for quality and productivity in a long run					

SECTION C VI: Effects of 5S on performance

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

It is appropriate for the supply management function in a lean environment to integrate lean concepts and terminology into the development of supply strategy	1	2	3	4	5
Companies adopting the lean production philosophy often implement the 5S process to bring order to the workplace and thereby support lean production					
5S is a proven model for organizing and maintaining a lean production environment					
5S is an appealing model for the development of supply strategy in a lean production environment.					

SECTION D: Challenges Faced in the implementation of SC Improvement Approaches in large scale manufacturing firms

To what extent do you agree with the following statement? Rate your answer on a five point Likert scale: Use a scale of 1-5 where; Strongly Agree =5, Agree =4, Moderately agree=3, Disagree =2 and Strongly disagree =1

	1	2	3	4	5
Transportation Cost					
Response of customer emails within 24hrs					
Product availability at all times					
Prediction of future cost with certainties					
Achievements of desired financial objectives at all times					
Prediction of market fluctuations of demand and supply with certainty					
Having skilled expertise on right jobs.					
Resistance to change					
Cost control					
Supporting innovation across value chain					
Leveraging process diagnostics and benchmarking					
Generating savings					
Improving operational productivity through new technologies					

Section E: performance of large scale manufacturing firms in Kenya. Please provide requested data or tick appropriately as required below

1. Please provide your organization sales turnover for the last three years:

Year	2012	2013	2014	2015
Turnover in KES(million)				

2. Please provide the average Return on Investment by your organization in the last three years

Year	2012	2013	2014	2015
%				

3. Please provide your organization's Net Income after Tax in KES for the last three years by ticking appropriately

Year	2012	2013	2014	2015
Less than Zero				
0-250 Million				
250-500 Million				
Above 500 Million				

4. Please provide the reduction in cost achieved by your organization (%) for the last three years by ticking appropriately

Year	2012	2013	2014	2015
Less than Zero (%)				
0-5%				
5-10%				
Above 10%				

5. Market Share (%)

Please indicate the proportion of your market share your organization commands in the industry by ticking appropriately. Please tick one

Year	2012	2013	2014	2015
0-5%				
5-10%				
10-15%				
15-20%				
Above 20%				

THANK YOU!!

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

Sector: Building, Construction and Mining (6)	
Central Glass Industries Ltd	Kenya Builders and Concrete Ltd
Karsan Murji and Company Limited	Manson Hart Kenya Ltd
Kenbro Industries Ltd	Mombasa Cement Ltd
Sector: Food, Beverages and Tobacco (100)	
Africa Spirits Ltd Highlands	Mineral Water Co. Ltd
Agriner Agricultural Development Limited	Home oil
Belfast Millers Ltd Insta	Products (EPZ) Ltd
Bidco Oil Refineries Ltd	Jambo Biscuits (K) Ltd
Bio Foods Products Limited	Jetlak Foods Ltd
Breakfast Cereal Company(K) Ltd	Karirana Estate Ltd
British American Tobacco Kenya Ltd	Kenafric Industries Limited
Broadway Bakery Ltd	Kenblest Limited
C. Czarnikow Sugar (EA) Ltd	Kenya Breweries Ltd
Cadbury Kenya Ltd Kenya	Nut Company Ltd
Centrofood Industries Ltd	Kenya Sweets Ltd
Coca cola East Africa Ltd	Nestle Kenya Ltd
Confec Industries (E.A) Ltd	Nicola Farms Ltd
Corn Products Kenya Ltd	Palmhouse Dairies Ltd
Crown Foods Ltd	Patco Industries Limited
Cut Tobacco (K) Ltd	Pearl Industries Ltd
Deepa Industries Ltd	Pembe Flour Mills Ltd
Del Monte Kenya Ltd	Premier Flour Mills Ltd
East African Breweries Ltd	Premier Food Industries Limited
East African Sea Food Ltd	Proctor and Allan (E.A.) Ltd
Eastern Produce Kenya Ltd	Promasidor (Kenya) Ltd
Farmers Choice Ltd	Trufoods Ltd

Frigoken Ltd	UDV Kenya Ltd
Giloil Company Limited	Unga Group Ltd
Glacier Products Ltd	Usafi Services Ltd
Global Allied Industries Ltd	Uzuri foods Ltd
Global Beverages Ltd	ValuePak Foods Ltd
Global Fresh Ltd W.E.	Tilley (Muthaiga) Ltd
Gonas Best Ltd	Kevian Kenya Ltd
Hail and Cotton Distillers Ltd	Koba Waters Ltd
Al-Mahra Industries Ltd	Kwality Candies and Sweets Ltd
Alliance One Tobacco Kenya Ltd	Lari Dairies Alliance Ltd
Alpha Fine Foods Ltd	London Distillers (K) Ltd
Alpine Coolers Ltd	Mafuko Industries Ltd
Annum Trading Company Limited	Manji Food Industries Ltd 61
Aquamist Ltd	Melvin Marsh International
Brookside Dairy Ltd	Kenya Tea Development Agency
Candy Kenya Ltd	Mini Bakeries (Nbi) Ltd
Capwelll Industries Ltd	Miritini Kenya Ltd
Carlton Products (EA) Ltd	Mount Kenya Bottlers Ltd
Chirag Kenya Limited	Nairobi Bottlers Ltd
E and A Industries Ltd	Nairobi Flour Mills Ltd
Kakuzi Ltd	NAS Airport Services Ltd
Erdemann Co. (K) Ltd	Rafiki Millers Ltd
Excel Chemical Ltd	Razco Ltd
Kenya Wine Agency Limited	Re-Suns Spices Limited
Highlands Canner Ltd	Smash Industries Ltd
Super Bakery Ltd	Softa Bottling Co. Ltd
Sunny Processor Ltd	Spice World Ltd
Spin Knit Dairy Ltd	Wrigley Company (E.A.) Ltd
Sector: Chemical and Allied (62)	

Anffi Kenya Ltd	Crown Berger Kenya Ltd
Basco Product (K) Ltd	Crown Gases Ltd
Bayer East Africa Ltd	Decase Chemical (Ltd)
Continental Products Ltd	Deluxe Inks Ltd
Cooper K- Brands Ltd	Desbro Kenya Limited
Cooper Kenya Limited	E. Africa Heavy Chemicals (1999) Ltd
Beiersdorf East Africa Ltd	Elex Products Ltd
Blue Ring Products Ltd	European Perfumes and Cosmetics Ltd
BOC Kenya Limited	Galaxy Paints and Coating Co. Ltd
Buyline Industries Limited	Grand Paints Ltd
Carbacid (CO2) Limited	Henkel Kenya Ltd
Chemicals and Solvents E.A. Ltd	Imaging Solutions (K) Ltd
Chemicals and Solvents E.A. Ltd	Interconsumer Products Ltd
Coates Brothers (E.A.) Limited	Odex Chemicals Ltd
Coil Products (K) Limited	Osho Chemicals Industries Ltd
Colgate Palmolive (E.A) Ltd	PolyChem East Africa Ltd
Johnson Diversity East Africa Limited	Procter and Gamble East Africa Ltd
Kel Chemicals Limited	PZ Cussons Ltd
Kemia International Ltd	Royal Trading Co. Ltd
Ken Nat Ink and Chemical Ltd	Reckitt Benckiser (E.A) Ltd
Magadi Soda Company Ltd	Revolution Stores Co. Ltd
Maroo Polymers Ltd	Soilex Chemical Ltd
Match Masters Ltd	Strategic Industries Limited
United Chemical Industries Ltd	Supa Brite Ltd
Oasis Ltd	Unilever Kenya Ltd
Rumorth EA Ltd	Murphy Chemical E.A Ltd
Rumorth East Africa Ltd	Syngenta East Africa Ltd 62
Sadolin Paints (E.A.) Ltd	Synresins Ltd
Sara Lee Kenya Limited	Tri-Clover Industries (K) Ltd

Saroc Ltd	Twiga Chemical Industries Limited
Super Foam Ltd	Vitafoam Products Limited
Sector: Energy, Electrical and Electronics (42)	
A.I Records (Kenya) Ltd	East African Cables Ltd
Amedo Centre Kenya Ltd	Eveready East Africa Limited
Assa Abloy East Africa Ltd	Frigorex East Africa Ltd
Aucma Digital Technology Africa Ltd	Holman Brothers (E.A.) Ltd
Avery (East Africa) Ltd	IberaAfrica Power (EA) Ltd
Baumann Engineering Limited	International Energy Technik Ltd
Centurion Systems Limited	Kenwest Cables Ltd
Digitech East Africa Limited	Kenwestfal Works Ltd
Manufacturers and Suppliers (K) Ltd	Kenya Power and Lighting Co. Ltd
Marshall Fowler (Engineers) Ltd	Kenya Scale Co. Ltd/ Avery
Mecer East Africa Ltd	Kenya Ltd
Metlex Industries Ltd	Kenya Shell Ltd
Metsec Ltd	Libya Oil Kenya Limited
Modulec Engineering Systems Ltd	Power Technics Ltd
Mustek East Africa Sanyo	Reliable Electricals Engineers Ltd
Nationwide Electrical Industries	Armo (Kenya) Ltd
Nationwide Electrical Industries Ltd	Socabelec East Africa
Optimum Lubricants Ltd	Sollatek Electronics (Kenya) Limited
PCTL Automation Ltd	Specialised Power Systems Ltd
Pentagon Agencies Tea	Synergy-Pro
Power Engineering International Ltd	Vac Machinery Limited
Sector: Plastics and Rubber (54)	
Betatrad (K) Ltd	ACME Containers Ltd
Blowplast Ltd	Afro Plastics (K) Ltd
Bobmil Industries Ltd	Alankar Industries Ltd
Complast Industries Limited	Dune Packaging Ltd

Kenpoly Manufacturers Ltd	Elgitread (Kenya) Ltd
Kentainers Ltd	Elgon Kenya Ltd
King Plastic Industries Ltd	Eslon Plastics of Kenya Ltd
Kingway Tyres and Automart Ltd	Five Star Industries Ltd
L.G. Harris and Co. Ltd	General Plastics Limited
Laneeb Plastics Industries Ltd	Haco Industries Kenya Ltd
Metro Plastics Kenya Limited	Hi-Plast Ltd
Ombi Rubber Rollers Ltd	Jamlam Industries Ltd
Packaging Industries Ltd	Kamba Manufacturing (1986) Ltd
Plastics and Rubber Industries Ltd	Keci Rubber Industries
Polyblend Limited	Nairobi Plastics Industries
Polyflex Industries Ltd	Nav Plastics Limited
Polythene Industries Ltd	Ombi Rubber
Premier Industries Ltd	Packaging Masters Limited
Prestige Packaging Ltd	Plastic Electricons
Prosel Ltd	Raffia Bags (K) Ltd
Qplast Industries	Rubber Products Ltd
Sumaria Industries Ltd	Safepak Limited
Super Manufacturers Ltd	Sameer Africa Ltd
Techpak Industries Ltd	Sanpac Africa Ltd
Treadsetters Tyres Ltd	Silpack Industries Limited
Uni-Plastcis Ltd	Solvochem East Africa Ltd
Wonderpac Industries Ltd	Springbox Kenya Ltd
Sector: Textile and Apparels (38)	
Africa Apparels EPZ Ltd	MRC Nairobi (EPZ) Ltd
Fulchand Manek and Bros Ltd	Ngecha Industries Ltd
Image Apparels Ltd	Premier Knitwear Ltd
Alltex EPZ Ltd	Protex Kenya (EPZ) Ltd
Alpha Knits Limited	Riziki Manufacturers Ltd

Apex Appaels (EPZ) Ltd	Rolex Garments EPZ Ltd
Baraka Apparels (EPZ) Ltd	Silver Star Manufacturers Ltd
Bhupco Textile Mills Limited	Spinners and Spinners Ltd
Blue Plus Limited	Storm Apparel Manufacturers Co. Ltd
Bogani Industries Ltd	Straightline Enterprises Ltd
Brother Shirts Factory Ltd	Sunflag Textile and Knitwear Mills Ltd
Embalishments Ltd	Tarpo Industries Limited
J.A.R Kenya (EPZ) Ltd	Teita Estate Ltd
Kenya Trading EPZ Ltd	Thika Cloth Mills Ltd
Kikoy Co. Ltd	United Aryan (EPZ) Ltd
Le-Stud Limited	Upan Wasana (EPZ) Ltd
Metro Impex Ltd	Vaja Manufacturers Limited
Midco Textiles (EA) Ltd	Yoochan Kenya EPZ Company Ltd
Mirage Fashionwear EPZ Ltd	YU-UN Kenya EPZ Company Ltd
Sector: Timber, Wood Products and Furniture (22)	
Economic Housing Group Ltd	Rosewood Office Systems Ltd
Eldema (Kenya) Limited	Shah Timber Mart Ltd
Fine Wood Works Ltd	Shamco Industries Ltd
Furniture International Limited	Slumberland Kenya Limited
Hwan Sung Industries (K) Ltd	Timsales Ltd
Kenya Wood Ltd	Wood Makers Kenya Ltd
Newline Ltd	Woodtex Kenya Ltd
PG Bison Ltd	United Bags Manufacturers Ltd
Transpaper Kenya Ltd	Statpack Industries Ltd
Twiga Stationers and Printers Ltd	Taws Limited 64
Uchumi Quick Suppliers Ltd	Tetra Pak Ltd
Sector: Pharmaceutical and Medical Equipment (20)	
Alpha Medical Manufacturers Ltd	Dawa Limited
Beta Healthcare International Limited	Elys Chemical Industries

Biodeal Laboratories Ltd	Gesto Pharmaceutical Ltd
Bulks Medical Ltd	Glaxo Smithkline Kenya Ltd
Cosmos Limited	KAM Industries Ltd
Laboratory and Allied Limited	KAM Pharmacy Limited
Manhar Brothers (K) Ltd	Pharmaceutical Manufacturing Co.
Madivet Products Ltd	Regals Pharmaceuticals
Novelty Manufacturing Ltd	Universal Corporation Limited
Oss. Chemie (K) Pharm	Access Africa Ltd
Sector: Metal and Allied (38)	
Allied Metal Services Ltd	Booth Extrusions Limited
Alloy Street Castings Ltd	City Engineering Works Ltd
Apex Street Ltd	Rolling Mill Division Crystal Industries Ltd
ASL Ltd	Davis and Shirtliff Ltd
ASP Company Ltd	Devki Steel Mills Ltd
East Africa Foundry Works (K) Ltd	East Africa Spectre Limited
Elite Tools Ltd	Kens Metal Industries Ltd
Friendship Container Manufacturers	Khetshi Dharamshi and Co. Ltd
General Aluminum Fabricators Ltd	Nampak Kenya Ltd
Gopitech (Kenya) Ltd	Napro Industries Limited
Heavy Engineering Ltd	Specialized Engineer Co. (EA) Ltd
Insteel Limited Steel	Structures Limited
Metal Crown Limited	Steelmakers Ltd
Morris and Co. Limited	Steelwool (Africa) Ltd
Nails and Steel Products Ltd	Tononoka Steel Ltd
Orbit Engineering Ltd	Welding Alloys Ltd
Rolmil Kenya Ltd	Wire Products Limited
Sandvik Kenya Ltd	Viking Industries Ltd
Sheffield Steel Systems Ltd	Warren Enterprises Ltd

Sector: Leather Products and Footwear (8)	
Alpharama Ltd	CP Shoes
Bata Shoe Co. (K) Ltd	Dogbones Ltd
New Market Leather Factory Ltd	East Africa Tanners (K) Ltd
C and P Shoe Industries Ltd	Leather Industries of Kenya Limited
Sector: Motor Vehicle Assembly and Accessories (18)	
Auto Ancillaries Ltd Kenya	Vehicle Manufacturers Limited
Varsani Brakelining Ltd	Labh Singh Harnam Singh Ltd
Bhachu Industries Ltd	Mann Manufacturing Co. Ltd
Chui Auto Spring Industries Ltd	Megh Cushion industries Ltd
Toyota East Africa Ltd Mutsimoto	Motor Company Ltd
Unifilters Kenya Ltd	Pipe Manufacturers Ltd
General Motor East Africa Limited	Sohansons Ltd
Impala Glass Industries Ltd	Theevan Enterprises Ltd
Kenya Grange	Vehicle Industries Ltd
Sector: Paper and Paperboard (48)	
Ajit Clothing Factory Ltd	Conventual Franciscan Friars-Kolbe Press
Associated Papers and Stationery Ltd	Creative Print House
Autolitho Ltd	D.L. Patel Press (Kenya) Limited
Bag and Envelope Converters Ltd	Dodhia Packaging Limited
Bags and Balers Manufacturers (K) Ltd	East Africa Packaging Industries Ltd
Brand Printers	Elite Offset Ltd
Business Forms and Systems Ltd	Ellams Products Ltd
Carton Manufacturers Ltd	English Press Limited
Cempack Ltd	General Printers Limited
Chandaria Industries Limited	Graphics and Allied Ltd
Colour Labels Ltd	Guaca Stationers Ltd
Colour Packaging Ltd	Icons Printers Ltd
Colour Print Ltd	Interlabels Africa Ltd

Kenya Stationers Ltd	Jomo Kenyatta Foundation
Kim-Fay East Africa Ltd	Kartasi Industries Ltd
Paper Converters (Kenya) Ltd	Kenafric Diaries Manufacturers Ltd
Paper House of Kenya Ltd	Kitabu Industries Ltd
Paperbags Limited	Kul Graphics Ltd
Primex Printers Ltd	Label Converters
Print Exchange Ltd	Modern Lithographic (K) Ltd
Printpak Multi Packaging Ltd	Pan African Paper Mills (EA) Limited
Printwell Industries Ltd	Ramco Printing Works Ltd
Prudential Printers Ltd	Regal Press Kenya Ltd
Punchlines Ltd	SIG Combibloc Obeikan Kenya

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