

**TOTAL QUALITY INTEGRATION IN SUPPLY CHAIN OPERATIONS AND
PERFORMANCE OF LARGE MANUFACTURING FIRMS IN NAIROBI,
KENYA**

BY

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DECLARATION

This research project is my original work and has not been presented to any other examination body for award of degree.

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DEDICATION

I would like to dedicate this project to my family, who had to cope with my absence from home and school activities in many occasions during this study may God bless you all.

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ABBREVIATIONS AND ACRONYMS

EMIS	Employees Management Information System
GDP	Gross Domestic Product
ISO	International Organization for Standardization
KAM	Kenya Association of Manufacturers
SCM	Supply Chain Management
SCO	Supply Chain Operations
SMEs	Small and medium enterprises
SMS	Supplier Management System
TQ	Total Quality
TQM	Total Quality Management

ABSTRACT

This study explores the impacts of Total Quality integration in Supply Chain Operations and performance within the context of large manufacturing firm in Nairobi Kenya. Most of the organizations has achieved world-class status when they successfully and explicitly developed operational capabilities (through Total Quality Management) to drive the company towards attainment of a sustained overall quality over their competitors which has a direct impact on customer satisfaction. However, Total Quality Integration (TQI) would only be successfully implemented in an organization if it's well managed across all parties involved is supply chain network from upstream to downstream. Customers as the end user of the services and products need to be satisfied by what the corporations are offering, and this can be attained by continuous improvement and innovation through TQ and supply chain integration. Empirically, the purpose of this research is to present an explicit result on the effect of Total Quality integration on SCO and performance where other researchers have perhaps known or described them only implicitly. This study suggests that the role of TQ and SCO Integration has significant association with organization performance and customer satisfaction and support this proposition with statistical evidence. The result of the study fills a gap that exists in the literature on the impact Total Quality integration in Supply Chain Operations and performance of large manufacturing firms in Nairobi. The study adopted the descriptive cross-sectional design where data were collected using self-administered questionnaire that were distributed to 46 manufacturing firms targeting supply chain managers or their equivalent as the respondents where 38 copies were returned dully filled. The data was then presented in using pie charts, tables and analyzed using means and standard deviations and a regression equation adopted to establish the relationship. The finding gave a positive relationship between TQ integration in supply chain operation and the performance of large manufacturing firms in Nairobi. It was found that if TQ integration in supply chain operations if well implemented properly produces many benefits such as meeting the customers' needs, better problem-solving capacity of the firm and better internal communication. The study therefore recommends that firms should adopt TQ integration I s their supply chain so as to attain optimum performance. The study's key limitation is that it only focused on the manufacturing sector and thus the study's findings might not be replicated to other context and thus future research should focus on expanding the domain through other dimensions such as logistics integration, geographical proximity and cross functional coordination for better output.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The quest for quality and affordable products and services is probably widely spread in the global market more than any other time in business history. Customer are demanding quality and affordable product or services that give them back value for their money. Many are the time cunning businessmen re-package their sub-standard product using the package of quality approved product because customer believe in quality and they know customer will buy their fake/sub-standard product thinking it's the original product, good example being Mumias Sugar. Improving quality of the products and services is key to increased profitability and productivity as it reduces overall product cost and improve product/service quality (Karthi, C. P., 2014). Many organizations have come up with several strategies that aid in achieving competitive advantage while retaining and satisfying their customer. Integrating Total Quality (TQ) principles such as -Strong customer focus, Leadership, Motivation, Process approach and Continuous improvement in Supply Chain Operations (SCO) is the key strategy organizations are applying to attain the competitive advantage in the market (Cristina, Tracy, Lim & Vonderembse, 2015).

Supply Chain Management and Total Quality Management (TQM) grew along the same path although they did not emerge from the same starting point. Their scope was broadened to gain synergy through integration of concerns of all interrelated parties (Vinichchinchai & Igel, 2009). TQM emphasizes more on internal participation whereas SC focuses more on external partnerships. Integrating TQ & SCO result in shifting of focus from operational concern towards strategic issues expectation (Cristina, Tracy, Lim & Vonderembse, 2015). Integration of total quality principles with SCO such as Supplier Partnership, Customer Relationship Management, Outsourcing and Information Sharing offers great potential for broadening Supply Chain Management (SCM) perspectives from its traditional focus on competitive relationship and costs to focusing on cooperative associations between the players in the supply chain (Flynn and Flynn, 2005). According to Talib (2011), TQ and SCO are considered as the most vital strategies for businesses of all kind. Supply chain embrace quality to achieve better product quality and development.

Application of TQM have an impact in reducing organization process variance which positively affect supply chain performance indicators such as product cost and perfect delivery (Flynn et al. 1995). ISO 9001:2015 (Quality Management system (QMS) which is the recent ISO certification is the most predominant global quality initiative that help firms to meet both regulatory and statutory requirements relating to their product/services (Gotzamani, 2016). The standard is set on several Quality Management principles including; Customer Focus, Leadership. Motivation, Continuous Improvement, Process Approach and Relationship Management (Tan and Lim-Teck Sia, 2016). (Sanjeev 2017) observed that TQM principles including Customer Focus, Continuous Improvement, People Involvement, People Based Management, Data Based Management, Motivation and Culture of continuous improvement resulted in business excellence in supply chain operation.

Theories underpinning this research included, Total Quality Management theory, Customer Satisfaction theory and Systems theory. TQM theory is an approach which seeks to improve the performance of the firm which meet and exceed the customer's expectations. Systems theory stipulate the overall perspective structure of a firm whose implication is that the organization's objectives cannot be viewed separately per departmental but should all be linked together to create synergy and inter-dependence (Pels & Polese, 2010). Customer Satisfaction theory is the theory that investigate how goods and services supplied to the customers conform or surpass customer's expectation. McDaniel (2015) argued that, customer satisfaction measures the extent to which the products/services supplied by the firm meet or surpass the customer's expectations.

1.1.1 Total Quality Management Integration

Integration is defined as the process of merging elements from two processes to create a single process which could substitute the original process (Miller, 2016). Some studies define integration between TQ and SCO as the concept of Supply Chain Quality Management (SCQM). Total Quality Management (TQM) is a framework based on a belief that, organization can build a long-term achievement if all members from various management levels can focus on quality improvement thus help the organization to meet customer satisfaction (Rouse, 2017). It provides a framework under which everybody in the organization can participate to yield customer satisfaction. Total

quality referred to as total since it entails the following qualities; Quality of products to satisfy the customer's specific needs, Quality of return to satisfy the needs of stakeholders and quality of work-life balance (Chia-Chen, 2016). Furthermore, TQM is a total systems approach which works across all functions and departments, from top to bottom, and stretches forward and backward to constitute suppliers and customers (Talib et al. 2010).

Supply chain operations are all about managing people and processes and there cannot be any improvement model than TQM which focuses on individuals and processes. Various principles such as strong customer focus, leadership, motivation, continuous improvement, process approach and relationship management as spelt out in ISO 9001:2015 were observed as a measure to integrate in supply chain operations (Tan and Lim, 2016).

Sprague (2013) suggested that, TQ concepts integration with SCO affect SCM capabilities in both upstream and downstream side of supply chain. SCM examines the coordination and configuring the process that are required to make products delivered on time and in good condition. The TQ variables include Leadership Customer Focus, Top Management Commitment, Motivation, Continuous Improvement, Relationship Management and Process Approach as per the past studies such as Teece (2010), Govindarajan, Kopalle, & Danneels (2011) and Yildirim (2012).

1.1.2 Supply Chain Operations

Supply Chain Operations are the structures, systems, and processes used to plan and undertake the flow of goods, services and information from the point of supply to the end user (David B, 2013). It links the company's internal functions and combines them with the supplier's external operations, customers and other chain players thus improving competitive performance (Chackusta, 2018). Donlon (2015) considered outsourcing, information sharing, supplier partnership, cycle time compression and continuous process flow as supply chain operations processes.

Due to increased competition and fast changing business environment, supply chains have been put in stress. Thus, in order to help organizations to overcome this pressure, supply chain council has suggested Supply Chain Operations Reference (SCOR) model (Surya Prakash, 2013). It's a systematic procedure that provides a unique framework

entailing five processes which includes; plan, make, source, deliver and return. With the help of such tools, the firm will be able to address and improve the decisions of SCM within the organization, customers and suppliers thus improve quality of communication within supply chain operations (Gunjan, 2013).

Supply chain operations variables that were considering in this study are Supplier Partnership, Outsourcing, Information Sharing and Customer Relationship Management. Tandy (2012) used Quality, Customer Relation, Purchasing and Procurement to represent SCO in their empirical study.

1.1.3 Operational Performance

Performance in organizations is a process by which organization assess the progress toward the attainment of predetermined goal. It's the process through which the firm evaluates its progress towards the attainment of the predetermined goals (Terrel, 2013). It takes different forms depending on the type and reasons for the measurement e.g. organization growth, financial growth, new product and product differentiation, diversification, innovation and competitive advantage. For informed decision making, different stakeholders require various performance indicators (Manyuru, 2015). The utilization of financial measures alone disregards the fact that it is the attainment of the stated objectives that drives the firm towards the achievement of better financial results in terms of increased market strength and competitiveness (Thompson, Joel and Martin, 2017). The non-financial measures may include competitiveness, market standing, innovativeness and customer satisfaction.

There are various methods that can be used for the measurement of the overall firm performance which include; (I)Accounting Measures which can be measured through (profitability measures, leverage, growth rate, cash flow measures and liquidity), (II) Operational Performance which can be measured through (customer satisfaction, changes in intangible assets including human resources, patents and stakeholder performance (III)Survival Measures (performance over time) (IV) Market Based Measures which can be measured through (market value added, return on shareholder, holding period returns), and (V) Economic Value Measures which can be measured through (residual income, cash flow return on investment and economics value added) (Kaplan and Morton, 2016).

1.1.4 Large Manufacturing Firms in Kenya

Kenya has a wide range of manufacturing sectors which serve both the local market and international market. The manufacturing sector, which is dominated mainly by multinational corporations, contribute an average of 15% toward the Gross Domestic Product (GDP) OF Kenya (Pricewaterhousecoopers, 2006). Awino and Gituro (2011) indicated that Kenyan manufacturing firms can be classified based on the number of employees they have engaged or based on capital employed. They further stated that large scale manufacturing firms are those that have engaged more than 100 employees, medium firms from 50-100 employees while small scale firms have 11-50 employees.

The manufacturing sector is a vital sector in Kenya economy as its one of the major pillars of vision 2030 geared towards transforming the country into a middle level income nation by the year 2030. There are more than 700 functioning multi-sector Kenyan manufacturing firms where 455 are situated in Nairobi (KAM, 2018). These firms differ in term of product they produce, and the size is dictated by the number of workers.

The manufacturing sector has played a critical role across the world in steering economic development through stimulation and sustenance of high productive growth, providing employment opportunities for both skilled and semi-skilled labor and increasing the competitiveness of the county through exports. After independence, Kenya Government promoted economic growth through public investment in infrastructure by encouraging small-scale agricultural production, providing better living conditions and issuing private industrial investment incentives which resulted to job creation for the working population (Kenya National Bureau of Statistic, 2017)

The volatility and dynamism of the business environment in Kenya has forced large manufacturing firms to focus more on being efficient and flexible in their manufacturing processes and supply chain operations so as to handle the changes that are brought by this dynamism (Kinya, 2013). Excessive competition from cheap imports has become an impediment to the growth of the industry. This calls for strategies that will lead to cost reduction (Kenya Association of Manufacturers, 2018)

1.2 Research Problem

While it is apparent that total quality integration in supply chain operations has well-documented benefits to all organization dealing with business of all kind, most of the organizations aim at maximizing profit without really taking care of the quality of goods they produce (Powell, 2015). Companies should consider the superior quality as a critical element of customer satisfaction and attainment of organization goals. Thus, many highly competitive organizations have integrated TQM principles with supply chain operations so as to improve customer relationships and performance (Abas & Jude, 2016). Jilani, John and Mwandembo (2017) opined that total quality integration is a management strategy of a firm which focuses on quality, involvement of all staff members and aim at long term success. They concluded that TQ and SCO integration is a philosophy for managing supply chain flow from upstream to downstream that meet customer expectation and leave all the staff motivated.

The choice for large manufacturing industry in this study is guided by the fact that they have the capacity and ability to put in place all the system processes required to aid the integration of the TQM and SCO. Supply chain network constitutes the business activities required to design, make and deliver product/services to the end user. Thus, businesses rely on their supply chain to provide them with what is required to survive and thrive in the present highly competitive and volatile business environment; hence the need to integrate TQM principles with supply chain operations (Sandeep, 2013).

A study by Jojo (2010) in China on TQ integration in supply chain operation and organization performance indicated that, improvement of the quality of supply chain processes leads to better resource utilization, increased efficiency and reduced cost hence quality and affordable product that meet customers' expectations. Bruce (2017) conducted a study in Turkey and observed that, the size of the firm statistically affects TQ and SCO integration effort. He pointed out that large firms have the capacity to implement systems such as Employees Management Information System (EMIS), Supplier Integrated System (SIS) and continuous improvement practices intensively as compared to small firms and thus the choice of large manufacturing firm in kenya.

Kokonya, (2014) researched on "Competitive advantage in integrating TQ and SCM in telecommunication industry in kenya" concluded that its evident that integrating TQ in SCM bring about competitive advantage as has seen in the leading telecommunication firm that has maintained a competitive edge over the other firms in the industry. Wanjau

(2018) studies on the role of quality integration in supply chain operations on SMEs and economic development in Kenya concluded that though it's a big challenge on implementation of TQ in SCM, it's evidence that firms embracing this strategy have cut their clear line in the market because of the competitive edge as compared to those that are yet to implement the integration. Vanichchichai and Igel (2010) argued that simultaneous implementation of TQM and supply chain operations require many resources because of enlarged scope that that contained the internal functions as well as the operations of the external parties.

In view of the above foregoing studies, a lot is known about quality and integration in supply chain operations but its implementation to achieve high performance and customer satisfaction remain a challenge to many organizations despite them being quality certified and deployment of quality management systems (James, 2018). Many organizations view certification not on the context of customer satisfaction rather than to be viewed as quality complaint in the market. More so with quality raw material, quality process, satisfied employees, quality product will result to satisfied customer. The research sought to answer the following questions: To what extent have the firms implemented the integration of TQ principles in Supply Chain Operations? What is the impact of implementation of TQ principles and SCO integration on the performance of large manufacturing firms in Kenya? What are the barriers faced by the firms in the implementation of TQ in SCO?

1.3 Objectives of The Study

The study was based on the general objective which is to establish the impact of total quality integration in supply chain operations on firm's performance. The survey's specific objectives were;

- i. To establish the extent of implementation of TQ integration in Supply Chain Operation by the large manufacturing firms in Nairobi.
- ii. To establish the impact of TQ integration in Supply Chain Operations and the performance of large manufacturing firms in Nairobi.
- iii. To establish the barriers faced by the large manufacturing firms in Nairobi in implementation of TQ integration in Supply Chain Operation.

1.4 Value of the Study

TQM organizes an organization by process not by functions and this seeks to eliminate the barriers and concentrates on delivering products that fully satisfy the needs of the customer. Thus, it will help Kenyan manufacturing firms to adopt the best practices for competitive advantage and customer satisfaction. Other small manufacturing industries and non-manufacturing organizations will also benefit from this study's results since it will elaborate on the implications of integrating TQ in SCO on organization performance.

This study can also be applied by practitioners and policy makers to solve work related problems. TQ and SCO integration encourages innovation, motivate employee for better quality, make organization adaptable to change and integrate the business arising from common purpose which provide the firm with a valuable and distinctive and competitive advantage and more so positively contributes to customer satisfaction. The findings can also be used for academic documentation that contributes to the body of knowledge which is useful for academic references. It will also be useful by scholars thus forming the basis of stimulating further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section reviews previous scholarly work conducted in a similar field as that of the study. The chapter covers areas such as; theoretical review, theories underpinning this study, concept of integrating total quality and supply chain operations, empirical review, drivers, barriers and summary of literature.

2:2 Theoretical Literature Review

This section provides a theoretical understanding of the Total Quality integration in SCO. It covers the main theoretical underpinning the integration TQ integration in SCO which include; Total quality management theory (TQM) and Customer Satisfaction theory and system theory. Total Quality Management theory is applicable to this study as it focuses on firm's internal processes while the overall result is to have satisfied customer as explained by the Customer Satisfaction theory.

2.2.1 Total Quality Management Theory

The concept of TQM originated from Japanese industry in the 1950's and has received increased popularity in the west since early 1980's. The Japanese advanced the new concept in the Late 1950's in response to the Americans. These include Ishikawa who made several contributions to quality which included total quality control which advocates for human side of quality and Poka - yoke (late 1950s) who emphasized on rectifying errors before they become defects hence producing quality products. Between 1970's and 1980's Western gurus preceded the Japanese industrial revolution; these are the like of Crosby who initiated the concept of 'Zero Defect' and Quality is free'. According to Philip Crosby (1979), quality is neither tangible nor measurable. Rather, it is a strategic imperative which could be used to improve. Ford (2016) in the study "Beyond TQM," describes quality as "meeting the customer's agreed requirement, formal and informal, at the lowest cost every time"

This theory was relevant to this study because TQM focuses more on internal participation where's SCO emphasizes more on the external partnerships. Sprague (2016) argued that implementation of TQM principles such as top management commitment, customer survey, customer satisfaction, product design and

manufacturing, outgoing inspection and quality control affect SCO capabilities in both upstream and upstream side of supply chain. Furthermore, TQM is a total system dimension which affects all functions of the organization involving all the employees at all levels of management and stretches backward and forward to includes the supplier and customer chain (Haseeb, 2017).

2.2.2 Customer Satisfaction Theory

In the business world, providing and maintaining customers satisfaction is one of the challenges facing business today. McDaniel (2015) argued that customer satisfaction as a business term measures the extent to which the products or services supplied by the firm meet or surpasses the customer's expectations. It is perceived as a chief performance determinant within business and is one of the four key aspects of a scorecard. In general satisfaction is a feeling of content or discontent emerging from the comparison of perceived performance of a product against his or her expectation.

This theory was applicable to this research because the ultimate goal of improved firm's performances is to have satisfied customers while maintaining competitive advantage. This theory will help the researcher to focus on the supply chain aspects that will help the firms to improve their performances as well as satisfying their customers.

2.2.3 Systems Theory

The theory was advanced by Bertalariffy in 1968. He proposed a system which included the interrelation and distinctiveness of an element. He emphasized on the comprehensiveness as opposed to concentrating on single systems peculiarities in order to create consistency between different fields. He believed that the wholeness can create more value in the system than focusing on every aspect exclusively. System theory brings about the general perspective structure for analyzing the firm as a whole implication is that an organization's activities cannot be viewed separately but as interdependent so as to create synergy and interconnections (Pels & Polese, 2010). System theory considers communication as a system bidder, controls for the survival and growth of the firm. Integrating the subsystems facilitate internal stability and controls (Klein, 2016).

Systems theory was relevant in this study because the entire supply chain can be viewed as a system comprising of various element such as manufacturers, suppliers, retailers, wholesalers and customers as subsystems. For the whole system to function as one all subsystems must link to each other and play its functions well for the success of the entire system. This way products will be able to move from origin to the final destination and the customer will be able to derive maximum satisfaction from the products as the right products will reach m at the right time, quality and quantity and at the right place.

2.3 Total Quality Integration in Supply Chain Operation

Supply chain operations are the structures, systems and processes to facilitate the flow of goods, services and information from the point of production to consumption point (David B, 2013). TQ and SCM grew along similar paths although their starting points were different (Chia-Chen, 2016). They differed with regards to the extent of integration then widened in scope to gain synergy through integration of the concept of all interrelated players (Igel and Vanichchinchai, 2009). However, TQM focuses more on internal participation where SCO places more emphasis on structures, processes that extend to external partnerships. Supply chain operations variables this study will be considering are customer relationship, supplier partnership, information sharing and outsourcing. The TQM variables include top management commitment and leadership, customer focus and continuous improvements as per the past studies such as Reed at al. (1996), Teece (2010), Govindarajan, Kopalle, & Danneels (2011) and Yildirim 2018).

The management establishes unity of purpose and direction which creates condition in which individuals are involved in attaining the firm's quality objectives. The role of the top management has been cited as one of the key determinants of successful implementation of TQ. (Pyne & Plunkett, 2015). The top management must be fully committed for quality objectives to be achieved. The management exercises its influence through acceptable management tools to change the perception and develop positive behavioral approaches of the employees on quality related matters. Where the top management is involved customer is guaranteed of quality product and services.

The concept of customer focus means meeting the need and expectations of existing and potential customer by developing a comprehensive understanding of customer

needs (Sharabi, 2015). The measurement of customer satisfaction assesses the accuracy with which the firm delivers products/services to the marketplace. By focusing on customer's need, organization will be able to know when the customer taste and preference change and whether there is a need to improve to meet change the customer require. Without checking with customer need the organization will not be in better place to retain their customer through satisfaction.

TQM culture advocate for full commitment to customer satisfaction via innovation and continuous improvement in all areas business. In the TQM culture, the customer is not the final recipient of the firm's product and services but also every person or department within the firm. From the TQM context, 'sensitivity to customer needs exceeds defects and reducing customer complaints or meeting specifications. The concept of requirement is expounded to take into consideration not only product and services characteristics that meet basic requirement, but also those that distinguish them from competitors.

Effective management of the organization entails involving individuals at all levels of management. Empowerment, recognition and enhancement of competence facilitates involvement of individuals in achieving the firm's quality objectives (Sharabi, 2015). Engagement is all about involving all the employees in designing and planning, valuing their inputs while giving them greater independence in decision making (Paul 2015). Employee's empowerment is an important factor that affects performance of supply chain (Abdullah, et al., 2016). They hold the notion that the participation of personnel in TQM implementation increases their self-sufficiency, innovativeness and commitment which leads to the firm quality excellence.

Arriving at decisions based on evaluation of information are more likely to yield the desired result in an organization. Information sharing is one of the evidence-based decision making in an organization. Information Sharing refers to the extent to which important information is conveyed to certain members in the supply chain (Henley, 2015). The use of technology as a tool for collaboration has improved the sharing of processes between manufacturers. Various study on information sharing show that information sharing has significant effect on supply chain performance among partners. Lysons and Farrington (2016), purports that the speed with which information is shared

and passes in the supply chain has increased in the global market thus making it an important success factor for most establishments.

For sustainable success of supply chain network, organization must manage its associations with all the interested parties including suppliers (Enell, 2015). Supplier Relation Management (SRM) entails strategically planning and management of all interactions with the third-party establishment which supplies goods and services to a firm to increase the value of these interactions. There exist three types of partnerships namely, less interactive relationship, long time view relationship and establishments sharing vital strategic and operational combinations (Lambert and Gardner, 2016). Firms which participate in collaborations and engage other suppliers in early product development reduce supply chain risk and boost the performance of their supplier while upholding quality and timely delivery (Farrington and Lysons, 2016).

2.4 Total Quality Integration and Supply Chain Operation Performance

The modern approach of TQM can be analyzed from a broader perspective whereby quality is mentioned at each stage in supply chain network to ensure no mistakes which could result to flaws (Malcolm, 2014). Crosby, Deming, Ishikawa and Juran had common perspective toward the concept of quality management, that is to reduce cost and increase customer satisfaction. TQM being a paradigm of reducing costs as well as customer satisfaction, if incorporated into the supply chain strategies, well communicated to all and well implemented in all levels of supply chain, there will be a positive impact on the supply chain operations as well as smooth movement of goods from point of origin to the end user (Nair, 2016).

TQM principles are crucial in mitigating process variance which are directly associated with certain measures of supply chain performance such as delivery dependability and cycle time. SCO adopt quality management initiatives to improve the product quality (Martin, 2014). Dickson (2015) states that firms with strong TQM environment record better performance than those that possess Quality Certificates for instance ISO 9001 Certification. Salaheldin (2016) indicated that to some degree, SCO relies on TQM to integrate suppliers, manufacturers, distributors and the customers. For a firm to improve and strengthen its organizational competitiveness, TQM mainly focuses on the six

major fundamental practices namely, Strategic Planning, Customer Focus, Leadership, Information Analysis and Human Resource Management (Salaheldin, 2016)

2.5 Drivers for Total Quality Integration in Supply Chain Operations.

In today business world more than any other time in history, business environment is in a constant change with more customer requirements, product portfolios, marketplace demographic and improved awareness on the quality of the product/ services provided. Firms need methods, tools and trading relationship that allow them to be more flexible and adapt more quickly to changes (Borac et al., 2010). Drivers for both quality management and supply chain operations can be investigated separately while that of total quality management include; focus on the customer need, top management support and directions, long term commitment on leadership, employees empowerment, effective communication, training and development, reliance on standard measures and employees reward and recognition (McAdam & Henderson 2016).

The driver for quality and supply chain operation integration include, buyer supplier collaboration, information sharing, responsiveness to the customers, customer relationship and distribution strategies (Kakoya 2016). Shahzadi, Amin and Kashif, (2018) in their research on drivers of supply chain performance indicated that there are six key drivers that include, Facilities, Inventory, Transportation, Sourcing and Pricing. Where all the six drivers are interrelated with each other and supports each other in enhancing the firms' output. According to Rahman, Shokshok & Wahab (2018), integration of quality with supply operations offers many benefits such as elimination of defects, reduced scrap and rework, increased level of productivities and efficiency, reduced level of cost, satisfied customer and better employee morale.

2.6 Barriers of Implementation of Total Quality Integration in Supply Chain Operations

Even though there is a lot of success stories on TQ and SCO integration, there is also an abundance of literature available that highlights the reasons why the same has not been very successful (Connie and Prakash,2012). There are several barriers that hinders the integration of TQ in supply chain operations. Ustadh (2012) has identified them as follows; poor buyer supplier relationship, lack of information sharing, poor channels of

distribution, poor customer responsiveness, competitive markets, inadequate resources, lack of leadership for quality, lack of effective measures of quality improvement, deficiency of cultural dynamism, resistance of the workforce, lack of proper training and poor planning.

Samuel and Kashif (2013) investigated 5 barriers of TQ and SCO integration which includes; poor understanding of other functions, lack of communication, lack of direction from the senior management and conflicting goals. Moberg (2016) explained barriers to TQ, SCM Integration which are lack of trust, internal politics, poor understanding, weak management information system, misaligned goals and objectives and other supply chain complex issues.

2.7 Empirical Literature Review

This section highlights some of the previous studies executed in relation to TQ and SCO integration both globally and locally. Lau & Tang (2016) researched on Quality Supply Chain Management strategies sort to determine how the concepts of QM and SCO play out in an organization and their effect on organization performance. The study used a total of 500 firms and a target of 150 firms using Quantitative Approach method concluded that there is much attention buy firms focusing on Quality Supply Chain Operations concept have recently linked supply chain management with quality management perspectives to improve the firm's effectiveness and efficiency. However, the study only presented a conceptual model that reflects SCO/QM integration but did not show clearly their impact in firm's performance.

Abushaikha (2016) researched on Quality Management Practices on Performance of Integrated Supply Chain using exploratory study concluded that quality management initiatives when transformed in supply chain perspective synchronize and interact across the entire supply chain network of the firm. The research failed to show the benefit of integrating quality in SCM practices.

Hong and Min (2016) researched on implementation of responsive supply chain strategy in the global complexity and supply quality integration among the manufacturing firms. They studied 100 firms across 24 countries by using an exploratory factor analysis (EFA). The findings were that implementation of responsive supply chain and supply quality integration requires a careful definition of a firm's

product range, the frequency and innovativeness of the product offering. In addition, the firms need to define its key implementation practices on areas such as supplier collaboration, information sharing with customer and the use of advanced manufacturing technology to achieve responsiveness to the market.

Wang (2018) in his study in China used descriptive research method to research on how improvement of the quality of supply chain processes can impact the performance of a firm. Results in his findings indicated that, advancing the quality of supply chain process lead to better resource utilization, cost reduction and increased process efficiency. The research failed to show which processes in supply chain have the big impact to the firm performance.

Rosa (2016) researched on Competitive Advantage of Integrated Supply Chain Practices in telecommunication industry in kenya seek to determine the competitive advantage on integrating TQ and SCM in telecommunication industry in kenya using descriptive research method. The researcher concluded that its evident that Integrated Supply Chain Practices result to competitive advantage as evidenced by leading Safaricom firm that has maintained a competitive edge over the other firms in the industry. The researcher focused on the performance on the leading telecommunication firm.

Jabali (2016) researched on TQ Integration in supply chain operations using descriptive cross-sectional design method argued that Total Quality Integration is an organization's management strategy that focuses on quality, involvement of all employees and aim at long term success. He concluded that TQ and SCO integration is a philosophy for managing supply chain flow from upstream to downstream that meet customer expectation and leave all the staff motivated.

Wanjau (2017) in his research on the role of quality integration in supply chain management on SMEs and economic development in Kenya concluded that though it's a big challenge on implementation of TQ in SCM it's an evidence that firms embracing this strategy have cut their clear line in the market because of the competitive edge as compared to those that are yet to implement the integration.

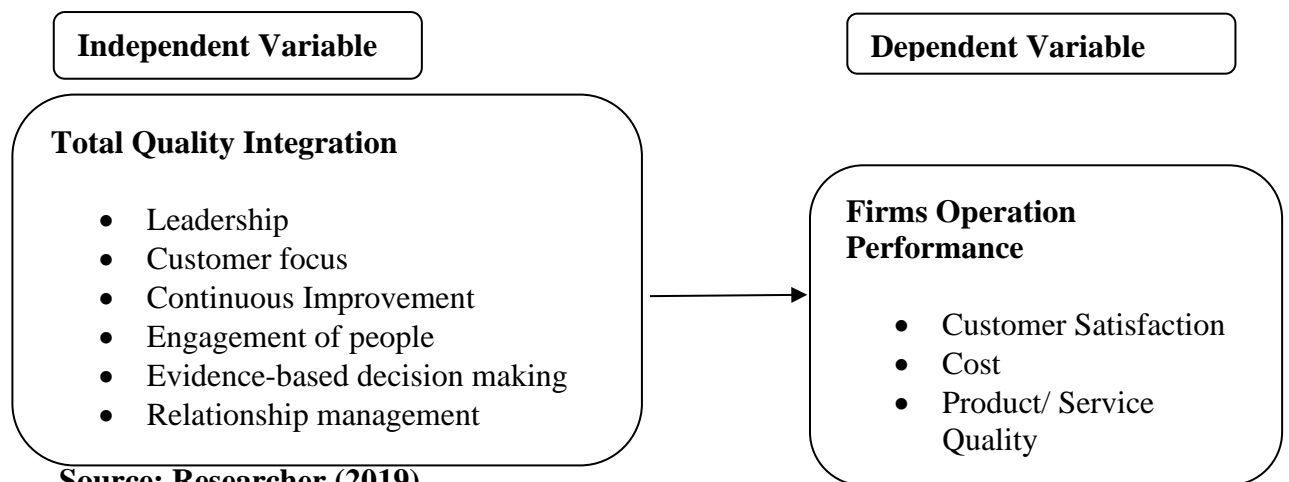
Wesonga (2018) carried a study on leagile supply chain management practice in service industries in Kenya a case of Kenyatta National Hospital and established a positive

connection amongst leagile supply chain practices and enhanced SCM practices. It also recommended incorporation of quality supply chain strategy, lean supply chain processes, creation of awareness and involvement hence efficiency and effectiveness in the hospital operations.

2.8 Conceptual Framework

The concept of integrating TQ in SCO and its influence on firm’s performance has been analyzed comprehensively by past empirical studies an existing literature. The variable that constitutes integration of TQ in SCM are inconsistent with some proposing as many as 22 variables while other have condensed them to fewer manifests. This study will adopt independent variables which are categorized as follows: Customer focus, Leadership, Motivation, Continuous Improvement, Process approach, and Leadership Management, while dependent variables include; Operational Performance measured through; (Customer satisfaction, Cost and Product/ Service Quality)

Figure 2.1 Conceptual Model



Source: Researcher (2019)

Figure 2.1 Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section addresses the approach to the survey. It entails the methodology that was adopted to gather data relevant to the research. It gives an explanation to the research design, study population, the target population, sample design procedure, sample size means of data collecting and data analysis.

3.2 Research Design

The study adopted the descriptive cross-sectional design. Descriptive cross-sectional design help in explaining the attributes of a given group confronted by a given situation through presentation of data in a logical form (Chaudhary, 2017). This design method relies on observation as a collection of data to test hypothesis and to answer question pertaining to the current status of the subject in the research. Questionnaires were used for data collection since the problem is specific and well defined. This is because through questionnaires it is possible to reach the respondent with busy schedules.

3.3 Population of the Study

The study's population consisted of all the large manufacturing firms based in Nairobi. There are 455 large scale manufacturing firms that are based in Nairobi KAM (2018) (See Appendix II). This area was chosen because of high concentration of target population where proportionate sample will be derived. Large manufacturing firms were chosen due to their resource capability that enable them to adopt and implement most of supply chain process which tend to be very costly.

3.4 Sampling Design

The researcher used stratified random sampling in selecting the firms that were included in the study. The population was divided into twelve sectors that were individually homogeneous then took simple random samples within each group. In order to select the sample size, researcher adopted Trezo, Cooper and Schindler (2014) formula which was also used by Evangeline (2016) in identifying a sample size from the large-scale manufacturing firms in Nairobi. The formula was selected because the sample size was

to be derived from large heterogeneous group which was divided into 12 homogeneous group. Taking nonzero probability of 0.101 the sample size was $(455 \times 0.101) = 46$ respondents. Or

$$0.101 = \frac{\text{Sample size}}{455} = 46 \text{ respondents.}$$

The study involved 46 large scale manufacturing firm that were selected through stratified sampling as indicated in Table 3.1.

Table 3.1 Target Population

Sector	Population	Percentage in Sector	Respondents
Food and Beverages	100	22.0	10
Chemicals	62	13.6	6
Plastic and Rubber	54	12.1	5
Paper	48	10.5	5
Energy	42	9.4	4
Textile and Apparels	38	8.4	4
Wood products	38	8.4	4
Metals and Allied	22	4.8	2
Pharmaceuticals	20	4.4	2
Motor vehicle	17	3.7	2
Leather products	8	1.8	1
Building	6	1.3	1
Total	445	100	46

Source: KAM List (2018)

3.5 Data Collection

Both quantitative and qualitative primary data collected with the aid of structured questionnaires were used in the study. Items that were used in the questionnaires ranged from open and closed ended questions to option items. The questionnaires have 4 sections which include; (I) General data for the firm, (II) Question relating to TQ and

Supply Chain Operations integration, (III) Question relating to effect of TQ and Supply Chain Operations integration on the performances of the firm. Finally, section (IV) covered the Barriers of TQ and Supply Chain integration.

The target respondents were the Supply Chain Managers in the organization or their equivalent. These respondents were purposefully selected since they are deemed to be more versed on the TQ, Supply Chain Integration. Questionnaires shall be administered through the drop-and-pick later technique and through emails for ease of administration.

3.6 Data Analysis

Since the collected data were in qualitative and quantitative form, the study adopted both qualitative and quantitative method of data analysis. Analysis was conducted using quantitative techniques using excel tables, Statistical Package of Social Science Software (SPSS) and present them using excel tables to summarize various groups of data. Following regression model was used to establish the impact of integrating TQM with SCM practices on large manufacturing firm performance in Nairobi.

Regression model- $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \alpha$

Where

$Y_1(\text{Operation performance}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \alpha$

$Y_2(\text{Cost}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \alpha$

$Y_3(\text{Product/Service Quality}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \alpha$

β_0 = the y intercept when x is zero;

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$, are regression coefficients of the following variables respectively

x_1 = Leadership and Management;

x_2 =customer focus

x_3 =continuous improvement

x_4 = Engagement of people

x_5 =Evidence- based decisions

x_6 =Relationship management

α =is the error term.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 Introduction

The study sought to establish the extent of total quality integration in supply chain operations and performance of large manufacturing firms in Nairobi. This section presents findings from the data analysis in line with the study's objectives. The study has three objectives: to establish the extent of implementation of TQ integration in SCO by the large manufacturing firms in Nairobi; to establish the impact of implementing TQ integration in Supply Chain Operations and large manufacturing firms' performance in Nairobi and to establish the barriers faced by the large manufacturing firms in Nairobi in implementation of TQ integration in Supply Chain Operations.

4.2 Response Rate

The researcher distributed 46 questionnaires to large manufacturing firms in Nairobi where 38 were successively filled and returned which represent a response rate of 82.6%. This percentage were considered adequate for the research. Mworira (2015) noted that response rates of 50% were acceptable for analysis, 60% was good and 70% was very good. Therefore, based on these assertions, 82.6% response rate was adequate for the study. The 17.4% that never responded stated like of time as the key reason for failure to fill the questionnaires.

4.1.1 Duration of Operation

Respondents were requested to indicate the number of years their firms have been in operation and the results are shown in Table 4.1

Table 4.1: Duration of operation

	Frequency	Percentage	Cumulative Percentage
Less than 5 years	0	0	0
5- 10 years	8	21.1	21.1
11-15 years	10	26.3	47.4
Above 15 years	20	52.6	100.0
Total	38	100.0	

Source: Researcher (2019)

It is evident as illustrated in Table 4.1 most of the large manufacturing firms in Nairobi have been operating for more than 10 years which represent 78.9%. Firms that have been in operation between 5 years to 10 years represent 21.1% and there were no single large manufacturing firm that was in operation for 5 years and below. Most large manufacturing firms have been operating for long periods and thus they have vast experience in supply chain operations issues in relation to quality of services and products.

4.1.2 Number of Employees

The study sought to ascertain the number of employers in each of the large manufacturing firms in Nairobi which is represented in Table 4.2.

Table 4.2: Number of employees

Number of Employees			
Number of Employees	Frequency	Percent	Cumulative Percent
Less than 100	4	10.5	10.5
100-200	10	26.3	36.8
201-300	16	42.1	78.9
Above 301	8	21.1	100.0
Total	38	100.0	

Source: Research data (2019)

As illustrated in Table 4.2, it is evident that 42% of the large manufacturing firms in Nairobi have employees between 201 to 300; 26% have employees between 100-200; 21% have above 300 while 11% have less than 100 employees. This finding reveals that majority of these firms have more than 200 employees and hence large enough to embrace total quality integration in supply chain operations.

4.1.3 Position of the Respondents

The respondents were requested to tick the position they held in their firms and 60% were the Supply chain managers where's 40% were their equivalent. This confirms that they were well conversant with supply chain operation and the impacts on TQ integration in supply chain operations.

4.3 Extent of implementation of TQ Integration in Supply Chain Operations by the large manufacturing firms in Nairobi

The research sought to establish the degree to which large Total Quality Integration has been implemented by large manufacturing firms in supply chain operations. The respondents were asked to rate the different statements in a scale of 1-5 where 1 represent not at all and 5 a great extent and responses presented using means and standard deviations.

Table 4.3: Total Quality Integration Results

Total Quality Integration	Mean	Standard Deviation
Leadership Commitment		
TQ Integration initiatives in the firm start at the top with the leaders of the company	4.185	0.611
All senior and middle level managers demonstrate their commitment and seriousness to quality integration.	4.148	0.590
Senior and middle level managers communicate the principles, benefits and strategies of TQ integration in supply chain operations to the employees.	3.830	0.881
Communicate the, strategies, principles and benefits of TQ integration in supply chain operations to the employees.	3.667	0.943
Leaders develop a mission statement and strategies that are translated into action plans down through the organization	3.444	0.629
Overall Mean	3.855	0.731
Customers Focus		
The whole firm has implemented the philosophy of putting customer at the forefront (both internal and external customers)	4.609	0.570
All activities in product design, production and marketing designed based on the needs of the customer	4.609	0.650
Every employee and department share equal customer-focused vision	4.522	0.650
Good customer relationship management is practiced, and a customer relations program maintained	4.391	0.706
The firm continually gathers information in order to stay in tune with the customer's needs.	3.933	0.850
Overall Mean	4.413	0.685
Continuous improvement		
The company undertakes quality audits and evaluation regularly	4.500	0.645
Customer complaints are used as technique of to initiate improvements in current processes	4.417	0.820
The company evaluate the supplier's performance	4.370	0.618
The company improves employees' competencies through trainings	4.333	0.687
Regular employee and department appraisals are carried out	4.208	0.815
Overall Mean	4.366	0.717

Engagement of People		
The employees receive feedback on quality performance	3.704	0.850
The employees understand that quality is their key responsibility	3.625	0.808
Employee satisfaction is regularly and formally measured	3.519	0.904
Employee flexibility, training and multi-skilling are actively used	3.444	0.875
Employees are involved in design and planning	3.331	0.777
Overall Mean	3.525	0.843
Evidence-based Decision making		
Employees are involved in decision making	3.217	0.950
Are all data/information needed available to all relevant people for decision making	3.887	0.839
Are decisions and actions taken based on evidence	4.887	0.964
Employees engaged in decision making are competent to analyze and evaluate data needed	3.823	0.871
There is increased ability to review, challenge and change opinion and opinion	3.304	0.767
Overall Mean	3.824	0.878
Relationship management		
We often interact with customers to standards such as reliability for the firm	2.542	1.190
We undertake frequent measure and evaluation of customer satisfaction	2.333	0.875
We undertake frequent analysis in the expected changes in customer expectations	2.321	0.707
We facilitate the ability of the customers to seek assistance from us.	2.444	0.944
We undertake frequent evaluation the importance of our associations with our customers	2.459	1.250
Overall Mean	2.420	0.993

Source: Research Data (2019)

Table 4.4: Total quality integration results summary

Total Quality Integration	Average mean	Standard Deviation	Rank
Customer Focus	4.413	0.685	1
Continuous improvement	4.366	0.717	2
Leadership Commitment	3.885	0.731	3
Evidence-based Decision making	3.824	0.878	2
Engagement of People	3.525	0.843	5
Relationship management	2.420	0.993	6
Average mean	3.739	0.808	

Table 4.4 shows that large manufacturing firms in Nairobi have embrace total quality integration in SCO almost to the equal extent. Most of the manufacturing firms sampled showed that quality management programs had been incorporated in the company visions. Continuous improvement and customer focus are taking the lead with a mean

of 4.41 and 4.37 respectively. This shows that large manufacturing firms in Nairobi have an effective mechanism for resolving customers complaints and continuous improvement on quality products and services that give value to the customers. This is vital in supply chain as it take care of both internal and external customers. According to Mwale (2012) great emphasis on customer focus and continuous improvement are required in order to give value to the customers and remain highly competitive in current highly volatile market where customers are demanding high quality and affordable products and services.

Top management support has a big impact on the organization commitment to quality as they clearly understand the fundamental spirits and principle of total quality integration in SCO. Top management has a mean grade of 3.89 that shows the factor has been largely embraced by the responding manufacturing firm to a large extent.

The results in the finding shows that large manufacturing firms undertake quality audit and evaluation to improve the quality of product offered to their customers and conduct regular employees' appraisal on their involvement to quality improvement. Results on employee involvement in quality process suggest that employees are highly committed to quality improvements in large manufacturing firms where they score a mean of 3.824. There is indication that employees are given chance to suggest ways of improving of quality of services and products advanced to the customers. This is evidenced by a mean of 3.53 on people's engagement in decision making.

However, there is a concern over relationship management which fall under little extent with a mean of 2.42. This could be as a result of these firms not being able to implement the integrated systems that can be used to interact with the customers with minimal effort. The firms need to increase frequency at which they interact with customers and measure their satisfaction rather than relying on their complaints only. Programs such as Customer Experience (CX) can be of great help in evaluating the customer satisfaction both in quality of product and service lever offered by the firm. The findings on this research partly agreement with the literature review that was conducted. Wang (2018) in his study on how improving the quality of supply chain processes can impact the performance of a firm indicated that, advancing the quality of supply chain process lead to better resource utilization, cost reduction and increased process efficiency. This has proven to be the same case for large manufacturing firms in Nairobi as the results from the table above indicate that all these practices have been adapted to a large extent.

It also agrees with the system theory where Klein (2016) indicated that integrating the subsystems facilitate internal stability and controls.

4.4 Effects of TQ Integration in Supply Chain Operations and The Performance of Large Manufacturing Firms in Nairobi.

The second objective of this study was to determine the effect of Total Quality integration in supply chain operations and the performance of large manufacturing firms in Nairobi. Regression analysis was performed, and the results are discussed next.

4.3 Regression Analysis

Table 4.5: Coefficient of Determination on Customer Satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t/z	P-value
(Constant)	2.037	0.962		2.117	.101
Leadership Commitment	.308	.127	.404	2.425	.029
Customer Focus	.444	.158	.520	2.810	.014
Continuous improvement	.357	.155	.245	2.303	.120
Engagement of People	.293	.139	.299	2.108	.121
Evidence-based Decision making	.159	.212	.160	0.994	.663
Relationship management	.257	.156	.123	1.647	.074

a. Dependent Variable: TQ Integration in supply chain operations

Source: Research Data (2019)

The study used the SPSS computer software to code, enter and compute the measurement the association between independent variables and the impact on customers satisfaction and below multiple linear regression was established.

$$Y1(\text{Customer satisfaction}) = 2.037 + 0.308X1 + 0.444X2 + 0.257X3 + 0.263X4 + 0.159X5 + 0.357 X6$$

The constant $\beta_0 = 2.037$ shows that if all the variables (Leadership and Management; customer focus; continuous improvement; Engagement of people; Evidence-based decisions and Relationship management) are held constant the firm's performance will be 2.037.

At 5% level of significance, any value with p value of more than 0.05 is considered insignificant and therefore relationship management and evidence based decision making were noted to be statistically insignificant. From the data above x1(Leadership and Management), x2(customer focus), x3(continuous improvement), and x4(Engagement of People) are statistically significant. This is also supported by the P-value using the critical $Z = 1.96$

$\beta_1 = 0.308$ implies that a unit variation in Leadership and Management produces 0.308 unit improvements in organizational performance, $\beta_2 = 0.444$, implies that a unit change in customer focus produces in 0.444 units improvement in firm Performance, $\beta_3 = 0.257$, further implies that a unit variation in continuous improvement produces boosts firm performance by 0.257 units, Furthermore, $\beta_4 = 0.263$, implies that a unit variation in Engagement of people produces 0.263 units improvement in firm performance, $\beta_5 = 0.159$, alludes that a unit change in Evidence- based decisions produces 0.159 units increase in firm performance and $\beta_6 = 0.357$, shows that a unit variation Relationship management produces 0.357 units improvement in firm performance.

Table 4.6: Coefficient of determination of Cost

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t/z	P-value
(Constant)	1.063	.155		6.858	.010
Leadership Commitment	.722	.190	.632	3.800	.047
Customer Focus	.604	.129	.475	4.682	.000
Continuous improvement	.532	.173	.519	3.075	.327
Engagement of People	.684	.125	.459	5.472	.043
Evidence-based Decision making	.650	.199	.559	3.266	.037
Relationship management	.670	.321	.569	1.162	.572

a. Dependent Variable: TQ Integration in supply chain operations

Source: Research Data (2019)

The results in Table 4.8 indicate that the factors (Leadership Commitment, Customer Focus, Continuous improvement, Engagement of People, Relationship management, Evidence-based Decision making) significantly predict the cost effectiveness.

$$Y_2(\text{Cost}) = 1.063 + 0.722X_1 + 0.604X_2 + 0.604X_3 + 0.532X_4 + 0.684X_5 + 0.650X_6$$

Therefore, the independent variables were statistically significant at 5% level of significance (p= 0.047, 0.000, 0.327, 0.043, 0.037) respectively and that the factors predicted performance significantly. These results show that Leadership Commitment, Customer Focus, Engagement of People, Continuous improvement and Evidence-based Decision making affects most the dependent variable respectively.

Table 4.7: Coefficient of Determination of Product Quality

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t/z	P-value
(Constant)	1.936	.515		3.759	.002
Leadership Commitment	.741	.051	.635	4.907	.020
Customer Focus	.667	.139	.648	4.799	.015
Continuous improvement	.737	.207	.613	3.560	.001
Engagement of People	.549	.132	.615	4.159	.006
Evidence-based Decision making	.602	.394	.608	1.527	.763
Relationship management	.670	.371	.569	1.806	.574

a. Dependent Variable: TQ Integration in supply chain operations

Source: Research Data (2019)

Multiple regression investigation was carried out as to find out the link between cost and the seven independent variables. The output in Table 4.7 indicate that the factors (Leadership Commitment, Customer Focus, Continuous improvement, Engagement of People, Relationship management, Evidence-based Decision making) significantly predict the product/service Quality.

$$\text{Product/Service Quality} = 1.936 + 0.741X_1 + 0.667X_2 + 0.737X_3 + 0.549X_4 + 0.519X_5 + 0.602X_6$$

It could be distinguished that the independent variables are significant at 5% level of significance (p=; 0.020, 0.015, 0.001, 10.006) respectively and that the factors predicted product/service Quality.

4.4 Model Summary

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Customer Satisfaction	.804 ^a	.646	.577	.2074
Cost	.645 ^a	.416	.463	.1664
Product Quality	.792 ^a	.627	.568	.2043
a. Predictors: (Constant), Leadership Commitment, Customer Focus, Continuous improvement, Engagement of People, Evidence-based Decision making, Relationship management				
b. Dependent Variable: Financial Performance				

Source: Research data (2019)

Table 4.8 shows the percentage variation in the dependent variable that is attributed to changes in independent variable $R^2=64.6\%$ leaving 35.4% unexplained on Customer Satisfaction. On Cost, $R^2=41.6\%$ leaving 58.4% unexplained. On product quality $R^2=62.7\%$ leaving 37.3 unexplained. The P-values of 0.007, 0.004 and 0.007 which is less than 0.05 signifies that the model of the firm's performance is significant at the 5% significant level. Its therefore suits to conclude that Total Quality Integration in SCO are crucial in boosting firm's performance since the unexplained variance is linked to other variables that are not factored in for this research.

4.5 ANOVA

Table 4.9 ANOVA

Model		Sum of Squares	df	Mean Square	F	P-value
Customer Satisfaction	Regression	5.442	6	.907	10.283	0.007 ^a
	Residual	1.327	31	.043		
	Total	6.769	37			
Cost	Regression	4.116	6	.686	8.236	0.004 ^a
	Residual	2.263	31	.073		
	Total	6.379	37			
Product Quality	Regression	5.358	6	.893	10.133	0.007 ^a
	Residual	1.612	31	.052		
	Total	6.769	37			

Source: Research data (2019)

At 5% significance level, $df = 6$ and denominator $df = 37$, F critical value is 2.42, Table 4.9 depicts the calculated F value as 10.283, 8.236 and 10.133. Therefore, the regression model was statistically significant implying that it is good for analysis and adequate to explain TQ integration in supply chain operations and firm's

4.5 Barriers Impeding TQ Integration in Supply Chain Operations by Large Manufacturing Firms

Table 4.10: Barriers Impeding TQ Integration in Supply Chain Operations by Large Manufacturing Firms

	Barriers	Frequency	Rank
1	Lack of enough finances to support the system implementation	32	1
2	Most of the Operating systems are expensive to purchase and maintain	30	2
3	Suppliers are not willing to share information on pricing of their products	28	3
4	Lack of capacity to integrate by other companies	22	4
5	Getting users to accept the system is a huddle	20	5
6	Challenges in linking all suppliers	18	6
7	Resistance from suppliers	18	7
8	The management lack of commitment to the integration	18	8
9	Lack of shared vision between the Firm and its suppliers which affects integration	17	9
10	Lack of willingness from other stakeholders	10	10
11	Lack of internal integration of functions	6	11

Source: Research Data (2019)

Respondents were requested to list barriers impending TQ Integration in supply chain operations and below were repeatedly listed as indicated in Table 4.10. From the above analysis various barriers were fronted but those that had been listed by the respondents in the highest numbers were as follows; Lack of enough finances to support the system implementation, Suppliers are not willing to share information on pricing of their products, Lack of capacity to integrate by other companies, Getting users to accept the system is a huddle, Challenges in linking all suppliers and The management lack of commitment to the integration

The listed barriers disagree with that of Samuel and Kashif (2013) who investigated barriers of TQ and SCO integration which includes and listed them as; poor understanding of other functions, lack of communication, poor working relationship, lack of direction from the senior management and conflicting goals. It also disagrees

with Moberg (2016) findings who explained barriers to TQ and SCM Integration as lack of trust, internal politics, poor understanding, weak management information system, misaligned goals and objectives and other supply chain complex issues.

CHAPTER FIVE: SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section present the summary of the results from the previous chapter, conclusions and recommendations based on the objectives of the study. The objectives of the study were to determine the effect of Total Quality integration in Supply Chain Operations and the performance of large manufacturing firms in Nairobi, to determine the extent of implementation of TQ integration in Supply Chain Operation by the large manufacturing firms in Nairobi and to establish the barriers faced by the large manufacturing firms in Nairobi in implementation of TQ integration in Supply Chain Operation.

5.2 Summary of the Findings

The research adopted the descriptive cross-sectional design which relies on observation as a means of data collection to test hypothesis and to answer question pertaining to the prevailing status of the subject in the investigation. Questionnaires were used for data collection which sought to three main questions as outlined in objective of the study in chapter one.

This study sought to establish whether large manufacturing firms in Nairobi has adopted integration of total quality management in supply chain operations. The findings revealed that the practice has been adopted by various firms but at a varying degree. All the variable held together had an average mean of 3.739 which is an indication that they have been adopted at a great extent. Most of the firms embarked on Continuous Improvement and Customer Focus as they are leading with an average mean of 4.413 and 4.366 respectively. This concurs with Deming, Ishikawa, Feigenbaum and Juran that the objective of quality management is to reduce costs and increase customer satisfaction. This can be explained by the fact that there is increased demand for quality and affordable product that give customers back the value of their money (Cheroigin, 2016). Top management commitment is highly needed as they play a very vital roles in the adoption of TQ integration in supply chain operations. Quality is everyone business and therefore all employee should embrace quality and their

decisions regarding quality should also be considered and respected by the management. Crosby (1996) pointed out that the quality problems require cross-functional communication at various levels of the organization. TQ Integration in supply chain operations requires an organization culture where all individuals are concerned with quality and are free to question practice that do not conform with quality emphasis.

The study sought to investigate impact of TQ integration in supply chain operation and the performance of large manufacturing firms in Nairobi. Most of the respondents indicated that there is reduction on overall cost which is supported with a mean of 4.67. In relation to profitability of the firm, respondents indicated that due to TQ integration in supply chain operations, administration costs have reduced significantly thus resulting to increased profit. Most importantly, majority of the respondents indicated that there is great reduction on defect on produced good because all parties from supplier to production embrace quality which is supported by a mean of 3.77. There is reduction on lead time from supplier to the firm and from firm to the customers due to enhanced quality services in supply chain operation. In overall a mean of 3.4 indicate that there is great improvement in firm's operation due to TQ integration in supply chain operations.

In relation to barriers impeding TQ integration in supply chain operations by large manufacturing firms, respondents were required to list them and the following barriers were listed; Lack of enough finances to support the system implementation, Operating systems are expensive to purchase and maintain, Suppliers are reluctant to share information on how they price their products, Lack of capacity to integrate by other companies, Getting users to accept the system is a huddle, Challenges in linking all suppliers and The management lack of commitment to the integration.

5.3 Conclusion

The research concludes that many large manufacturing firms in Nairobi have integrated total quality in supply chain operations. The practices have enables large manufacturing firms to boost their performances. This was affirmed by the positive and significant relationship between TQ integration in supply chain and performance of manufacturing firms. The study has confirmed that integrating total quality in supply chain operations play a very significant role in firms' performance as well as satisfying the customers.

Currently, competition is shifting from one organization to between supply chain and therefore more emphasis on adopting TQ Integration in supply chain operations is needed in order to reduce supply chain cost and secure competitive advantage in the market while meeting customer need.

Emphasis need to be put on all supply chain up-stream to down-stream while reducing any loops that can increase the cost of production. Integrating quality in supply chain operations will mean to have quality supplier, quality logistic, quality production, quality warehousing and quality distribution. Embracing of technology and innovativeness can help the firms to solve some of issue that affect quality. A good example is use of mobile technology where customer can use short messages to confirm whether the product is genuine.

5.4 Recommendations

The survey recommends that all manufacturing firms to adopt the concept of TQ integration in order to realize benefits arising from the utilization of these practices such as improvement of organizational performance. With increased quality awareness in the market and demand for quality and affordable demand by customers, it's advisable that all business of all kind should embrace quality so as to increase their competitiveness in the market as well as being reliable and have a sustainable business.

To get full potential of TQ integration in SCOs it's important to train all employees at all levels in so as to create quality awareness, interest, action and desire. Thus, top management should be committed to developing the ideal training programs. Furthermore, managers should treat suppliers as business partners for so as to fully leverage on TQM; they need to be brought on board they should work closely together for value addition with customers in mind.

5.5 Limitations of the Study

The study was coupled with various limitations. First, the study only focused on large manufacturing firms situated in Nairobi ignoring forms of other sizes or those located outside Nairobi which limits the application of the study results to other contexts as they can only be used for comparative purposes. The study was also constrained by resource and time constraints which further signify why the study was only carried out

in Nairobi, County. The researcher also failed to attain full response rate due to confidentiality concerns by the respondents and challenges in administering the questionnaires.

There are eleven barriers that were listed that impend TQ integration in SCO by large manufacturing firms in Nairobi. The firms should look for ways of overcoming these barriers in order to achieve high levels of successful implementation of TQ integration in supply chain operations.

5.6 Suggestions for Further Research

As the concept of TQ Integration in supply chain operations is complex and entails a network of companies in the effort of in the production and delivery of final product, its domain would not be covered in just one research. Future studies can emphasize on the concept of supply chain integration by considering other factors such as cross functional coordination, geographical proximity, supply chain leadership and logistics integration which the current study ignored.

Since supply chain is highly dependent to technology which constantly changes, a similar study should be undertaken after a few years to find out if the same findings still hold

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APPENDIX I: QUESTIONNAIRE

This questionnaire is aimed at collecting data required for a study entitled **Impact of Total Quality Integrating in Supply Chain Management Practices on Performance of Large Manufacturing Firms in Nairobi, Kenya**. The questionnaire forms an integral part of the study and respondents are kindly requested to complete and give any additional information they might feel is necessary for the study. The data collected is for academic purposes only and will be treated with high confidentiality.

SECTION I: General Information

Company name -----

Year of establishment -----

Number of employees.....

Duration company has been in operation

1. Less than 5 years
2. 5-10 years
3. 11-15 years
4. Above 15 years

What is your position in organization?

Supply Chain Manager

Assistant Supply Chain Manager

Finance Manager

Production manager

IT Manager

Other.....specify.....

SECTION II

The following are aspects of TQ integration in Supply Chain Operations, please indicate (by ticking) only one of the respective numbers to indicate, as per the key, to what extent your company has implemented TQ integration in SCO.

Leadership Commitment	1	2	3	4	5
TQ integration initiatives in the firm start at the top with the leaders of the organization.					
All senior and middle level managers demonstrate their seriousness and commitment to Total Quality integration in SCO.					
Senior and middle level managers communicate the principles, strategies and benefits of Total Quality integration in SCO to the employees.					
Communicate the principles, strategies and benefits of TQ integration in SCO to the employees.					
Leaders prepare, review and monitor quality policy of the organization.					
Leaders develop a mission statement and strategies that are translated into action plans down through the organization					
Customer Focus	1	2	3	4	5
The whole organization has implemented a philosophy of putting customer first					
All activities in product design, production and marketing are built around the customer					
Every department and every employee share the same customer-focused vision					
Good customer relationship management is practiced, and customer relations program maintained					
The firm continually gathers information in order to stay in tune with the customer's needs.					
Continuous improvement	1	2	3	4	5
The company undertakes quality audits and evaluation regularly					
Use of customer complaints as a method to initiate improvements in current processes					
The company evaluate the performance of suppliers					
The company improves employees' competencies through trainings					
Regular departmental and employee appraisals carried out					
Engagement of People	1	2	3	4	5
The employees are provided with feedback on their quality performance (effective top-down and bottom-up communication)					
All employees believe that quality is their responsibility					
Employee satisfaction is formally and regularly measured					
Employee flexibility, multi-skilling and training are actively used					
Employees are involved in design and planning					

Evidence-based Decision making	1	2	3	4	5
Employees are involved in decision making					
Are all data/information needed available to all relevant people for decision making					
Are decisions and actions taken based on evidence					
Employees engaged in decision making are competent to analyze and evaluate data needed					
There is increased ability to review, challenge and change opinion and opinion					
Relationship management	1	2	3	4	5
We frequently interact with customers to set reliability responsiveness, and other standards for us					
We frequently measure and evaluate customer satisfaction					
We frequently determine future customer expectations					
We facilitate customer`s ability to seek assistance from us.					
We periodically evaluate the importance of our relationship with our customers					

KEY

1. -----Not at all
2. -----To a little extent
3. -----To a moderate extent
4. -----To a great extent
5. -----To a very great extent

SECTION III: Firms Performance

The following are aspects describe firm`s performance, please indicate (by ticking) the level at which you agree with as per the key below

Key:

1. -----very satisfied
2. ----- satisfied
3. ----- a little satisfied
4. ----- not satisfied
5. -----don`t know

Firms Performance Indicators	1	2	3	4	5
Reduction in overall cost					
Increase profitability					
Elimination of defects					
Increase profitability					
Increase customer satisfaction					
Reduced Supply Side Lead Times					
Reduce demand side lead time					
Green initiative					
Others (specify)					

SECTION III: Barriers Large Manufacturing Firms are Facing on the TQ Integration in Supply Chain Operations

Kindly list the barriers you are facing on the implementation of Total Quality integration in Supply chain operations.

- i.
- ii.
- iii.
- iv.
- v.
- vi.
- vii.
- viii.

APPENDIX II: List of Large-Scale Manufacturing Firms in Nairobi

Sector: Paper and Paperboard (48)		
Ajit Clothing Factory Ltd	Tetra pak Ltd	Paper House of Kenya Ltd
Conventual Franciscan Friars-Kolbe Press	General Printers Limited	Kitabu Industries Ltd
Associated Papers & Stationery Ltd	Chandaria Industries Limited	Paperbags Limited
Creative Print House	Graphics & Allied Ltd	Kul Graphics Ltd
Autolitho Ltd	Colour Labels Ltd	Primex Printers Ltd
D.L. Patel Press (Kenya) Limited	Guaca Stationers Ltd	Label Converters
Bag and Envelope Converters Ltd	Colour Packaging Ltd	Print Exchange Ltd
Dodhia Packaging Limited	Icons Printers Ltd	Modern Lithographic (K) Ltd
Bags & Balers Manufacturers (K) Ltd	Colour Print Ltd	Printpak Multi Packaging Ltd
East Africa Packaging Industries Ltd	Interlabels Africa Ltd	Pan African Paper Mills (EA) Limited
Brand Printers	Kenya Stationers Ltd	Printwell Industries Ltd
Elite Offset Ltd	Jomo Kenyatta Foundation	Ramco Printing Works Ltd
Business Forms & Systems Ltd	Kim-Fay East Africa Ltd	Prudential Printers Ltd
Ellams Products Ltd	Kartasi Industries Ltd	Regal Press Kenya Ltd
Carton Manufacturers Ltd	Paper Converters (Kenya) Ltd	Punchlines Ltd
English Press Limited	Kenafric Diaries Manufacturers Ltd	SIG Combibloc Obeikan Kenya
Sector: Textile and Apparels (38)		
Africa Apparels EPZ Ltd	Kenya Trading EPZ Ltd	Spinners & Spinners Ltd
Fulchand Manek & Bros Ltd	Kikoy Co. Ltd Storm Apparel Manufacturers Co. Ltd	Le-Stud Limited
Image Apparels Ltd	Straightline Enterprises Ltd	Sunflag Textile & Knitwear Mills Ltd
Alltex EPZ Ltd	Metro Impex Ltd	Alpha Knits Limited
Midco Textiles (EA) Ltd	Tarpo Industries Limited	Yoohan Kenya EPZ Company Ltd
Apex Apparels (EPZ) Ltd	Upan Wasana (EPZ) Ltd	YU-UN Kenya EPZ Company Ltd
Mirage Fashionwear EPZ Ltd	Bogani Industries Ltd	J.A.R Kenya (EPZ) Ltd
Teita Estate Ltd	Protex Kenya (EPZ) Ltd	Silver Star Manufacturers Ltd
Baraka Apparels (EPZ) Ltd	Vaja Manufacturers Ltd	Bhupco Textile Mills Limited

MRC Nairobi (EPZ) Ltd	Brother Shirts Factory Ltd	Ngecha Industries Ltd
Thika Cloth Mills Ltd	Riziki Manufacturers Ltd	United Aryan (EPZ) Ltd
Blue Plus Limited Premier Knitwear Ltd	Embalishments Ltd Rolex Garments EPZ Ltd	
Sector: Building, Construction and Mining (6)		
Central Glass Industries Ltd	Kenya Builders & Concrete Ltd	Karsan Murji & Company Limited
Manson Hart Kenya Ltd	Kenbro Industries Ltd	Mombasa Cement Ltd
Sector: Food, Beverages and Tobacco (100)		
Africa Spirits Ltd	Del Monte Kenya Ltd	Mafuko Industries Ltd
Highlands Mineral Water Co. Ltd	Premier Flour Mills Ltd	Annum Trading Company Limited
Agriner Agricultural Development Limited	East African Breweries Ltd	Manji Food Industries Ltd
Homeoil	Premier Food Industries Limited	Aquamist Ltd
Belfast Millers Ltd	East African Sea Food Ltd	Melvin Marsh International
Insta Products (EPZ) Ltd	Proctor & Allan (E.A.) Ltd	Brookside Dairy Ltd
Bidco Oil Refineries Ltd	Eastern Produce Kenya Ltd	Kenya Tea Development Agency
Jambo Biscuits (K) Ltd	Promasidor (Kenya) Ltd	Candy Kenya Ltd
Bio Foods Products Limited	Farmers Choice Ltd	Mini Bakeries (Nbi) Ltd
Jetlak Foods Ltd	Trufoods Ltd	Capwell Industries Ltd
Breakfast Cereal Company(K) Ltd	Frigoken Ltd	Miritini Kenya Ltd
Karirana Estate Ltd	UDV Kenya Ltd	Carlton Products (EA) Ltd
British American Tobacco Kenya Ltd	Giloil Company Limited	Mount Kenya Bottlers Ltd
Kenafric Industries Limited	Unga Group Ltd	Chirag Kenya Limited
Broadway Bakery Ltd	Glacier Products Ltd	Nairobi Bottlers Ltd
Kenblest Limited	Usafi Services Ltd	E & A Industries Ltd
C. Czarnikow Sugar (EA) Ltd	Global Allied Industries Ltd	Nairobi Flour Mills Ltd
Kenya Breweries Ltd	Uzuri foods Ltd	Kakuzi Ltd
Cadbury Kenya Ltd	Global Beverages Ltd	NAS Airport Services Ltd
Kenya Nut Company Ltd	ValuePak Foods Ltd	Erdemann Co. (K) Ltd
Centrofood Industries Ltd	Global Fresh Ltd	Rafiki Millers Ltd
Kenya Sweets Ltd	W.E. Tilley (Muthaiga) Ltd	Excel Chemical Ltd
Coca cola East Africa Ltd	Gonas Best Ltd	Razco Ltd
Nestle Kenya Ltd	Kevian Kenya Ltd	Kenya Wine Agency Limited
Confec Industries (E.A) Ltd	Hail & Cotton Distillers Ltd	Re-Suns Spices Limited
Nicola Farms Ltd	Koba Waters Ltd	Highlands Canner Ltd

Corn Products Kenya Ltd	Al-Mahra Industries Ltd	Smash Industries Ltd
Palmhouse Dairies Ltd	Kwality Candies & Sweets Ltd	Super Bakery Ltd
Crown Foods Ltd	Alliance One Tobacco Kenya Ltd	Softa Bottling Co. Ltd
Patco Industries Limited	Lari Dairies Alliance Ltd	Sunny Processor Ltd
Cut Tobacco (K) Ltd	Alpha Fine Foods Ltd	Spice World Ltd
Pearl Industries Ltd	London Distillers (K) Ltd	Spin Knit Dairy Ltd
Deepa Industries Ltd	Alpine Coolers Ltd	Wrigley Company (E.A.) Ltd
Pembe Flour Mills Ltd		
Sector: Chemical and Allied (62)		
Anffi Kenya Ltd	Henkel Kenya Ltd	Maroo Polymers Ltd
Crown Berger Kenya Ltd	Chemicals & Solvents E.A. Ltd	Soilex Chemical Ltd
Basco Product (K) Ltd	Imaging Solutions (K) Ltd	Match Masters Ltd
Crown Gases Ltd	Chemicals and Solvents E.A. Ltd	Strategic Industries Limited
Bayer East Africa Ltd	Interconsumer Products Ltd	United Chemical Industries Ltd
Decase Chemical (Ltd)	Coates Brothers (E.A.) Limited	Supa Brite Ltd
Continental Products Ltd	Odex Chemicals Ltd	Oasis Ltd
Deluxe Inks Ltd	Coil Products (K) Limited	Unilever Kenya Ltd
Cooper K- Brands Ltd	Osho Chemicals Industries Ltd	Rumorth EA Ltd
Desbro Kenya Limited	Colgate Palmolive (E.A) Ltd	Murphy Chemical E.A Ltd
Cooper Kenya Limited	PolyChem East Africa Ltd	Rumorth East Africa Ltd
E. Africa Heavy Chemicals (1999) Ltd	Johnson Diversity East Africa Limited	Syngenta East Africa Ltd
Beiersdorf East Africa td	Procter & Gamble East Africa Ltd	Sadolin Paints (E.A.) Ltd
Elex Products Ltd	Kel Chemicals Limited	Synresins Ltd
Blue Ring Products Ltd	PZ Cussons Ltd	Sara Lee Kenya Limited
European Perfumes & Cosmetics Ltd	Kemia International Ltd	Tri-Clover Industries (K) Ltd
BOC Kenya Limited	Royal Trading Co. Ltd	Saroc Ltd
Galaxy Paints & Coating Co. Ltd	Ken Nat Ink & Chemical Ltd	Twiga Chemical Industries Limited
Buyline Industries Limited	Reckitt Benckiser (E.A) Ltd	Super Foam Ltd
Grand Paints Ltd	Magadi Soda Company Ltd	Vitafoam Products Limited
Carbacid (CO2) Limited	Revolution Stores Co. Ltd	
Sector: Energy, Electrical and Electronics (42)		
A.I Records (Kenya) Ltd	Digitech East Africa Limited	Mustek East Africa
East African Cables Ltd	Kenwestfal Works Ltd	Sanyo Armo (Kenya) Ltd
Amedo Centre Kenya Ltd	Manufacturers & Suppliers (K) Ltd	Nationwide Electrical Industries

Eveready East Africa Limited	Kenya Power & Lighting Co. Ltd	Socabelec East Africa
Assa Abloy East Africa Ltd	Marshall Fowler (Engineers) Ltd	Nationwide Electrical Industries Ltd
Frigorex East Africa Ltd	Kenya Scale Co. Ltd/ Avery Kenya Ltd	Sollatek Electronics (Kenya) Limited
Aucma Digital Technology Africa Ltd	Mecer East Africa Ltd	Optimum Lubricants Ltd
Holman Brothers (E.A.) Ltd	Kenya Shell Ltd	Specialised Power Systems Ltd
Avery (East Africa) Ltd	Metlex Industries Ltd	PCTL Automation Ltd
IberaAfrica Power (EA) Ltd	Libya Oil Kenya Limited	Synergy-Pro
Baumann Engineering Limited	Metsec Ltd	Pentagon Agencies
International Energy Technik Ltd	Power Technics Ltd	Tea Vac Machinery Limited
Centurion Systems Limited	Modulec Engineering Systems Ltd	Power Engineering International Ltd
Kenwest Cables Ltd	Reliable Electricals Engineers Ltd	Virtual City Ltd
Sector: Plastics and Rubber (54)		
Betatrad (K) Ltd	Laneeb Plastics Industries Ltd	Prestige Packaging Ltd
ACME Containers Ltd	Haco Industries Kenya Ltd	Plastic Electricons
Blowplast Ltd	Metro Plastics Kenya Limited	Prosel Ltd
Afro Plastics (K) Ltd	Hi-Plast Ltd	Raffia Bags (K) Ltd
Bobmil Industries Ltd	Ombi Rubber Rollers Ltd	Qplast Industries
Alankar Industries Ltd	Jamlam Industries Ltd	Rubber Products Ltd
Complast Industries Limited	Packaging Industries Ltd	Sumaria Industries Ltd
Dune Packaging Ltd	Kamba Manufacturing (1986) Ltd	Safepak Limited
Kenpoly Manufacturers Ltd	Plastics & Rubber Industries Ltd	Super Manufacturers Ltd
Elgitread (Kenya) Ltd	Keci Rubber Industries	Sameer Africa Ltd
Kentainers Ltd	Polyblend Limited	Techpak Industries Ltd
Elgon Kenya Ltd	Nairobi Plastics Industries	Sanpac Africa Ltd
King Plastic Industries Ltd	Polyflex Industries Ltd	Treadsetters Tyres Ltd
Eslon Plastics of Kenya Ltd	Nav Plastics Limited	Silpack Industries Limited
Kingway Tyres & Automart Ltd	Polythene Industries Ltd	Uni-Plastcis Ltd
Five Star Industries Ltd	Ombi Rubber	Solvochem East Africa Ltd
L.G. Harris & Co. Ltd	Premier Industries Ltd	Wonderpac Industries Ltd
General Plastics Limited	Packaging Masters Limited	Springbox Kenya Ltd
Sector: Timber, Wood Products and Furniture (22)		
Economic Housing Group Ltd	Slumberland Kenya Limited	PG Bison Ltd
Rosewood Office Systems Ltd	Hwan Sung Industries (K) Ltd	United Bags Manufacturers Ltd

Eldema (Kenya) Limited	Timsales Ltd	Transpaper Kenya Ltd
Shah Timber Mart Ltd	Kenya Wood Ltd	Statpack Industries Ltd
Fine Wood Works Ltd	Wood Makers Kenya Ltd	Twiga Stationers & Printers Ltd
Shamco Industries Ltd	Newline Ltd	Taws Limited
Furniture International Limited	Woodtex Kenya Ltd	
Sector: Pharmaceutical and Medical Equipment (20)		
Alpha Medical Manufacturers Ltd	Glaxo Smithkline Kenya Ltd	Madivet Products Ltd
Dawa Limited	Cosmos Limited	Regals Pharmaceuticals
Beta Healthcare International Limited	KAM Industries Ltd	Novelty Manufacturing Ltd
Elys Chemical Industries	Laboratory & Allied Limited	Universal Corporation Limited
Biodeal Laboratories Ltd	KAM Pharmacy Limited	Oss. Chemie (K)
Gesto Pharmaceutical Ltd	Manhar Brothers (K) Ltd	Pharm Access Africa Ltd
Bulks Medical Ltd	Pharmaceutical Manufacturing Co.	
Sector: Metal and Allied (38)		
Allied Metal Services Ltd	Kens Metal Industries Ltd	Morris & Co. Limited
Booth Extrusions Limited	Friendship Container Manufacturers	Steelwool (Africa) Ltd
Alloy Street Castings Ltd	Khetshi Dharamshi & Co. Ltd	Nails & Steel Products Ltd
City Engineering Works Ltd	General Aluminum Fabricators Ltd	Tononoka Steel Ltd
Apex Street Ltd Rolling Mill Division	Nampak Kenya Ltd	Orbit Engineering Ltd
Crystal Industries Ltd	Gopitech (Kenya) Ltd	Welding Alloys Ltd
ASL Ltd	Napro Industries Limited	Rolmil Kenya Ltd
Davis & Shirliff Ltd	Heavy Engineering Ltd	Wire Products Limited
ASP Company Ltd	Specialized Engineer Co. (EA) Ltd	Sandvik Kenya Ltd
Devki Steel Mills Ltd	Insteel Limited	Viking Industries Ltd
East Africa Foundry Works (K) Ltd	Steel Structures Limited	Sheffield Steel Systems Ltd
East Africa Spectre Limited	Metal Crown Limited	Warren Enterprises Ltd
Elite Tools Ltd	Steelmakers Ltd	
Sector: Leather Products and Footwear (8)		
Alpharama Ltd	Dogbones Ltd	C & P Shoe Industries Ltd
CP Shoes	New Market Leather Factory Ltd	Leather Industries of Kenya Limited
Bata Shoe Co. (K) Ltd	East Africa Tanners (K) Ltd	
Dogbones Ltd		
Sector: Motor Vehicle Assembly and Accessories (17)		

Auto Ancillaries Ltd	Chui Auto Spring Industries Ltd	General Motor East Africa Limited
Kenya Vehicle Manufacturers Limited	Megh Cushion industries Ltd	Sohansons Ltd
Varsani Brakelining Ltd	Toyota East Africa Ltd	Impala Glass Industries Ltd
Labh Singh Harnam Singh Ltd	Mutsumoto Motor Company Ltd	Theevan Enterprises Ltd
Bhachu Industries Ltd	Unifilters Kenya Ltd	Kenya Grange Vehicle Industries Ltd
Mann Manufacturing Co. Ltd		

Source: Kenya Association of Manufactures Directory (KAM) (2013)