

**QUALITY MANAGEMENT AND ORGANIZATIONAL  
PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI  
COUNTY**

**BY**

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## **DECLARATION**

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

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## ABSTRACT

The interference of quality management practices has brought excellent impact on the rampant organizational endeavors. Previous researches have indicated that when quality management practices are applied, positive effects within the organizational networking can attest to its establishment. It is essential for the organization to implement quality management interventions to attain competitive control; externally and internally. The objectives of the study were; to establish quality management practices among manufacturing firms in Nairobi City County; to establish the performance of firms in manufacturing industry in Nairobi City County; to determine the relationship between quality management and performance of firms in the manufacturing industry in Nairobi City County. The study was guided by the three theories; quality improvement theory, theory of constraint and Resource-Based View (RBV).

The research design used was descriptive survey method. A sample of 70 manufacturing firms in Nairobi County was selected which is 12.75% of the target population. The data collected comprised of primary data that was both quantitative and qualitative. Both descriptive and inferential statistics was used to analyze the data. From the data collected the respondents reported that continuous quality improvement is practiced between a very large extent and large extent. Most activities in continuous quality improvement are practiced to a large extent.

From the findings all activities show that customer focus practices have been adopted in the respective organizations at large extent. All activities show that top management commitment practices have been adopted in the respective organizations at large extent. It was established that Quality management was embraced in the vision of the company to a large extent as shown by a mean of 4.02. All activities show that ISO 9000 practices have been adopted in the respective organizations at large extent with the mean ranging from 3.61 to 3.92.

The successful implementation of quality programs depends on workforce. If manufacturing industry would have more trained, involved and empowered employees it is more likely to realize benefits of implementation of quality management techniques. The findings of research study suggest that management of manufacturing industry should be more involved in quality improvement programs.

Therefore, this study recommends that manufacturing firms should consider adopting and implementing other quality management practices for example ISO 9000 and compare the benefits and the challenges of these quality management practices. This will provide a better platform of choosing the quality management practices that lead to improved organizational performance. The study also recommends that manufacturing firms in Kenya should benchmark themselves with the best performing firms globally in order to find out the quality management practices that the firms use in enhancing competitiveness. This will shed more light on the best quality management practices to adapt to increase organizational performance.

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## **ABBREVIATIONS AND ACRONYMS**

<b>COMESA</b>	Common Market for Eastern and Southern Africa
<b>ISO</b>	International Organization for Standardization
<b>UNEP</b>	United Nations Environmental Programme
<b>KAM</b>	Kenya Association of Manufacturers
<b>TQM</b>	Total Quality Management
<b>OP</b>	Organizational Performance
<b>DSA</b>	Deliver schedule achievement
<b>EAC</b>	East African Community
<b>GDP</b>	Gross domestic product
<b>QCD</b>	Quality Cost Delivery
<b>QM</b>	Quality Management
<b>RBV</b>	Resource Based View
<b>TOC</b>	Theory of Constraints
<b>ROK</b>	Republic of Kenya
<b>PDCA</b>	Plan Do Check Act

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the Study**

The interference of quality management practices has brought excellent impact on the rampant organizational endeavors. Previous researches have indicated that when quality management practices are applied, positive effects within the organizational networking can attest to its establishment. Quality management is any practice that produces better products while decreasing cost and increasing consumer satisfaction levels. Customer satisfaction is usually defined as post purchase of product comparison in between performance expected and expectation before purchase (Jun & Cai, 2010). The intervention of quality management practices in the organizations is imperative as augmentation of Human Resource practices lead to an enhanced organizational performance. Previous studies show that radical problems were experienced in various industries regarding quality management practices, and were resolved by the intervention of state of the art quality management cell. Globally, manufacturing firms apply quality management practices mainly for meeting customers' satisfaction.

The expected results of quality management are better organizational performance, enhanced productivity, efficient processes and competitive goods and services that satisfies the consumer and enhances the organizational competitiveness. Organizational performance stands out as the most critical variable in the administration look into and without a doubt the most imperative pointer of hierarchical achievement. The primary condition that is important to enhance and accomplish perfection in business is creating and executing a framework for measuring performance of the association. As indicated by Robert Kaplan (2003), "Every association must make and impart approaches to gauge execution to mirror its special methodology. The prompt part of an execution estimation is to check the association's advance in accomplishing its objectives. Another essential part of an execution estimation framework is to inform people the angles that are critical for achievement and distinguishing the areas that need change.



Quality management has gained prominence in the recent past as it directly impacts on the overall performance of manufacturing organizations. Quality has been noted to affect the whole organization and comes with a dramatic cost implication. Poor quality becomes a big problem when it leads to dissatisfied customers and eventually leads to loss of customers (Hoyle, 2007). From an academic point of view, quality management has been adopted by firms keen on leveraging their overall performance. Thus key decision makers within a given organization should incline their operational tendencies towards quality management practices for enhanced performance.

In the aggressive environment of today, it is essential for a business foundation to remain in front of rivalry and consistently fulfill clients' needs. Quality administrative practices have been generally actualized, although a few associations encounter incredible achievement, different activities have failed (Jinhui Wu et al. 2011). Numerous studies have begun scrutinizing the widespread utilization of value administration in all associations, and they assert that a portion of the quality administration practices are subject to the hierarchical setting, for example, industry, firm size and country.

### **1.1.1 Quality Management**

Quality management is a managerial approach geared towards in cooperating inherent managerial tendencies of planning, control and improvement. It depends on the accompanying standards: quality integration, quality first, consumer loyalty, constant change, continuous improvement, factual-based decision and workforce involvement. Defining quality can be a cumbersome affair considering that quality appeal is unique to individuals. The role of the people defining quality also plays a major role in its definition. Clients or customers might have a difficult time defining quality but when they see it, they can tell what it is. To illustrate this, the definition of quality shoes may get a difference in opinion between two people. One person might see the shoes as quality while another might see them as of low quality. The difficulty in the definition of quality exists regardless of product while at the same time, regardless of manufacturing or service industry.

The evolution of quality management from its early beginnings reveals that the foundations were laid centuries ago but its development was through different strands (Mawby, 2005). From the initial focus of quality management being the checking of the final product against standards, the quest has been to eliminate product failure. In the recent past, quality management thinking has moved up from the work place to other disciplines, it became apparent that every function of a business contributes to outcome thus needs to be subjected to some quality standard (Gitlow, 2000). Additionally, the terminology of quality management from the time it was known as inspection evolved to quality control, which evolved to quality assurance. As if not complete in maturity and evolution still continues up to date (Hoyle, 2007).

### **1.1.2 Organizational Performance**

The purpose of any business enterprise is to do better than its competitors, offer better returns to the owners and stakeholders. (Richard, Devinney, Yip, & Johnson, 2009). Organizational performance allows researchers to evaluate firms over time and compare them to rivals (Richard et al., 2009). Strategy scholars concern themselves with the implications of management decisions and its effect on the firm (Rumelt et al., 1994).

The idea of OP is based upon the possibility that an association is the willful relationship of beneficial resources and those giving hope to get value in return. The concept of organizational performance is based upon the idea that an organization is the voluntary association of productive assets and those providing the assets expect to receive value in exchange (Barney, 1991). Hence the provider of the resource is the one who defines value as the essential overall performance evaluation criteria. OP is a multidimensional concept that encompasses aspects including financial performance and market performance (Richard et al., 2009).

### **1.1.3 Manufacturing Firms in Nairobi**

The African manufacturing industry is dominated by various sub-sectors namely food and beverages, construction, textiles, pharmaceuticals, leather products, paper, timber, chemicals, plastics and electronics, Initially most of this goods were always imported from developed countries. Interestingly, Kenyan's Vision the Kenyan 2030 posits significantly the role manufacturing firms have towards enhancing the country's Gross Domestic Product and employment and quality management has overtime resulted to increased performance in the manufacturing firms.

Nairobi is the capital city of Kenya and a manufacturing hub nationally and regionally. Its location coupled with a good transport network makes it an attractive destination for manufacturing firms. Kenya's manufacturing sector is highly import-dependent (Kagechu, 2013). The firms face a number of challenges that include limited access to the market, high labour costs and start-up capital.

According to research (Kagechu, 2013), Kenya's manufacturing sector contributes to 10% of the Gross Domestic Product (GDP) and 12.5% of exports (Were, 2007). In recent years, manufacturing firms have increased textile exports to the US. This is attributed to the export-led growth as a policy priority in Kenya. Most of the firms registered under this sector are owned and operated by families. The bulk of the products manufactured include food and beverages, building and construction materials, household items and chemicals. The sector is key to achieving the country's vision of becoming prosperous and globally competitive by 2030 (Were, 2007). The manufacturing sector in Kenya has been the fundamental pathway for the nation's joining into local and world markets like Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC) (Were, 2007). The sector has attracted international investors as well (Muhoro, 2011).

## **1.2 Research Problem**

In many emerging economies especially in Asia, manufacturing industry had been the economic growth engine and was the major tradable sector in those economies (Tsai, 2004). However Kenya's manufacturing industrial sector enjoyed modest growth rates averaging 4 percent over the last decade (KAM 2012). In the year 2000 manufacturing sector was the second largest sub sector of the economy after

agriculture (RoK, 2008) but in 2010, it was in the fourth place behind agriculture, wholesale and retail trade, transport and communication (World Bank 2012). As a result, the sector had seen a reduction in its contribution to GDP from 13.6 percent in the early 90's to 9.2 percent in 2012, (RoK, 2013). Kenya Vision 2030 emphasizes the need for appropriate manufacturing strategy for efficient and sustainable practices as a way of making the country globally competitive and a prosperous nation (RoK, 2007). Nevertheless, most manufacturing firms in Kenya operate at a technical efficiency of about 59 percent compared to their counterparts in Malaysia that average about 74 percent (Achuora, Guyo, Arasa, Odhiambo, 2015) raising doubts about the sector's capacity to meet the goals of Vision 2030 (RoK, 2007).

Kenya's manufacturing sector is burdened by challenges such as resource scarcity, high cost of energy, unreliable electricity supply, low level technology utilization and declining trend of product innovation (UNEP, 2015). Nonetheless, Kenya experienced an average growth of 4.1% p.a. between the years 2006 and 2013 but this was smaller than the average annual growth in the overall GDP of 4.6%. Among the major challenges that are facing the industry are shortage of electricity and long and time consuming bureaucratic procedures. Companies that experience good performance consistently have the understanding of what customer defined quality means to a business. For this reason, manufacturing companies in Kenya are adopting quality management strategies that work for them in order to improve on Thus the study intends to look at the role played by quality management in influencing performance among manufacturing industries with an additional look at the relationship that may exist between quality management and performance.

Studies have linked quality management practices (ISO certification) and performance of firms, while others have contradicted this view while others have found a significant relationship (Vasileios & Odysseas, 2015). The study by Terziovski and Power (2007) discovered that two years after enlistment of ISO confirmation, the rate of return of examined firms was 35% higher than that of the gathering of non-ISO firms. Prajogo and Sohal (2004) demonstrated that a minor 4% of the 50 Australian firms inspected reported a change in their benefit after ISO accreditation.

The study by Fotopoulos *et al.* (2010) among firms in Basque reported a significant relationship between ISO and performance. Quanzi and Padibjo (1998) in their study did not find a significant relationship between quality management practices and firm performance. Local studies such as Njuguna (2013) and Mutua (2014) found a causal relationship between quality management and performance in the manufacturing industry. Wachira (2013) established that organizational performance largely affects the administration of quality management practices at 75.5%. The study was also able to identify specific quality management practices that were deemed to have an effect on operational performance.

In view of the foregoing discussion, it is clear that previous studies have not provided adequate evidence on the relationship between quality management practices and organizational performance of manufacturing firms. This study aimed to answer the question is there a significant relationship between quality management and performance of firms in Kenyan manufacturing industry?

### **1.3 Study Objectives**

- i. To establish quality management practices among manufacturing firms in Nairobi City County.
- ii. To establish the performance of firms in manufacturing industry in Nairobi city County.
- iii. To establish the relationship between quality management and performance of firms in the manufacturing industry in Nairobi city county.

### **1.4 Importance of the Study**

The study will have significant value for policy makers and development partners who lend a hand in the growth of private sector programs that contribute to a diversified and productive manufacturing industry. With regards to quality and performance, policies and regulations will be implemented to boost and stimulate both factors. This stands to benefit the managers of manufacturing firms who are the key players in organizational performance.

The various organizations that undertake manufacturing in Kenya will benefit from the study through insight on how quality management affects their overall performance. Industry stakeholders who will have an understanding of the fact that by

increasing the value of a product before they are taken to the market revenues are boosted thus increasing the average earnings per input.

The study will also benefit academicians in their contribution to existing literature, specifically studies on quality management and organizational performance. Thus the insights from the study could be timely in availing different contextual perspectives to scholars.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter is an overview of literature pertaining to quality management and performance of manufacturing firms in Nairobi County. The theories underpinning the study are to be highlighted. Additionally, the chapter discusses quality management and the practices applied in manufacturing firms. Performance in manufacturing firms is covered as well as the relationship between quality management and performance in manufacturing firms. Finally, the summary and conceptual framework is also highlighted.

### **2.2 Theoretical Literature**

The study was guided by the three theories; quality improvement theory, theory of constraint and Resource-Based View (RBV).

#### **2.2.1 Quality Improvement Theory**

Quality Improvement Theory proposes that a component of quality management is that it places duty regarding fabricating associations decisively at the entryway of top administration (Deming, 1986). The hypothesis expresses that the administration is in charge of the frameworks, and that the framework produces 80 percent of the issues in firms (Hill, 1995). Deming (1986) noticed that no quality administration framework could prevail without top administration duty; the administration puts resources into the procedures, makes corporate culture, chooses providers and grows long haul connections. Deming's Quality Improvement Theory gives business an arrangement to take out low quality control issues through successful administrative systems. Management's conduct shapes the corporate mentality and characterizes what is essential for the achievement and survival of the firm.

Hubert (2000) has put forward the hypothetical approach of Deming (1986) in regard to the quality administration framework, and it visualizes the production of a hierarchical framework that encourages participation and figuring out how to encourage the execution of process administration rehearses. This, thus, prompts the persistent change of the procedures, items, and administrations and imparts worker

fulfillment. These are basic to advancing client center, and, eventually, helping in the survival of any association.

Deming (1986) put stock in a precise way to deal with critical thinking and advanced the generally known Plan Do Check Act cycle. The Plan Do Check Act (PDCA) cycle of ceaseless change is an all-inclusive quality change idea whose point is to always enhance execution, consequently decreasing the distinction between client prerequisites and the execution of the assembling firms (Goetsch and Davis, 2006). The hypothetical quintessence of the Quality Improvement Theory concentrated on quality worries in the making of an authoritative framework that cultivates participation and learning for encouraging the usage of process administration rehearses, which, thus, prompts execution (Anderson et al., 1994). Oakland (2004) focused on that the obligations of top administration ought to lead the pack in changing procedures and frameworks. Administration assumes a critical part in guaranteeing the achievement of value administration since it is the top administration's duty to make and impart the vision to move the firm toward execution change.

### **2.2.2 Theory of Constraints**

Theory of Constraints (TOC) was initially displayed in 1984 by Eliyahu M. (Goldratt and Cox, 1984) through his progressive book, *The Goal*. TOC gives the strategy to characterize what to change, what ought to be changed to, and how to impact the change to persistently enhance the execution of a whole framework. TOC, as TQM, regards change as a progressing procedure. In any case, rather than concentrating on restricted enhancements in all zones, it assaults the one limitation or bottleneck that restrains the framework's execution. TOC can be utilized as an indispensable system to help the usage of QM. It must not supplant QM, yet rather be utilized as a part of helping the organization to discover issues in its execution and center the QM endeavors toward the association's objective. TOC is an incredible approach in nonstop change, however has very little been broadly concentrated on. In the light of this, it is imperative to decide the degree of QM and TOC execution.

TOC which is an arrangement of ideas, standards and apparatuses that can be utilized to enhance administration of frameworks and expand execution by distinguishing the



most prohibitive restricting component that requirements the framework's execution and overseeing it. It concentrates on enhancing execution as opposed to decreasing expenses. By and large, TOC is a mix of logic, ideas, standards, and apparatuses imagined to augment the execution of any framework by recognizing, overseeing and breaking the most prohibitive restricting variable that limitations framework execution.

Rahman (1998) outlined the idea of TOC that each framework must have no less than one requirement and the presence of limitations speaks to open doors for development. The one primary part of TOC, which contrasts from conventional change methodologies, is the way it assesses change endeavors. Numerous quality change endeavors are centered around accomplishing the most elevated cost decreases. Kazim (2008), contends that hypothesis of imperatives depends on the rule that a chain is just as solid as the weakest connection or limitation and to lift and deal with the requirement as fundamental.

### **2.2.3 Resource-Based View**

The Resource Based View (RBV) accentuates the association's assets as the essential determinants of competitive advantage and implementation. It embraces two suppositions in breaking down competitive advantage (Barney, 2001). This model accepts that organizations inside an industry might be heterogeneous regarding the assets that they control. Second, it accepts that asset heterogeneity may hold on after some time on the grounds that the assets used to execute firms' schemes are not mobile across firms (i.e., a portion of the assets can't be exchanged and are hard to collect). Asset heterogeneity (or uniqueness) is viewed as an important condition for an asset package to add to competitive advantage.

The Resource-Based View Theory is to a great extent in light of behavioral and sociological worldview and considers organizational variables and their fit with the world as the significant determinants of progress. System models with this interior introduction have a solid 'inside out' approach that considers inside process factors, (for example, quality improvement, product advancement, and adaptability and cost effectiveness) as the most powerful achievement elements.

Since assets mirror a lot of the components of abilities, this study likewise centered on the performance ramifications of some internal attributes of the organizations (Barney, 2001), for this situation capacities of organizations, persistent change and client centeredness. In dissimilarity, the basic contention of the Resource-Based View Theory is that uncommon, matchless, non-substitutable assets make a company's heterogeneity, and that fruitful firms are those that get and protect significant and impossible to miss assets that outcome to an organization's decent execution emerging from the maintainable upper hand that emerges thereof (DiMaggio and Powell, 1991).

Organizational readiness figures out what sort of value administration frameworks to seek after, since the assets that an association has will impact what the firm does or does not do. The methodologies so attempted will then impact the execution of the firm and help the firm pick up an upper hand in the commercial center, coming about to upgraded performance.

### **2.3 Quality Management Practices**

The American Society for Quality Control characterizes quality as "the aggregate components and attributes of an item or administration made or performed to fulfill clients' needs at the period of buying and during utilization" Talha, (2004). Quality management on the other hand, can be defined as a managerial approach geared towards in cooperating inherent managerial tendencies of planning, control and improvement. Manufacturing-based definition positions quality management as design activities and manufacturing practices aimed at enhancing product quality. The ISO 9000 defines quality management as the set coordinated activities directing and controlling an organization's quality projections. The activities encapsulate quality planning, quality control, quality improvement and quality assurance.

Value is defined as identifying the client's wants and their fulfillment. Numerous associations have concentrated on quality and diminished their expenses to increase consumer loyalty e.g. Toyota in Japan, Samsung in South Korea. As indicated by (Foster, 2001 and Maguad, 2006) accomplishing consumer loyalty relies on upon not just how well and how closely quality activities in the few areas of the association work exclusively but also on how well they cooperate. As indicated by Kusaba (1995), quality alludes to the diverse workmanship of different exercises. Thus every business or movement has a varied meaning of value, for instance in sales the term

quality is more centered around the client, while in manufacturing, the term quality is more centered around the production procedure, and in development, quality alludes to both service provided and outputs.

Hradesky (2003) notes that quality is dictated by the client and the marketplace and incorporates all the items characteristics. Quality incorporates everything that the customer expects and requires and is persistently evolving. The definition considered the clients who direct the quality, and alterable as indicated by client necessities. Mukherjee (2006) shows that quality fulfills three F's-Fit, Form and Function. This is a customary meaning of value is essentially bound to an item fulfilling the requirement for the required measurements, fitment, required frame and feel. The item ought to likewise have the capacity to satisfy the capacities fancied to be performed by the item. Quality is more than an instrument or issue used to increase upper hand for organizations since it involves survival. In this way, the greater part of the quality ideas specified above concentrate on giving an item that fulfills and address the clients issues. Quality is subsequently to a great degree essential for the associations to guarantee that they have conveyed their items or administrations as indicated by the client desires and necessities (Muchemu, 2008). In addition, every individual has his or her own idea of value and it is extremely hard to give particular definition for quality, yet there is most likely and everybody can concur that, quality is flawlessness through control, precision, and fulfillment in work.

The philosophy of quality management has identified its key drivers as the vehicle to achieving manufacturing excellence within an organization. Quality management is aimed at elimination of error and waste in the manufacturing environment by get things right the first time through mechanisms such as continuous improvement, statistical measurement and having a mentality of zero defect (Lindsay & Evans, 2007). In the manufacturing scene, the definition of quality differs from that of the service industry. Manufacturing organizations produce tangible products that can be seen, touched as well as directly measured. This means that quality in the manufacturing firms has a focus most of the time on tangible product features. According to Moore (2012) the most common definition of quality in manufacturing is on conformance. Conformance is defined as the degree to which the characteristics of a product meet standards that have been preset. Quality in the manufacturing scene

is also defined in terms of performance, reliability, the features, durability and serviceability.

Interestingly, Altiok (2012) argues that one cannot inspect quality into a product. A product will remain in the same quality it was produced during inspection no matter how many inspections are done, it will remain unchanged. The delivering of quality for optimal performance in an organization is integral and involves also practices that prevent failure from occurring and hazardous that would jeopardize performance. The benefits of quality in a manufacturing organization can only be underscored by the pattern of spread and through quality initiatives Muchemu (2008) postulates. Through quality management, there are two purposes that are achieved in a manufacturing setting. Firstly, the present situation is well known preferably through a recent study that was done based on past development. Secondly, the focus is additionally on future areas of concentration.

Unquestionably, quality concepts have been identified empirically to spread unevenly in the functional areas of an organization states (Crosby, 1979). The questions that are considered include: which are the functional areas that have the highest spread and why? What implications are created by the uneven spread of quality concepts in an organization? When answers are gotten to such questions, the management of an organization is able to frame and come up with quality management strategies. In a manufacturing setting, at its early stages of development, the concentration on quality is in functional areas that will bring about the highest benefits or profits suggests (Zabel & Avery, 2002). This areas are mostly in operations/manufacturing and product design. As an organization grows in time, quality initiatives spread to other functional areas such as services, sales, marketing and administration. All in all the incremental benefits of quality initiatives should be planned for implemented at all the stages of growth for an organization to achieve optimal performance.

## **2.4 Organizational Performance**

Performance measurement tools can also be availed within the organizational framework. Activities around this area establishes the most important client needs, identifying specific quantifiable outputs and establishing targets against which results are to be scored. A variety of perspectives exists on the best approach to measure and quantify organizational performance depending on the dynamics of the industry.

Measuring profitability margins highlight the amount a given organization has invested in its operations. Raw growth revenue is important as it highlights the organizational expansion capacity and the scope of potential economies of scale. The market share of an organization can also be used to highlight its success relative to its immediate competition. In manufacturing organizations, brand loyalty can also be used to gauge the consumer loyalty and overall retention. It is only through performance that organizations are able to grow and progress (Crosby, 1979). In a manufacturing setting, knowing the determinants of organizational performance is key in predicting the future, considering the numerous economic crises and shocks that have hit the economic landscape in the globe. The factors that are of most impact are isolated and then treated with utmost interest so as to ensure superior performance (Zabel & Avery, 2002). Further on, knowing the factors that generate success and how they can be measured is of critical importance

Operational performance, measurement can be grounded on the consumer's expectations within a the manufacturing firm in terms of the sales data on what the clients order for most of the time and what is not ordered and the handling of complaints. All in all it's the management of customer relationship (Gudrun, 2009). Operational performance measurement can also be implemented on the employees through meetings and having appraisals. Through the Quality Cost Delivery (QCD) system, which is a capture of the seven key drivers of the manufacturing operations (Moore, 2012)? The QCD measures include: not right first time (NRFT) which is a measure of the rate at which defective units are produced. Stock turns on the other hand gauges the number of times a business sells and replaces its inventory (Anyango, Wanjau & Mageto, 2013).

Overall equipment effectiveness measures whether the most is being made from a piece of equipment. We also have the people productivity which measures the number of worker hours taken to produce each unit of output. Floor space utilization is a measure of the level of revenue generated per square meter of factory floor space. Delivery schedule achievement (DSA) on the other hand, measures the success in delivering the goods that are promised to a client to the schedule that was promised. Value added per person measures the amount of value the manufacturing process adds to the raw materials and compares it to the number of people involved in the whole process.

## **2.5 Quality Management and Organizational Performance**

Through quality management (QM), an organizational strategy can be adopted that leads to improvement of product and service quality (Moore, 2012). QM over the years has been sold as a commodity and remedy that can solve a lot of organizational problems which include high performance in a firm. Through the contingency theory in contrast to this, which is all about “no one best way” asserts that high performance comes about as a result of the alignment between organization systems/processes and implicating context factors. Most studies indicate a positive relationship between QM and performance while some studies indicate a negative relationship (Mohanty, 2008). Thus organizational performance refers to how effectively and efficiently manufacturing firms are conducting their activities so as to achieve optimal productivity (Rajab, 2014).

In the manufacturing sector, the measure of performance is in the form of different metrics such as schedule performance. Further on, performance can also be measured through the use of measurement systems that are implemented in production plants and service delivery (Hoyle, 2007). The implementation of systems gives the organization the ability to keep track of business progress. The knowledge that is gained on the manner in which the different areas of a business are performing is fundamental and additionally, the right measurement system will determine this. The measures of performance in the manufacturing scene have to be quantifiable factors that may be clearly linked to success indicators such as operational and financial performance, value creation, competitive advantage and synergy. In the manufacturing scene, performance measures go beyond the financial aspects argues (Crosby, 1979). The first step in the measurement of performance in the manufacturing scene is through the identification of the key areas that drive business performance. The next step is the setting up of performance targets which assist in giving everyone an opportunity to know what is being aimed for (Buchholz & Appelfeller, 2011).

Preliminary evidence indicates that firms which adopt quality management practices experience better performance compared to those that do not (Zabelet *al*, 2002). The customers in the world of today have their demand on high quality products more sensitized. Organizations that cannot deliver this have the risk of running out of

business thus an indication of poor performance. Based on empirical evidence, McCollum (2004) demonstrates that world class organizations such as General Electric and Motorola have attributed their performance to having one of the best quality management programs in the world. The two companies are noted to have implemented the Six-Sigma quality program. In the initiative, the level of defect is reduced to approximately 3.4 parts per million (Mohanty, 2008). This can only be achieved when every employee in the organization is trained on quality issues (McCollum, 2004). Motorola in the long run was able to win the prestigious MalcomBaldrige National Quality Award in 1988. In both companies, quality is considered as a critical factor that leads to the increased sales and market share thus good performance.

Quality management in an organization can be achieved only when the top brass such as managers and top executives play their role in driving the change (Hoyle, 2007). Besides this, there are other factors and principles that drive the implementation of QM. Hoyle (2007) highlights that over and over again that the top management of an organization as a driving force in ensuring firms achieve an orientation to quality. In the process, firms are able to create value, establish objectives and systems that will satisfy the expectations of customers which in the long run will improve on the performance of the organization. When quality management is successfully implemented in an organization, it will lead to performance drivers such as lower costs, greater efficiency, better product quality, improved market share, increased motivation and satisfaction (Altiok, 2012).

## 2.6 Summary of Literature Review, Conceptual Framework and Hypotheses

This section presents the summary of literature review, conceptual framework which depicts the relation between the variables in the study and hypotheses which the study sought to test.

### 2.6.1 Summary of Literature Review

Quality management is an integral component essential for the excellence of any given manufacturing organization, to enable their survival in the rapidly changing business environment. Recognizing quality as a key ingredient to performance is likely to propel an organization to greater heights.

**Table 2.1 Summary of Literature Review and Knowledge Gaps**

<b>Scholar</b>	<b>Study</b>	<b>Objectives</b>	<b>Key Findings</b>	<b>Knowledge gaps</b>
Tata & Prasad, (1998)	Cultural and structural constraints on total quality management implementation	To determine cultural and structural constraints on total quality management implementation	Organizational culture affects performance	The study did not measure the effects of the constraints on performance
Prajogo & McDermott, (2005)	The relationship between total quality management practices and organizational culture	To establish the relationship between total quality management practices and organizational culture	Total quality management practices affects organizational culture	The study focus on culture while the present study will focus on performance
Lindsay & Evans, (2007)	Managing for Quality and Performance Excellence	To find out how quality management affect business performance	Quality management significantly affects performance	The study was done in a developed world while the present study will be done in



				Kenya.
Terziovski and power (2007)	Increasing ISO 9000 certification: a continuous improvement approach	To find out how culture, management responsibility, employee involvement affect performance	There is a positive relationship between continuous improvement and quality culture and a firm's performance	The study did not consider quality management practices and its effects on performance
Ab-Wahid and Corner (2009)	Critical success factors and problem in ISO maintenance	To find out the critical success factors in ISO maintenance	There is a positive relationship between strategic, financial, and continuous improvement and a firm's performance	The study did not find out how CSF influence performance
Bell and Omachonu (2011)	Quality system implementation process for business success	To find out how Quality system implementation affect performance	There is significant linkage between improved documentation, firms performance and organizational performance	The study did not consider performance of manufacturing firms
Anyango,; Wanjau, and Mageto, (2013) Kenya	Assessment of the relationship between ISO 9001 certification and performance of manufacturing firms in Kenya	To find out the relationship between ISO 9001 certification and performance of manufacturing firms in Kenya	There is positive relationship between financial HRM, firms performance, HRM and control measures and a firm's performance	The study was biased towards quality managers, who may have been subjective, whereas the current study used quality assurance managers and internal auditors

Njuguna, M. (2013)	Value Chain Management Practices And Supply Chain Performance of Large Manufacturing Firms in Nairobi	To establish the relationship between value chain management and supply chain performance	Quality improvement within the value chain improved supply chain performance	The study measured supply chain performance while current study will focus on organizational performance
Mutua, J. (2014).	Quality management practices and financial performance of cement manufacturing firms in Kenya	To establish the quality management practices adopted by cement manufacturing firm in Kenya and financial performance of the same	Most cement manufacturing firms that implemented quality management practices recorded high sales turnover leading to organizational performance.	The study considered only cement manufacturing firms leaving out firms in other sectors
Rajab, A.F (2014)	Quality management practices and supply chain performance of large scale manufacturing firms in kenya	To determine the extent to which quality management practices are implemented by large scale manufacturing firms in Kenya	Quality management practices have been practiced to a large extent by the large manufacturing firms in Nairobi, Kenya.	The study measured supply chain performance while current study will focus on organizational performance

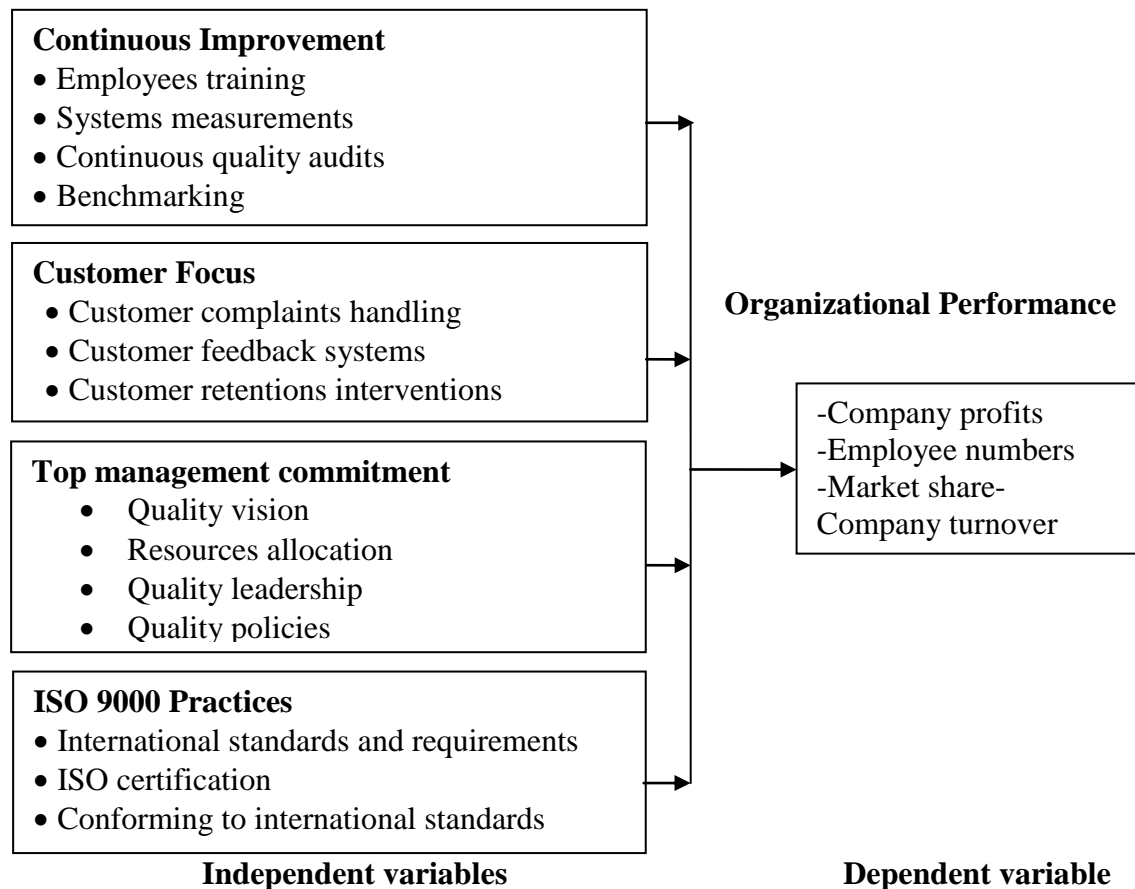
The empirical literature encompasses the need for quality management practices and how they influence performance of manufacturing firms in Kenya. Studies that have been done have concluded that quality management practices are important for improving performance and the quality of goods and services provided by these manufacturing firms. However, none of the studies have addressed issues of quality management practices and organizational performance in all the manufacturing firms in Kenya. This study therefore found it necessary to address these issues by determining the quality management practices adopted by manufacturing firm in Kenya and their relationship with the performance of the organizations.

### 2.6.2 Conceptual Framework

The conceptual framework depicts the relation between the depended and independent variables in the study.

**Figure 2.1 Conceptual Framework**

#### Quality Management



### **2.6.3 Hypothesis**

The study tested the following hypotheses;

**H<sub>1</sub>:** There is no statistically significant relationship between quality management and organizational performance

**H<sub>2</sub>** There is no statistically significant relationship between continuous improvement and organizational performance

**H<sub>3</sub>** There is no statistically significant relationship between customer focus and organizational performance

**H<sub>4</sub>** There is no statistically significant relationship between top management commitment and organizational performance

**H<sub>5</sub>** There is no statistically significant relationship between ISO 9000 Practices and organizational performance

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter presents the research methodology that was used to explore quality management and organizational performance. The section spells out the procedures that were used to come up with the research design which tentatively determines the population and sample for the study. Additionally, the sampling procedures and size was determined as well as the data collection techniques and the expected analysis.

### **3.2 Research Design**

The study employed descriptive research design. The main aim of descriptive research design was to express the situation as it is. This kind of study tries to explain things such as characteristics, values, possible behavior, and attitudes. Descriptive research purposefully depicts an accurate representation of individuals, events and places. Philosophically descriptive research leans on the positivist view that seeks to test the research hypothesis with trying to understand the background meaning.

### **3.3 Target Population**

According to the Kenya Manufacturers Association (KMA) manufacturing firms in Kenya operating in different sectors and are classified into 12 sub categories which are based on the raw materials that the companies import or the products that they manufacture. The total number of manufacturing entities within Nairobi reportedly is 594 out of a total membership of 700 in Kenya (KAM, 2014). Thus Nairobi presented a suitable study area as 65% of the manufacturing organizations are located in it.

### **3.4 Sampling**

A sample of 70 manufacturing firms in Nairobi County was selected which is 12.75% of the target population. According to Patton (2002), a sample of at least 10% of the target population is adequate for a descriptive study. This study ensured that the selected sample was a representative of the manufacturing firms in the County. This is crucial as it allowed for the making of valid inferences such that the conclusions that were drawn reflected the entire population. Stratified random sampling technique

were used where the 12 different subcategories formed the strata as shown in table 3.1.

The ideal number of companies to take part in this study was statistically determined using the formula

$$n \geq \frac{Z^2 S^2}{E^2}, \text{ where,}$$

1. n- sample size
2. Z - critical value from the normal tables for 95% confidence.
3. E- the desired precision (5%).

$$n = \left( \frac{Z\sigma}{E} \right)^2 = \frac{1.96^2 \times 21^2}{2}$$

$$=70$$

**Table 3.1 Sample distribution**

	<b>Manufacturing Firms Category</b>	<b>Number of Firms</b>	<b>Number of sampled Firms</b>
<b>1</b>	Chemical & Allied	68	8
<b>2</b>	Energy, Electricals	37	4
<b>3</b>	Food and Beverages	149	18
<b>4</b>	Leather	7	1
<b>5</b>	Metal	59	7
<b>6</b>	Motor vehicle	27	3
<b>7</b>	Mining	19	2
<b>8</b>	Paper and Board	68	8
<b>9</b>	Pharmaceuticals	23	3
<b>10</b>	Plastic	67	8
<b>11</b>	Textiles	53	6
<b>12</b>	Timber	17	2
<b>Total</b>	12 Categories	<b>594</b>	<b>70</b>

### **3.5 Data Collection**

The data collected comprised of primary data that was both quantitative and qualitative. As a means of creating measures for the study geared towards an investigation of the research topic as well as the objectives, the study used a self-administered structured questionnaire as the main tool for collecting data.

The questionnaire was divided into three sections; Section A contained background data, section B contained quality management practices while section C contained organizational performance. The content of the structured questionnaire ranged from open ended to closed ended questions, Likert scales questions and also the use of scripted introduction and order of questions as per the research objectives.

Quality assurance manager was considered appropriate respondents for the study hence the questionnaire was administered to them. The questionnaire was administered through drop and pick later method. It was also emailed to the respondents who were not available immediately to fill the questionnaire.

### **3.6 Data Analysis**

The study involved both quantitative and qualitative data. It examined the collected data to make inferences; editing to eliminate restatements, erraticness and for grouping. After the data was checked for wholeness and readiness for analysis, it was thematically coded. Descriptive statistics such as frequencies, percentages, means and standard deviations was used to was used to analyze the measures of dispersion for quantitative data.

Regression analysis was used to analyse the relationship between quality management and performance of firms in the manufacturing industry. A mathematical function  $Y = f(X_1, X_2, X_3, X_4)$  was employed to state the relationship between variables.

Where Y (performance) was the dependent variable and  $X_1$ ,  $X_2$ ,  $X_3$  and  $X_4$  are the independent variables (continuous improvement, customer focus, top management commitment and ISO 9000 Practices) thus, developing an analytical model of a linear multiple regression equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where:

Y= Organization Performance

$\alpha$  = Autonomous factors

X<sub>1</sub> = Continuous improvement

X<sub>2</sub> = Customer focus

X<sub>3</sub> = Top management commitment

X<sub>4</sub> = ISO 9000 Practices

B<sub>i</sub> represents the beta coefficients of the independent variables X<sub>i</sub>

e= Error term



## CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSION

### 4.1 Introduction

This part of the research deals with the analysis, interpretation and discussion of the data gathered from the desk study and questionnaire survey as discussed in subsequent sub headings.

### 4.2 Questionnaire Response Rate

The questionnaires were distributed to the quality assurance managers. A total of 70 questionnaires were distributed. 62 questionnaires were filled and returned giving a response rate of 88.57%. The response rate is considered satisfactory for the study.

This response rate corresponds to Mugenda and Mugenda (2003) assertion that a response rate of 50% is adequate; a rate of 60% is good and a response rate of 70% and over is excellent.

### 4.3 Reliability Analysis

Item analysis was conducted to determine the reliability of the summated scores calculated for the various factor categories. The Item analysis was conducted for statements in the questionnaire that were summated into scores for the 5 factor categories. For each factor Cronbach's coefficient  $\alpha$  was calculated and a factor analysis specifying a one factor model was conducted. Internal reliability test of the factors in each category was conducted by determining their Cronbach's coefficient  $\alpha$  value as shown in table 4.1.

**Table 4.1 Reliability Analysis**

Variable	Cronbach's Alpha
Continuous improvement	.83
Customer focus	.80
Top management commitment	.82
ISO 9000 Practices	.77
Organizational Performance	.89

**Source: Research data, (2016)**

Cronbach's  $\alpha$  value for all factor categories were  $> .70$ , this is adequate proof of internal consistency. Cronbach's  $\alpha$  values of 0.50 to 0.70 are acceptable.

#### 4.4 Background data

The background data of the respondents as shown in table 4.2 included; job designation, employment status, market coverage, organization standardization and current number of employees in the organizations.

**Table 4.2 Background data**

<b>Job designation</b>		
	Frequency	Percentage
Civil works	12	19
Mechanical	14	22
Electrical	10	16
Materials	14	23
Finance	12	20
<b>Employment status</b>		
	Frequency	Percentage
Permanent	45	73
Temporary	0	0
Contractual	17	27
<b>Current market region</b>		
	Frequency	Percentage
Local	21	34
Regional	23	37
International	18	29
<b>Organization standardization</b>		
	Frequency	Percentage
KEBS	14	22
ISO 9001	24	39
ISO 9000	24	39
<b>Current number of employees</b>		

	Frequency	Percentage
Less than 100	28	45
Equal or more than 100	25	41
Equal or more than 1000	9	14

**Source: Research data, (2016)**

The respondents were asked to indicate their job designations where it was established that 23% were from materials, followed by 22% from mechanical and 20% from finance. The remaining respondents were drawn from civil works and electrical works. The results indicated that majority (73%) of the respondents were employed on a permanent basis while 27% were on contracts. It was also established that none of the respondents were employed on temporary basis.

In terms of market coverage, 37% of the manufacturing firms target regional market while 34% targeted local market. It was also noted that 29% of the firms involved in the study had spread their coverage to international markets. All the manufacturing organizations involved in the study complied with KEBS and ISO standards. It was established that 39% of the firms used ISO 9000 and ISO 9001 respectively as their organization standardization. The findings also revealed that 22% of the firms used KEBS standards as their organization standardization. In terms of current number of employees, the study established that majority (45%) of the firms had less than 100 employees while 41% had equal or more than 100 employees. Further findings indicated that only 14% of the firms had equal or more than 100 employees.

#### **4.5 Quality Management Practices**

The respondents were asked to indicate the extent to which they agreed with the statements on the Quality Management Practices used by manufacturing Firms in Kenya. The scale that was applicable was: 1=very small extent, 2= small extent, 3= moderate extent, 4= Large extent, 5= to a very large extent. The scores of “Very small extent” and “Small extent” have been taken to represent a variable which had a mean score of 0 to 2.5 on the continuous Likert scale;(0≤ S.E <2.4). The scores of “moderate extent” have been taken to represent a variable with a mean score of 2.5 to 3.4 on the continuous Likert scale: (2.5≤M.E. <3.4) and the score of both “Great extent” and “Very

great extent” have been taken to represent a variable which had a mean score of 3.5 to 5.0 on a continuous Likert scale; ( $3.5 \leq L.E. < 5.0$ ).

#### 4.5.1 Continuous improvement

From the data collected the respondents reported that continuous quality improvement is practiced between a very large extent and large extent. Most activities in continuous quality improvement are practiced to a large extent (training policies for employees, continuous employee training which enhances internal quality performance, continuous improvement of quality systems which has led to increased revenue, firms benchmarks its quality against other quality management practices best practices, set time limit for meeting efficient products delivery, Quality audits according to ISO certification requirements, reviews through internal quality audits conducted for continuous improvement and every individual makes product improvement continuously in the company. This is shown by a mean score of 3.64, 3.76, 3.82, 3.71, 3.79, 3.62, 3.86 and 3.79 respectively.

**Table 4.3 Continuous improvement**

<b>Continuous improvement</b>	<b>N</b>	<b>Mean</b>	<b>S.D</b>
Training policies for employees training exist in the company	62	3.64	0.849
There is continuous employee training which enhances internal quality performance	62	3.76	0.712
There is existence of continuous improvement of quality systems which has led to increased revenue	62	3.82	1.003
The firms benchmarks its quality against other quality management practices best practices	62	3.71	0.861
There is set time limit for meeting efficient products delivery	62	3.79	0.990
There exists continuous Quality audits according to ISO certification requirements.	62	3.62	0.793
There are reviews through internal quality audits conducted for continuous improvement	62	3.86	0.871
As a policy, every individual makes product improvement continuously in the company	62	3.79	0.968
<b>Average score</b>	62	3.74875	0.880875

**Source: Research Data, (2016)**

### 4.5.2 Customer focus

The findings shown in table 4.4 indicate that all activities show that customer focus practices have been adopted in the respective organizations at large extent (there exists mechanisms for handling customer complains, there are well trained employees working as customer care representatives, Company retains customers through provision of quality products, customer needs and expectations are communicated throughout the company, the company conducts customer feedback surveys regularly and benchmarking with other company helps the company to measure performance progress. This is shown by a mean score of 3.90, 3.65, 3.76, 3.79, 4.01 and 3.82 respectively.

**Table 4.4 Customer focus**

<b>Customer focus</b>	<b>N</b>	<b>Mean</b>	<b>S.D</b>
There exists mechanisms for handling customer complains.	62	3.90	0.761
There are well trained employees working as customer care representatives	62	3.65	0.667
Company retains customers through provision of quality products	62	3.76	0.884
Customer needs and expectations are communicated throughout the company.	62	3.79	0.741
The Company conducts customer feedback surveys regularly	62	4.01	1.054
Benchmarking with other company helps the company to measure performance progress	62	3.82	0.898
<b>Average score</b>	62	3.821667	0.834167

**Source: Research Data, (2016)**

### 4.5.3 Top management commitment

All activities show that top management commitment practices have been adopted in the respective organizations at large extent. It was established that. The company vision embraces Quality management to a large extent as shown by a mean of 4.02. There is review of QMS for purposes of continuity, adequacy and effectiveness at intervals (M=3.79, S,D=0.851) and ISO certification has been assigned resources for its implementation and support (M=3.97, S.D=0.907). It was also established that all employees are regularly updated on policies and procedures from time to time (M=3.81, S.D=0.953) and in order to meet the needs of the organization there is regular review of quality policies (M=3.71, S.D=0.598). Further findings indicated

that Quality teams are always guided by the management as shown by a mean of 3.72 and a standard deviation of 0.744. Finally it was established that fear is eliminated through building trust by the top management (M=3.61, S.D=0.958) and Quality improvement has been effected through elimination of fear by management (M=3.88, S.D=1.054). Table 4.5 shows the findings of the study.

**Table 4.5 Top management commitment**

<b>Top management commitment</b>	<b>N</b>	<b>Mean</b>	<b>S.D</b>
The company vision embraces Quality management	62	4.02	0.954
There is review of QMS for purposes of continuity, adequacy and effectiveness at intervals	62	3.79	0.851
ISO certification has been assigned resources for its implementation and support	62	3.97	0.907
All employees are regularly updated on policies and procedures from time to time	62	3.81	0.953
In order to meet the needs of the organization there is regular review of quality policies	62	3.71	0.598
Quality teams are always guided by the management	62	3.72	0.744
Fear is eliminated through building trust by the top management	62	3.61	0.958
Quality improvement has been effected through elimination of fear by management	62	3.88	1.054
<b>Average score</b>	62	3.81375	0.877375

**Source: Research Data, (2016)**

#### **4.5.4 ISO 9000 Practices**

All activities show that ISO 9000 practices have been adopted in the respective organizations at large extent with the mean ranging from 3.61 to 3.92 as shown in table 4.6. The respondents indicated that their firm observe international standards and requirements (M=3.73, S.D=0.890), is ISO certified (M=3.61, S.D=0.722) and prevent non conformity (M=3.78, S.D=0.776). The respondents also indicated that their manufacturing firm undergoes a comprehensive program to apply for ISO 9000 (M=3.79, S.D=1.007), reviews documents and manage procedures (M=3.70, S.D=1.058) and undergoes a process that enables them to get certification (M=3.92, S.D=1.098).

**Table 4.6 ISO 9000 practices**

<b>ISO 9000 Practices</b>	<b>N</b>	<b>Mean</b>	<b>S.D</b>
Our firm observe international standards and requirements	62	3.73	0.890
Our manufacturing firm is ISO certified	62	3.61	0.722
Our manufacturing firm prevent non conformity	62	3.78	0.776
Our manufacturing firm undergoes a comprehensive program to apply for ISO 9000	62	3.79	1.007
Our manufacturing firm reviews documents and manage procedures	62	3.70	1.058
Our firm undergoes a process that enables them to get certification.	62	3.92	1.098
<b>Average score</b>	62	3.755	0.925167

**Source: Research Data, (2016)**

#### **4.6 Organizational performance**

To measure the performance of manufacturing firms, each respondent in this study was asked to evaluate it with respect to the following four dimensions: enterprise profits, employee numbers, market share/number of customers, and enterprise turnover/growth in sales. All these were benchmarked to 100% in 2010 as the base year. The results are presented in table 4.7.

**Table 4.7 Organizational performance**

Constructs considered	Annual growth or decline as a percentage (%)						Overall Annual growth
	2010=100%	2011	2012	2013	2014	2015	
Enterprise profits	100%	22	23	23	24	31	24.6
Employee numbers	100%	2	2	3	3	3	3
Market Share/Number of customers	100%	22	23	23	24	24	23.2
Enterprise turnover/Sales	100%	15	15	20	21	24	23
Average growth							18.45

**Source: Research data, (2016)**

From the findings on organizational performance with 2010 being the base year and benchmarked at 100%, the year 2011 registered an average score of (22%), the year 2012 registered an average score of (23%), the year 2013 registered an average score of (23%), an average score of (24%) for the year 2014 with the year 2015 registering the highest percentage average profit representing (31%). As far as employee numbers is concerned, there was an average of 2% increase in employees' numbers in 2011, an average of 2% in 2012, an average of 3% in 2013, an average of 3% in 2014 with an average of 3% employees in 2015. Further the market share/number of customers in 2011 was 22% 2012 and 2013 stood at a constant of (23%). In 2014 and 2015, the market share stood at (24%) showing a positive increase of (1%) as compared to the previous years. Furthermore the enterprise turnover/sales showed a progressive increase throughout the period with the highest being in 2015 with an average of (24%). The overall growth was exhibited in the enterprise profits with the best performing year registering (24.6%). The growth of profits may be attributed to the high turnover and low cost structures that are typical of privatized firms. The employee numbers average at (3%) for the five years still indicating that annual growth is still minimal. The sales turnover increased considerably to correspond with the growth in profits. It is worth noting that despite a favorable enterprise performance the market share is still very depressed at a partly (23.2%) annually due to stiff competition in the manufacturing sector.

#### **4.7 Relationship between Quality Management and Organizational Performance**

In addition, the researcher conducted a multiple regression analysis so as to determine the relationship between quality management and performance of firms in the manufacturing industry. Multiple regression is a statistical technique that allows us to predict a score of one variable on the basis of their scores on several other variables. The main purpose of multiple regressions is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Table 4.8 present the model coefficients.



**Table 4.8 Model Coefficients**

	Unstandardized		Standardized	t/2	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	1.224	0.312		2.358	0.000
Continuous improvement	0.217	0.1440	0.185	.776	0.0387
Customer focus	0.118	0.1264	0.089	.849	0.038
Top management commitment	0.299	0.0715	0.235	2.0936	0.044
ISO 9000 Practices	0.272	0.0847	0.023	0.4069	0.046

a. Dependent Variable: Organizational performance

**Source: Research Data, (2016)**

The regression equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Y = Organization Performance

$\alpha$  = Autonomous factors

$X_1$  = Continuous improvement

$X_2$  = Customer focus

$X_3$  = Top management commitment

$X_4$  = ISO 9000 Practices

$\beta_i$  represents the beta coefficients of the independent variables  $X_i$

e = Error term - Captures all relevant variables not included in the model

Replacing Beta coefficients identified in Table 4.11, the equation will be:

$$Y = 1.224 + 0.185X_1 + 0.089X_2 + 0.235X_3 + 0.023X_4 + e$$

According to the regression equation established, taking all factors (continuous improvement, customer focus, top management commitment and ISO 9000 practices)

constant at zero, organizational performance realized would be 1.224. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in continuous improvement results to a 0.185 increase in organizational performance. A unit increase in customer focus will lead to a 0.089 increase in performance; a unit increase in top management commitment will lead to a 0.235 increase in organizational performance, whereas a unit increase in ISO 9000 practices will lead to a 0.023 increase in organizational performance. These results infer that continuous improvement, customer focus, top management commitment and ISO 9000 practices affects organizational performance. The significant which were less than 5% imply that all the predictors used were significant. All the *t* values are > 1.96 hence the values are significant.

#### 4.7.1 Co-efficient of Determination

The coefficient of determination is a measure of how well a statistical model is likely to predict future outcomes. The coefficient of determination,  $r^2$  is the square of the sample correlation coefficient between outcomes and predicted values. As such it explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (organizational performance) that is explained by all the four independent variables (continuous improvement, customer focus, top management commitment and ISO 9000 practices).

**Table 4.9 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.892 (a)	.796	.303	.125

**Predictors:** (Constant), continuous improvement, customer focus, top management commitment, ISO 9000 practices.

**Source: Research Data, (2016)**

The four independent variables that were studied, explain 79.6% of the organizational performance as represented by the  $R^2$ . This therefore means the four independent variables only contribute about 79.6% to organizational performance while other quality management practices not included in the study explain 20.40% of performance.

#### 4.7.2 ANOVA

The significance value shown in table 4.10 is 0.0173 which is less than 0.05 thus the model is statistically significant in predicting how quality management practices influence organizational performance of manufacturing firms. The F critical at 5% level of significance was 3.04. Since F calculated is greater than the F critical (value = 9.475), this shows that the overall model was significant.

**Table 4.10 ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	2.534	2	1.267	9.475	.0173 <sup>a</sup>
Residual	9.307	60	2.327		
Total	3.465	62			

a. **Predictors: (Constant)**, continuous improvement, customer focus, top management commitment, ISO 9000 practices.

**Source: Research data, (2016)**

#### 4.8 Discussion

The findings established that quality management practices had been adopted to a large extent in the manufacturing industry. The quality management practices considered in the study were continuous improvement, customer focus, top management commitment and ISO 9000 practices. The findings of the second objective through regression analysis found out that 79.6% of the changes in organizational performance could be attributed to the combined effect of the independent variables (quality management practices).

Several studies have found a relationship between quality management practices and organizational performance. These findings are coherent with a study conducted by Hendricks and Singhal (2007) has provided evidence of an existing relationship between quality management practices and financial performance of manufacturing firms and the effectiveness of the implementation of quality management practices. Adam et al. (2007) has shown that there is a positive impact of quality management practices on financial performance of a firm. In addition, Choi and Eboch (2008) found a significant direct link between quality management practices and performance of a firm.

The critical factor 'top management support' is cited by most researchers. Strong commitment from the top management is vital in quality management and leading to higher quality performance. Most of the researchers consented to this notion (Anderson *et al.*, 1995). Senior management acts a driver of TQM implementation, establishing values, goals, and systems to satisfy customers' needs and expectations and improve organizational performance (Ahire *et al.*, 1996).

On customer focus practices, the study also concur with Sila and Ebrahimpour, (2005) who reported a strong link between the delivery of high quality goods and services and profitability through customer satisfaction. An organization must identify customer relationship to measure customer needs and expectations; involve customers in quality improvement and determine customer satisfaction (Prajogo & Sohal, 2003). The consumer is the most important part of the production line, Quality should be aimed at the needs of the consumer, present and future" (Deming, 1986, p. 32). The customer should be closely involved in the product design and development process, with input at every stage of the process; so that there is less likelihood of quality problems once full production begins.

The availability of customer complaint information to managers and the degree of the use of customer feedback to improve product quality reveal the level of customer focus in an organization. As customer expectations are dynamic, an organization needs to survey customer expectations regularly and modify its operations accordingly (Ahire *et al.*, 1996).

On organizational performance, quality management is often used as a multidimensional approach to measuring organizational performance, where both financial and non-financial measures assume equal importance (Sila, 2007). A Literature on QM suggests various measures of performance, for instance, product and service outcomes, financial and market outcomes, customer-focused outcomes, process effectiveness outcomes, workforce-focused outcomes, and leadership outcomes.

## **CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

The study was carried out to establish relationship between quality management and supply chain performance in manufacturing firms in Nairobi, Kenya. This chapter presents the summary of findings for the research objectives, conclusion, limitations, recommendations made based on the findings and suggestions for further research.

### **5.2 Summary of Findings**

From the data collected the respondents reported that continuous quality improvement is practiced between a very large extent and large extent. Most activities in continuous quality improvement are practiced to a large extent (training policies for employees, employees are continuously trained to enhance internal quality performance, continuous improvement of quality systems leading to increased revenue, firms benchmarks its quality against other quality management practices best practices, set time limit to meet efficiency of products delivery, quality audits are carried out continuously as per ISO certification requirements, continuous improvement reviews through internal quality audits and policy for making continuous improvement of products quality for every individual in the company.

All activities show that customer focus practices have been adopted in the respective organizations at large extent (mechanism for customer complaints handling, customer care employees are well trained as telephone customer care, company is committed to customer retention by ensuring quality products, customer needs and expectations are communicated throughout the company, the company conducts customer feedback surveys regularly and benchmarking with other company helps the company to measure performance progress.

All activities show that top management commitment practices have been adopted in the respective organizations at large extent. It was established that Quality management is embraced in the vision of the company had been adopted to large extent as shown by a mean of 4.02. It was also established that top management reviews organizations QMS at planned intervals to ensure continuity, adequacy and effectiveness and devotes resources for development and support for ISO certification. It was also established that Quality policies and procedures are documented and communicated to

all employees and are reviewed regularly to meet the needs of the organization. Further findings indicated that management takes leading positions on guiding quality teams. Finally it was established that top management establish trust and commitment to quality improvement by eliminating fear.

All activities show that ISO 9000 practices have been adopted in the respective organizations at large extent. The respondents indicated that their firms observe international standards and requirements, is ISO certified and prevent non conformity. The respondents also indicated that their manufacturing firm undergoes a comprehensive program to apply for ISO 9000, reviews documents and manage procedures and undergoes a process that enables them to get certification.

### **5.3 Conclusions**

The successful implementation of quality programs depends on workforce. If manufacturing industry would have more trained, involved and empowered employees it is more likely to realize benefits of implementation of quality management techniques. The findings of research study suggest that management of manufacturing industry should be more involved in quality improvement programs.

The manufacturing industry of Kenya is accepting the importance of quality management practices which are getting popular in this industry. But the pace of adopting new practices and their successful implementation is still lagging behind the advanced countries. The firms in manufacturing industry which are customer focused and were working on continuous improvement by following benchmarking practices were realizing better organizational performance. The success of quality management practices in delivering desired organizational performance is strongly influenced by the effective role of leadership. It is concluded that the manufacturing industry of Kenya has develop the concept of leadership for successful implementation of quality management practices to generate the desired performance and it is featured with moderate level of quality management techniques.

## **5.4 Recommendations from the study**

The study recommends that manufacturing firms adopt and implement alternative QMP strategies e.g. ISO 9000 for purposes of comparison and selecting the best practices for improved operational performance. Manufacturing firms in Kenya ought to benchmark themselves against the best performing firms globally in an effort to enhance competitiveness.

## **5.5 Limitations of the Study**

The sampling technique used in this study is far from perfect. Further empirical research could become better than the current study by attempting to obtain a list of employees working in the manufacturing firms (sample framework). A somewhat related limitation is due to the fact that this study was based on a self-assessment of quality by managers in the studied organizations, which could have resulted in an inherent bias. Future studies may well examine the perceptions of customers of quality in these manufacturing firms.

## **5.6 Suggestions for Further Research**

Future research may employ different research methods to investigate more systematically and ascertain the causal relationships implicit assumed in this study. Future research should unfold further dimensions of QM and examines the impact of each on various dimensions of organization performance, as this would be fruitful in testing this causal relationship more deeply. Future researchers must work upon all the dimensions of quality management and they must ensure that no dimension would be shadowed by the other item.



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## **APPENDICES**

### **Appendix I: Letter to the Respondents**

**THE UNIVERSITY OF NAIROBI  
SCHOOL OF BUSINES  
MBA, PROGRAM.**

**Dear Sir/Madam**

I am a student at the University of Nairobi pursuing degree in Master of Business Administration in Operations Management as part of my course requirement. I am expected to carry out a research project work of which I am researching on **“QUALITY MANAGEMENT AND ORGANIZATIONAL PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY”**. The purpose of this letter is to request you to assist me by responding to the questionnaire.

The findings of the study will be used for academic purposes only and your responses will remain confidential.

Yours faithfully,

**MONIREI EUNICE MILANOI**

## Appendix II: Research Questionnaire

The questionnaire aims at collecting information and data for academic use by the researcher. Information gained from you will be of great help and will be highly appreciated. Many thanks for your time. Kindly note that information gained through this study will only be used for academic and related purposes only. Confidentiality of the information you provide will remain protected.

### **SECTION A: BACKGROUND DATA**

*Please tick (✓) or fill the gap as appropriate*

1. What is your designation in your company?

1 = Civil works [ ] 2 = Mechanical [ ] 3 = Electrical works [ ] 4 = Materials [ ] 5 = Finance [ ]

If other, please specify here:

.....

2. Please indicate your employment status

1 = Permanent [ ] 2 = Temporary [ ] 3 = Contractual [ ]

If other, please specify here: .....

3. Please indicate the current market region of your organization

1 = Local [ ] 2 = Regional [ ] 3 = International [ ]

If other, please specify here:

.....

4. Please indicate the organization standardization

1 = KEBS [ ] 2 = ISO 9001 [ ] 3 = ISO 9000 [ ]

If other, please specify here:

.....

5. Indicate the current number of employees in your organization

1 = Less than 100 [ ] 2 = Equal or more than 100 [ ] 3 = Equal or more than 1000 [ ]

**SECTION B: QUALITY MANAGEMENT PRACTICES USED BY MANUFACTURING FIRMS IN KENYA**

Please indicate the extent to which you agree with the following statements on the Quality Management Practices used by manufacturing Firms in Kenya. The scale below will be applicable: 1=very small extent, 2= small extent, 3= moderate extent, 4= Large extent, 5= to a very large extent.

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Continuous improvement</b>					
The company has training policies for employees					
Employees are continuously trained to enhance internal quality performance					
The company has continuous improvement of quality systems leading to increased revenue					
The firms benchmarks its quality against other quality management practices best practices					
The company has set time limit to meet efficiency of products delivery					
Quality audits are carried out continuously as per ISO certification requirements.					
There is continuous improvement reviews through internal quality audits					
There is a policy for making continuous improvement of products quality for every individual in the company					
<b>Customer focus</b>					
Mechanism exists for customer complaints handling.					
Customer care employees are well trained as telephone customer care.					
Company is committed to customer retention by ensuring quality products					
Customer needs and expectations are communicated throughout the company.					
The Company conducts customer feedback surveys regularly					
Benchmarking with other company helps the company to measure performance progress					
<b>Top management commitment</b>					
Quality management is embraced in the vision of the company					
Top management reviews organizations QMS at planned intervals to ensure continuity, adequacy and effectiveness					
Top management devotes resources for development and support for ISO certification					
Quality policies and procedures are documented and communicated to all employees					
Quality policies are reviewed regularly to meet the needs of the organization					
Management takes leading positions on guiding quality teams					
Top management establish trust and commitment to quality improvement					

by eliminating fear					
Top management establish commitment to quality improvement by eliminating fear					
<b>ISO 9000 practices</b>					
Our firm observe international standards and requirements					
Our manufacturing firm is ISO certified					
Our manufacturing firm prevent non conformity					
Our manufacturing firm undergoes a comprehensive program to apply for ISO 9000					
Our manufacturing firm reviews documents and manage procedures					
Our firm undergoes a process that enables them to get certification.					

**SECTION C: PERFORMANCE**

18. Please give the percentage (%) figure relating to the increase or decrease in the parameters in the table below for the period of five years. For increase or decrease the benchmark is 100%.

Constructs considered	Annual growth or decline as a percentage (%)						Overall Annual growth
	2010=100%	2011	2012	2013	2014	2015	
Company profits (KSH)							
Employee numbers							
Market Share/Number of customers							
Enterprise turnover/Sales(KSH)							

19. On overall, how would you rate the performance of your firm for the past 5 years?

- Exceptional growth       Satisfactory growth       No growth   
 Negative Growth

### Appendix iii: List of Manufacturing Firms

<b>Sector: Building, Construction and Mining (6)</b>	
Central Glass Industries Ltd	Kenya Builders & Concrete Ltd
Karsan Murji & Company Limited	Manson Hart Kenya Ltd
Kenbro Industries Ltd	Mombasa Cement Ltd
<b>Sector: Food, Beverages and Tobacco (100)</b>	
Africa Spirits Ltd	Highlands Mineral Water Co. Ltd
Agriner Agricultural Development Limited	Homeoil
Belfast Millers Ltd	Insta Products (EPZ) Ltd
Bidco Oil Refineries Ltd	Jambo Biscuits (K) Ltd
Bio Foods Products Limited	Jetlak Foods Ltd
Breakfast Cereal Company(K) Ltd	Karirana Estate Ltd
British American Tobacco Kenya Ltd	Kenafric Industries Limited
Broadway Bakery Ltd	Kenblest Limited
C. Czamikow 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
Com Products Kenya Ltd	Palmhouse Dairies Ltd
Crown Foods Ltd	Patco Industries Limited
Cut Tobacco (K) Ltd	Pearl Industries Ltd
Deepa Industries Ltd	Pembe Flour Mills Ltd
Del Monte Kenya Ltd	Premier Flour Mills Ltd
East African Breweries Ltd	Premier Food Industries Limited
East African Sea Food Ltd	Proctor & Allan (E.A.) Ltd
Eastern Produce Kenya Ltd	Promasidor (Kenya) Ltd
Farmers Choice Ltd	Trufoods Ltd
Frigoken Ltd	UDV Kenya Ltd
Giloil Company Limited	Unga Group Ltd
Glacier Products Ltd	Usafi Services Ltd
Global Allied Industries Ltd	Uzuri foods Ltd
Global Beverages Ltd	ValuePak Foods Ltd
Global Fresh Ltd	W.E. Tilley (Muthaiga) Ltd
Gonas Best Ltd	Kevian Kenya Ltd
Hail & Cotton Distillers Ltd	Koba Waters Ltd
Al-Mahra Industries Ltd	Kwality Candies & Sweets Ltd
Alliance One Tobacco Kenya Ltd	Lari Dairies Alliance Ltd
Alpha Fine Foods Ltd	London Distillers (K) Ltd
Alpine Coolers Ltd	Mafuko Industries Ltd
Annum Trading Company Limited	Manji Food Industries Ltd
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 & A Industries Ltd	Nairobi Flour Mills Ltd



Kakuzi Ltd	NAS Airport Services Ltd
Erdemann Co. (K) Ltd	Rafiki Millers Ltd
Excel Chemical Ltd	Razco Ltd
Kenya Wine Agency Limited	Re-Suns Spices Limited
Highlands Canner Ltd	Smash Industries Ltd
Super Bakery Ltd	Softa Bottling Co. Ltd
Sunny Processor Ltd	Spice World Ltd
Spin Knit Dairy Ltd	Wrigley Company (E.A.) Ltd
<b>Sector: Chemical and Allied (62)</b>	
Anffi Kenya Ltd	Crown Berger Kenya Ltd
Basco Product (K) Ltd	Crown Gases Ltd
Bayer East Africa Ltd	Decase Chemical (Ltd)
Continental Products Ltd	Deluxe Inks Ltd
Cooper K- Brands Ltd	Desbro Kenya Limited
Cooper Kenya Limited	E. Africa Heavy Chemicals (1999) Ltd
Beiersdorf East Africa td	Elex Products Ltd
Blue Ring Products Ltd	European Perfumes & Cosmetics Ltd
BOC Kenya Limited	Galaxy Paints & Coating Co. Ltd
Buyline Industries Limited	Grand Paints Ltd
Carbacid (C02) Limited	Henkel Kenya Ltd
Chemicals & Solvents E.A. Ltd	Imaging Solutions (K) Ltd
Chemicals and Solvents E.A. Ltd	Interconsumer Products Ltd
Coates Brothers (E.A.) Limited	Odex Chemicals Ltd
Coil Products (K) Limited	Osho Chemicals Industries Ltd
Colgate Palmolive (E.A) Ltd	PolyChem East Africa Ltd
Johnson Diversity East Africa Limited	Procter & Gamble East Africa Ltd
Kel Chemicals Limited	PZ Cussons Ltd
Kemia International Ltd	Royal Trading Co. Ltd
Ken Nat Ink & Chemical Ltd	Reckitt Benckiser (E.A) Ltd
Magadi Soda Company Ltd	Revolution Stores Co. Ltd
Maroo Polymers Ltd	Soilex Chemical Ltd
Match Masters Ltd	Strategic Industries Limited
United Chemical Industries Ltd	Supa Brite Ltd
Oasis Ltd	Unilever Kenya Ltd
Rumorth EA Ltd	Murphy Chemical E.A Ltd
Rumorth East Africa Ltd	Syngenta East Africa Ltd
Sadolin Paints (E.A.) Ltd	Synresins Ltd
Sara Lee Kenya Limited	Tri-Clover Industries (K) Ltd
Saroc Ltd	Twiga Chemical Industries Limited
Super Foam Ltd	Vitafoam Products Limited
<b>Sector: Energy, Electrical and Electronics (42)</b>	
A.I Records (Kenya) Ltd	East African Cables Ltd
Amedo Centre Kenya Ltd	Eveready East Africa Limited
Assa Abloy East Africa Ltd	Frigorex East Africa Ltd
Aucma Digital Technology Africa Ltd	Holman Brothers (E.A.) Ltd
Avery (East Africa) Ltd	IberaAfrica Power (EA) Ltd
Baumann Engineering Limited	International Energy Technik Ltd
Centurion Systems Limited	Kenwest Cables Ltd
Digitech East Africa Limited	Kenwestfal Works Ltd
Manufacturers & Suppliers (K) Ltd	Kenya Power & Lighting Co. Ltd

Marshall Fowler (Engineers) Ltd	Kenya Scale Co. Ltd/ Avery Kenya Ltd
Mecer East Africa Ltd	Kenya Shell Ltd
Metlex Industries Ltd	Libya Oil Kenya Limited
Metsec Ltd	Power Technics Ltd
Modulec Engineering Systems Ltd	Reliable Electricals Engineers Ltd
Mustek East Africa	Sanyo Armo (Kenya) Ltd
Nationwide Electrical Industries	Socabelec East Africa
Nationwide Electrical Industries Ltd	Sollatek Electronics (Kenya) Limited
Optimum Lubricants Ltd	Specialised Power Systems Ltd
PCTL Automation Ltd	Synergy-Pro
Pentagon Agencies	Tea Vac Machinery Limited
Power Engineering International Ltd	Virtual City Ltd
<b>Sector: Plastics and Rubber (54)</b>	
Betatrads (K) Ltd	ACME Containers Ltd
Blowplast Ltd	Afro Plastics (K) Ltd
Bobmil Industries Ltd	Alankar Industries Ltd
Complast Industries Limited	Dune Packaging Ltd
Kenpoly Manufacturers Ltd	Elgitread (Kenya) Ltd
Kentainers Ltd	Elgon Kenya Ltd
King Plastic Industries Ltd	Eslon Plastics of Kenya Ltd
Kingway Tyres & Automart Ltd	Five Star Industries Ltd
L.G. Harris & Co. Ltd	General Plastics Limited
Laneeb Plastics Industries Ltd	Haco Industries Kenya Ltd
Metro Plastics Kenya Limited	Hi-Plast Ltd
Ombi Rubber Rollers Ltd	Jamlam Industries Ltd
Packaging Industries Ltd	Kamba Manufacturing (1986) Ltd
Plastics & Rubber Industries Ltd	Keci Rubber Industries
Polyblend Limited	Nairobi Plastics Industries
Polyflex Industries Ltd	Nav Plastics Limited
Polythene Industries Ltd	Ombi Rubber
Premier Industries Ltd	Packaging Masters Limited
Prestige Packaging Ltd	Plastic Electricians
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-Plastics Ltd	Solvochem East Africa Ltd
Wonderpac Industries Ltd	Springbox Kenya Ltd
<b>Sector: Textile and Apparels (38)</b>	
Africa Apparels EPZ Ltd	MRC Nairobi (EPZ) Ltd
Fulchand Manek & Bros Ltd	Ngecha Industries Ltd
Image Apparels Ltd	Premier Knitwear Ltd
Alltex EPZ Ltd	Protex Kenya (EPZ) Ltd
Alpha Knits Limited	Riziki Manufacturers Ltd
Apex Apparels (EPZ) Ltd	Rolex Garments EPZ Ltd
Baraka Apparels (EPZ) Ltd	Silver Star Manufacturers Ltd
Bhupco Textile Mills Limited	Spinners & Spinners Ltd
Blue Plus Limited	Storm Apparel Manufacturers Co. Ltd

Bogani Industries Ltd	Straightline Enterprises Ltd
Brother Shirts Factory Ltd	Sunflag Textile & Knitwear Mills Ltd
Embalishments Ltd	Tarpo Industries Limited
J.A.R Kenya (EPZ) Ltd	Teita Estate Ltd
Kenya Trading EPZ Ltd	Thika Cloth Mills Ltd
Kikoy Co. Ltd	United Aryan (EPZ) Ltd
Le-Stud Limited	Upan Wasana (EPZ) Ltd
Metro Impex Ltd	Vaja Manufacturers Limited
Midco Textiles (EA) Ltd	Yoohan Kenya EPZ Company Ltd
Mirage Fashionwear EPZ Ltd	YU-UN Kenya EPZ Company Ltd
<b>Sector: Timber, Wood Products and Furniture (22)</b>	
Economic Housing Group Ltd	Rosewood Office Systems Ltd
Eldema (Kenya) Limited	Shah Timber Mart Ltd
Fine Wood Works Ltd	Shamco Industries Ltd
Furniture International Limited	Slumberland Kenya Limited
Hwan Sung Industries (K) Ltd	Timsales Ltd
Kenya Wood Ltd	Wood Makers Kenya Ltd
Newline Ltd	Woodtex Kenya Ltd
PG Bison Ltd	United Bags Manufacturers Ltd
Transpaper Kenya Ltd	Statpack Industries Ltd
Twiga Stationers & Printers Ltd	Taws Limited
Uchumi Quick Suppliers Ltd	Tetra Pak Ltd
<b>Sector: Pharmaceutical and Medical Equipment (20)</b>	
Alpha Medical Manufacturers Ltd	Dawa Limited
Beta Healthcare International Limited	Elys Chemical Industries
Biodeal Laboratories Ltd	Gesto Pharmaceutical Ltd
Bulks Medical Ltd	Glaxo Smithkline Kenya Ltd
Cosmos Limited	KAM Industries Ltd
Laboratory & Allied Limited	KAM Pharmacy Limited
Manhar Brothers (K) Ltd	Pharmaceutical Manufacturing Co.
Madivet Products Ltd	Regals Pharmaceuticals
Novelty Manufacturing Ltd	Universal Corporation Limited
Oss. Chemie (K)	Pharm Access Africa Ltd
<b>Sector: Meta and Allied (38)</b>	
Allied Metal Services Ltd	Booth Extrusions Limited
Alloy Street Castings Ltd	City Engineering Works Ltd
Apex Street Ltd Rolling Mill Division	Crystal Industries Ltd
ASL Ltd	Davis & Shirtliff Ltd
ASP Company Ltd	Devki Steel Mills Ltd
East Africa Foundry Works (K) Ltd	East Africa Spectre Limited
Elite Tools Ltd	Kens Metal Industries Ltd
Friendship Container Manufacturers	Khetshi Dharamshi & Co. Ltd
General Aluminum Fabricators Ltd	Nampak Kenya Ltd
Gopitech (Kenya) Ltd	Napro Industries Limited
Heavy Engineering Ltd	Specialized Engineer Co. (EA) Ltd
Insteel Limited	Steel Structures Limited
Metal Crown Limited	Steelmakers Ltd
Morris & Co. Limited	Steelwool (Africa) Ltd
Nails & Steel Products Ltd	Tononoka Steel Ltd
Orbit Engineering Ltd	Welding Alloys Ltd

Rolmil Kenya Ltd	Wire Products Limited
Sandvik Kenya Ltd	Viking Industries Ltd
Sheffield Steel Systems Ltd	Warren Enterprises Ltd
<b>Sector: Leather Products and Footwear (8)</b>	
Alpharama Ltd	CP Shoes
Bata Shoe Co. (K) Ltd	Dogbones Ltd
New Market Leather Factory Ltd	East Africa Tanners (K) Ltd
C & P Shoe Industries Ltd	Leather Industries of Kenya Limited
<b>Sector: Motor Vehicle Assembly and Accessories (17)</b>	
Auto Ancillaries Ltd	Kenya Vehicle Manufacturers Limited
Varsani Brakelining Ltd	Labh Singh Hamam Singh Ltd
Bhachu Industries Ltd	Mann Manufacturing Co. Ltd
Chui Auto Spring Industries Ltd	Megh Cushion industries Ltd
Toyota East Africa Ltd	Mutsumoto Motor Company Ltd
Unifilters Kenya Ltd	Pipe Manufacturers Ltd
General Motor East Africa Limited	Sohansons Ltd
Impala Glass Industries Ltd	Theevan Enterprises Ltd
Kenya Grange Vehicle Industries Ltd	
<b>Sector: Paper and Paperboard (48)</b>	
Ajit Clothing Factory Ltd	Conventual Franciscan Friars-Kolbe Press
Associated Papers & Stationery Ltd	Creative Print House
Autolitho Ltd	D.L. Patel Press (Kenya) Limited
Bag and Envelope Converters Ltd	Dodhia Packaging Limited
Bags & Balers Manufacturers (K) Ltd	East Africa Packaging Industries Ltd
Brand Printers	Elite Offset Ltd
Business Forms & Systems Ltd	Ellams Products Ltd
Carton Manufacturers Ltd	English Press Limited
Cempack Ltd	General Printers Limited
Chandaria Industries Limited	Graphics & Allied Ltd
Colour Labels Ltd	Guaca Stationers Ltd
Colour Packaging Ltd	Icons Printers Ltd
Colour Print Ltd	Interlabels Africa Ltd
Kenya Stationers Ltd	Jomo Kenyatta Foundation
Kirn-Fay East Africa Ltd	Kartasi Industries Ltd
Paper Converters (Kenya) Ltd	Kenafic Diaries Manufacturers Ltd
Paper House of Kenya Ltd	Kitabu Industries Ltd
Paperbags Limited	Kul Graphics Ltd
Primex Printers Ltd	Label Converters
Print Exchange Ltd	Modem 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

**APPENDIX iv: Panel Raw Data**

<b>Firm</b>	<b>X1</b>	<b>X2</b>	<b>X3</b>	<b>X4</b>	<b>Y</b>
<b>1</b>	3.92	3.74	3.64	2.71	0.17
<b>2</b>	3.80	3.74	3.76	2.83	0.24
<b>3</b>	3.62	3.70	3.82	3.37	0.3
<b>4</b>	2.77	3.78	3.71	2.52	0.22
<b>5</b>	2.64	3.68	3.79	3.44	0.28
<b>6</b>	3.82	3.67	3.62	3.95	0.19
<b>7</b>	3.31	3.90	3.86	3.95	0.18
<b>8</b>	3.51	3.77	3.74	3.40	0.20
<b>9</b>	3.49	3.95	3.90	3.35	0.17
<b>10</b>	3.42	3.98	3.65	3.07	0.17
<b>11</b>	3.12	3.86	3.76	3.71	0.27
<b>12</b>	3.02	3.83	3.79	3.14	0.19
<b>13</b>	2.87	3.83	4.01	3.47	0.24
<b>14</b>	2.60	3.80	3.42	3.81	0.24
<b>15</b>	4.10	3.79	4.02	4.00	0.20
<b>16</b>	3.00	3.74	3.79	3.67	0.27
<b>17</b>	4.10	3.74	3.97	2.85	0.17
<b>18</b>	3.00	3.70	3.81	2.76	0.17
<b>19</b>	4.03	3.70	3.31	3.57	0.29
<b>20</b>	3.31	3.69	3.72	3.64	0.17
<b>21</b>	4.12	3.67	3.61	3.95	0.15
<b>22</b>	3.61	3.64	3.08	3.69	0.18
<b>23</b>	3.08	3.63	3.53	3.78	0.16
<b>24</b>	3.65	3.62	3.61	3.59	0.21
<b>25</b>	3.39	3.58	3.58	3.67	0.28

<b>26</b>	3.53	3.52	3.49	2.96	0.24
<b>27</b>	3.81	3.68	3.40	3.64	0.24
<b>28</b>	3.77	3.80	3.52	3.54	0.17
<b>29</b>	3.52	3.67	3.20	3.96	0.17
<b>30</b>	3.42	3.87	4.00	3.76	0.17
<b>31</b>	3.62	3.70	3.60	3.61	0.17
<b>32</b>	4.02	3.57	4.01	4.01	0.19
<b>33</b>	3.97	3.44	3.61	3.74	0.17
<b>34</b>	3.52	3.74	4.23	3.80	0.23
<b>35</b>	4.21	3.67	3.67	3.77	0.24
<b>36</b>	3.90	3.57	3.30	3.68	0.25
<b>37</b>	3.84	3.97	3.54	3.57	0.28
<b>38</b>	3.76	3.47	3.96	3.45	0.28
<b>39</b>	3.65	3.49	3.92	3.27	0.20
<b>40</b>	3.64	3.67	3.52	3.56	0.17
<b>41</b>	3.56	3.83	3.80	3.21	0.14
<b>42</b>	3.52	3.94	3.77	3.36	0.14
<b>43</b>	3.51	3.85	3.64	3.03	0.16
<b>44</b>	3.39	3.38	3.72	3.12	0.26
<b>45</b>	3.12	3.38	3.81	3.75	0.27
<b>46</b>	3.09	3.40	3.91	3.04	1.21
<b>47</b>	3.08	3.97	3.47	4.07	0.18
<b>48</b>	3.05	3.74	3.59	3.38	0.19
<b>49</b>	3.04	3.34	3.57	3.21	0.19
<b>50</b>	3.71	3.56	3.60	3.69	0.17
<b>51</b>	3.61	3.46	3.52	4.00	0.18

<b>52</b>	3.67	3.47	3.54	3.01	0.14
<b>53</b>	3.84	3.41	3.054	3.69	0.15
<b>54</b>	3.50	3.48	3.98	3.75	0.24
<b>55</b>	3.84	3.49	3.42	3.74	0.18
<b>56</b>	3.71	3.59	3.98	3.48	0.26
<b>57</b>	3.60	3.50	3.54	3.51	0.12
<b>58</b>	3.86	3.98	3.98	2.94	0.27
<b>59</b>	3.99	3.84	3.942	3.11	0.23
<b>60</b>	3.76	3.85	3.30	3.49	0.20
<b>61</b>	3.73	3.94	3.82	3.69	0.17
<b>62</b>	3.78	3.68	4.01	3.54	0.23