KAIZEN MANAGEMENT PRACTICES AND OPERATIONAL PERFOMANCE OF COOKING OIL MANUFACTURING FIRMS IN NAIROBI

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DECLARATION

This research project is my own original work and has not been presented for the award of degree in other university.

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D61/71067/2014

This research project has been submitted for examination with my approval as university supervisor

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DEDICATION

This research proposal is dedicated to everyone who taught me the values of life, knowledge, respect, integrity, hard work, and self-improvement and to those who taught me to simply stand up when I fall, to be good to people, and always encouraged me to dream and work hard towards my dreams. To my mother Catherine Watetu Karue, who taught me that the best kind of knowledge to have is that which is learned for its own sake, and my uncles and aunties, who taught me that even the largest task can be accomplished if it is done one step at a time. Without you, I would not be who I am today. Your inspiration is greatly treasured. I dedicate this work to my wife Serah Wanjiru Karue for her support in my studies and consequently, completion of this research project. Your prayers, encouragement and understanding are priceless: To my brother(s), sister(s), cousins, siblings, relatives, friends and colleagues at Fresha Dairies who always encouraged me to dream and work hard towards my dreams. May the Almighty God bless you all abundantly.

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ABBREVATIONS AND ACRONYMS

CEOs	Chief Executive Officers
EPZA	Export Processing Zone Authority
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
JIT	Just-In-Time
KAM	Kenyan Association of Manufacturers
MDGs	Millennium Development Goals
MDs	Managing Directors
PDCA	Plan-Do-Check-Act
SOPs	Operation Procedures
SPSS	Statistical Package for Social Sciences
TOC	Theory Of Constraints
TPM	Total Productive Maintenance
TQM	Total Quality Management
UK	United Kingdom
USA	United States of America

ABSTRACT

The study sought to establish the extent to which Kaizen is implemented and its effects on operational performance of cooking oil manufacturing firms in Kenya. This study also aimed at assessing the relationship between Kaizen management practices on the operational performance of cooking oil manufacturing firms in Nairobi Kenya. This study employed a descriptive research design. All the cooking oil manufacturing firms based in Nairobi have implemented all or at least one Kaizen Management Practice in their operations. The study utilized primary data due to its efficient, flexible, accurate and inexpensive nature. The data was collected through the use of questionnaires. As such a total 54 possible respondents was drawn purposively from the nine (9) cooking oil manufacturing firms. The data collected was purely quantitative and it was analyzed by descriptive analysis. The descriptive statistical tools such as Statistical Package for Social Sciences (SPSS) and MS Excel helped the researcher to describe the data and determine the extent used. Data analysis used frequencies, percentages, means and other central tendencies. The findings were presented using tables and charts. In addition, regression analysis was conducted. The study found that majority of the organisations had implemented Total Quality Management. Kaizen management practices affect the operational performance of cooking oil manufacturing firms. Just-In-Time (JIT) affects quality management of cooking oil manufacturing firms in Kenya. Just-In-Time (JIT), Suggestion System, Kaizen Events, Total Productive Management (TPM) and Total Quality Management (TQM) affect cost efficiency of the cooking oil manufacturing firms in Kenya. Total Productive Management (TPM) affects delivery time of cooking oil manufacturing firms in Kenya. As a result of implementation of Kaizen manufacturing practices, the firms realized improved product quality, exceeded customer expectations, speed time-to-marker, reduced lead time and cut operation costs. In order to ensure that Kaizen improvement outcome remain effective in operational performance, the management of the firms should procure employees that are competent with right qualifications to manage Kaizen practices. The execution ought to be in accordance with the corporate vision, mission, values and policies. The main focus of the study was the cooking oil manufacturing firms that are in Nairobi County and its environs hence further research could widen their scope beyond Nairobi to cover the whole country.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

As indicated by Schonberger (2008), a Kaizen is a nonstop change in Japanese. This practice is a two to five day venture up occasion. Concurring Schonberger, (2008), Kaizen has been endeavored known through the endeavors of Masaaki Imai and his 1986 book on the specific subject. Cocoa, (2006) clarifies KAIZEN as a blend of two words starting from the Japanese culture - great and change. Bessant (2000) depicted the idea to be straightforward and can be summed up as, "with each match of hands, you get a free cerebrum".

Kaizen management practices have been conceptualized in various theoretical perspectives. The Production theory developed by Charles Cobb and Paul Douglas (1928) argues that the diverse decisions a business venture makes about its production can be classified into three layers which include decisions about techniques of producing a given quantity of yield in a plant of given size and equipment, determination of the most profitable quantities of products and the determination of the most gainful size and equipment of plant. Deming's theory of Total Quality Management was put forward by Deming (1986) and it is based on fourteen points of management he identified, the system of profound knowledge, and the Shewart Cycle (Plan-Do-Check-Act). The Theory of Constraints by Dr. Eliyahu Goldratt in (1984) takes a scientific approach to improvement and provides a great set of tools for aiding to attain that goal.

The expectations of Kenya‘s manufacturing sector as contained in the Vision 2030 development plan, is to have a vigorous, diversified and aggressive manufacturing sector capable of supporting the country‘s socio-economic development agenda. This is to be attained through employment creation, wealth generation, attraction of Foreign Direct Investment (FDI), and providing the required motive towards attainment of Millennium Development Goals (MDGs). Manufacturing sector contribution to the country‘s GDP has stagnated at around 10% and set to raise at a rate of 10% per year as per the Medium Term Plan of Kenya Vision 2030.

Japanese organizations, for instance Toyota and Canon, collect a total of 60 to 70 suggestions for every staff annually, written down, shared and implemented, Cannon, (2008). In most cases these are not ideas for major changes.

1.1.1 Concept of Kaizen Practice

"Kaizen" is a derivative of two Japanese ideograms, "kai," which means change, and "zen," which means great or to improve things (Six Sigma LLC, 2004). Kaizen is a logic that spotlights on the procedure and results also. It is an umbrella idea that, when actualized precisely adapts the working environment, evacuates superfluous diligent work (both mental and physical), it trains staff to do fast tests utilizing logical techniques. The Kaizen reasoning suggests that the lifestyle be it working, social, or home spotlights on predictable change ways. Despite the fact that improvements under Kaizen are pretty much nothing and incremental, the Kaizen technique brings surprising results in the long runs (Imai, 2003). The administration science writing has much of the time credited Kaizen and support of the work constrain in process overhauling and upgrade as a noteworthy part in Japanese assembling triumph (Abdolshah and Jahan, 2006).

The famous advocate of Kaizen concept, Maasaki Imai (2003) provides explanation of Kaizen as a Japanese name for "small, incremental, continuous improvement," translated as Continuous Improvement: it is a method of improving manufacturing operations. According to Watson (2002), the source of Japanese Kaizen movement was the method of quality control inherited from the United States of America (USA) in the after World War II period. Japan incorporated and transformed this management practice like its own exceeding performance even in the USA. Kaizen then spread overseas and Japanese enterprises began to establish manufacturing networks with local organizations.

According to Singh and Singh (2009) in order to support high standards, Kaizen also takes into consideration training materials and supervision needed for staff to achieve and maintain their capabilities to keep those standards persistently. There are many practices that fit in the kaizen methodology.

They include 5S, kaizen events, 5 whys, Total Preventive Maintenance (TPM), Just-In-Time (JIT) System, Suggestion System, kaizen costing, Quality Control Circles (QCC) or Quality Circle (QC), Total Quality Management (TQM), Toyota Production System (TPS), kanban system, elimination of the seven kinds of wastes, and poke-yoke (error proofing) (Maurer, 2012; Abdolshah & Jahan, 2006). This study focused on Total Quality Management, Just-In-Time, Total Productive Management, Five S, Kaizen Events, Five Whys and Suggestion System as they are considered the major distinct techniques/practices.

1.1.2 Operations Performance

The studies that paid attention to Japanese manufacturing system showed the importance of Kaizen on improvement of Organizational performance (Liker, 2004).

Manufacturing operational performance is characterized by four key performance measures, that is: cost, speed, flexibility and quality. Therefore a well-defined system of operational performance measures can be a powerful means of prioritizing and achieving organizational goals (Kirkendal, 2008). Organizational performance improvements as a result of Kaizen actions varied from moderate (25-50 %), to important (75-100%) and to degree of high improvements (more than 100%).

Manufacturing Operational performance management was characterized by four distinctive performance measures that is; cost and productivity, time and speed, operational flexibility and quality. In addition there was creativity, innovation and customer satisfaction (De Toni & Tonchia, 2001). These four specific levels of performance dimension correspond to the four essential components of cost, quality, speed and flexibility by which the manufacturing plan of a business is normally articulated. These manufacturing performance dimensions determined the market rivalry aimed at "price", "product" and "place".

1.1.3 Cooking Oil Manufacturing Firms in Nairobi

Cooking oil manufacturing is a key player in driving the economy to a 10% growth rate, corresponding to Kenya Vision 2030 and in sustaining the country's social development plan through creation of employment, the creation of foreign trade, and attracting overseas straight investment (KAM, 2016). The above goals can be met through having more efficient driven processes.

Capital resources and machinery required should be made and invested from within the company's internal wealth. This is through learning that creates and amasses inner assets which has been knowledgeable about Japanese makers, administrative

instruments, especially the Kaizen strategy, is basic for efficiency and quality enhancements crosswise over businesses (ISixSigma LLC, 2004).

Local manufacture of edible oils in Kenya was around 380,000 tonnes, which was a third of its yearly demand; the deficit was met through imports. Oil manufacturing is among the most competitive trade sectors in Kenya with some manufacturers extracting oil from seeds for human consumption and oil cake production used in animal feeds (EPZA, 2008). The edible oil sector is a collaborative responsibility of Government organizations such as the Ministries of Agriculture, Trade and Industry, Treasury and Planning and National Development.

Cooking oil refineries in Nairobi include firms such as Kapa Oil refineries, Bidco oil refineries, Menengai refineries and Unilever oil refineries, among others. These firms deal with production of cooking products, laundry soaps, detergents and personal care products. For example, Unilever sold its Kimbo Brand to Bidco Oil refineries. Bidco Oil refineries are the largest vegetable oil processing company (EPZ, 2008). The main manufacturers are Bidco Oil Refineries, KAPA Oil Refineries, Unilever Kenya Limited, Gill Oil and Menengai Oil Refineries among others located in Nairobi and its outskirts (KAM, 2015). The country sends overseas edible oil and fat products to majorly East Africa and Horn of Africa countries, Europe and the United State of America (USA). It was classified in position fifteen across the globe in export of edible oils and fat products (EPZA, 2008).

1.2 Research Problem

Kaizen has been put forward as one of the basis of competitiveness of Japanese manufactures (Imai 1986). Tum, Gakure and Wanjau (2011) state that Kaizen is a system of a culture of unrelenting continual improvement aimed at removing wastes in the whole process of a firm. Literature points out that Kaizen has been conveyed within Japanese companies, to foreign countries (Aoki, 2008) and assimilated by developed countries as well as developing countries.

There are a several studies on Kaizen as a Japanese management system practice in Japan, its implementation, organizational performance and culture (Brunet & New, 2003). They showed that Kaizen varies exceptionally within different organization owing to changes in that particular business setting. They include its integration with strategies in Australia and the results showing its success being related to employee involvement. In Sweden, studies have shown that Kaizen is significantly related to culture (Lindeberg & Berger, 2006) and its significant relationship to the cultural context in the United Kingdom (UK) is also shown by Oliver and Wilkinson (2002).

The shift of Kaizen is not effectively done by the companies (Easton & Jarrell, 2008). Hong et al. (2006b) illustrates that it is hard receive active participation from the leading edge of staff in kaizen activities in China, and suggests that immense management support is required to implement the Japanese kaizen activities, such as bringing in an open blue print plan of the plant and office design as well as import daily communal rituals from Japan. Assessment of key performance pointers between Japanese, UK and USA auto-mobile and parts manufacturers by Oliver et al. (2002) confirm that there exists a big gap on the influences of kaizen events between Japan and western firms.

In Kenya studies done on Kaizen include its implementation and relationship to organizational performance; the results show a significant relationship (Nderi, 2012). According to Ouma, Njeru and Juma (2015) in their study on the influence of KAIZEN on cost level management in the pharmaceutical Industry in Kenya established that Kaizen had a statistically considerable relationship with the cost level management.

Anot (2015) investigated kaizen sustainability and operational performance of manufacturing firms in Mombasa County and established that kaizen had varying level of sustainability in manufacturing firms in Kenya with the aspect of improved maintenance practices having the greatest extent of sustainability and aspect of lower inventory levels having the least extent of sustainability.

Although a number of studies had been done on the concept and context of Kaizen and manufacturing firms respectively, these studies have not covered the extent to which Kaizen is implemented and its effects on operational performance of cooking oil manufacturing firms in Kenya. Consequently this research sought to find out the level of implementation and effects of Kaizen practice on the operational performance of Cooking Oil Manufacturing firms in Kenya. Therefore this study strived to respond to this research question: what is the relationship between Kaizen management practices on the operational performance of cooking oil manufacturing firms in Nairobi Kenya?

1.3 Research Objectives

This study aimed at assessing the relationship between Kaizen management practices on the operational performance of cooking oil manufacturing firms in Nairobi Kenya.

The specific objectives of this study were:

i) Determine the extent of implementation of Kaizen by the cooking Oil Manufacturing firms in Nairobi.
ii) Assess the impact of Kaizen implementation on operational performance of cooking oil manufacturing firms in Nairobi

1.4 Value of the Study

For the scholars, this study would contribute to adding on to the already existing body of literature in the field of Kaizen knowledge, implementation and contribution to manufacturing firms. Scholars and academicians would find this study as a foundation of secondary data for prospective studies in the field of Kaizen.

The findings from this study would provide insight to the management field and manufacturing sector especially Cooking Oil Manufacturing firms in Nairobi on the Kaizen practices available that can be of use to improve operational efficiency and effectiveness.

To policy makers, findings from this study would aid firms and even the government in policy formulation on adoption of Kaizen methodologies and appropriate techniques for adoption by their organizations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This is the second chapter in this research which focuses reviewing the relevant works on Kaizen management practices in firms. It highlights understanding of various authors on the concept of Kaizen, principles and philosophy, implementation techniques and practices. The chapter also covers Kaizen in operations management as a world class manufacturing practice, its techniques and contribution to various operational performances.

2.2 Theoretical Review

Among the studies done on Kaizen there has not been a specific theory on Kaizen thus the need to borrow from other related disciplines. In this research the theory of constraints, Production theory and the Deming's theory of Total Quality Management were found applicable to support this study.

The Theory of Constraints (abbreviated as TOC) was postulated by Goldratt, an Israeli physicist, in 1984. It has evolved over time and today it is an important factor within the field of management practice (Moore & Scheinkopf, 1998). Goldratt explained this theory as a methodology of classifying the major limiting factor or factors that act as hindrances in achieving the set goals. TOC takes scientific way of improvement; it theorizes that every composite system, as well as manufacturing processes, consists of numerous connected activities one of which acts as a limit of the whole system.

It has the following dominant set of tools: The five focusing steps (a method for recognizing and getting rid of constraint), The Thinking Processes (ways of examining and solving problems) and Throughput accounting (a technique for determining performance and directing management verdict). One of the inherent characteristic of TOC is, it essentially prioritizes step up activities just like Kaizen which is actually Continuous Improvement. The theory's principles focuses on improving the throughput from the system, by increasing throughput, the end results are improved.

The TOC approach to constraint management includes identifying the systems constraint and exploiting it. TOC is a philosophy about change thus application of TOC tools can dramatically, systematically and routinely smooth the transition and reduce discomfort (Chrisoph, 2005). Blocher, Chen and Lin (2008) asserts that firms using TQC can achieve the following benefits: reduced lead time, improved operations, fall in inventory and increased return on investment. In Kaizen workers have knowledge about detecting constraints, how to improve processes and reduce costs (Ngeta, 2009).

The Production theory developed by Charles W. Cobb and Paul H. Douglas (1928) is the study of the economic ways of transforming inputs into outputs. Production uses resources to make a good or a service appropriate for use or for trade in a market financial system. This can be manufacture, storage, distribution, and packaging. This theory is trying to explain the ways through which an enterprise chooses the amount of every single product that it offers it will make, and the amount of each sort of data sources or elements of creation i.e. work, crude material, altered capital great, that it utilizes: it will utilize.

The theory of profound knowledge proposed by Deming is a management philosophy is anchored in systems theory. It rests on the principle that every organization is composed of a system of interrelated processes and individuals which constitute the system's components. The achievement of all workers within the system depends on management's capacity to orchestrate the slight stability of each component for maximization of the whole system (Bowen, 2010).

The system of reflective knowledge puts basis on system approval to comprehend the processes and systems of a company, knowledge of variation to appreciate the rate of variations and their causes, knowledge theory to comprehend quality programs and the knowledge of psychology to value human being nature. In his fourteen principles, he illustrated that, management dedication, optimistic organizational culture, worker training and awareness and appropriate communication and feedback system is an overriding factor in execution of TQM.

2.3 Kaizen Management Practices

Kaizen is a Japanese term resulting from two idioms "kai" meaning change and "zen" standing for better (Palmer, 2001). The most accepted meaning of Kaizen is continual and increasing improvement of all features of a company. It is a Japanese term for improvement at the work place to enhance operational activities. It involves everybody in the organization and it requires relatively low expenditure. Although its progress is modest and incremental, Kaizen process results are spectacular eventually (Imai, 1997). Therefore the idiom "change for better" is every change resulting in improvements in quality, cost reduction, delivery, durability, operational flexibility and customer satisfaction (Zimmerman, 1991).

Kaizen is a continuous process in nature aimed towards achievement of quality, efficiency and effectiveness in all organizational activities. It is a method of constant improvement in quality, technological expertise, procedures, organizational culture, output, safety and headship (Mishra, 2010). Kaizen is incremental in nature, meaning that change takes place gradually and over time (O'Meara, 2013). Kaizen rides of the basis of making tiny changes on a frequent basis thus minimizing waste and always getting better productivity, safety and efficiency (Cheser, 1998).

Kaizen is comparably participative as it includes the senior and junior administration staff over the organizations subsequently making Kaizen groups which encourage enhanced authoritative ability (O'Meara, 2013). Doolen et al. (2003) portray the factors that are utilized to quantify the effect of Kaizen exercises on human asset. These factors incorporate state of mind toward Kaizen occasions, abilities picked up from occasion interest, understanding the requirement for Kaizen, effect of these occasions on representative, effect of these occasions on the work territory, and the general impression of the relative achievement of these occasions. Among the key methodologies of Kaizen are: TQM, JIT, TPM, 5S, Kaizen Events, 5Whys and Suggestion System. Imai (1986, 1997) has accentuated the utilization of these methodologies for enhancing operational performance.

2.4 Kaizen and Operational Performance

Hyland, Milia, and Terry (2004) highlights the major benefits of Kaizen which include, increased business performance in terms of increased employee performance, reduced waste, setup time, breakdown and lead time (Brunet, 2000). The ultimate goal of Kaizen in Operational Performance is to improve quality, cost and delivery. Kaizen has been compared with target costing one of the manufacturing techniques both of

which originate from Japan (Williamson, 1997). Target costing ensures that products are cheaply produced and still make ideal profit. Kaizen costing concentrates on the esteem and productivity of the assembling stage.

Kaizen costing elements are a part of a procedure of business change persistently in quality, item usefulness and administration. Consolidating of these two strategies gives a premise of the aggregate life-cost administration overseeing cost all through the item life cycle. Delivery is the process of transporting the requested volume of product in time such as practicing just in time production system (Thessaloniki, 2000). Kaizen by reducing the waste of waiting time, transportation and worker motion improves reliability and the speed of delivery (Christina, 2012)

2.5 Empirical Studies

A study by Aoki, (2008) on Transferring Japanese Kaizen exercises to abroad plant in China', found that, Kaizen exercises in the nations outside Japan, for example, US, China, Australia, Sweden and the UK recommend that the idea, methodologies, and practices of Kaizen have turned out to be routinely acknowledged all through the world. In any case, writing demonstrates that, as Kaizen is acquainted with abroad operations taking after the Japanese corporate extension exercises, the execution of Kaizen usage is relevant ward. Notwithstanding the national culture, the study demonstrates that the association culture altogether impacts the selection of Kaizen practices.

With a specific end goal to expand the odds for fruitful Kaizen selection, two parts of hierarchical culture are required: control appointment and strengthening, and high collaboration between directors, laborers, clients, and providers. A Study by Granja et al. (2005) tried to build up the structure adopting together two coordinating strategies,

which gives a premise to an aggregate cost administration framework. The study found that the factors that are used to measure the impact of Kaizen activities on human resource.

These factors in Granja et al. (2005) think about included demeanor toward Kaizen occasions, aptitudes picked up from occasion support, understanding the requirement for Kaizen, effect of these occasions on worker, effect of these occasions on the work zone, and the general impression of the relative accomplishment of these occasions. The study reasoned that the proceeding with arrangement of Kaizen exercises is expected to accomplish item execution and lessen the cost. Consolidating target and Kaizen costing is an intense approach for the development organization by guaranteeing esteem for the client at a low however beneficial cost.

A study by Kariuki (2013) to establish fit between Kaizen culture and organizational culture of manufacturing companies in Kenya found that quite a number of challenges were experienced by manufacturing companies in Kenya. Some of those challenges included; employee resistance to towards continuous improvement practices due to untimely introduction of change at the workplace. It was established that technology was the driving force of continuous improvement practices among the manufacturing companies in Kenya.

Gitonga (2014) examined the effects of managerial preparing mediation on business execution found that even fleeting essential preparing can enhance their administration hones. The study looked to examine the effects of educating the very fundamentals of KAIZEN, a modest, realistic way to deal with administration underlining the decrease of squandered materials and exercises, to proprietors of little endeavors on their business execution. This exploration was led in a metalworking

group in Kariobangi Jua kali part in Nairobi, Kenya. Another study by Ngware (2006) on effects of Total Quality Management using KAIZEN on implementation of business performance in service institutions, case of Kenya Wildlife Services, the study found that in order for an organization to successfully implement quality management system, the top management must create, share and sustain quality management targets and values. The top management must also demonstrate visibly commitment to quality issues since this influences success of the value management approaches. They concluded that top management must commit sufficient resources for successful implementation of quality issues.

A study by Muthengi and Soni (2005) on effectiveness of KAZIEN System in enhancing financial performances of Baba Dogo Metal fabricators found that Kaizen is not a procedure effectively aced. Despite the fact that the standards can be just characterized, taking in their viable application through cross-useful kaizen groups requires study, duty and determination. Direction by experienced professionals, frequently on a drawn out premise, is referred to on numerous occasions as a basic central of progress, and as with most business change forms, the prizes are proportionate with the venture.

Numerous studies have been conducted on the concept of Kaizen in manufacturing firms as evident in the foregoing review however no study has focused on the cooking oil manufacturing firms especially in the Kenyan context and in this era of globalization and technological advancements where quality improvement is key for operational performance. This study on the relationship between Kaizen management practices and operational performance of cooking oil manufacturing firms in Nairobi was a modest attempt to bridge this gap.

2.6 Summary of Theories and Empirical Studies

The theory used in this study is the theory of Constrains stating it as the creation of a system of continuous improvement through elimination of constrains in an organization. These empirical researches are shown in a summary in Table 2.1.

Table 2.1: Empirical Studies

Author	Research	Findings	Research gap
Adam Paul Brunet and Steve New, (2003)	Kaizen in Japanese Companies	Kaizen evolves uniquely within each organization's environment.	Details of specific organization environment could not be identified.
Aoki, (2008)	Transferring Japanese Kaizen Activities to overseas plants in China.	Team base suggestion schemes and floor visits by managers were found successful.	Influence of cultural factors in Kaizen implementation.
Toni L., Doolen Eileen M., Van Aken Jennifer A., Farris June M., Worley Jeremy Huwe, (2008)	Kaizen events and organizational performance in the USA.	Kaizen has varied success in departments even in a single organization.	Failure to show sustainable improvements through Kaizen.
Sami Al Smadi, (2009)	Kaizen strategy and the drive for competitiveness: challenges and opportunities in United Arab Emirates	Kaizen can contribute to continuous improvement hence drive completion.	Requirements for creating a culture for successful Kaizen implementation.
Manuel F., Suárez-Barraza, Juan Ramis-Pujol, Mariana Estrada-Robles, (2012)	Application of Gemba-Kaizen in multinational food companies (chocolate) in Mexico.	Kaizen yielded benefits to the organization in cost and waste reduction.	No evaluation on the impact of Kaizen on company's performance.
Wiljeana J., Glover Wen-Hsing Liu, Jennifer A., Farris Eileen M., Van Aken, (2013)	Characteristics of established Kaizen events programs in the United States of America.	There were successful programs providing a better understanding of the characteristics of established Kaizen programs and improvements.	Difficulty in measuring important Kaizen programs especially human resource, processes, event types and resources.
Kariuki, L. W. (2013)	Kaizen and Organizational Culture in manufacturing firms in Kenya.	There was a positive correlation on Kaizen practices and organizational culture in relation to performance of manufacturing companies.	The research did not identify the reasons behind low adoption of Kaizen practice.
Mucheru, A. M. (2013)	Effects of Kaizen Tool on Organization Effectiveness in Davis and Shirtliff Limited	Kaizen had a positive effect on organizational effectiveness in productivity, cost reduction, waste reduction and time saving.	This could not be correlated by analysis of secondary data which could not link Kaizen to improvements even when they occurred.

Source: Author, (2016)

2.7 Conceptual Framework

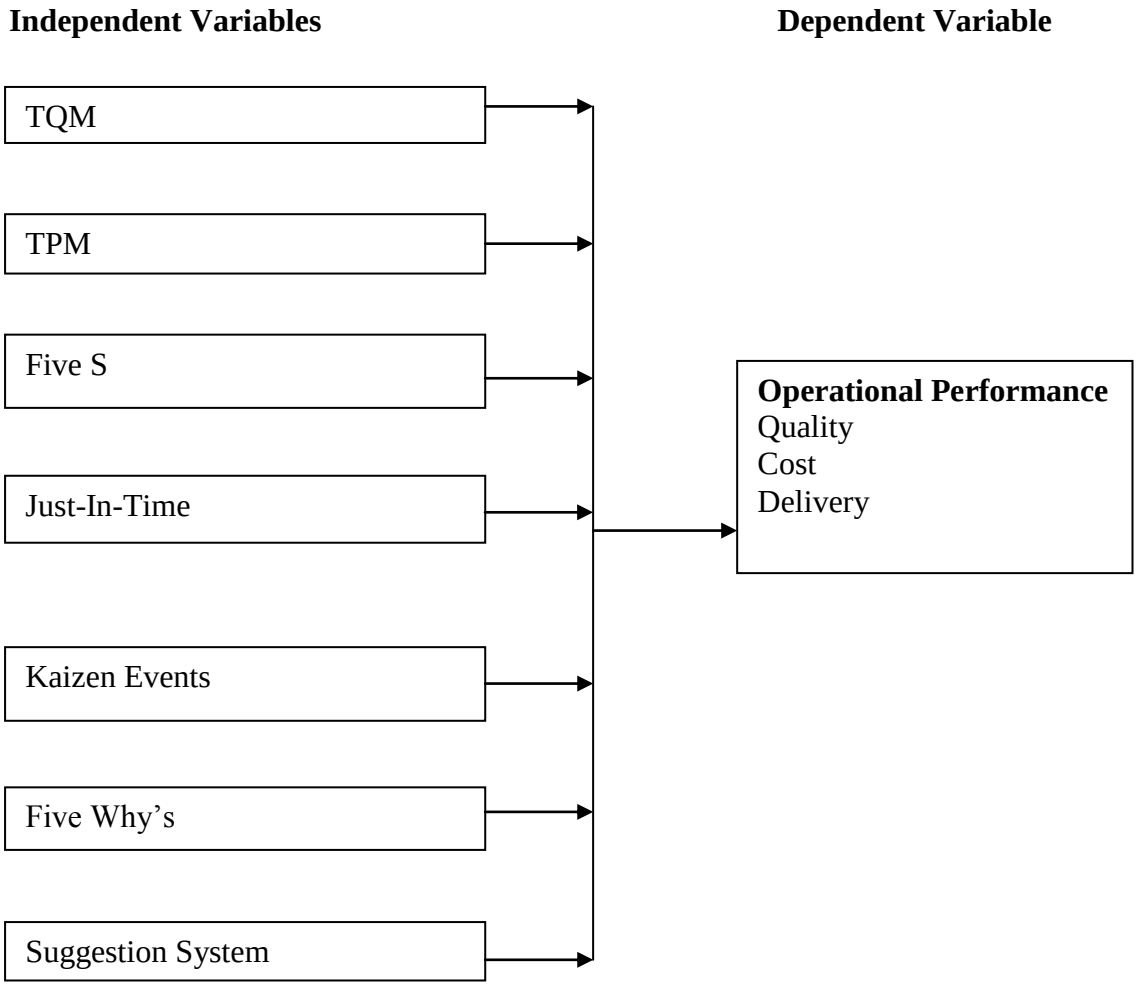

Figure 2.1: Relationship between Kaizen Practices and Operational Performance
Source: Author, (2016)

In this study, seven indicators are extracted for measuring the independent variable being TQM, TPM, Five S, Kaizen Events, Just-In-Time, Five Why's and Suggestion System. Independent variable is Kaizen practices and the dependent variable is operational performance of cooking oil manufacturing firms in Nairobi. These aspects form the above diagram. The Kaizen practices are perceived to improve operational performance of cooking oil manufacturing firms in terms of quality management, cost effectiveness and delivery time.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter covered the steps and approaches that were used by the researcher in executing the research study. The chapter covered the following areas: the research design, sampling and sampling techniques, data collection and data analysis techniques.

3.2 Research Design

This study employed a descriptive research design. This was a descriptive study designed to identify the extent to which cooking oil manufacturing firms in Nairobi County and its environs namely Thika and Mombasa road apply Kaizen management practices to enhance their operational performance. A descriptive research assembles truths from individuals from particular masses and helps the researcher in getting the reminiscent winning events by enquiring the objective populace about their perceptions, attitudes, behaviour or values (Cooper & Schindler, 2006). Besides, it investigates the current status of at least two factors at a given position in time and whether a relationship exists between them; subsequently most suited in surveying the relationship between implementation of Kaizen management practice and operations performance of cooking oil manufacturing firms in Nairobi, Kenya.

3.3 Population

The main focus of the study was the cooking oil manufacturing firms that are in Nairobi County and its environs (Appendix 1). According to the Kenya Association of Manufacturers (KAM) there are 9 cooking oil manufacturing firms based in Nairobi.

All the cooking oil manufacturing firms based in Nairobi have implemented at least one Kaizen Management Practice in their operations.

Owing to the small number of cooking oil manufacturing firms with Kaizen management practices, the study conducted a census survey. A census survey was carried out due to the relatively small number of cooking oil manufacturing firms in Nairobi County. This gave the appreciation of Kaizen management practice and it was easy and less costly to collect data and information.

3.4 Data Collection

The study utilized primary data due to its efficient, flexible, accurate and inexpensive nature (Mugenda & Mugenda, 2003). The study collected primary data through the use of research questionnaire targeting the plant managers, operations managers, supervisors, operators and staff. The research instrument was divided into 4 sections, requiring responses to various dimensions based on the Likert type scale for purposes of enabling easy rating /ranking of answers, coding and data analysis; and a closing open ended section.

The first section, A, consisted of a brief background regarding the social demographic information of the management staffs working in the cooking oil manufacturing firms which are the subjects of the study. The second section, B, focused on dimensions of implementation of Kaizen practice in the cooking oil manufacturing firms in Nairobi Kenya. The third section, C, focused on Kaizen management practices and operational performance of cooking oil manufacturing firms in Nairobi. The fourth section, D was a semi structured section on additional information on the effects of Kaizen management practices on operational performance of cooking oil manufacturing firms

in Nairobi. The respondents were the CEOs, MDs and Managers/Heads of Departments in the cooking oil manufacturing firms in Nairobi.

The study drew one (1) respondent from each of the six department departments as well as the MDs and CEOs or their representatives in the firms. As such a total 54 possible respondents was drawn purposively from the nine cooking oil manufacturing firms. The respondents were selected because they had functional knowledge and overall responsibility for their operational areas and would be intimately involved in implementation of Kaizen management practices in the cooking oil manufacturing firms in Nairobi.

3.5 Data Analysis

The information gathered was absolutely quantitative and it was dissected by illustrative investigation. The spellbinding factual instruments, for example, Statistical Package for Social Sciences (SPSS) and MS Excel helped the scientist to depict the information and decide the degree utilized. Information examination utilized frequencies, rates, implies and other focal propensities. The outcomes were depicted in forbidden and illustrative structures. The Likert measures were used to assess the weighted midpoints and standard scattering from the ascertained means.

In addition, regression analysis was conducted to investigate the relationship between Kaizen practices and operational performance. The analysis was done with the help of Statistical Package for Social Sciences (SPSS) software. The research sought to investigate the operational performance as the dependent variable which was measured in terms of quality, cost and delivery. Accordingly, three sub regression analyses were conducted for the three sub-variables represented as follows:

$$Y_a = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e \ldots\ldots. (i)$$

$$Y_b = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e \ldots\ldots. (ii)$$

$$Y_c = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e \ldots\ldots. (iii)$$

Where Y_a = Quality, Y_b = cost and Y_c = delivery.

The overall regression model that was also evaluated and represented as follows:

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$$

Where; Y = Operational Performance, α_0 = Constant Term, X_1 = Total Quality Management, X_2 = Total Preventive Maintenance, X_3 = Five S, X_4 = Kaizen Events, X_5 = Just-In-Time, X_6 = Five Why's, X_7 = Suggestion System and E = Error Term.

Table 3.1: Summary of the Chapter

Variable	**Indicators**	**Analysis Technique**	**Result Interpretation**
Operational Performance	Quality management Cost effectiveness Delivery time	Regression Analysis	Y is the dependent variable, β_0 is the intercept, ε is the error and β_1 is the coefficient, which represents the slope of the straight line the equation describes.
		Descriptive analysis	Mean score is the weighted average of the raw data
Kaizen practices	TQM TPM Five S Kaizen Events Just-In-Time Five Why's Suggestion System	Regression Analysis	Linear regression determines the best-fit line through a scatterplot of data, such that the sum of squared residuals is minimized; equivalently, it minimizes the error variance. X1…Xn (i.e. X_1, X_2, X_3, X_4, X_5, X_6, X_7) are the independent variables and $\beta_1 \ldots \beta n$ are the coefficients of interest
		Descriptive analysis	Mean score is the weighted average of the raw data

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATIONS

4.1 Introduction

This chapter aims at introducing the outcomes and results acquired from field reactions on Kaizen management rehearses and operational performance of cooking oil fabricating firms in Nairobi Kenya. The examination applies clear insights utilizing factual measures, for example, rates, mean scores, standard deviations, tables and figures to investigate the way of the after-effects of the factors under study. Assist it additionally applies relapse investigation to decide the relationship between the study factors and the degree of the relationship between and among the factors. The information was assembled from the poll which was planned in accordance with the targets of the study. The specific objectives were: to determine the extent of implementation of Kaizen by the cooking Oil Manufacturing firms in Nairobi and to assess the impact of Kaizen implementation on operational performance of cooking oil manufacturing firms in Nairobi.

4.2 Response Rate

The study targeted CEOs, MDs and Managers/Heads of Departments in the cooking oil manufacturing firms in Nairobi. From the target population a sample size of 54 CEOs, MDs and Managers/Heads of Departments was drawn from the cooking oil manufacturing firms in Nairobi.

Table 4.1: Questionnaire Return Rate

Response	Frequency	Percentage
Returned questionnaires	42	77.8
Unreturned questionnaires	12	22.2
Total	**54**	**100.0**

Source: Research Data, 2016

As shown in Table 4.1, 42 out of the 54 questionnaires distributed were received back from the respondents fully filled which accounts to 77.8% response rate. On the other hand 12 of the questionnaires (contributing to 22.2% of the sample) were not received and therefore were not considered in the analysis.

The questionnaires that were not returned were because of; the respondents were not accessible to fill them in around then and even with industrious subsequent meet-ups there were no positive reactions from them. This implies that based on this assertion, the response rate of 77.8% is therefore very good. From the foregoing, the response rate provides adequate data to proceed with the analysis. The use of drop and pick method, personal visits, and follow-up telephone calls and e–mail communication to the respondents, explaining the purpose of the study and its usefulness to the Organization improved the response rate. This was supplemented with a letter of introduction and a letter of authority to conduct research to cooking oil manufacturing firms from the University of Nairobi.

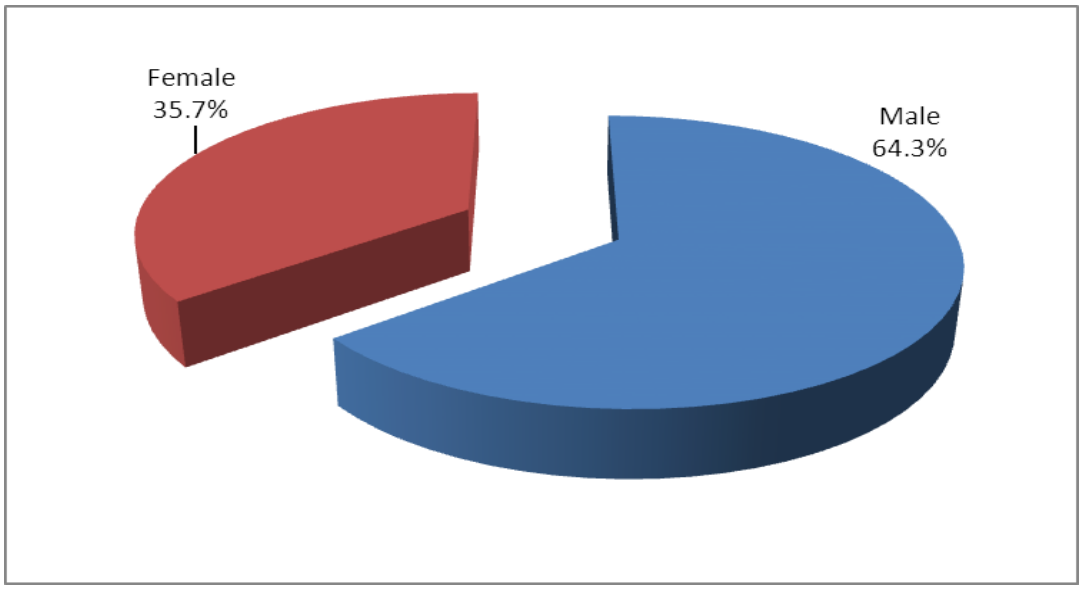

Figure 4.1: Gender of the Respondents

The results exhibited in Figure 4.1 concern the dispersion of respondents in connection to sexual orientation. 64.3% of the respondents were male staffs while 35.7% of them were female staffs. This implies that the number of male staffs was more than the female staffs. The findings show that the cooking oil manufacturing firms studied have both male and female staffs and views expressed in these findings can be taken as illustrative of the feelings of both sexual orientations.

Table 4.2: Age Brackets of the Respondents

Age Brackets	Frequency	Percent
21-30 years	10	23.8
31-40 years	18	42.9
41-50 years	9	21.4
Above 50 years	6	14.3
Total	**42**	**100.0**

Source: Research Data, 2016

This study tried to explore the age sections of the respondents to seeing how the respondents were appropriated over the different age sections and thus their assessments on the subject of study. The outcomes on Table 4.2 uncover that greater part (42.9%) were in the age section of 31-40 years, 23.8% were matured between 21-

30 years, 21.4% were matured between 41-50 years and 13.4% were matured above 50 years. Majority of the respondents were found to be aged between 31-40 years. This could be because the Kaizen Practices became more active early 2000's when more of the employees could have been recruited to fill the gaps which were there created to ensure the effectiveness of these practices in operational performance.

Employees with few years of experience might not have a clear understanding of the issues sought by the study. According to the results depicted in Figure 4.2, majority of the respondents (shown by 26.2%) recapped that they had been working in the cooking oil manufacturing companies for a period of 11-15 years, 23.8% of them reiterated that they had 6-10 years of continuous working in the cooking oil manufacturing companies, 19.0% of the respondents had been working in the cooking oil manufacturing companies for a period of 16 – 20 years another 19.0% of the indicated that they worked in cooking oil manufacturing companies for more than 20 years, while 11.9%of the respondents indicated that they had been working in the cooking oil manufacturing companies for a period of less than 5 years. This infers the vast majority of the staffs taking an interest in this study had been working for a sufficient time in the cooking oil fabricating organizations to react to this study on Kaizen management rehearses and operational performance of cooking oil producing firms in Nairobi

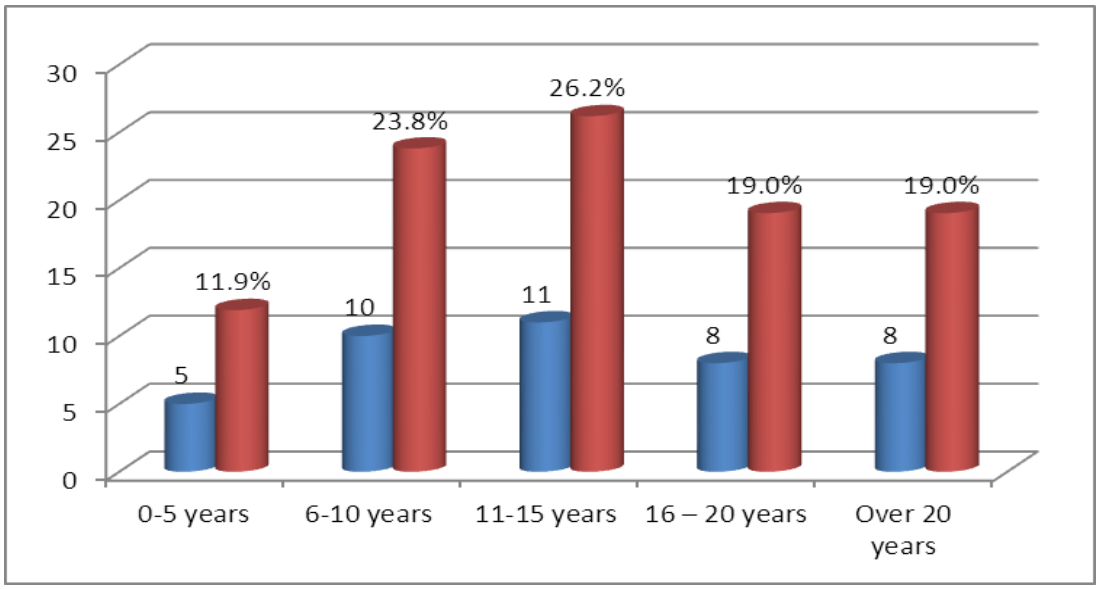

Figure 4.2: Length of Working in Cooking Oil Manufacturing Companies

The study targeted to collect data from the staffs comprising of CEOs or senior managers, general managers and functional heads working in the cooking oil manufacturing companies. As such, the study sample included managers, assistant managers, supervisors and general staff.

Table 4.3: Designation of the Respondents

Category	**Frequency**	**Percentage**
Managers	4	9.5
Assistant managers	17	40.5
Supervisors	11	26.2
General staffs	10	23.8
Total	**42**	**100.0**

Source: Research Data, 2016

As per the outcomes appeared in Table 4.3, lion's share (40.5%) of the respondents were right hand chiefs, 26.2% of them were administrators, 23.8% of them demonstrated that they were general staffs, while 9.5% of the respondents comprised of managers working in the cooking oil manufacturing companies in Nairobi.

From these outcomes, the respondents that took an interest in the study are primarily the staffs required in detailing and execution of decisions concerned with Kaizen management practices for operational performance of cooking oil manufacturing firms in Nairobi and hence their insights are viewed as more resourceful for knowledge and policy recommendations.

The chosen cooking oil producing organizations in Nairobi utilize staffs in various work stations henceforth extraordinary scholastic capabilities. Lion's share (57.1%) of the respondents demonstrated that they had obtained a Bachelor's Degrees, 19.0% of them showed that they had procured Masters Degrees, another 19.0% of the respondents had gained school certificates while 4.8% of the respondents demonstrated that they had gained PhDs. These results further give an assurance that the respondents would give a fair feed back to the questionnaire based on the fact that their education background allows them to understand importance of academic research.

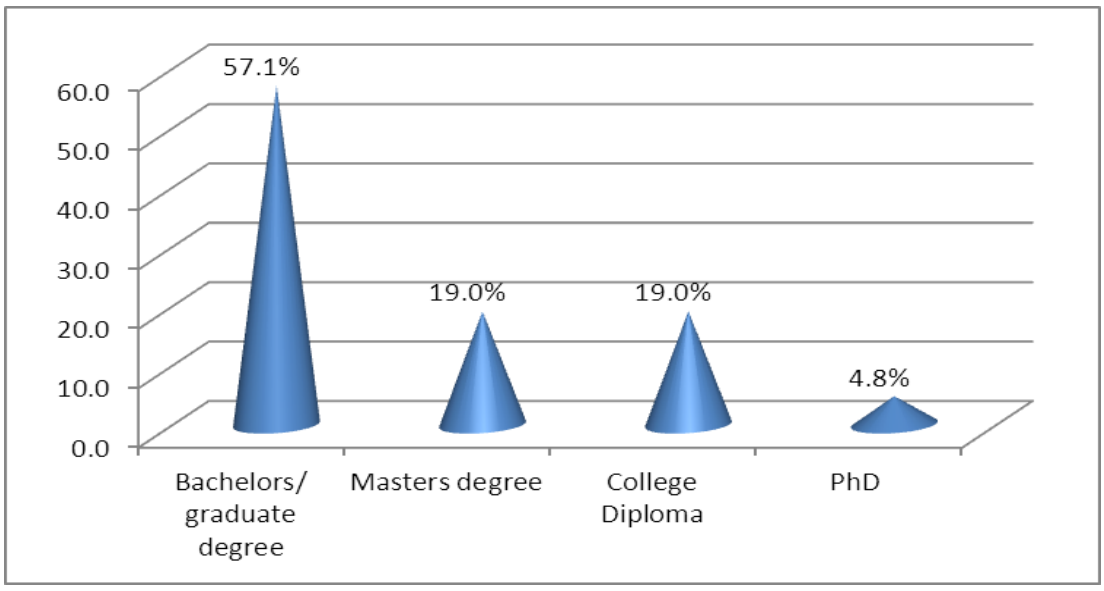

Figure 4.3: Level of Education

4.3 Implementation of Kaizen Practices

To determine the extent of implementation of Kaizen by the cooking Oil Manufacturing firms in Nairobi, the respondents were asked whether their organisations had implemented Kaizen manufacturing practice(s). All the respondents (100.0%) unanimously agreed that their organisations had implemented Kaizen manufacturing practice(s). In addition, the study required the respondents to indicate the the extent to which their organisations had implemented Kaizen manufacturing practices.

Table 4.4: Extent to which Organisations Had Implemented Kaizen *Practices*

Kaizen Practices	**No extent**	**Little extent**	**Moderate extent**	**Large extent**	**Very large extent**	**Mean**	**Std. Dev.**
Total quality management (TQM)	0	5.2	37.5	47.9	9.4	3.6146	0.7308
Just-In-Time (JIT)	0	3.1	42.7	47.9	6.3	3.5729	0.6608
Total productive management (TPM)	0	2.1	39.6	54.2	4.2	3.6042	0.6066
Five S	0	3.1	40.6	51	5.2	3.5833	0.6434
Kaizen Events	0	3.1	49	43.8	4.2	3.4896	0.6323
Five Whys	0	6.3	45.8	43.8	4.2	3.4583	0.6792
Suggestion System	0	5.2	43.8	46.9	4.2	3.5000	0.6649

Source: Research Data, 2016

As per the outcomes delineated in Table 4.4, greater part of the respondents emphasized that their associations had actualized Total Quality Management (TQM, as it were, as appeared by a mean score of 3.6146, Total Productive Management (TPM, as it were, as appeared by a mean score of 3.6042, Five S, as it were, as appeared by a mean score of 3.5833, Just-In-Time (JIT, as it were, as appeared by a mean score of 3.5729 and proposal framework, as it were, as appeared by a mean score of 3.5000. Then again, the respondents demonstrated that their organizations had executed Kaizen Events to a direct degree as appeared by a mean of 3.4896 and

Five Whys to a direct degree as appeared by a mean of 3.4583.The goals of the cooking oil manufacturing firms are met through more efficient Kaizen practices in their operations.

4.4 Kaizen Practices and Operations Performance

In its second objectives, the research pursued to assess the impact of Kaizen implementation on operational performance of cooking oil manufacturing firms in Nairobi. The study was inquisitive of the extent to which Kaizen management practices affect the operational performance of cooking oil manufacturing firms. Most of the respondents (42.3%) indicated that Kaizen management practices affect the operational performance of cooking oil manufacturing firms to a great extent, 38.5% of them indicated to a very great extent, while 19.2% of the respondents opined that Kaizen management practices affect the operational performance of cooking oil manufacturing firms to a moderate extent.

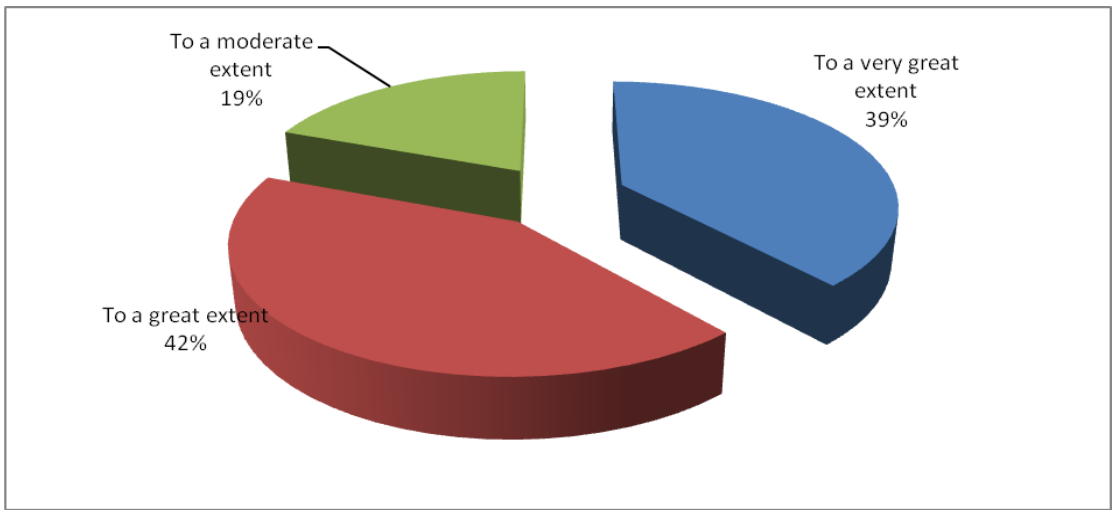

Figure 4.4: Extent to which Kaizen Management Practices affect Performance

Table 4.5: Extent to which Kaizen Management Practices affect Performance

Operation performance measures	No extent	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
Quality management	0	3.7	40.7	51.9	3.7	3.516	0.6197
Cost effectiveness	0	7.4	40.7	51.9	0	3.467	0.6322
Speed of delivery	0	7.4	37	55.6	0	3.533	0.6190

Source: Research Data, 2016

On the degree to which Kaizen managers hones influence the different parts of operational performance in the cooking oil producing firms, the greater part of the reactions acquired uncovered that Kaizen managers rehearses influence speed of conveyance in the cooking oil fabricating firms, as it were, as appeared by a mean score of 3.533 and quality managers in the cooking oil producing firms, all things considered, as appeared by a mean score of 3.516, while they demonstrated that Kaizen managers hones in influence cost adequacy in the cooking oil producing firms to a direct degree as appeared by a mean score of 3.467. Fabricating operations performance managers is described by three key unmistakable performance measurements which incorporate; cost/efficiency, time/speed, quality administration.

The respondents were required to indicate the level of effect of various Kaizen manufacturing practices on quality of cooking oil manufacturing firms in Kenya. The results obtained are tabulated below.

Table 4.6: Effects of Kaizen Practices on Quality Management

Kaizen Practices	No extent	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
Total Quality Management (TQM)	0	4.2	37.5	53.1	5.2	3.5937	0.6582
Just-In-Time (JIT)	0	4.2	34.4	53.1	8.3	3.6563	0.6932
Total productive management (TPM)	0	3.1	50	42.7	4.2	3.4792	0.6321
Five S	0	5.2	34.4	55.2	5.2	3.6042	0.6724
Kaizen Events	0	3.1	49	43.8	4.2	3.4896	0.6323
Five Whys	0	6.3	37.5	51	5.2	3.5521	0.6938
Suggestion System	0	1	46.9	46.9	5.2	3.5625	0.6123

Source: Research Data, 2016

The interpretation on the respondents' ranks of the statements was done in relation to the key provided where the means checked up in the scale to reveal the corresponding measure in the scale. Accordingly, majority of the respondents reiterated that Just-In-Time (JIT) affects quality management of cooking oil manufacturing firms in Kenya all things considered, as appeared by a mean score of 3.6563, Five S influences quality management of cooking oil fabricating firms in Kenya, as it were, as appeared by a mean score of 3.6042, Total Quality Management (TQM) influences quality administration of cooking oil producing firms in Kenya, as it were, as appeared by a mean score of 3.5937, Suggestion System influences quality management of cooking oil producing firms in Kenya, all things considered, as appeared by a mean score of 3.5625 and Five Whys influences quality administration of cooking oil producing firms in Kenya, as it were, as appeared by a mean score of 3.5521. Then again, Kaizen Events and Total productive maintenance (TPM) influence quality

administration of cooking oil producing firms in Kenya to direct degrees as appeared by mean scores of 3.4896 and 3.4792 separately.

Table 4.7: Effects of Kaizen Practices on Cost Effectiveness

Kaizen Practices	**No extent**	**Little extent**	**Moderate extent**	**Large extent**	**Very large**	**Mean**	**Std. Dev.**
Total Quality Management (TQM)	0	7.4	29.6	63	0	3.525	0.658
Just-In-Time (JIT)	0	3.7	29.6	66.7	0	3.615	0.566
Total Productive Management (TPM)	0	7.4	29.6	63	0	3.533	0.645
Five S	0	3.7	63	33.3	0	3.303	0.519
Kaizen Events	0	7.4	29.6	63	0	3.582	0.600
Five Whys	0	48.2	40.7	11.1	0	3.401	0.676
Suggestion System	0	7.4	29.6	63	0	3.606	0.624

Source: Research Data, 2016

On a scale of 1 to 5, most of the respondents reported that Just-In-Time (JIT), Suggestion System, Kaizen Events, Total Productive Management (TPM) and Total Quality Management (TQM) affect cost efficiency of the cooking oil manufacturing firms in Kenya to great extents as shown by mean scores of 3.615, 3.606, 3.582, 3.533 and 3.525 correspondingly. In addition, they reiterated that Five Whys affects cost management of cooking oil manufacturing firms in Kenya to a moderate extent as shown by a mean score of 3.401 as well as Five S shown by a mean score of 3.303.

Table 4.8: Effects of Kaizen Practices on Delivery Time

Kaizen Practices	No extent	Little extent	Moderate extent	Large extent	Very large	Mean	Std. Dev.
Total Quality Management (TQM)	0	3.7	33.3	63.2	0	3.582	0.572
Just-In-Time (JIT)	0	7.4	29.6	63.2	0	3.525	0.658
Total Productive Management (TPM)	0	3.7	29.6	66.7	0	3.615	0.566
Five S	0	7.4	29.6	63.2	0	3.533	0.645
Kaizen Events	0	3.7	63	33.3	0	3.303	0.519
Five Whys	0	7.4	29.6	63	0	3.582	0.600
Suggestion System	0	48.2	40.7	11.1	0	3.401	0.676

Source: Research Data, 2016

To obtain the corresponding measure of agreement, the calculated weighted mean is rounded off to the nearest whole and the result counter-checked against the matching number in the key provided in the questionnaire. The highest ranking mean score was 3.615 This mean score corresponds to a measure of 4 which means that majority of the respondents indicated that Total Productive Management (TPM) affects delivery time of cooking oil manufacturing firms in Kenya to a great extent.

The respondents further echoed that Total Quality Management (TQM) affects delivery time of cooking oil manufacturing firms in Kenya to a great extent as shown by a mean score of 3.582, Five Whys affects delivery time of cooking oil manufacturing firms in Kenya to a great extent as shown by a mean score of 3.582, Five S affects delivery time of cooking oil manufacturing firms in Kenya to a great extent as shown by a mean score of 3.533 and Just-In-Time (JIT) affects delivery time of cooking oil manufacturing firms in Kenya to a great extent as shown by a mean score of 3.525. In the same line, majority of the respondents indicated that Suggestion System affects delivery time of cooking oil manufacturing firms in Kenya to a

moderate extent as shown by a mean score of 3.401 and that Kaizen Events affects delivery time of cooking oil manufacturing firms in Kenya to a moderate extent as shown by a mean score of 3.303.

Table 4.9: Benefits of implementing Kaizen Manufacturing Practices

BENEFITS	No extent	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
Reduced lead time	0	7.4	37	51.9	3.7	3.5521	0.6938
Cut operation costs	0	7.4	40.7	44.5	7.4	3.5104	0.7677
Increased business performance	0	3.7	48.2	44.4	3.7	3.4896	0.6323
Speed time-to-marker	0	3.7	33.3	63	0	3.582	0.572
Exceeded customer expectations	0	4.2	45.8	37.5	12.5	3.5833	0.7755
Increased number of jobs mastered by employees	0	12.5	50	29.2	8.3	3.3333	0.8165
Improved product quality	0	5.2	36.5	50	8.3	3.6146	0.7162
Improved staff morale	0	3.1	49	43.8	4.2	3.4896	0.6323

Source: Research Data, 2016

The study further requested the respondents to rank the benefits that their organisations have achieved after implementing Kaizen manufacturing practices. Table 4.9 demonstrates the outcomes. Dominant part of the respondents recapped that as a consequence of execution of Kaizen assembling rehearses, their organizations acknowledged enhanced item quality, as it were, as appeared by a mean score of 3.6146, surpassed client desires, all things considered, as appeared by a mean score of 3.5833, speed time-to-marker, as it were, as appeared by a mean score of 3.582, diminished lead time, as it were, as appeared by a mean score of 3.5521 and slice operation expenses, as it were, as appeared by a mean score of 3.5104.

In addition, the respondents indicated that their firms realized increased business performance, improved staff morale and increased number of jobs mastered by employees to moderate extents as shown by mean scores of 3.4896, 3.4896 and 3.3333 respectively. These results signify the importance of Kaizen practices in operational performance of the firms.

4.5 Regression Analysis

Analysis of variance (ANOVA) is usually conducted prior to other inferential analyses to determine whether there are any statistically significant differences between the means of three or more independent groups. In this study a one way analysis of variance (ANOVA) that provided information about levels of variability within the regression model and which formed a basis for tests of significance was used.

Table 4.10: ANOVA Test for Quality Management

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.787	1	.447	4.617	.034
	Residual	62.191	41	.351		
	Total	63.978	42			

Predictors: (Constant), Total quality management, just-in-time, total productive management, five S, kaizen events, five whys and suggestion system

Dependent Variable: Quality Management in cooking oil manufacturing firms

All the independent variables were combined and involved in the analysis. The results of Analysis of variance (ANOVA) for regression coefficients are shown in Table 4.10. The analysis results revealed that the significance of F statistics is 0.034 which is less than 0.05. This implies that there is a significant relationship between total quality management, just-in-time, total productive management, five S, kaizen events,

five whys and suggestion system with quality management of cooking oil manufacturing firms in Nairobi.

Multiple regression is the main inferential analysis that was employed in determining the relative importance of each of the variables. In this exercise, three sub-models were created to investigate the relationship between the Kaizen Practices and the three measures of operational performance (quality management, cost effectiveness and delivery time).

Table 4.2: Regression Coefficients for Quality Management

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.110	0.606		3.483	0.001
TQM	0.439	0.106	0.086	0.858	0.014
JIT	0.383	0.089	0.026	0.263	0.039
TPM	0.295	0.106	0.279	0.793	0.016
Five S	0.227	0.094	1.351	0.181	0.047
Kaizen Events	0.216	0.079	2.223	0.030	0.033
Five Whys	0.164	0.093	3.922	0.000	0.026
Suggestion System	0.288	0.091	0.026	0.097	0.048

Source: Research Data, 2016

From the Regression results, the multiple linear regression model finally appear as:

$$Y_a = 2.110+0.439X_1+0.383X_2+0.295X_3+0.227X_4+0.216X_5+0.164X_6+0.288X_7$$

Y is the dependent variable (quality management of cooking oil manufacturing firms); X_1 = Total Quality Management, X_2 = Total Preventive Maintenance, X_3 = Five S, X_4 = Kaizen Events, X_5 = Just-In-Time, X_6 = Five Why's, X_7 = Suggestion System. The regression results indicate that taking all factors were kept constant at zero, the quality

management of cooking oil manufacturing firms will be 2.110. under the same conditions, a unit increase in total quality management will lead to a 0.439 increase in quality management of cooking oil manufacturing firms; a unit increase in total preventive maintenance will lead to a 0.383 increase in quality management of cooking oil manufacturing firms and a unit increase in Five S will lead to a 0.295 increase in quality management of cooking oil manufacturing firms.

In addition, a unit increase in Kaizen events will lead to a 0.227 increase in quality management of cooking oil manufacturing firms; a unit increase in just-in-time will lead to a 0.216 increase in quality management of cooking oil manufacturing firms; a unit increase in Five Why's will lead to a 0.164 increase in quality management of cooking oil manufacturing firms; while a unit increase in suggestion system will lead to a 0.288 increase in quality management of cooking oil manufacturing firms. These results infer that TQM contributes more to the quality management of cooking oil manufacturing firms, while five whys contributes the least to the quality management of cooking oil manufacturing firms in Nairobi. At 5% level of significance and 95% level of confidence, Suggestion System had a 0.048 level of significance, while TQM had a 0.014 level of significance hence the most significant Kaizen practice affecting quality management of cooking oil manufacturing firms in Nairobi.

Table 4.3: ANOVA Test

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	29.8607	4	4.97679	20.9903	0.000
	Residual	11.3808	38	0.237099		
	Total	**41.2415**	42			

Predictors: (Constant), Quality control planning, quality control policies, quality control procedures and quality control reporting

Dependent Variable: Cost Effectiveness in cooking oil manufacturing firms

Analysis of Variance (ANOVA) assessed the overall significance of the model. According to the table 4.13, $p < 0.05$ (0.000), the model of the study sufficiently or significantly explained the variation in cost effectiveness

Table 4.4: Multiple Regression for Cost Effectiveness

Variable	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	1.224	0.3122		3.358	0.000
TQM	0.217	0.1440	0.185	0.776	0.038
JIT	0.118	0.0847	0.023	0.406	0.046
TPM	0.299	0.0715	0.235	2.793	0.024
Five S	0.248	0.1071	0.145	1.378	0.012
Kaizen Events	0.191	0.1064	0.086	0.858	0.039
Five Whys	0.113	0.0892	0.026	0.263	0.049
Suggestion System	0.295	0.1060	0.279	2.793	0.026

Source: Research Data, 2016

The regression equation ($Y_b = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7$) will be:

$$Y_b = 1.224+0.217X_1+0.118X_2+0.299X_3+0.248X_4+0.191X_5+0.113X_6+0.295X_7$$

Further, if all factors were kept constant at zero, the cost effectiveness of cooking oil manufacturing firms in Nairobi will be 1.224. The regression analysis also shows that taking all other independent variables at zero, a unit increase in TQM will lead to a 0.217 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi; a unit increase in JIT will lead to a 0.118 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi; a unit increase in TPM will lead to a 0.299 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi and a unit increase

in Five S will lead to a 0.248 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi.

Further, if Kaizen events were increased by one unit, the resulting cost effectiveness of cooking oil manufacturing firms in Nairobi will show a positive change of 0.191; a unit increase in five whys will lead to a 0.113 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi; while a unit increase in suggestion system will lead to a 0.295 increase in cost effectiveness of cooking oil manufacturing firms in Nairobi. All the Kazen practices had p-values less than 0.05 hence deemed to have a significant relationship with the dependent variable.

This notwithstanding, Five Whys had a 0.049 level of significance, JIT had a 0.046 level of significance, Kaizen Events had a 0.039 level of significance, TQM had a 0.038 level of significance, Suggestion System had 0.026 level of significance, TPM had a 0.024 level of significance and Five S had a 0.012 level of significance hence the most significant Kaizen practice affecting cost effectiveness of cooking oil manufacturing firms in Nairobi.

Table 4.5: ANOVAs Analysis

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	10.053	1	3.351	7.810	.003[b]
	Residual	17.592	41	.429		
	Total	27.644	42			

Predictors: (Constant), Quality control planning, quality control policies, quality control procedures and quality control reporting

Dependent Variable: Cost Effectiveness in cooking oil manufacturing firms

The researcher conducted ANOVA test to examine whether the mean of the variables tends to differ significantly among the five industries; that is to say whether firms in the cooking oil sub-sector tend to have significantly different ratios. Indeed, the calculated F- test statistic yielded a statistically significant P-value (P= 0.003<0.05) which indicated that relationship existed between Cost Effectiveness in cooking oil manufacturing firms and the seven independent variables.

Table 4.6: Multiple Regression for Delivery Time

Variable	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.837	.112		4.358	0.000
TQM	0.153	.146	0.330	2.276	0.015
JIT	0.353	.088	0.167	1.379	0.041
TPM	0.237	.075	0.235	2.7936	0.024
Five S	0.274	.064	0.314	3.009	0.030
Kaizen Events	0.337	.075	0.235	1.379	0.020
Five Whys	0.220	.120	0.224	1.922	0.028
Suggestion System	0.257	.146	0.330	2.276	0.024

Source: Research Data, 2016

The regression equation ($Y_c = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7$**)** will be:

$$Y_C = 2.837+0.553X_1+0.753X_2+0.637X_3+0.474X_4+0.637X_5+0.420X_6+0.553X_7$$

From Table 4.15, taking all factors (total quality management, just-in-time, total productive management, five S, kaizen events, five whys and suggestion system) constant at zero, the delivery time of cooking oil manufacturing firms in Nairobi will be 2.837. A unit increase in TQM will lead to a 0.153 increase in delivery time of cooking oil manufacturing firms in Nairobi; a unit increase JIT will lead to a 0.353 increase in delivery time of cooking oil manufacturing firms in Nairobi; a unit

increase in TPM will lead to a 0.237 increase in delivery time of cooking oil manufacturing firms in Nairobi, and a unit increase in Five S will lead to a 0.474 increase in delivery time of cooking oil manufacturing firms in Nairobi.

The regression further depicted that a unit increase in Kaizen Events will lead to a 0.337 increase in delivery time of cooking oil manufacturing firms in Nairobi; a unit increase Five Whys will lead to a 0.220 increase in delivery time of cooking oil manufacturing firms in Nairobi; while a unit increase in suggestion system will lead to a 0.257 increase in delivery time of cooking oil manufacturing firms in Nairobi. All the factors had significant p-values less than 0.05 hence significant for the study. TQM is the most significant practice in delivery time of cooking oil manufacturing firms in Nairobi with p-values of 0.015.

Table 4.7: Coefficient of Determination (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of Estimate	Sig.
1	.908[a]	.825	.789	.65323	0.04

Source: Research Data, 2016

The independent variables that were studied, explain 82.5% of the operational performance of cooking oil manufacturing firms in Nairobi as represented by the R^2. The other aspects not considered in this research account for approximately 17.5% of the operational performance of cooking oil manufacturing firms in Nairobi.

Table 4.8: Analysis of Variance in Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	11.745	4	1.307	2.122	0.04
Residual	40.185	38	0.616		
Total	**51.93**	**42**			

The results in Table 4.17 are significant at 4% (P =0.04). This implies that there is a very strong relationship between Kaizen practices and operational performance of cooking oil manufacturing firms in Nairobi. Hence, from these results it can be concluded that the model is good and can be used for the estimation of operational performance of cooking oil manufacturing firms in Nairobi. The study used ANOVA to establish the significance of the regression model from which a F significance value of p=0.040 was established. This therefore means that the regression model has a confidence level of over 95% hence high reliability of the results. The significance tests for the overall model; Using p-value, the regression model is significant since 0.040<0.05.

Table 4.9: Multiple Regression Analysis

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.318	.509		4.552	0.000
TQM	0.983	.055	.970	7.975	0.014
JIT	0.975	.147	.507	3.651	0.022
TPM	0.753	0.088	0.167	1.382	0.041
Five S	0.474	.064	0.314	1.009	0.030
Kaizen Events	0.637	.075	0.235	2.793	0.024
Five Whys	0.453	.057	.419	1.393	0.047
Suggestion System	0.528	.116	.323	2.834	0.046

Source: Research Data, 2016

The overall regression model that was also evaluated and represented as follows:

$$Y = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + e$$

$$Y = 2.318 + 0.983X_1 + 0.975X_2 + 0.753X_3 + 0.474X_4 + 0.637X_5 + 0.453X_6 + 0.528X_7$$

Where; Y = Operational Performance, α_0 = Constant Term, X_1 = Total Quality Management, X_2 =JIT, X_3 = Total Preventive Maintenance, X_4 = Five S, X_5 = Kaizen Events, X_6 = Five Why's, X_7 = Suggestion System and E = Error Term.

From the above regression model, taking all factors constant at zero, the operational performance of cooking oil manufacturing firms in Nairobi realized would be 2.837. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in TQM lead to a 0.983 increase in operational performance of cooking oil manufacturing firms in Nairobi. A unit increase in JIT will lead to a 0.975 increase in operational performance of cooking oil manufacturing firms in Nairobi; a unit increase in TPM will lead to a 0.753 increase in operational performance of cooking oil manufacturing firms in Nairobi, whereas a unit increase in Five S will lead to a 0.474 increase in operational performance of cooking oil manufacturing firms in Nairobi.

The results further show that a unit increase in Kaizen Events will lead to a 0.637 increase in operational performance of cooking oil manufacturing firms in Nairobi, a unit increase in Five Whys will lead to a 0.453 increase in operational performance of cooking oil manufacturing firms in Nairobi while a unit increase in suggestion system will lead to a 0.528 increase in operational performance of cooking oil manufacturing firms in Nairobi. These results infer that TQM contributes more to operational performance of cooking oil manufacturing firms in Nairobi, followed by JIT, then TPM, Kaizen events, Suggestion System, and Five S, while Five Whys contributes the least to operational performance of cooking oil manufacturing firms in Nairobi. Based on the results, all the explanatory variables are statistically significant.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section is the last chapter in this research which concentrates on summarizing of the study findings, making conclusions and constructing commendations and suggestions that can be adopted to enhance the operational performance using the Kaizen management practices. The study also puts forward suggestions for further research. Descriptive statistics are used to summarize the data and inferential statistics were used to investigate the relationship between Kaizen management practices on the operational performance of cooking oil manufacturing firms in Nairobi, Kenya.

5.2 Summary of the Findings

The study found that organizations had executed Kaizen manufacturing practice(s) which centre both on the procedure and the outcomes. The study found that larger part of the organizations had executed Total Quality Management (TQM), Total Productive Management (TPM), Five S, Just-In-Time (JIT) and suggestion framework to a great extent in that order. A portion of the organizations however were found to have executed Kaizen Events and Five Whys to a direct moderate degree in that order. The objectives of the cooking oil producing firms are met through more effective Kaizen hones in their operations. The study further established that Kaizen management practices affect the operational performance of cooking oil manufacturing firms to a great extent. Kaizen management practices affect speed of delivery in the cooking oil manufacturing firms to a great extent as well as and quality management, while Kaizen management practices in affect cost effectiveness in the cooking oil manufacturing firms to a moderate extent.

The study also found that Just-In-Time (JIT) affects quality management of cooking oil manufacturing firms in Kenya to a great extent as well as Five S, Total Quality Management (TQM), Suggestion System and Five Whys. In addition, Kaizen Events and Total productive management (TPM) affect quality management of cooking oil manufacturing firms in Kenya to moderate extents. On the same line, it was established that the various Kaizen practices affect cost efficiency of the cooking oil manufacturing firms in Kenya to significant extents.

The study also found that Total Productive Management (TPM) affects delivery time of cooking oil manufacturing firms in Kenya to a great extent. As well, Total Quality Management (TQM), Five Whys, Five S and Just-In-Time (JIT) affects delivery time of cooking oil manufacturing firms in Kenya to a great extent. Suggestion System affects delivery time of cooking oil manufacturing firms in Kenya to a moderate extent and Kaizen Events affects delivery time of cooking oil manufacturing firms in Kenya moderately. The implementation of Kaizen manufacturing practices has enhanced the firms realize improved product quality, exceeded customer expectations, speed time-to-marker, reduced lead time and cut operation costs to great extents. However, firms realized increased business performance, improved staff morale and increased number of jobs mastered by employees to moderate extents.

From the regression analysis, TQM contributes more to the quality management of cooking oil manufacturing firms, while five whys contributes the least to the quality management of cooking oil manufacturing firms in Nairobi. Five S was found to be the most significant Kaizen practice affecting cost effectiveness of cooking oil manufacturing firms in Nairobi.

TQM is the most significant practice in delivery time of cooking oil manufacturing firms in Nairobi. On overall, TQM contributes more to operational performance of cooking oil manufacturing firms in Nairobi, followed by JIT, then TPM, Kaizen events, Suggestion System, and Five S, while Five Whys contributes the least to operational performance of cooking oil manufacturing firms in Nairobi.

5.3 Conclusions

The study concludes that there exists a relationship between kaizen sustainability and operational performance in Kenyan manufacturing firms. The aspect of relationship that exist between kaizen sustainability and operational performance in Kenyan manufacturing firms includes communication within the work area and across various levels of the organization, organizational structure and policies, improvement of culture, employee's focus and commitment to the work, improvement of activity characteristics (e.g., project scope, goals, and improvement team dynamics), external environment impact , impact from external stakeholders , education and training. The result indicated by the values of R implies that there is a positive relationship between kaizen sustainability practices and all the operations performance measures of improvement outcome.

The study also concludes that to some extent sustainability of kaizen improvement outcomes has contributed to operational Performance in Kenyan manufacturing firms and some of the aspects of sustainability of Kaizen improvement outcome includes continuous flow of production, education in lead time, overall manufacturing flexibility improvements, improvement in product quality, lower inventory levels, improved equipment efficiency, reduction in processing time, improvement in overall productivity, enhanced competitiveness, improved maintenance practices, increased

Environmental Sustainability. Further, the study concluded that there are challenges faced by Kenyan manufacturing firms in sustaining kaizen, in the context of the economic, social and cultural environment that they operate in and these challenges includes employees' commitment and innovativeness, lack of participation of workers, organization structure, financial constraints, attitudes and misconceptions about Kaizen, ineffective training, ineffective performance, lack of proper communication systems.

5.4 Recommendations

The study established that there exists a relationship between kaizen practices and operational performance of manufacturing firms in Nairobi, Kenya. The study therefore recommends that in order to ensure that Kaizen improvement outcome remain effective in operational performance, the management of the firms should procure employees that are competent with right qualifications to manage Kaizen practices. The study further recommends that since to some extent kaizen practices contributed to operational Performance in Kenyan manufacturing firms, the management should focus more on those aspects of kaizen outcomes. The study also recommends that since there are some challenges faced by Kenyan manufacturing firms in implementing kaizen practices, in the context of the economic, social and cultural environment that they operate in, the management should ensure that counter challenges strategies are formulated and implemented appropriately.

The study established any decision they made was to be approved by their senior managers, little action was to be taken without supervisor approval of the idea, small matters were to be referred to someone higher for final answer and individual decision was a challenge in the organization. Therefore, this study recommends that

management to use bottom up approach of management for effective implementation of Kaizen practices. Decisions should be decentralized rather that centralization. This study recommends that major strategic partnerships should be formed by manufacturing companies to drive cost reduction and profit maximization in operations.

5.5 Suggestions for Further Research

This study was limited to cooking oil manufacturing firms in Nairobi and its environs. Different manufacturing firms in Kenya have different orientation in the industry and differ in various other aspects which could contribute to the difference in implementation of Kaizen management practices for their operational performance. As such another study should be conducted in the local setting in this era of technological advancements. The other areas of focus could be on each of Kaizen practices in firms in different organizations as they were found to be differently effective on the operational performance of the firms studied. These could be a litmus test on which of the practices work better for various organizations.

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APPENDICES

Appendix I: Questionnaire

SECTION A: PERSONAL DETAILS

1. Your company's name ……...
2. Gender

Male	[ ]	Female	[ ]

3. Age Bracket

Below 20 Years	[ ]	20 – 29 years	[ ]
30 -39 Years	[ ]	40 -49 Years	[ ]
50 years and above	[ ]		

4. For how long have you been working in this FMCG Company? (Yrs)

0-5 years	( )	6-10 years	( )
11-15 years	( )	16 – 20 years	( )
Over 20 years	( )		

5. Indicate the department/section you are currently working……
6. What is your highest level of education?

Certificate	[ ]	Diploma	[ ]
Bachelor's Degree	[ ]	Masters	[ ]
PhD	[ ]	Others (Specify.....)	[ ]

SECTION B: IMPLEMENTATION OF KAIZEN PRACTICES

7. Has your organisation implemented Kaizen manufacturing practice?

Yes ( ) No ( )

If no go to question 14.

8. Please mark the appropriate box that indicates the extent to which your organisation has implemented Kaizen manufacturing practices. Kaizen practices implementation scale ranging from minimal (1) to great extent (5)

KAIZEN PRACTICE	**SCALE**				
	1	2	3	4	5
Total Quality Management (TQM)					
Just-In-Time (JIT)					
Total Productive Management (TPM)					
Five S					
Kaizen Events					
Five Whys					
Suggestion System					

PART C: KAIZEN PRACTICES AND OPERATIONS PERFORMANCE

9. With regard to this Firm, to what extent do Kaizen management practices affect the operational performance of cooking oil manufacturing firms?

To a very great extent	To a great extent	To a moderate extent	To a little extent	To no extent

10. To what extent do Kaizen management practices in general affect the following aspects of operational performance in this cooking oil manufacturing Firm? Use a scale of 1 to 5. None=1 and to very great extent= 5

Operation performance measures	**1**	**2**	**3**	**4**	**5**
Quality management					
Cost effectiveness					
Speed of delivery					

11. Please rate the extent to which the following Kaizen manufacturing practices affect quality of cooking oil manufacturing firms in Kenya.

EFFECTS OF KAIZEN PRACTICES ON QUALITY MANAGEMENT	**SCALE**				
	1	2	3	4	5
Total Quality Management (TQM)					
Just-In-Time (JIT)					
Total Productive Management (TPM)					
Five S					
Kaizen Events					
Five Whys					
Suggestion System					

12. To what extent do Kaizen manufacturing practices affect cost effectiveness in the cooking oil manufacturing firms?

EFFECTS OF KAIZEN PRACTICES ON COST EFFECTIVENESS	**SCALE**				
	1	2	3	4	5
Total Quality Management (TQM)					
Just-In-Time (JIT)					
Total Productive Management (TPM)					
Five S					
Kaizen Events					
Five Whys					
Suggestion System					

13. With regard to this Company, to what extent do Kaizen manufacturing practices affect delivery time in the cooking oil manufacturing firms. Rate on a scale of 1 to 5 where 1= no extent, 2= little extent, 3= moderate extent, 4= great extent and 5 is to a very great extent.

EFFECTS OF KAIZEN PRACTICES ON DELIVERY TIME	**SCALE**				
	1	2	3	4	5
Total Quality Management (TQM)					
Just-In-Time (JIT)					
Total Productive Management (TPM)					
Five S					
Kaizen Events					
Five Whys					
Suggestion System					

14. On a scale of 1-5 show the extent of how the following operational performance dimensions have been improved by Kaizen manufacturing practice in your organization. Operational performance dimension measure ranging from minimal (1) to great extent (5)

OPERATION PERFORMANCE MEASURE	**1**	**2**	**3**	**4**	**5**
Reduction in inventory					
Improved time-to-market					
Reduce lead time					
Improve input per worker					
Increase equipment utilization					
Reduced employee supervision					
Reduce time taken to note errors and their correction					
Increased customer satisfaction					
Increased staff morale					
Reduced waste					
Improved product quality					
Improved competitiveness					
Reduced product cost					

15. On a scale of 1-5 rank the benefits that your organisation has achieved after implementing Kaizen manufacturing practice. Where 1 means minimal and 5 means great extent.

BENEFITS	**1**	**2**	**3**	**4**	**5**
Reduced lead time					
Cut operation costs					
Increased business performance					
Speed time-to-marker					
Exceeded customer expectations					
Increased number of jobs mastered by employees					
Improved product quality					
Improved staff morale					

PART D: ADDITIONAL INFORMATION

16. What other information would you like to share about the relationship between Kaizen management practices on the operational performance of cooking oil manufacturing firms in Nairobi?

……

……

Appendix II: Cooking Oil Manufacturing Companies in Nairobi County

1. Bidco Oil Refineries Limited
2. Unilever Kenya Limited
3. Kapa Oil Refineries Limited
4. Gill Oil Refineries
5. Menengai Oil Refineries
6. Darfords Enterprises Ltd
7. Subiaco Foods
8. Palmac Oil Refineries
9. Kenya Nut Company,

Source: Kenya Association of Manufacturers (2016)