

**KAIZEN SUSTAINABILITY AND OPERATIONAL PERFORMANCE
A CASE OF MANUFACTURING FIRMS IN MOMBASA COUNTY,
KENYA**

**BY
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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL
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DECLARATION

I the undersigned, declare that this research project is my original work and has not been submitted to any other institution for any examination or award.

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D61/76446/2012

This research project has been presented for examination with my approval as the appointed university supervisor.

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DEDICATION

I dedicate this work and give special thanks to my family members and my adorable daughter Narelle for being there for me throughout the entire MBA program. All of you have been my best cheerleaders.

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This research project would not have been successful without the invaluable support, understanding, assistance and guidance from workmates, colleagues and family members. I sincerely thank all those individuals whose encouragement and support made the completion of this study a reality and success. I may not be able to name all, but I feel obliged to name a few people whose contribution was enormous in this journey.

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ABSTRACT

KAIZEN (Japanese word for continuous improvement) is the use of various problem-solving tools for the identification and solution of work-based problems. The purpose of this study was to establish the relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms. The specific objectives of this study being to determine the extent to which sustainability of *kaizen* improvement outcomes has contributed to operational Performance in Kenyan manufacturing firms and establish the challenges faced by Kenyan manufacturing firms in sustaining *kaizen*, in the context of the economic, social and cultural environment that they operate in. A survey questionnaire was used to collect data from operations managers or their equivalents in 24 Kenyan manufacturing firms that are practicing *kaizen*. Descriptive statistics was used to evaluate the extent to which sustainability of *kaizen* improvement outcomes has contributed to operational Performance in Kenyan manufacturing firms and establish the challenges faced by Kenyan manufacturing firms in sustaining *kaizen*, in the context of the economic, social and cultural environment that they operate in. Individual operations performance measures were regressed against the set of *kaizen* practices to evaluate the relationship between the two. A regression model was used to evaluate the overall relationship between *kaizen* implementation and operations performance improvement. The results from the study shown that *kaizen* practices had varying degrees of sustainability in Kenyan manufacturing firms 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. On challenges faced in *kaizen* implementation, lack of management support, ineffective training and lack of proper communication about *kaizen* posed the greatest challenge whereas employees' commitments and innovativeness, financial constraints posed the least challenge. Results from the regression analysis showed that sustainability of *kaizen* practices in Kenyan manufacturing firms is significantly related to operational performance. This study has provided insights into the extent of sustainability of *kaizen* in Kenyan manufacturing firms, and provides further evidence that *kaizen* sustainability is fundamental in adding value on operational performance.

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ABBREVIATIONS

AGOA	African Growth and Opportunities Act
CI	Continuous Improvement
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EPZ	Export Processing Zones
GDP	Gross Domestic Product
JICA	Japan International Cooperation Agency
JIT	Just In Time
JISHA	Japan Industrial Safety and Health Association
KAM	Kenya Association of Manufacturers
KEPSA	Kenya Private Sector Alliance
KNBS	Kenya National Bureau of Statistics
SME	Small and Medium Enterprise
TPM	Total Productive Maintenance
TPS	Toyota Production System
TQM	Total Quality Management
TQC	Total Quality Control
UK	United Kingdom
USA	United States of America

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Kaizen has been regarded as a key element in Japanese management and has been presented as one of the sources of the competitiveness of Japanese manufacturers. Since late of the 1980s, a larger number of studies, which have focused on different *Kaizen* systems, approaches and practices such as Japanese manufacturing techniques (Brunet, & New, 2003), the Toyota production system (Liker, 2004) and lean production , have illustrated the effectiveness of *Kaizen*. Furthermore, studies of *kaizen* activities in the countries outside Japan, such as US, China, Australia, Sweden and the UK suggest that the concept, approaches, and practices of *Kaizen* have become routinely accepted throughout the world. These practices if well sustained will have an impact on the operational performance.

The study was based on the Resource-Based Theory (Barney, 1991b) and Dynamic Capabilities Theory (Martin, 2000). Resource Based View (RBV) argued that superior firm performance is the result of the ability of the firms to accumulate resources and capabilities that are rare, valuable, and difficult to imitate (Barney, 2001). The DCT focused on the degree of ‘fit’ over time between an organization’s changing external environment and its changing portfolio of activities and capabilities (Porter, 1996).

This chapter enlightened and gave brief introduction of the core aspect of the project and provided the scope as well. Areas covered under this included: *Kaizen*, Operational performance, and the manufacturing sector. The chapter also covered the research problem, research objectives and value of the study.

1.1.1 Kaizen

The term “kaizen” is a derivative of two Japanese ideograms, “kai,” meaning change, and “zen,” meaning good or for the better (Six Sigma LLC, 2004). Another definition of the Japanese meaning of *kaizen* is “to take apart and put back together in a better way” (Minton, 1998, p.14). The popular meaning is continual, incremental improvement of all aspects of a company (Imai, 1986). *Kaizen* is the Japanese word for improvement or “change for the better” carrying the connotation in industry of all the activities which took place in the Japanese workplace to enhance the operations and environment. The phrase “change for the better” implied any change that resulted in improvement which could be quality or other factors that customers or an organization judged to be of value such as innovation, ease of use, on time delivery, durability, operations flexibility, customer satisfaction and low cost (Zimmerman, 1991).

1.1.2 Operational Performance

Studies that had focused on Japanese manufacturing techniques had all illustrated the importance of *kaizen* in the improvement of organizational performance (Liker, 2004; Ohno, 1988; Womack and Jones, 1996; Womack et al, 1990). Manufacturing Operational performance management was characterized by four key distinct performance dimensions which included; cost/productivity, time/speed, operations flexibility and quality. Others included creativity, innovation and customer satisfaction (De Toni and Tonchia, 2001). These four distinct classes of performance dimension coincided with the four basic components of cost, quality, speed and flexibility by which the manufacturing strategy of a firm is generally expressed (Ward et alia., 1995). These manufacturing performance dimensions determined the market competition focused on “price”, “product” and “place”

(Corbett & van, 1993).

Kaizen events attempted to impact business performance as well as human resource outcomes. Reported business performance improvements resulting from *kaizen* events appeared to vary from moderate improvement (25-50 per cent), to significant improvement (75-100 per cent) to orders of magnitude improvement (greater than 100 per cent) (Cuscela, 1998; Sheridan, 1997). *Kaizen* events that generated short term performance improvements had provided impetus that the organizational change literature purported was necessary for creating employee commitment to a given performance improvement strategy (Keating,1999; Kotter,1995).

Some of the purported human resource outcomes of *kaizen* event are increased employee knowledge of the need for improvement in the organization (Butterworth, 2001; Tanner and Roncarti, 1994), increased employee knowledge of the principles, tools ,techniques of continuous improvement, development of problem solving skills (McNichols et al.,1999), promoted teamwork in an organization, proficiency in lean manufacturing tools (Mika ,2002).

1.1.3 The Manufacturing Sector in Kenya

The manufacturing sector in Sub-Saharan Africa is generally not dominant economically compared to the agriculture and service sectors, Kenya is no exception. In 2007, the contribution to GDP of the manufacturing sector in Kenya was 11.8 percent, whereas the agriculture and the service sectors accounted for 22.7 percent and 58.2 percent, respectively (World Bank, 2009).

There are about 2000 fragmented manufacturing units in Kenya according to the Kenya vision 2030 reported of 2007 (Kenya National Bureau of Statistics, 2012) with the Kenya Association of Manufacturers (KAM) membership comprise of 700 members.

This sector is quite diversified and comprises of all products which in other terms are referred to as non-agricultural products as well products from agro-processing industries. The major products falling under the former are textiles and clothing, refined petroleum products, paints and varnishes, transport machinery, where assembled motor vehicles constitute the bulk of products, electrical machinery and alliances, metal products, paper and paperboard products, medicinal and pharmaceutical products, organic and non-organic chemicals, pesticides and fertilizers, non-metallic minerals like fluorspar and soda ash, hides, skins and leather products, soaps, essential oils, perfumes and cleansing products, plastics articles, rubber products, cement, salt, wood and wood products, printing and publishing articles, non-electrical machinery and appliances, and glass products. The latter largely comprises of products from food processing, beverages and tobacco manufacturing. Although the sector is fragmented, food processing, beverages and tobacco manufacturing, refined petroleum products and textiles and clothing account for 50 percent of GDP and exports and 60 percent of formal employment (Kenya Association of Manufacturers, 2012; Kenya National Bureau of Statistics, 2012).

Kenya manufactured good markets included domestic as well as exports. The export destinations for majority of the above products are destined for the EAC and COMESA markets mainly owing to proximity, preferential treatment, reconstruction activities and a

relatively well-developed manufacturing industry in Kenya compared to immediate neighbours. The other market, especially for Kenyan apparel manufacturers is the USA. The largest industrial sector contribution to exports in 2005 was garments (74.4 percent), followed by chemicals (7.2 percent) and agro-processing (5.2 percent). In addition, 10.7 percent of national exports representing over 70 percent of EPZ output is exported to the USA under African Growth and Opportunities Act (AGOA). Locally manufactured goods comprise 25 percent of Kenya's exports. However, in the East African region, Kenyan share is only 7 percent of the \$11billion market of manufactured goods with the larger percentage being dominated by imports from outside the region. This indicates that there is a huge potential to improve Kenya's competitiveness in the region by replacing external suppliers (Kenya National Bureau of Statistics, 2012; Kenya Association of Manufacturers, 2012).

1.2 Research problem

The concept of *kaizen* has received much attention as a key to Japan's competitive success (Imai, 1986). In contrast to the worldwide diffusion of the concept of *kaizen*, many researchers have illustrated the difficulties for many companies outside Japan to have *kaizen* activities take root in organizations (Bateman & David, 2002; Bessant., 1994). The transfer of Japanese *kaizen* activities to plants overseas has been researched as a component of the studies on transfer of Japanese management practices to overseas plants. In the USA, (Abo, 1994; Kenney & Florida, 1993; Liker., 1999), the UK, (Elger & Smith, 2005; Oliver & Wilkinson, 1992; Saka, 2004), and China (Hong., 2006a, b; Taylor, 1999) These studies suggest that the implementation and influence of Japanese

kaizen activities in overseas plants is situated in the social, economic and cultural contexts.

Patil (2003) conducted a field study of one Kaizen event in a manufacturing organization to determine whether outcomes were sustained eight months after the event. Through a sustainability checklist and audit of the area by the researcher and the event leadership, the researcher found a lack of sustainability and created a framework for sustaining Kaizen events based on the shortcomings of the event studied. In Kenya, reports indicated that *kaizen* interventions have often resulted in 50-70% reductions in Throughput time, 50-100% increases in productivity, 20-40% savings in manufacturing costs, 40-60% reductions in quality errors, and 50% releases of space, as well as significant improvements in team spirit and morale (Kenya Association of Manufacturers, 2012). In general, *Kaizen* provides the channel through which employees contribute to the development of their company. Local studies done had concentrated on the relationship between implementation of *kaizen* and operations performance improvement (Nderi, 2012). No known studies had been done locally on the sustainability of Kaizen and so the need to carry out this research

In fact, as the comparison of key performance indicators between Japanese, UK and USA auto-parts manufacturers by Oliver et al. (2002) shows, there is still a large gap in terms of the *kaizen* sustainability between Japanese and western companies. The sector operates in a largely unfavorable business operating environment characterized by high operations cost, poor infrastructure, inadequate and expensive financing and inadequate managerial and technical skills (Kenya Private Sector Alliance, 2005). To overcome these challenges

it's reported that manufacturing firms adopt non costly continuous improvement methodologies so as to improve their competitiveness.

This gap is a big concern and had triggered this research study so as to understand not only the implementation of *kaizen* activities in countries outside Japan, but also the sustainability of these *kaizen* events in more depth and their relationship with the organizational performance when the social, economic and cultural aspects are put into perspective. The main research question for this study was, “what is the relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms; Mombasa County, Kenya?”

1.3 Research Objectives

The main research objective for this study was to establish the relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms. The specific objectives of this study were to:

- i. Determine the extent to which *kaizen* sustainability had contributed to operational performance in Kenyan manufacturing firms; Mombasa county, Kenya.
- ii. Establish the extent to which *Kaizen* sustainability challenges had contributed to the operational performance in Kenyan manufacturing firms.

1.4 Value of the Study

This study will contribute to enhancing the existing knowledge gap on *kaizen* by providing knowledge and insights into the adoption of *kaizen* by Kenyan manufacturing firms. It will further provide evidence as to whether sustainability of *kaizen* has relationships with operational performance in Kenyan manufacturing firms.

The findings from this study will appropriately enlighten the manufacturing fraternity in Kenya on the available low-cost *kaizen* practices that can be used to improve their operational efficiency and effectiveness. These practices and techniques can be adopted either individually or as a set of practices.

The findings from this study may further aid firms in their policy formulation regarding adoption of continuous improvement methodologies. The relationships between *kaizen* sustainability and operational performance will appropriately guide policy formulators on which *kaizen* techniques or practices are most appropriate for adoption in their firms.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covered the review of literature on the various aspects of *kaizen* as a continuous improvement methodology in firms. The chapter highlights the understandings of various authors on the concept of *kaizen* as well as the unanimously accepted principles or features of *kaizen*. A description of the most common *kaizen* sustainability practices were covered in this chapter. Presented also is a summary of theoretical and empirical findings from authors on the influences of various *kaizen* practices on a variety of operations performance dimensions in different parts of the world as well as the challenges associated with *kaizen* sustainability.

2.2 Theoretical studies of *Kaizen*

Since there were no known studies on the sustainability of *kaizen*, theories on the same had not been developed and so the need to borrow from other disciplines such as management and economics. In this research, resource based view theory of the firm and dynamic capabilities theory were found applicable to anchor this study.

2.2.1 Resource -Based Theory of the Firm

The resource-based view (RBV) argued that firms possessing resources, a subset of which enabled them to achieve competitive advantage, and a subset of those that led to superior long-term performance (Barney, 1991b). Resources that were valuable and rare led to the creation of competitive advantage. That advantage can be sustained over longer time periods to the extent that the firm is able to protect against resource imitation, transfer, or substitution. In general, empirical studies using the theory have strongly supported the resource-based view.

In this study the main resource is the *Kaizen* practices such as employee focus and commitment, communication within work area, improvement policies and culture being applied in the manufacturing firms will contribute to the operational performance.

2.2.2 Dynamic Capabilities Theory

The dynamic capability approach focuses attention on the firm's ability to renew its resources in line with changes in its environment. Dynamic capabilities refer to the firm's ability to alter the resource base by creating, integrating, recombining and releasing resources (Eisenhardt & Martin, 2000). Collis (1994) is particularly explicit when making the point that dynamic capabilities govern the rate of change of ordinary capabilities. Teece. (1997, page 516) give another definition: 'Dynamic capabilities are the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments'. The dynamic capabilities approach is not merely an inward-looking view of the organisation and its strategy. Its central focus is on the degree of 'fit' over time between an organisation's changing external environment and its changing portfolio of activities and capabilities (Porter, 1996).

“The concept of dynamic capabilities, especially in terms of organizational knowledge processes, has become the predominant paradigm for the explanation of competitive advantages. However, major unsolved—or at least insufficiently solved—problems are first their measurement and second their management. Three dynamic capabilities are necessary in order to meet new challenges. Organizations and their employees need the capability to learn quickly and to build strategic assets. New strategic assets such as capability, technology and customer feedback have to be integrated within the

manufacturing firms. Existing strategic assets have to be transformed or reconfigured. The main difference between the resource-based view of the firm and dynamic capabilities view is the fact that the latter focuses more on the issue of competitive survival rather than achievement of sustainable competitive advantage. This focus appears to be closer to contemporary business realities, the latter being more "high-velocity" than the case in previous decades. The demise of companies like Nokia shows that the more pressing issue is competitive survival.

In this study, effective *Kaizen* sustainability will enable the manufacturing firms attain a competitive edge that will enable them survive in this challenging environment.

2.3 *Kaizen*

Kaizen is a Japanese word that has become common in many western companies. The word indicates a process of continuous improvement of the standard way of work (Chen et al., 2000). It is a compound word involving two concepts: *Kai* (change) and *Zen* (for the better) (Palmer, 2001). The term comes from Gemba *Kaizen* meaning 'Continuous Improvement' (CI). Continuous Improvement is one of the core strategies for excellence in production, and is considered vital in today's competitive environment (Dean and Robinson, 1991). It calls for endless effort for improvement involving everyone in the organization (Malik and Ye Zhuang, 2006).

Many tools and techniques are developed to support these processes of incremental innovation. The difficulty is the consistent application of Continuous Improvement philosophy and tools and techniques. As an organization wide process, Continuous Improvement requires the efforts of all employees at every level. Radharamanan (1996) apply *Kaizen* technique to a small sized custom-made furniture industry. The various

problems that have been identified through brainstorming process are absence of appropriate methodology to assure quality, less compatibility of the individual protection equipment, old machines, and disorganized workplace, inadequate and insufficient number of measuring instruments, lack of training, and insufficient illumination at certain places and poor quality of raw material.

Suggestions are also given to solve these problems. The main aim is to develop the product with higher quality, lower cost and higher productivity to meet customer requirements. Balakrishnan et al. (1996) analyze a sample of 46 firms that publicly disclosed adoption of JIT production. Using a matched pair sample of non-JIT firms, they found no significant differences in inventory utilization for the two samples prior to JIT adoption. JIT firms, however, show superior utilization of overall and working process inventories relative to their control firm counterparts after adopting JIT production. Nevertheless, they found that these benefits by and large do not translate into significant Return On Asset (ROA) changes.

Doolen et al. (2003) describe the variables that are used to measure the impact of *Kaizen* activities on human resource. These variables include attitude toward *Kaizen* events, skills gained from event participation, understanding the need for *Kaizen*, impact of these events on employee, impact of these events on the work area, and the overall impression of the relative successfulness of these events. Granja et al. (2005) study the target and *Kaizen* costing concept in a construction company. The aim is to develop the framework taking together these two matching approaches, which provides a basis for a total cost

management system. The authors explain that the continuing series of *Kaizen* activities are needed to achieve product performance and reduce the cost. Combining target and *Kaizen* costing is a powerful approach for the construction company by assuring value for the customer at a low but profitable price. Malik et al. (2007) conducted a survey by a comparative analysis between two Asian developing countries, China and Pakistan, by investigating how they are deploying CI practices. The questionnaire consists of eighteen selected blocks of questions related to organization and its operation of CI, supporting tools used in the improvement activities, effects of improvement activities and company background and its characteristics. The result shows that the industries in both of the countries are deploying CI methodologies, but with different proportions.

2.4 *Kaizen* Sustainability

Because there is limited research on *Kaizen* event sustainability, this section reviews publications that discuss sustainability with respect to different process and continuous improvement methods. To address the sustainability of continuous improvement, Kaye and Anderson (1999) reviewed relevant literature and conducted semi-structured interviews. Their research resulted in a model that highlights the ten essential criteria of continuous improvement. Upton (1996) claimed that sustainability, continuous improvement over time, depends upon the underlying view of how improvement is achieved implicit in the actions of both managers and operators. Upton's continuous improvement initiatives model focuses on accelerating performance improvement, maintaining consistent long-term objectives, and choosing periodic projects based on organizational ability. These focus areas appear to provide direct improvement in the chosen direction and provide a platform for future gains. More recently, Readman and

Bessant (2007) assessed the results of the United Kingdom's (UK) Continuous Improvement Survey that was administered to 1000 UK firms. A part of the survey inquired about enabling improvement activities that served to encourage or reinforce the continuous improvement behaviors and routines. The most frequently reported enabling activities that assisted in the facilitation of continuous improvement were identified. Anand et al. (2009) identified infrastructure decision areas that are important for continuous improvement initiatives through the creation of a framework of continuous improvement as a dynamic capability when it includes a comprehensive organizational context.

To address the sustainability of various process improvement activities, Dale, Boaden, Wilcox, and McQuater (1997) identified key TQM sustainability issues through qualitative research and reference to relevant theoretical literature. Keating (1999) worked with research partners to address general process improvement program sustainability. System dynamics modeling analysis explained both internal dynamics and external interactions that appear to influence the sustainability of process improvement activities. Oxtoby et al. (2002) also address general process improvement program sustainability and used qualitative research methods to identify 15 key factors that determine an enterprise's change capability. Pillet and Maire (2008) surveyed 40 organizations to examine their performance across different types of improvement activities (e.g., 5S, ISO9000, etc.) and to understand the factors that they viewed as most important for sustainability. Across multiple process improvement activities, organizations sustained, on average, 40 percent of improvements, which further illustrates the difficulty that organizations have in sustaining improvements. Based on the

survey results, the authors created a model of process improvement sustainability that was based on three axes: organic state (the state towards which the organization will trend with no effort and absence of constraints), return on effort (reinforcing activities to encourage desired improvement activities), and facilitation (developing skills, group synergy, and simplified processes to support the desired improvement activities) (Pillet & Maire, 2008).

Many of these studies emphasize the following characteristics or activities in order to sustain improvement outcomes over time: communication within the work area and across various levels of the organization (top-down, bottom-up, and lateral communication), work area employee focus and commitment, improvement activity characteristics (project scope, goals, and improvement team dynamics), improvement culture, learning (education and training), management, measurement, and organizational structure and policies. Less commonly-noted sustainability characteristics are the impact of the external environment, external stakeholders, and team characteristics.

2.5 *Kaizen* and Manufacturing Operational Performance

A number of studies done have focused on Japanese manufacturing techniques have all illustrated the importance of *kaizen* in improvement of organizational performance (Liker, 2004; Ohno, 1988; Womack & Jones, 1990; Womack, 1996). Manufacturing Operational performance management is characterized by four key distinct performance dimensions which include; cost/productivity, time/speed, operations flexibility and quality. Others include creativity, innovation and customer satisfaction (De Toni & Tonchia, 2001). These four distinct classes of performance dimension coincide with the four basic components of cost, quality, speed and flexibility by which the manufacturing

strategy of a firm is generally expressed (Ward et al., 1995). These manufacturing performance dimensions determine the market competition focused on “price”, “product” and “place” (Corbett & van Wassenhove, 1993). *Kaizen* events attempt to impact business performance as well as human resource outcomes. Reported business performance improvements resulting from *kaizen* events appear to vary from moderate improvement (25-50 per cent), to significant improvement (75-100 per cent) to orders of magnitude improvement (greater than 100 per cent) (Cuscela, 1998; Sheridan, 1997). *Kaizen* events that generate short term performance may provide impetus that the organizational change literature purports is necessary for creating employee commitment to a given performance strategy (Keating et al., 1999; Kotter, 1995).

Some of the purported human resource outcomes of *kaizen* event are increased employee knowledge of the need for improvement in the organization (Butterworth, 2001; Tanner and Roncarti, 1994), increased employee knowledge of the principles, tools, techniques of continuous improvement, development of problem solving skills (McNichols et al., 1999), promotes teamwork in an organization, proficiency in lean manufacturing tools (Mika, 2002), positive influence in employee attitudes, anecdotal reports indicate increased levels of employee enthusiasm (David, 2000; Heard, 1997; Kumar & Harms, 2004; Rusiniak, 1996; Wittenberg, 1994), increased employee liking for their daily work (Minton, 1998). Anecdotal reports also suggest that employees appear to like *kaizen* events (Hasek, 2000), to find them fun (Bicheno, 2001), and to enjoy providing input to the improvement process (Kleinsasser, 2003). Doolen et al. (2008) further suggests that *kaizen* events are positively related to human resource outcomes such as sustained

performance or employee enthusiasm as well as contribute to achievement of a firm's business objectives. Such outcomes are purported to create an organizational culture focused on longer –term continuous improvement (Laraia , 1999;Melnyk et al., 1998; Sheridan, 1997).

It has been found that companies that employ TPS lean based production techniques such as 5-Why's analysis have benefitted among others in reduced lead times, just-in-time management, decreased costs, leveled production, continuous flow production, increased job satisfaction for employees, higher productivity lower inventories and higher quality levels (Kasul and Motwani,1997). Murugaiyaiah. (2010) found out that 5-why's analysis can be used in elimination of defects and wastes and the concept can be further extended to other manufacturing aspects such as improvement of overall equipment efficiency, breakdowns, time loss and customer complaints. He further showed that sound understanding of the manufacturing operations and extensive explorations of all possible solutions reduces non-value-adding activities or waste using the 5-why's analysis. In addition, it was also evident that inexpensive or zero cost solutions could be implemented to eliminate waste or defects. Elimination of waste in manufacturing firms through adoption of lean strategies such as *kaizen* can result in a 50 percent reduction in human effort, manufacturing space, tool investment and product development time and a 200-500percent improvement in quality (Zayko et al, 1997). Huson and Nanda (1995) found that after JIT adoption, firms reduced the labor content in facilities, increased inventory turnover, and enhanced earnings.

In Bangladesh, *kaizen* was piloted for the jute sector in “The Study on Potential Sub-sector Growth for Export Diversification.” After six months, four model companies achieved an average of 11% production growth in their spinning sections and machine stoppage reduced by 45.7%. In their weaving sections, the result was a 13.4% increase in production and 23.5% reduction in stoppage (JICA & Unico International Corporation, 2009). The findings of a study done in Tunisia on the effect of *kaizen* in some selected manufacturing firms found that, the number of companies that were able to achieve numerically expressible quality/productivity improvement using existing machinery and equipment was 9 out of 14 companies (64%) in the electrical and electronic sector, and 4 out of 13 (31%) in the food processing sector. For example, 8 companies achieved at least 20% higher productivity, 3 of which raised productivity by at least 50%; another company cut its nonconformity rate from around 20% to 0%, while another company reduced die replacement times from 110 minutes to 70 minutes (Kikuchi, 2008).

In Kenya, reports indicated that *kaizen* interventions have often resulted in 50-70% reductions in through-put time, 50-100% increases in productivity, 20-40% savings in manufacturing costs, 40-60% reductions in quality errors, and 50% releases of space, as well as significant improvements in team spirit and morale (Kenya Association of Manufacturers, 2012). In general, *Kaizen* provides the channel through which employees contribute to the development of their company.

2.6 *Kaizen* sustainability challenges

Many studies note that, in both Japan and abroad, especially in the cases of American and European companies, leadership is the single most important factor for successful

implementation and sustainability of *kaizen* (Imai, 1986; Kaplinsky, 1995). This implies that it is possible to apply *kaizen* in countries with different socio-cultural contexts but that application must be conducted under proper leadership and with adjustments that reflect the uniqueness of the targeted society. Shah and Ward (2003) argues that larger firms enjoy larger financial and human resources as well as economies of scale hence have better conditions for implementation and sustainability of new techniques in their firms as compared to small or medium sized firms.

Aoki (2008) found out that lack of organizational capabilities that facilitate an incremental organization-wide innovation greatly hindered implementation and sustainability of *kaizen* in Chinese firms. These capabilities include capabilities that facilitate cross-functional communication, that which encourages worker's self-initiative and those that discipline workers (shop- floor based) so that they conform to *kaizen* standards. Researchers who recognize the effectiveness of Japanese work practices state that Japanese companies have developed capabilities that make their workers or work teams learn and improve their work processes independently (Kenney & Florida, 1993; Koike,1994). On-the-job training (OJT) plays a critical role in creating such capabilities Employees in Japanese companies experience various kinds of jobs through the OJT, which helps to reduce social distance between different categories of the workforce (Lam, 2000). In this perspective, it is organizational capabilities which facilitate communication among diverse people that allow Japanese companies implement incremental organization-wide innovation successfully. This affirms the view that

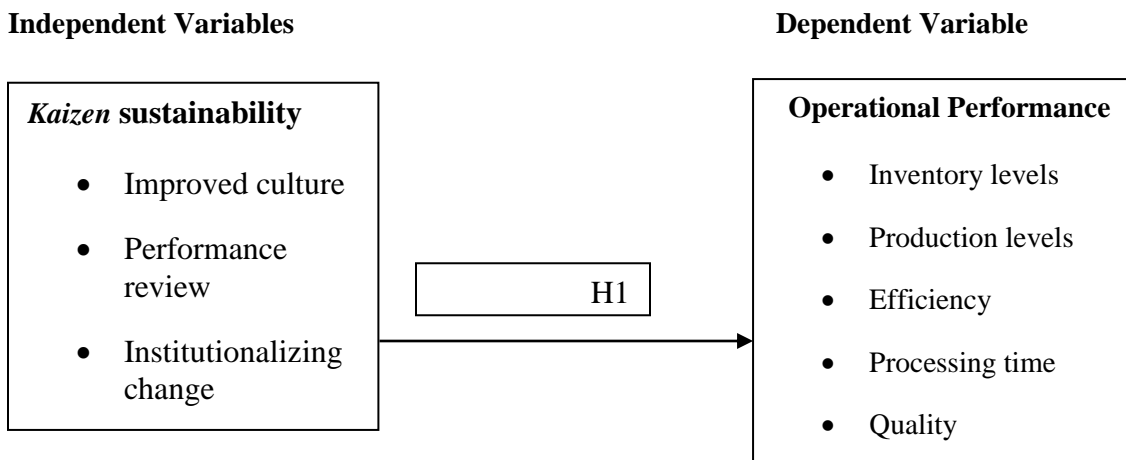
successful implementation and sustainability of *kaizen* is largely influenced by an organization's ability to develop these capabilities (Aoki, 2008).

2.7 Conceptual Framework

A conceptual framework is a tool researchers use to guide their inquiry. It is a set of ideas used to structure the research, a sort of a map (Kothari, 2012). It is the researcher's own position on the problem and gives direction to the study. It may be an adaptation of a model used in a previous study, with modifications to suite the inquiry.

The conceptual framework for *kaizen* sustainability will depict the relationship between the parameters of the dependent variable and independent variables.

Figure 2.1: Conceptual Framework



Source: (Researcher, 2015)

Conceptual Hypothesis:

This study aims at testing one hypothesis where;

H1: There is a relationship between *Kaizen* sustainability and operational performance.

Operational performance will be measured by inventory levels, production levels, efficiency, processing time and quality. Inventory and Production levels will help assess whether there is right stock levels to meet the demands, Efficiency will assess the speed with which production is done, processing time may refer to the time taken to produce and Quality is a measure of excellence or state of being free from defects.

Kaizen sustainability will be measured by the improved culture, performance review and institutional change of the organization. Where; improved culture refers to better ways of doing things, performance review refers to will assess the progress of the business operations, Institutionalizing change refers to an established different way of doing things.

2.8 Summary of Literature Review

The review of literature shows that the implementation and sustainability of *kaizen* practices have an impact on operational performance in manufacturing firms. However, successful sustainability of these practices is also influenced by the economic and socio-cultural environments that the respective firms operate in. These economic and socio-cultural factors pose challenges to successful sustainability of *kaizen* practices in firms and consequently the influence on operational performance. In this perspective, this research paper attempts to answer the research question, “what is the relationship

between *kaizen* sustainability and operational performance in Kenyan manufacturing firms in Mombasa County.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the steps and approaches that were used in executing the research study. This chapter comprised of the research design, population under study, data collection instruments and the data analysis methods that were employed in the study.

3.2 Research Design

According to Kerlinger (1986), research design is the plan and structure of investigation so conceived as to obtain answers to research questions or test the research hypotheses. The plan represented the overall strategy used in collecting and analyzing data in order to answer the research questions. Cooper and Schindler (2003) summarized the essentials of research design as an activity and time based plan; always based on the research question; guided the selection of sources and types of information; a framework for specifying the relationship among the study variables and outlines the procedures for every research activity.

A cross sectional survey was conducted among operations managers in Kenyan manufacturing firms in Mombasa county that had implemented and adopted the *kaizen* methodology to evaluate the relationships between *kaizen* sustainability and operations performance. The appropriateness of this study design was advised from the study's aim of establishing the relationships between sustainability of *kaizen* and operational performance in Kenyan manufacturing firms in Mombasa County at a particular point in time.

3.3 Population of the study

In this study, the unit of analysis was the firm, and the target population was the manufacturing firms in Kenya that have implemented the *kaizen* methodology in their operations. Kaizen Institute, an international private consultant group that specialized in the *kaizen* methodology, listed twenty four manufacturing companies in Kenya as their clients and who have implemented *kaizen* (Kaizen institute, 2014). These firms formed the target population of this study. The sampling design used for this study is a census. The appropriateness of this choice of this design necessitated by the relatively small number of known manufacturing firms that have adopted *kaizen* in Kenya.

3.4 Data collection methods and instruments

Questionnaires which are self-administered were delivered through email or in person for data collection. The questionnaire comprised of a five-point Likert scale that collected the respondents' responses to both operational performance elements as well as for *kaizen* practices quantitatively through closed-ended questions. The study targeted operations managers, who had considerable experience with *kaizen* practices and techniques in operations functions of the manufacturing firms. This was aimed at ensuring accuracy and authenticity of the information provided for the study.

The questionnaire was divided into four sections. Section A consisted of questions that provided information on the overall particulars of individual interviewed and the sectors of operation. Section B consisted of questions that established the extent to which *Kaizen* Improvement outcome was sustained. Section C and D comprised of questions that

provided information on the level of operational performance and challenges hindering the sustainability of *kaizen* respectively.

3.5 Data analysis

Descriptive statistics was used for data analysis with Statistical Practices and Social Services (SPSS) being used to aid the analysis. The use of descriptive statistics in data analysis was due to its appropriateness in finding out the basic features of the study data and hence aid in realization of the research objectives. For both objectives there was need to measure the “influence” of a variable on another that was, the influence of *Kaizen* sustainability on operational performance and that required the use of a regression parameter.

Regression analysis was done separately for the individual operational performance measures (dependent variables) against the set of *kaizen* techniques (independent variables). In addition, a regression model was used to evaluate the overall relationship between *kaizen* sustainability and operational performance.

Regression Model

The regression equation was ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \epsilon$):

Where:

β_0 = Constants

Y = *Kaizen* sustainability outcome

X_1 = Operational Performance

X_2 = *Kaizen* sustainability challenges

ϵ = std error

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The analysis of the data collected from the respondents and discussions of the research findings on the relationship between *kaizen* sustainability and operations performance outcome in Kenyan manufacturing firms are presented in this chapter. All completed questionnaires were edited for accuracy, uniformity, consistency and completeness.

4.2 Response Rate

Out of 24 respondents issued with questionnaires; 17 of them responded while 7 showed no response as shown in table 4.1. This means that response rate of (70.83%) was achieved from the total target of population of 24. The summaries of data findings and interpretations have been presented by use of mean, percentages, frequencies, pie charts, variances, standard deviation and tables.

Table 4.1: Response rate

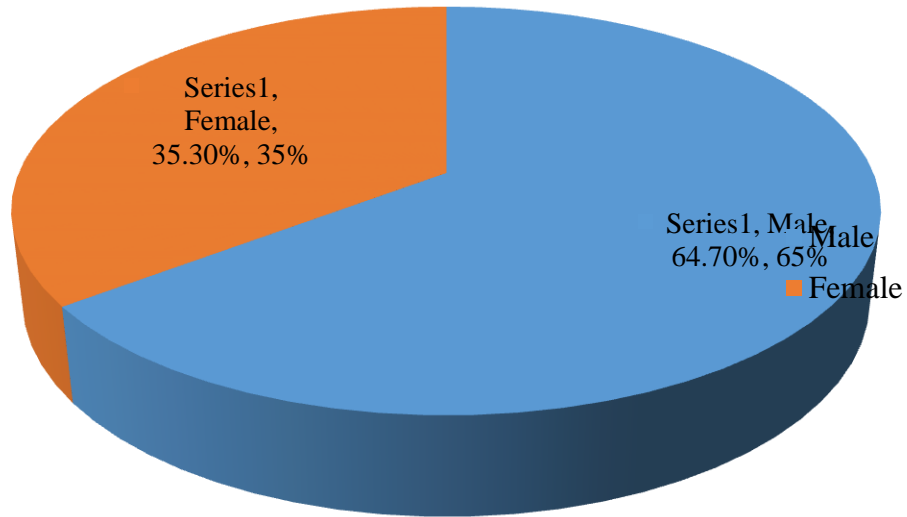
Respondents	Frequency	Percentage (%)
Questionnaires issued	24	100.00
Questionnaires returned	17	70.83
Questionnaires not returned	7	29.17

Source: Research data, (2015)

4.3: Demographic Characteristics

4.3.1: Gender of the Respondents

Figure 4.1 Gender of respondents

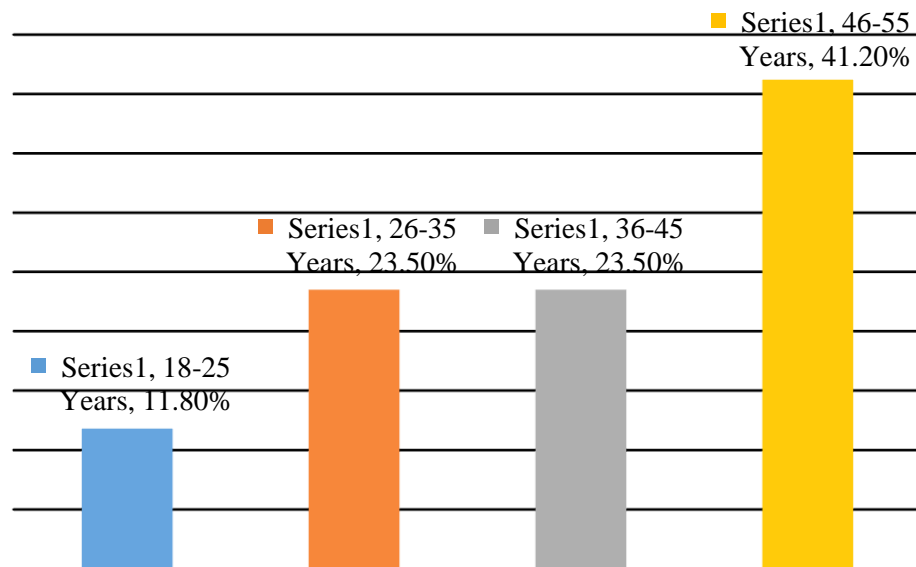


Source: Research data, (2015)

Gender of the respondents were sought, the study found that 64.70% of the respondents were male while 35.30% of the respondents were female as shown in Figure 4.1. This shows that majority of employees in operations are male.

4.3.2 Age of the Respondents

Figure 4.2 Age of respondents

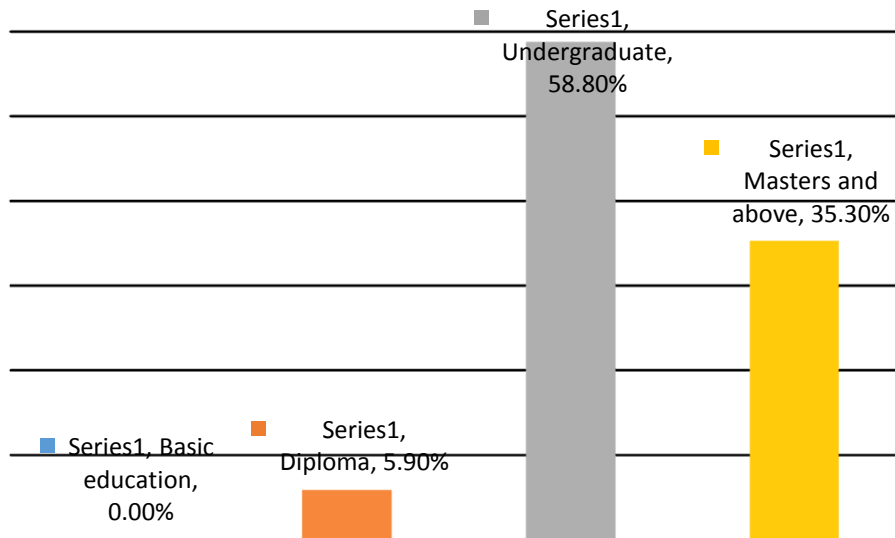


Source: Research data, (2015)

The respondents were asked to indicate their age bracket and the results were as follows: Respondents representing 11.80% indicated 18-25 years age bracket, 23.50% of the respondents indicated 26-35 years age bracket, and 23.50% indicated 36-45 years, while 41.20% indicated between 46-55 years. This shows that age bracket 26-55 years were the majority, an age bracket which comprised the middle-level people who are adult, mature and can be consistent in whatever responsibility assigned and ensure accuracy and authenticity of the information provided for the study.

4.3.3: Education of the respondents

Figure 4.3 Age of respondents

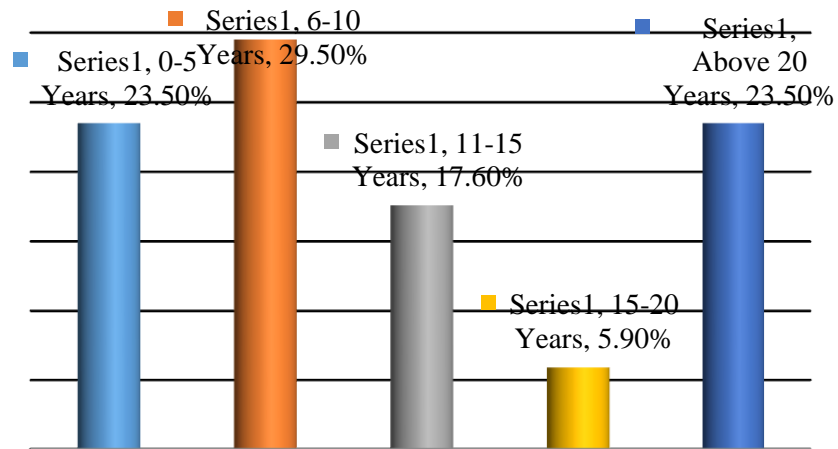


Source: Research data, (2015)

When respondents were asked to state their highest level of education, it was established that 35.30% had masters and above, 58.80% had undergraduate degree while 5.90% had diploma certificate. The objective of this study was to find out the relationship between Kaizen sustainability and operational performance outcome, it was therefore important that the management team such are operation managers be involved. It is expected that for one to be able to provide efficient and effective management in an organization, education is very vital. This is why majority (94.10%) of the management staff had attained university education. This is shown in Figure 4.3.

4.3.4: Duration worked with organization

Figure 4.4 Duration worked with organization



Source: Research data, (2015)

Regarding how long these managers have stayed in the organization they work for, it was established that majority (29.50%) said that they have worked for 6-10 years, 23.50% said that they have worked for more 0-5 years, 17.60% said that they have worked for 11-15 years, 5.90% said that they have worked for 15-20 years while 23.50% have worked for above 20 years. Further scrutiny of these findings indicates that majority (76.50%) of the managers had worked for six years and above in these manufacturing firms. These therefore, implied that most managers had worked in the firms for a long period and therefore were aware of the Kaizen strategic sustainability activities and their challenges. This findings is summarized in Figure 4.4.

4.3.5: Sectoral aspect of respondent companies

Table 4.2: Sectors

Sector	Percent
Paper and board	5.9
Chemical and Allied	5.9
Energy, Electrical and Electronics	5.9
Plastics and Rubber	11.8
Food and Beverages	17.6
Metal and Allied	29.4
Others	23.5
Total	100.0

Source: Research data, (2015)

Regarding sectoral representation of the respondents, the results in Table 4.2 show that 5.9% each of the respondents are from paper and board, chemical and allied and energy, electrical and electronics, 11.8% are from plastic and rubber, 17.6% are from food and beverages, 29.4% are from metal and allied while 23.5% were others.

4.4 Kaizen Sustainability

Table 4.2 Kaizen Sustainability

Statement	Mean	Std.dev
1. Communication within the work area and across various levels of the organization (top-down, bottom-up, and lateral communication has enabled your organization sustain Kaizen improvement outcome.	4.12	.928
2. The characteristics of management team in your organization has enabled your organization sustain Kaizen improvement outcome.	4.12	.928
3. Organizational structure and policies has enabled your organization sustain Kaizen improvement outcome.	4.47	.624
4. The improvement of culture has enabled your organization sustain Kaizen improvement outcome.	4.47	.624
5. The employee's focus and commitment to the work area has enabled your organization sustain Kaizen improvement outcome.	4.41	.712
6. The improvement of activity characteristics (e.g., project scope, goals, and improvement team dynamics) has enabled your organization sustain Kaizen improvement outcome.	4.29	.772
7. The external environment impact has influenced the sustainability of Kaizen improvement outcome in your organization.	4.29	.920

8. Impact from external stakeholders has some influence on the sustainability of Kaizen improvement outcome in your organization.	4.12	.928
9. Education and training has influenced the sustainability of Kaizen improvement outcome in your organization.	4.47	.624

Source: Research data, (2015)

One of the objective of this study was to establish *kaizen* improvement outcome sustainability in these manufacturing firms and was measured by looking at whether the communication within the work area and across various levels of the organization (top-down, bottom-up, and lateral communication has enabled the organization sustain Kaizen improvement outcome, the results indicated that 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 17.6% to a moderate extent, 35.3% to a large extent while 41.2% to a very large extent, whether the characteristics of management team in the organization has enabled the organization sustain Kaizen improvement outcome 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 17.6% to a moderate extent, 35.3% to a large extent while 41.2% to a very large extent, whether organizational structure and policies has enabled your organization sustain Kaizen improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 5.9% to a moderate extent, 41.2% to a large extent while 52.9% to a very large extent, whether the improvement of culture has enabled the organization sustain Kaizen improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 5.9% to a moderate extent, 41.2% to a large extent while 52.9% to a very large extent, whether the employee's focus and commitment to the work area has enabled the organization sustain Kaizen improvement outcome 0.0% of the respondents

said to a very small extent, 17.6% to a small extent, 35.3% to a moderate extent, 47.1% to a large extent while 4.29% to a very large extent, whether the improvement of activity characteristics (e.g., project scope, goals, and improvement team dynamics) has enabled the organization sustain Kaizen improvement outcome 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 29.4% to a moderate extent, 52.9% to a large extent while 4.29% to a very large extent, whether the external environment impact has influenced the sustainability of Kaizen improvement outcome in the organization 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 58.8% to a moderate extent, 35.3% to a large extent while 4.29% to a very large extent, whether impact from external stakeholders has some influence on the sustainability of Kaizen improvement outcome in the organization, 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 5.9% to a moderate extent, 58.8% to a large extent while 35.3% to a very large extent and whether education and training has influenced the sustainability of Kaizen improvement outcome in organization, 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 5.9% to a moderate extent, 41.2% to a large extent while 52.9% to a very large extent.

4.5: Operational Performance

Table 4.3: Operational Performance

Statement	Mean	Std. deviation
Statements(Operation performance)		
1.Continuous flow of production has been improved by <i>kaizen sustained</i> improvement outcome	3.88	.928
2.Reduction in lead time has been improved by <i>kaizen sustained</i> improvement outcome	4.00	.866
3.Overall manufacturing flexibility improvements is as a result of <i>kaizen sustained</i> improvement outcome	4.06	.748
4.Improvement in product quality has been influenced by <i>kaizen sustained</i> improvement outcome	4.06	.659
5.Lower inventory levels is due to <i>kaizen sustained</i> improvement outcome	3.82	.728
6.Improved equipment efficiency is as a result of <i>kaizen sustained</i> improvement outcome	4.18	.809
7.Reduction in processing time has been influenced by <i>kaizen sustained</i> improvement outcome	4.18	.883
8.Improvement in overall productivity has been due to <i>kaizen sustained</i> improvement outcome	4.24	.752
9.Enhanced competitiveness is as a result of <i>kaizen sustained</i> improvement outcome	4.29	.686
10.Improved maintenance practices is due to <i>kaizen sustained</i> improvement outcome	4.47	.624

11.Increased Environmental Sustainability has been influenced by <i>kaizen sustained</i> improvement outcome	4.12	.928
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Source: Research data, (2015)

The other objective of this study was to determine the extent to which sustainability of *kaizen improvement outcomes* has contributed to operations Performance in Kenyan manufacturing firms and was measured by looking at whether the continuous flow of production has been improved by *kaizen sustained* improvement outcome and the results indicated that 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 29.4% to a moderate extent, 35.3% to a large extent while 29.4% to a very large extent, whether education in lead time has been improved by *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 17.6% to a moderate extent, 47.1% to a large extent while 29.4% to a very large extent, whether overall manufacturing flexibility improvements is as a result of *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 23.5% to a moderate extent, 47.1% to a large extent while 29.4% to a very large extent, whether improvement in product quality has been influenced by *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 17.6% to a moderate extent, 58.8% to a large extent while 23.5% to a very large extent, whether lower inventory levels is due to *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 35.3% to a moderate extent, 47.1% to a large extent while 17.6% to a very large extent, whether improved equipment efficiency is as a result of *kaizen sustained*

improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 23.5% to a moderate extent, 35.3% to a large extent while 45.2% to a very large extent, whether reduction in processing time has been influenced by *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 11.8% to a moderate extent, 41.2% to a large extent while 41.2% to a very large extent, whether improvement in overall productivity has been due to *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 17.6% to a moderate extent, 41.2% to a large extent while 41.2% to a very large extent, whether enhanced competitiveness is as a result of *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 11.8% to a moderate extent, 47.1% to a large extent while 41.2% to a very large extent, whether improved maintenance practices is due to *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 5.9% to a moderate extent, 41.2% to a large extent while 52.9% to a very large extent, whether increased Environmental Sustainability has been influenced by *kaizen sustained* improvement outcome 0.0% of the respondents said to a very small extent, 5.9% to a small extent, 17.6% to a moderate extent, 35.3% to a large extent while 41.2% to a very large extent.

4.6 Kaizen sustainability and operational performance

Table 4.4 : Regression Model Summary

Mo	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R ² Change	F Change	df1	df2	Sig. F Change
1	0.937 (a)	0.879	0.870	0.211	0.870	108.508	1	15	0.000

Predictors: (Constant) Aggregate mean score of Kaizen

Source: Research data, (2015)

Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.634	.242		6.759	.000
Kaizen	.597	.057	.937	10.417	.000

Dependent: Aggregate mean score of Organizational Performance

Lever of significance, $\alpha = 0.05$

Source: Research data, (2015)

Table 4.4 shows the regression analysis done with the help of data from seventeen respondent companies that are practicing *kaizen* in their organizations. The results indicated by the values of R implies that there is a positive relationship between kaizen sustainability practices and all the operational performance measures. The results also show a strong correlation between the dependent and the independent variables as indicated by the values of $R^2 = 0.879$. Regarding the sensitivity of the beta (β), the results show that Kaizen sustainability had a strong relationship with operational performance in that for one unit increase of independent variable operational performance improves by 59.70 percent, ($\beta = 0.597$, $p=0.000$). Arising from the results the following simple regression equation that was used to estimate operational performance of manufacturing companies in Kenya; Mombasa county given level of value addition strategies can be stated as follows;

$$OP = 1.634 + 0.597KZ + \varepsilon ,$$

Where:

OP= is the Operational Performance

1.634 is the constant intercept of the term ($\alpha = 1.634$), or the slope coefficient

0.597 is the beta or the slope coefficient, (estimates of the expected increase in operational performance corresponding to an increase in utilization of Kaizen practise).

KZ is Kaizen

ϵ is the error term- random variation due to other unmeasured factors.

4.7: Challenges to Sustainability of *Kaizen*

Table 4.4: Challenges to Sustainability

Statement	Mean	Std.dev
1. Employees' commitment and innovativeness is one of the challenges facing Kaizen sustainability	4.12	.697
2. Lack of participation of workers affects the sustainability of Kaizen	4.24	.437
3. Organization structure affects sustainability of Kaizen	4.24	.664
4. Kaizen sustainability is faced by lack of management support or leadership	4.35	.702
5. Financial constraints is a major challenge facing Kaizen sustainability	4.12	.857
6. Attitudes and misconceptions about Kaizen is one of challenges facing Kaizen Sustainability	4.29	.772
7. Ineffective training affects Kaizen sustainability	4.35	.702
8. Ineffective performance measures of Kaizen is a factor affecting Kaizen success	4.29	.686
9. Lack of proper communication systems is one of challenges faced by Kaizen implementers	4.35	.702

Source: Research data, (2015)

Finally, the other objective of this study was to establish the challenges faced by Kenyan manufacturing firms in sustaining *kaizen*, in the context of the economic, social and cultural environment that they operate in and was measured by looking at whether

employees' commitment and innovativeness is one of the challenges facing Kaizen sustainability, 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 17.6% to a moderate extent, 52.9% to a large extent while 29.4% to a very large extent, whether lack of participation of workers affects the sustainability of Kaizen 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 0.0% to a moderate extent, 76.5% to a large extent while 23.5% to a very large extent, whether organization structure affects sustainability of Kaizen Kaizen sustainability is faced by lack of management support or leadership 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 11.8% to a moderate extent, 52.9% to a large extent while 35.3% to a very large extent, whether financial constraints is a major challenge facing Kaizen sustainability 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 11.8% to a moderate extent, 41.2% to a large extent while 47.1% to a very large extent, whether attitudes and misconceptions about Kaizen is one of challenges facing Kaizen Sustainability 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 29.4% to a moderate extent, 29.4% to a large extent while 41.2% to a very large extent, whether ineffective training affects Kaizen sustainability 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 17.6% to a moderate extent, 35.3% to a large extent while 47.1% to a very large extent, whether ineffective performance measures of Kaizen is a factor affecting Kaizen success 0.0% of the respondents said to a very small extent, 0.0% to a small extent, 11.8% to a moderate extent, 41.2% to a large extent while 47.1% to a very large extent, whether lack of proper communication systems is one of challenges faced by Kaizen implementers 0.0% of the respondents said to a very small

extent, 0.0% to a small extent, 11.8% to a moderate extent, 41.2% to a large extent while 47.1% to a very large extent.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented the discussion of key data findings, conclusion drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn were focused on addressing the purpose of this study which was to establish the relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms. From the analysis and data collected, the following discussions, conclusions and recommendations were made.

5.2 Summary of findings

The study deduced that there exists a relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms. The aspects of *Kaizen* improvement outcome sustainability that indicated that there exist a relationship include aspect of whether the organizational structure and policies, improvement of culture and employee's focus, education and training and commitment to the work area has enabled the manufacturing firms in Mombasa county, Kenya sustain *kaizen* to a large extent with a mean of 4.47 for the first two aspects and 4.41 for the later. Communication within the work area and across various levels, characteristics of management team and impact from external stakeholders has some influence on the operational performance with a mean of 4.12.

On operational performance as to what extent sustainability of *kaizen* improvement outcomes has contributed to operational Performance in Kenyan manufacturing firms., the study found that improved maintenance practices has been realized as a result of *kaizen* sustained outcome to a large extent with a mean of 4.47.Enhanced competitiveness

recorded a mean of 4.29; has also been achieved as a result of sustained *kaizen* events thereby impacting on the operational performance of the manufacturing firms. Study found out that there is improvement in overall productivity due to sustained *kaizen* improvement outcome indicating a mean of 4.24. Equipment efficiency has also improved and there is reduction in processing time both with mean of 4.18. Overall manufacturing flexibility improvements, improvement in product quality has been realized to a moderate extent with a mean of 4.06. Continuous flow of production recorded a weak relation with *kaizen* sustained improvement outcome with a mean of 3.88.

The study established 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. The main challenges affecting *kaizen* sustainability include lack of management support and ineffective training both recording a mean of 4.35. Other challenges posed were ineffective performance measures, attitude and misconceptions about *kaizen*. Lack of participation of workers and organizational structure also pose challenges in sustaining *kaizen* events. Employees' commitment and financial constraints posed the least challenge.

5.3 Conclusion

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 (top-down, bottom-up, and lateral communication),

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. This is in agreement with the preliminary results of Wiljeana J. Glover and Eileen M. Van Aken (200) on the relationship between *Kaizen* event follow-up mechanisms and goal sustainability. The results showed that there is a strong relationship between *kaizen* events follow-up mechanism and goal sustainability

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 of the Study

From the study findings, it was clear that there exists a relationship between *kaizen* sustainability and operational performance in Kenyan manufacturing firms. The study therefore recommends that in order to ensure that Kaizen improvement outcome remain sustainable, management should procure employees that are competent with right qualifications to manage *Kaizen* practices. The study further recommends that since to some extent sustainability of *kaizen* improvement outcomes has contributed to operational Performance in Kenyan manufacturing firms, the management should focus more on those aspects of sustainability of *kaizen* improvement outcomes. The study also recommends that since there are some challenges faced by Kenyan manufacturing firms in sustaining *kaizen*, 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.

5.5 Limitation of the Study

This study had several limitations. One of the limitations of the study was the low response rate which can be attributed to the difficulties encountered in getting companies to respond to the questionnaires which were sent through email. The target respondents were operational managers or their equivalents and this cadre of people take time to respond to questionnaires due to their busy work schedules.

The second limitation of the study is that it purely depended on the questionnaire responses for data collection. It was thus not possible to get in-depth information about *kaizen* in these organizations, but would have been possible if other methods were used

such as interviews and review of texts. To this effect the results are only true to the extent of information provided by the respondents.

5.6 Suggestions for further Research

The study recommends that further research should be done on the relationship between *kaizen* sustainability and operational performance in Kenyan; in other sectors so as to allow for generalization and benchmarking. Further studies may also be done on the relationship between *kaizen* sustainability and operational performance in manufacturing firms in other East African Countries.

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APPENDICES

Appendix I - Questionnaire

Data Collection Instrument

This is a research aimed at understanding the *Relationship between Kaizen Sustainability and Operational Performance outcome in your organization*. Please note that the information that you will provide shall be treated with utmost confidentiality and are for academic purposes only. Your honest participation in this survey will be highly appreciated.

Part A. Respondent's Details (Profile)

1. Kindly indicate your gender (please tick appropriately).

Male

Female

2. Which one best describes your age?

18-25 years

26-35 years

36-45 years

46-55 years

Above 56 years

3. Kindly indicate the highest level of your education.

Basic Education

Diploma/Tertiary

Undergraduate

Masters & above

4. For how long have you worked for your current employer/Company?

0 – 5 years

6 – 10 years

11 – 15 years

15 – 20 years ()

Above 20 years ()

5. For how long has your organization been in the business?

0 – 5 years ()

6 – 10 years ()

11 – 15 years ()

15 – 20 years ()

Above 20 years ()

6. Please tick the sector in which your firm belongs and the type of product you manufacture.

Sector	Tick	Type of products
Paper and Board		
Chemical and Allied		
Pharmaceutical and Medical Equipment		
Textile and Apparels		
Energy, Electrical and Electronics		
Plastics and Rubber		
Food and Beverages		
Metal and Allied		
Mining and Construction		
Motor vehicle and Accessories		
Others		

PART B: kaizen sustainability

1. To what extent (on a scale of 1-5) do you agree with the following characteristics or activities in order to sustain improvement outcomes over time in your company? Use the scale given below to appropriately answer the questions that follow by ticking (√) accordingly. To a very small extent =1, To a small extent =2 , To a moderate extent =3, To a large extent =4 and To a very large extent =5

Statements (<i>kaizen sustainability</i>)	1	2	3	4	5
Communication within the work area and across various levels of the organization (top-down, bottom-up, and lateral communication has enabled your organization sustain Kaizen improvement outcome.					
The characteristics of management team in your organization has enabled your organization sustain Kaizen improvement outcome.					
Organizational structure and policies has enabled your organization sustain Kaizen improvement outcome.					
The improvement of culture has enabled your organization sustain Kaizen improvement outcome.					
The employee's focus and commitment to the work area has enabled your organization sustain Kaizen improvement outcome					
The improvement of activity characteristics (e.g., project scope, goals, and improvement team dynamics) has enabled your organization sustain Kaizen improvement outcome.					
The external environment impact has influenced the sustainability of Kaizen improvement outcome in your organization.					
Impact from external stakeholders has some influence on the sustainability of Kaizen improvement outcome in your organization.					
Education and training has influenced the sustainability of Kaizen improvement outcome in your organization.					

PART C: Operational performance

2. To what extent (on a scale of 1-5) have the following operational performance dimensions been improved by *kaizen sustained* improvement outcome? Use the scale given below to appropriately answer the questions that follow by ticking (√) accordingly. To a very small extent =1, To a small extent =2, To a moderate extent =3, To a large extent =4 and To a very large extent =5

Statements(Operational performance)	1	2	3	4	5
Continuous flow of production has been improved by <i>kaizen sustained</i> improvement outcome					
Reduction in lead time has been improved by <i>kaizen sustained</i> improvement outcome					
Overall manufacturing flexibility improvements is as a result of <i>kaizen sustained</i> improvement outcome					
Improvement in product quality has been influenced by <i>kaizen sustained</i> improvement outcome					
Lower inventory levels is due to <i>kaizen sustained</i> improvement outcome					
Improved equipment efficiency is as a result of <i>kaizen sustained</i> improvement outcome					
Reduction in processing time has been influenced by <i>kaizen sustained</i> improvement outcome					
Improvement in overall productivity has been due to <i>kaizen sustained</i> improvement outcome					
Enhanced competitiveness is as a result of <i>kaizen sustained</i> improvement outcome					
Improved maintenance practices is due to <i>kaizen sustained</i> improvement outcome					
Increased Environmental Sustainability has been influenced by <i>kaizen sustained</i> improvement outcome					

PART D: Challenges to Sustainability of kaizen

On a scale of 1-5 to what extent have these factors contributed to the challenges of sustainability of *kaizen* in your view? Use the scale given below to appropriately answer the questions that follow by ticking (√) accordingly. To a very small extent =1, To a small extent =2 , To a moderate extent =3, To a large extent =4 and To a very large extent =5

Statements (Challenges to Sustainability of <i>kaizen</i>)	1	2	3	4	5
Employees' commitment and innovativeness is one of the challenges facing Kaizen sustainability					
Lack of participation of workers affects the sustainability of					
Organization structure affects sustainability of Kaizen					
Kaizen sustainability is faced by lack of management support or leadership					
Financial constraints is a major challenge facing Kaizen sustainability					
Attitudes and misconceptions about Kaizen is one of challenges facing Kaizen Sustainability					
Ineffective training affects Kaizen sustainability					
Ineffective performance measures of Kaizen is a factor affecting Kaizen success					
Lack of proper communication systems is one of challenges faced by Kaizen implementers					

Thank you....

Appendix II – List of Companies

Kenyan manufacturing firms that have implemented *Kaizen*

1. BascoProducts(Kenya) Limited
2. Bidco Oil Refineries Limited
3. Blowplast Limited
4. Booth Extrusions Limited
5. Comcraft Kenya Limited.
6. Cook ‘n’ Lite Limited
7. Chloride Exide Limited
8. Dodhia Packaging Limited
9. Eveready East Africa Limited
10. Finlays Kenya Limited
11. Haco Tiger brands Limited
12. Insteel Africa Limited
13. Kaluworks Limited
14. Mabati Rolling Mills Limited
15. Pardini Limited
16. Sanpac Africa Limited
17. ShumukAluminium Industries
18. Signode Packaging Systems Limited
19. Spin Knit Dairy Limited
20. Synresins Limited
21. Tetrapak KenyaLimited
22. Thermopak KenyaLimited
23. Unga Limited
24. Vita foam Limited

[Source: kaizen Institute]

Appendix III – Introduction Letter for Data Collection



UNIVERSITY OF NAIROBI MOMBASA CAMPUS

Telephone: 020-2059161
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsities
Our Ref: D61/76446/2012

P.O. Box 99560, 80107
Mombasa, Kenya

DATE: 22ND SEPTEMBER 2015

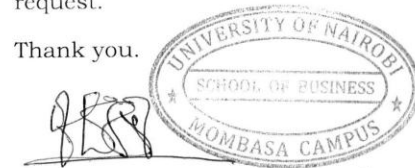
TO WHOM IT MAY CONCERN

The bearer of this letter, **Anot Benter Akoth** of Registration Number **D61/76446/2012** is a Master of Business Administration (MBA) student of the University of Nairobi, Mombasa Campus.

She is required to submit as part of her coursework assessment a research project report. We would like the student to do her project on ***Kaizen Sustainability and Operational Performance: A Case of Manufacturing Firms in Mombasa County, Kenya.*** We would, therefore, appreciate if you assist her by allowing her to collect data within your organization for the research.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organization on request.

Thank you.



Zephaniah Ogero Nyagwoka

Administrative Assistant, School of Business-Mombasa Campus

Appendix IV – Proposal Correction Certificate



UNIVERSITY OF NAIROBI SCHOOL OF BUSINESS

PROPOSAL CORRECTION FORM

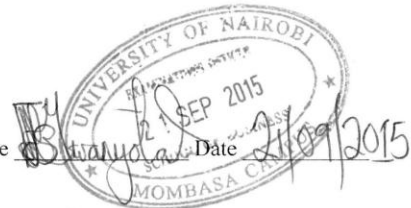
Student Name ANOT BENTER AKOTH
Registration Number D61/76446/2012
Department MANAGEMENT SCIENCE
Specialization OPERATIONS MANAGEMENT
Title of Project Proposal KAIZEN SUSTAINABILITY &
OPERATIONAL PERFORMANCE: A CASE OF
MANUFACTURING FIRMS IN MOMBASA COUNTY, KENYA

The student has done all the corrections as suggested during the Proposal Presentation and can now proceed to collect data.

Name of Supervisor

Mwanga Job

Signature



Date

12/09/2015