

**EFFECTS OF KAIZEN SYSTEM ON THE FINANCIAL PERFORMANCE OF
MANUFACTURING FIRMS IN KENYA**

**BY
STANLEY NG'ANG'A NGOTHI
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DECLARATION

Declaration by the Student

This research study is my original work and has not been presented to any other examination body. No part of this research should be reproduced without my consent or that of University of Nairobi

Stanley Ng'ang'a Ngothi

D63/72426/2011

Sign..... Date.....

Declaration by the Supervisor

This research has been submitted for examination with my approval as the University of Nairobi Supervisor

Prof. Josiah Aduda

Dean School of Business & Lecturer

Department of Finance and Accounting

School of Business, University of Nairobi

Sign..... Date.....

DEDICATION

I dedicate this project to my wife, Catherine and my two daughters Bernice and Angela. To my wife, a source of love, moral and guidance support and to my daughters, their little smiles from their hearts is a source of new energy in my life.

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LIST OF ABBREVIATIONS

FPMS	-	Financial Performance Measurement System
GDP	-	Gross Domestic Product
IFC	-	International Finance Corporation
JIT	-	Just-In-Time
KAM	-	Kenya Association of Manufacturers
MAS	-	Management Accounting Systems
OM	-	Operations Management
PCK	-	Productivity Centre of Kenya
PMS	-	Performance Measurement System
ROA	-	Return On Assets
ROS	-	Return On Sales
TOC	-	Theory of Constraints
TPM	-	Total Productive Maintenance
TQM	-	Total Quality Management

ABSTRACT

The study objective was to analyze the effects of kaizen system on the financial performance of manufacturing firms in Kenya. This research anticipates helping in addressing the existing knowledge gap in literature of effects of kaizen system on the financial performance of manufacturing firms. The study was guided by Theory of Lean Management, The Theory of Constraints and Production Theory. The study used descriptive survey design. The study targeted selected medium size and large companies using Kaizen System in Nairobi County while purposively sampling method was adopted. The financial statements of manufacturing companies that had adopted kaizen system in the year 2011 were used. There were Unga Limited, Everyday E.A limited and London Distillers Limited. All data was analyzed by use of Statistical Package for Social Science (SPSS 21).

The findings on the correlation analysis between company Profits and various indicators before introduction of Kaizen system found that Profits and return on sales as shown by correlation coefficient of 0.998, profits and return on investment was 0.964, profit margin on profits was 0.998. The analysis further found that after introduction of Kaizen system, Return on Assets and profits of 0.806, Profits and return on sales, 0.910, profits and return on investment 0.963, and profit margin on profits was 0.903. This indicated that, kaizen system had steady effect on organizational financial performance. The analysis found that in the short run, there was no statistically significant difference between performance of the company before introduction of Kaizen system and after introduction of kaizen system.

The study concluded that as much as the financial performance of manufacturing companies could not be easily noticed within a short run, the long run results are the most important when using the kaizen system. The study recommends that policy makers on financial performances of manufacturing companies and other companies should investigate the importance of kaizen system in private and public institutions to help the increased productivity and performance which is greatly lacking to most of the companies. The study recommends that the regulatory body mandated to oversee manufacturing companies should make regulations that promote kaizen system in manufacturing companies in Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background of Study

Manufacturing is the art of transformation of Raw Materials into either intermediate goods or final products through mechanized process, putting them in a box and shipping them to customers, thus creating wealth. Wealth is only created by making things, and countries that are to prosper need to be very good at creating wealth through making things (Maskell 2009). The manufacturing sector is often the darling of policy makers in less developed countries due to its viewed leading edge of modernization and skilled job creation as well as a fundamental source of various possible spill overs (Tybout, 2000).

Kenya's manufacturing sector expectation is no different. The expectations as contained in the Vision 2030 development plan, is to have a robust, diversified and competitive manufacturing sector capable of supporting the country's socio-economic development agenda. This is to be achieved 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 increase at a rate of 10% per annum as per the Medium Term Plan of Kenya Vision 2030. Currently it offers employment to 254,000 people, which represents 13% of total employment with an additional 1.4 million people employed in the informal side of the industry. The sector is mainly agro-based and characterized by relatively low value addition, employment and capacity utilization and export volumes partly due to weak linkages to other sectors. The intermediate and capital goods industries are also relatively underdeveloped, implying that Kenya's manufacturing sector is highly import dependent. Additionally, the sector is highly fragmented with more than 2,000 manufacturing units.

The top three manufacturing sub – sectors account for 50 % of the sector GDP, 50 % of exports, and 60 % of formal employment. Nearly, 50% of manufacturing firms in Kenya employ 50 workers or less and most being family - owned and operated. In addition, the bulk of Kenya manufactured goods (95%) are basic products like food,

beverages, building materials and basic chemicals. Only 5% of manufactured items, such as pharmaceuticals are in skill – intensive activities. Thus capacity building, processes improvement and general management improvement in the sector is critical, an avenue that Kaizen system penetrates.

Kaizen is a Japanese term that means continuous improvement. Kaizen system involves every employee, from upper management to the cleaning crew. Everyone is encouraged to come up with small improvement suggestions on a regular basis. This is not a once a month or once a year activity. It is continuous. Japanese companies, such as Toyota and Canon, collect a total of 60 to 70 suggestions per employee per year, written down, shared and implemented, Cannon, (2008). In most cases these are not ideas for major changes. Kaizen is based on making little changes on a regular basis: always improving productivity, safety and effectiveness while reducing waste. Suggestions are not limited to a specific area such as production or marketing. Kaizen is based on making changes anywhere where improvements can be made. (Zayko, Broughman, and Hancock, 2012)

Kaizen involves setting standards and then continually improving those standards. To support the higher standards Kaizen also involves providing the training, materials and supervision that is needed for employees to achieve the higher standards and maintain their ability to meet those standards on an on-going basis. Maurer, Robert (2012). There are several types of kaizen activities, ranging from those that focus on developing solutions to problems on the factory floor, to implementing a predetermined plan for change, to streamlining the flow of paperwork The kaizen process must begin with the process owner, the individual with real ownership and responsibility who has the authority to change the process and be answerable for the consequences. He or she may be the general manager, president, or in some cases plant manager, but always the person in charge. Kaizen cannot be successful without strong support and direction from the top (Chen et al. 2007).

According to Demeter, & Matyusz, (2011), the kaizen process is based on several rules that may vary in detail from company to company. But the underlying concepts are the same: “Be open minded, maintain a positive attitude, Reject excuses, and seek solutions, Ask Why? Why? Why? There are no stupid questions, Take action.

Implement ideas immediately, don't seek perfection, That is, do what can be done now, with the resources at hand, Use all of the team's knowledge. The experts are frequently found on the factory floor, Disregard rank. All team members are equal and everyone has something to contribute, just do it!!”

Kaizen fundamentally differs from traditional continuous improvement processes because it is almost entirely action-based. Teams are charged with both developing and implementing their solutions; they create processes or change existing processes, leaving a new process in place. Kaizen is very much a hands-on process. Team participants not only plan, they clean equipment, sort tools, move machinery (within the bounds of safety), assemble, build, and run the process. They get tired, they get frustrated, and they get dirty together. Rank is not recognized—factory managers and company officers work side by side with machine operators to find and implement the best of their ideas. The team's job is to make change happen and to create and leave in place a new way of doing things (Chenhall, 2003)

1.1.1 Kaizen System

Kaizen is a system that involves every employee. Everyone is encouraged to come up with small improvement suggestions on a regular basis in order to implement Kaizen; a team needs to be set up to look at a workplace. The employees within the Kaizen team need to be trained in Kaizen logic. The underlying of Kaizen is that it makes employees become aware that by using their skills to improve a process, results in the business becoming more successful, which lends itself to meaning more job security for the employee. Kaizen requires bringing employees together to look at their jobs, sections, and processes, to realize changes that will help performance Shah and Ward (2003). Whereas lean manufacturing looked at production issues, Kaizen can be applied to any business. Japanese production systems are inherently based on the logic that the employer will always look after the employee, they can be applied to Western companies, but we have to bear in mind the social differences between the cultures and not look merely at short term gains. Kaizen can be a good medium for improving employee-employer relationships (Robinson and Schroeder, 2006).

Five primary elements are required to support the manufacturing component of lean production: manufacturing flow, organization, process control, metrics, and logistics. On the manufacturing floor, work is divided into discrete cells based on natural groupings of related tasks. Manufacturing flow concerns the physical changes and design standards deployed as part of each work cell. Organization establishes people's roles and functions, and trains them in new ways of working and communicating (Rahman, Laosirihongthong, and Sohal, 2010). Process control includes efforts to monitor, control, stabilize, and improve discrete manufacturing process steps Metrics involves establishing visible, results-based performance measures, determining targets for improvement, and recognizing work teams for their process improvements. Logistics defines the operating rules and mechanisms for planning and controlling the flow of material (Neely et al., 2001).

Lean manufacturing may be considered as a synergistic set of integrated modern manufacturing management practices commonly classified under subsets of just-in-time (JIT), total quality management (TQM), total productive maintenance (TPM), and a collection of supportive human resource management practices including teamwork and employee empowerment Dinero, Donald (2005). Lean manufacturing encompasses such practices as employee involvement in problem solving, statistical process control (SPC), reengineering setups, cellular manufacturing, supplier information sharing and partnership, supply base rationalization, pull production, worker teams, integrated product design, in-house designed technology, and customer requirements integration Graban, Mark; Joe, Swartz (2012).

While a number of authors have noted Toyota's emphasis on front-line ideas, little research has been done to evaluate the specific nature of the relationship between front-line ideas and lean performance improvement. The goal of a high-performing idea system is to generate significant front-line involvement in identifying and implementing opportunities for improvement. Four of the primary principles that differentiate high-performing systems from low-performing ones include: ideas are integrated into everyday work, the emphasis is on small ideas, front-line performance metrics focus ideas on what is important and both managers and workers are held accountable for their roles in the idea process (Maurer, 2012).

Traditional suggestion systems focus on getting big ideas with major cost or revenue implications. But to generate more involvement, increase the rate of improvement, and achieve the greatest overall impact, high-performance idea systems target small ideas. Not only can front-line workers come up with a lot of them, but small ideas are easier to implement, face little resistance, and don't need to go far up the hierarchy for approval. Small ideas can be a routine part of daily work, and employees can see their ideas making a difference Hanebuth, (2002). This creates an invigorating atmosphere of rapid ongoing improvement. One of the surprising benefits of small ideas is that they create competitive advantage that is more sustainable (Robinson and Schroeder 2006). While competitors generally become aware of big ideas fairly quickly, and can copy or counter them, it is much harder for them to find out about small ideas. Because these remain effectively proprietary, they accumulate over time into a cushion of significant competitive advantage. As a number of researchers have identified, a common reason lean initiatives perform poorly is that they fail to engage the work force in creating a culture of lean improvement (Liker and Hoseus 2007)

1.1.2 Financial Performance

The Lean system remarkable characteristic is the clear linkage between the improvement results and the financial gains (Harry & Schroeder, 2000). However, the actual financial performance measurement system (FPMS) of most organizations can be a barrier to implement such quality improvement program. Many organizations around the world have extensive performance measurement system (PMS's) but they are based on traditional Managerial Accounting. They fail to support the attainment of strategic goals and do not also help to promote a sustainable continuous improvement because of poor relationship between financial and non-financial performance measures (Bititci et al., 2007). Nevertheless, the proof that lean works for the broad spectrum of manufacturing firms is specious. Even as practitioners attest that proof exists, studies by both operations management (OM) and finance researchers have proven inconsistent in establishing a significant positive relationship between lean practices and archival business financial performance. Most research studies find a positive association with at least one or two financial measures. Reductions in some form of inventory consistently occur in lean implementations. Yet measures of return on assets (ROA), return on sales (ROS), return per employee, and profit margin prove inconsistent (Emiliani, et al., 2007).

The most recently developed financial performance measurement framework is Performance Prism. It reflects organization's performance in five perspectives: stakeholder satisfaction, strategies, processes, capabilities, and stakeholder contribution. Performance Prism starts and ends with stakeholders. Strategies, processes and capabilities are the means to reach stakeholders' satisfaction. Strategy mobilizes the processes which require the capabilities of organizations. In order to be satisfied, the stakeholders also have to contribute to maintain and develop organization's capabilities (Neely et al., 2001). These performance measurement system (PMS) framework try to establish a relationship between the financial and nonfinancial performance measures which are grouped in perspectives, as in Performance Prism, or categories, as in Performance Pyramid (internal and external) (Hanebuth, 2002).

Another financial performance measurement method is the financial statement analysis. Because of the uniform contents of financial statements, financial analysis using conventional accounting ratios is common practice. By normalizing a specific financial output to some input, one may compare specific indicators of performance to some industry standard, as well as allow for the comparison of firms of different size. Multivariate statistical methods using ratios are often employed to make decisions regarding financial performance, assuming normality and constant returns to scale. A recent empirical study by Fullerton, McWatters, & Fawson, (2003) suggested that JIT adopters achieve improved financial performance. Similarly, the effects of another lean practice, total quality management (TQM), remain unclear, with some prior research by Easton & Jarrell, (2008) reporting superior financial performance among TQM adopters, while other studies (Lau, 2002) report little evidence of TQM-related financial benefits.

Regardless of its average financial performance effect, lean manufacturing's impact clearly varies across adopters of this relatively new paradigm. One source of variation is managers' piecemeal adoption of the various components of the lean philosophy. Prior research examines the consequences of implementing particular lean methods, including TQM and time-based manufacturing measures (Nahm, Vonderembse, & Koufteros, 2003). Aside from lean production's expansive definition, other factors

undoubtedly contribute to the variation in performance effects evident in prior lean-related studies. One such factor is the management accounting systems (MAS) used to support the philosophy. Chenhall (2003) notes that contingency theory has been used extensively in examining the fit between a firm's management control system and its operating environment, technology, structure, and strategy.

The analysis of Just-in-time and lean system can greatly help in financial performance measurement. JIT production methods generally lead to greater operational flexibility, improved quality, and lead time reductions resulting to better financial performances. Because JIT and lean manufacturing systems focus on allowing the customer to "pull" material through the process, only replenishing inventories upon receipt of an order, the impact of such systems should be manifest in the inventory and asset turnover metrics Nicholas, and Soni (2005). If the reduction in assets and improved efficiency reduces overall costs, then there should be a subsequent increase in the firm's return on assets. As resources are freed by the elimination of no value-added activities, productivity is expected to rise, as should labor utilization. It is reasonable to expect that reductions in accounts receivable and inventory, along with increases in productivity, will also positively impact cash flow from operations, making the firm a more efficient converter of resources to cash. Great is the volume of studies that have been performed to assess the effect of lean systems on the financial health and productivity of various industries, and varied are both the analytical approaches taken and the results obtained (Veech, 2004)

1.1.3 Kaizen System and Financial Relationship

Kaizen has become a global activity spread by multinational companies and their employees. It has become popular not only in the manufacturing sector but also in the service sector. However, proliferation of kaizen in Africa is still very small due to the limited number of players who bring in the practice. The manufacturing sector in Sub-Saharan Africa is generally not dominant 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%, whereas the agriculture and the service sectors accounted for 22.7% and 58.2%, respectively manufacturing activities in Kenya vary widely, since the country was a popular investment destination in the 1970s and 80s within East Africa (Timmons, and Spinelli. 2013)

However, there are some leading multinational and local companies operating in Kenya which are bringing in kaizen methods. Furthermore, the Kenya Association of Manufacturers (KAM), which has approximately 600 members, has been actively involved in organizing seminars and training to upgrade the capacity of its members. KAM has partnered with the Kaizen Institute in Mauritius since 2005 and has been inviting experts for seminars and consultations Liker and Hoseus (2007). Since the demand for training on kaizen is growing, the Kaizen Institute is offering regular training courses of its own in around the country. The relationship between kaizen system and performance of the manufacturing firms is the added profitability due to regular and gradual improvement from staff ideas about firm. Profitability of the firm and especially manufacturing companies can only be realized by subscribing to strategies that promote production practices that considers the reduction on expenditure of resources for any goal other than the creation of value for the end customer. This has come to be known as lean practices. With lean practices, manufacturer can reduce lead times through lower level of inventory (Bayou and de Korvin, 2008). The dominant principle of lean practices is waste elimination. Fullerton and Wempe, (2009) classified wastes into 7 types as follows: defects, over-production, waiting for the next step, unnecessary transport or materials, unnecessary movement of workers, inappropriate processing, and excess inventory.

A study carried out by Demeter & Matyusz (2011) examined the relationship between inventory leanness and performance in Kaizen System with focus to enhancement of financial performance of manufacturing firms. It was found that the relationship is strong. First, lean inventory shrink wastes and costs involved in inventory management, improving a firm's financial performance. Inventory accompanies the interest on money, space, labor, and equipment for warehousing and handling, inventory shrinkage and obsolescence. Second, the implementation of lean management permeates throughout the organization and embeds the philosophy of effectiveness into the fabric of an organization and supply chains. Thus, lean management has been introduced as an agent of organizational change and transformation (Womack & Jones 2003).

A number of studies have delved into the impact of the lean inventory management on financial performance of firms. Chen et al. (2007) reported that raw material and work in progress inventories have decreased from 1981 to 2004 and the decrease had a positive impact in stock market returns. After conducting 201 literatures, Kinney and Wempe (2002) found that through Kaizen system, lean production adoption improves profitability and return on assets. Using a survey of 253 manufacturing firms, Fullerton et al. (2003) found that lean production practices exhibits a positive effect on profitability, return on asset, and cash flow margin. Similarly, Shah and Ward (2003) found the positive relationship between lean production bundles and plant performance from 1575 manufacturing firms. However, a few studies contradict the reported results. In a study of automotive companies, Jayaram et al. (2008) found no significant influence of lean production on profitability and ROA. In a similar context, another study reports that inventory turnover rate has no influence on financial and accounting performance of the firms (Cannon 2008).

1.1.4 Manufacturing Firms in Kenya

Kenya's manufacturing industries are small; they are the most sophisticated in East Africa. The manufacturing sector has been growing since the late 1990s and into the new century. The manufacturing companies in Kenya are relatively diverse. The most common Manufacturing Industries in Kenya includes: Small-scale consumer goods (plastic, furniture, batteries, textiles, clothing, soap, cigarettes, and flour), agricultural products, horticulture, oil refining, aluminum industries, steel industries, lead industries, cement industries and commercial ship repair. The manufacturing sector has a great potential on promoting economic growth and competitiveness in the country like Kenya. It is the third leading sectors contributing to GDP in Kenya. The sector has experienced the fluctuations over the years under different financial conditions. It experienced the lowest real GDP growth rates in 2008 to 2009 as 1.7 percent in 2008 and improved to 2.6 percent in 2009 (East African Community Facts and Figures – 2010, March Issue, 2011). In the financial year 2010, the real GDP growth rate was 5.6 percent, revealing the improvement (East African Community Facts and Figures – 2011, October Issue, 2011).

The lack of demand from the domestic market caused depreciation in Shilling and international demand was largely hit by global financial crises which caused the

slower growth in the manufacturing sector. In terms of gross domestic product (GDP), the share of manufacturing sector maintained in the last 10 years from 2000-2001 as 10 percent to 2009-2010. On the other side, investment a “booster” of an economy, according to (East African Community Facts and Figures – 2011, October Issue, 2011) has shown a decreasing trend from 2008 to 2010.

1.2 Research Problem

Most Kenyan manufacturers are not only disadvantaged by the technological gap but also by the lack of knowledge in key managerial methodologies like kaizen. While engineering capacity may take time to catch up, managerial capacity may be improved more quickly since Kaizen tools are developed in a way to be appreciated by all the workers, and its fundamental methodology is not very complicated.

However, there are a few challenges in implementing kaizen in Kenya and its eventual leaping of financial performance by manufacturing firms. Firstly, in manufacturing companies where management systems are top bottom, power may be very much concentrated in the hands of top managers, whereas the basic concept of kaizen is empowering the workers in the company. It may be a challenge for managers to change their attitude and trust the workers in the organization Easton & Jarrell, (2008).

Secondly, workers without sufficient educational backgrounds may not understand tables and figures. Since visualization of production and quality performance is one of the key tools of the kaizen method, separate training for workers may be required to develop a full understanding of the tools Fullerton, and Wempe, (2009). Thirdly, the sources of productivity loss are often found outside the company, particularly delays in the delivery of materials and sudden interruption of orders from retailers and traders due to oversupply in the markets. Therefore, the problems of production site may often be found outside the company (Furlan, Vinelli, and Pont 2011).

Notwithstanding above, the concerns in Kenya today is that, the beneficiaries of Kenya Association of Manufacturers’ (KAM’s) kaizen activities are so far limited to relatively well-established enterprises, and the majority of manufactures are still not

aware of the actual methodology. Secondly, the mandate of Productivity Centre of Kenya (PCK) does not focus on the manufacturing sector. Therefore, the spread of kaizen activities to manufacturers through the channel of PCK may be slow. Yet, the Ministry of Industrialization as well as its agencies, which are the key public institutions for the manufacturing sector, are yet to be conversant with the kaizen methodology and cannot guide local manufacturers to realize the financial performance of Kaizen systems in their manufacturing firms Timmons, and Spinelli (2013). This raises the question; what are the effects of kaizen system on productivity of the manufacturing firm? How does Kaizen system support financial performance of the firms? What are the financial performance measures when using Kaizen system?

1.3 Objective of the Study

The study objective analyzed the effects of kaizen system on the financial performance of manufacturing firms in Kenya

1.4 Value of the Study

This research will help in addressing the existing knowledge gap in literature of effects of kaizen system on the financial performance of manufacturing firms in Kenya. It will also be a valuable addition to the existing knowledge and provide a platform for further research which will be useful to academicians and scholars.

The study will be of great benefit to Kenya Association of Manufacturers, Productivity Centre of Kenya and key sponsors of Kaizen in Kenya the African Management Services Company whose original sponsor is the International Finance Corporation (IFC). The stakeholders in the manufacturing firms targeted in the study will clearly understand more on effects of kaizen system on the financial performance of manufacturing firms in Kenya. They will have the advantage of applying the recommendations that will be made at the end of the study and engage the relevant stakeholder to determine whether to fully take up the kaizen system and lead production system or other management models.

The study will also have great benefit to the government and industrialization bodies. It will help the ministry of industrialization to understand the importance of Kaizen

system, how it can help manufacturing firms to increase their revenue, and what should be done to ensure even smaller manufacturers gain the benefit of kaizen systems.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covered the literature review on kaizen system. It encompassed the theoretical framework on kaizen system; evaluate what other researchers have written on kaizen system and its effects on the financial performance of manufacturing firms in Kenya. It concluded on empirical review on kaizen system and its effects of financial performance of manufacturing firms highlighting the knowledge gap.

2.2 Review of Theories

There have been several theoretical studies on the effects of kaizen system on the financial performance of manufacturing firms. Majority of this theoretical frameworks relating to kaizen system emphasize on continuous improvement, lean manufacturing and participation by all members of the organization as well as breaking the ranks in management. Highlighted below are theory of lean management, the theory of constraints and production theory

2.2.1 Theory of Lean Management

The theory of lean management developed by John Krafcik in (1988) posits that, companies are in business to make a profit. If they don't, they won't survive. There are two ways to increase profits; raise prices and lower costs. Competitive pressures often limit the ability to do the former, so companies tend to focus on cutting costs. One of the more popular ways for companies to reduce costs is through lean management. Lean management focuses on improving processes. Every step a product takes from raw materials to final assembly is reviewed. Waste or duplication of effort is identified and eliminated to the maximum extent possible. As mentioned above, the focus is on creating benefit (lower costs, quicker turn times, etc.) for the customer. A system of "continuous improvement" is established to monitor the results on an ongoing basis. The goal is to create the perfect process.

2.2.2 The Theory of Constraints

The Theory of Constraints developed by Dr. Eliyahu Goldratt in (1984) is a methodology for identifying the most important limiting factor (i.e. constraint) that

stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. In manufacturing, the constraint is often referred to as a bottleneck. The Theory of Constraints takes a scientific approach to improvement. It hypothesizes that every complex system, including manufacturing processes, consists of multiple linked activities, one of which acts as a constraint upon the entire system (i.e. the constraint activity is the “weakest link in the chain”). So, the ultimate goal of most manufacturing companies is to make a profit both in the short term and in the long term. The Theory of Constraints provides a powerful set of tools for helping to achieve that goal. It entails the five focusing steps which involves a methodology for identifying and eliminating constraints, the thinking processes which are tools for analyzing and resolving problems and lastly throughput accounting which is a method for measuring performance and guiding management decisions.

One of the appealing characteristics of the Theory of Constraints is that it inherently prioritizes improvement activities. The top priority is always the current constraint. In environments where there is an urgent need to improve, Theory of Constraints (TOC) offers a highly focused methodology for creating rapid improvement. A successful Theory of Constraints implementation benefits include Increased profit which is the primary goal of TOC for most companies, fast improvements as a result of focusing all attention on one critical area – the system constraint, Improved capacity, reduced lead times and reduced inventory(Mabin, and Balderstone, 2000)

2.2.3 Production Theory

The Production theory developed by Charles W. Cobb and Paul H. Douglas (1928) is the study of production, or the economic process of converting inputs into outputs. Production uses resources to create a good or service that are suitable for use, gift-giving in a gift economy, or exchange in a market economy. This can include manufacturing, storing, shipping, and packaging. The theory of production is an effort to explain the principles by which a business firm decides how much of each commodity that it sells (its “outputs” or “products”) it will produce, and how much of each kind of labour, raw material, fixed capital good, that it employs (its “inputs” or “factors of production”) it will use. The theory involves some of the most fundamental principles of economics. These include the relationship between the prices of commodities and the prices (or wages or rents) of the productive factors used

to produce them and also the relationships between the prices of commodities and productive factors, on the one hand, and the quantities of these commodities and productive factors that are produced or used, on the other.

The various decisions a business enterprise makes about its productive activities can be classified into three layers of increasing complexity. The first layer includes decisions about methods of producing a given quantity of the output in a plant of given size and equipment. It involves the problem of what is called short-run cost minimization. The second layer, including the determination of the most profitable quantities of products to produce in any given plant, deals with what is called short-run profit maximization. The third layer, concerning the determination of the most profitable size and equipment of plant, relates to what is called long-run profit maximization.

2.3 Determinants of Financial Performance

Firm profitability and its determinants are a well addressed research topic in the field of industrial organization and relates to lean production in the kaizen systems. A firm that displays solid operating fundamentals and generates high returns on its assets is sure to see that success translate into its stock price. Fundamental profitability analysis is objective and a true indication of how a company is performing. Stock prices, on the other hand, are subject to speculative swings that can make it difficult to identify the actual value of a firm (Demeter, & Matyusz, 2011).

Nevertheless, in order to properly function and develop financial performance in any manufacturing firm, an enterprise needs managers, who can well understand the economic environment that it operates in. However, this understanding is often limited to the closest environment. This is why many successes and failures come highly unexpected. Most managers arise from the surrounding macroeconomics that they are often unaware of its forces. Therefore, its mechanisms need to be understood, its potential opportunities need to be utilized and its threats limited (Doolen, and Hacker, 2005).

The survival and financial performance of companies in a globalized market, where there are no more frontiers for competition and any bad move can offer significant

risk to any organization, associated with the pressure from competition and the search for a competitive advantage, has forced companies to rethink strategies and how to manage their businesses. Companies have perceived that the management model adopted in the past as not appropriate for their reality Easton & Jarrell, (2008). This has given rise to the need to analyze new managerial practices and to implement a model that provides, among other objectives, cost reductions, increased quality in products and greater flexibility to quickly meet market demands. In this scenario, an increase can be verified in the number of companies adopting the management model developed by Toyota Motor Company - Lean Production. This model has provided Toyota and those companies that have adopted it increased efficiency and effectiveness in their production systems and eventually determining financial performance of many manufacturing firms (Fullerton, and Wempe, 2009)

2.4 Review Empirical Studies

Kaizen is Japanese business strategy that calls for never ending effort for improvement involving everyone in the organization, from managers to workers. Many companies that have adopted Kaizen improvement techniques as part of overall lean manufacturing or lean enterprise initiatives report that their more effective application of the means already at hand has resulted in significant reductions in their new capital equipment costs (Veech, 2004).

A study by Aoki, (2008) on ‘Transferring Japanese Kaizen activities to overseas plant in China’, found that, 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. However, literature indicates that, as Kaizen is introduced to overseas operations following the Japanese corporate expansion activities, the performance of Kaizen implementation is contextual dependent. Some scholars indicated that Kaizen practices were embedded in the Japanese culture and difficult to transfer abroad while others suggested that only the rational aspects of those practices were transferable overseas. The finding of this study suggested that Kaizen practices can be transferable to non-Japanese cultural environment. In addition to the national culture, the study indicates that the organization culture significantly influences the adoption of Kaizen practices. The

biggest barrier to Kaizen success is the centralization of authority and lack of cross functional cooperation. In order to increase the chances for successful Kaizen adoption, two aspects of organizational culture are required: power delegation and empowerment, and high cooperation between managers, workers, customers, and suppliers.

Another Study by Granja et al. (2005) concerning the target and Kaizen costing concept in a construction company wanted to develop the framework taking together two matching approaches, which provides a basis for a total cost management system. The study found that 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. The study concluded 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.

An empirical study by Brunet & New, (2003) focused on different Kaizen systems, approaches and practices such as Japanese manufacturing techniques in Vietnam. Quality improvement is now regarded as the key management issue in Vietnamese companies. Though the attention of Kaizen and quality management practices in Vietnamese companies is constantly increased, there is a lack of Kaizen studies. There is several questions regarding the performance of Japanese management techniques implemented in Vietnamese companies and how do they fit to the culture and organization structure of Vietnamese companies. The results of the study suggest that Manufacturing firms in Vietnam should adopt and adapt Kaizen practices effectively and flexibly to enhance the performance and achieve competitive advantage.

Furthermore, studies of kaizen activities in the countries outside Japan, such as Australia (Chapman et al., 1997), Sweden (Lindberg & Berger, 1997) and the UK (Oliver & Wilkinson, 1992) suggest that the concept, approaches, and practices of Kaizen have become routinely accepted throughout the world. However, literature indicates that, as Kaizen is introduced to overseas operations following the Japanese

corporate expansion activities, the performance of Kaizen implementation is contextual dependent. Some scholars indicated that Kaizen practices were embedded in the Japanese culture and difficult to transfer abroad while others suggested that only the rational aspects of those practices were transferable overseas. Recent studies show that Kaizen approaches were not easily. Beside of this, our analysis proved that implementation of Kaizen practices associates with culture in low uncertainty avoidance. Adopted in abroad due to such environmental factors as the differences in national culture and working ethics.

A local 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.

Another study by Gitonga (2014) on the impacts of managerial training intervention on business performance found that even short-term basic training can improve their management practices. The study sought to analyze the impacts of teaching the very basics of KAIZEN, an inexpensive, commonsense approach to management emphasizing the reduction of wasted materials and activities, to owners of small enterprises on their business performance. This experiment was conducted in a metalworking cluster in Kariobangi Jua kali sector in Nairobi, Kenya.

A study by Mathenge (2012), examined the factors influencing implementation of quality standards (KAIZEN) in Kenyan flower industry. His study indicated that the following factors influenced implementation of KAIZEN; team work was leading in influence, followed by training, followed by management support and last was education level of workers. The researcher concluded that team work was very important in the implementation of KAIZEN while education level had very little influence in KAIZEN implementation.

Another local 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 quality management practices. The study findings also conclude that top management must commit sufficient resources for successful implementation of quality issues.

Finally a study by Muthengi Nicholas, and Soni (2005) on effectiveness of KAZIEN System in enhancing financial performances; A case study of Baba Dogo Metal fabricators, found that Kaizen is not a process easily mastered. Although the principles can be simply defined, learning their effective application through cross-functional kaizen teams requires study, commitment and perseverance. Guidance by experienced practitioners, often on a prolonged basis, is cited time after time as an underlying fundamental of success, and as with most business improvement processes, the rewards are commensurate with the investment.

In summary, the range of projects that a kaizen team might be asked to carry out is large, the scope and focus must be narrowly defined, clearly bounded (for example, improve a press or cell, not a stamping plant). In a factory environment, a team might be assigned to build a manufacturing cell from individual functionally applied machines, another might attack changeover times on a key bottleneck machine, yet another might create a pull system to regulate a part or all of a process (Zayko, et al., 2012). The successful implementation of lean practices has become accepted by Toyota as source of competitive advantage (Doolen and Hacker, 2005). There are several studies that have examined the effects of lean on performance. The results showed that lean practices might not be universally valid in all organizational contexts (Boyle et al., 2011). Many researchers confirmed that the relationship of lean on financial performance is mixed (Wayhan and Balderson, 2007). The study of Furlan et al. (2011) indicated that not all the plants implement lean manufacturing bundles show the improvement on operational performance.

Many researches showed that lean implementation effect organizational performance. Motwani (2003) mentioned that lean practices eliminate wastes and improve process. Krafcik (1998) stressed that lean practices improve quality, productivity, and customer responsiveness. Rahman et al (2010) stated that lean practices can reduce lead times in production and increase velocity and flow in the supply chain. In addition, lean practices can reduce human effort, tool investment, product development time, and manufacturing space (Zayko et al., 1997). In Kaizen system, Improvement is the goal and responsibility of every worker, from the CEO to the manual workers, in every activity, everyday, all the time. Through the small but continual efforts of everyone, significant reductions in costs can be attained overtime. For a business to realize the true benefits of Kaizen it should form a long-term strategy, which accepts that by involving employees in making their processes better, we all benefit (Womack, & Jones 2003). Getting employees to believe that they are the real experts from which the firm can achieve ‘a change for the better’. Short-term Kaizen does not work. It can be stated that new quality policies such as Six Sigma, are an extension of Kaizen. If any business is serious about implementing Kaizen into the workplace, then it has to have a long-term strategy (Wayhan, and Balderson, 2007).

2.5 Summary of Literature Review

In today’s corporate world, several paradigms are being broken and changes are happening quickly. The traditional mass production model is being replaced by the lean production model in several organizations. Performance measurement has been in the agenda of manager and academics alike over the last decades. If management philosophy is to be changed, it is important that the way in which the organization measures its performance is also adequate. The relationship between lean manufacturing management practices, operations financial performance, and business financial performance can be viewed as a hierarchical relationship. Business financial performance resides at the top of that hierarchy (Grabau, & Swartz (2012).

To develop a Performance Measurement System (PMS) adequate to lean production, metrics must allow for the identification of waste that must be eliminated and also the practice of continuous improvement. In the context of the manufacturing environment, it is evident that a PMS needs to be adequate to the organization aiming

to implement principles of Kaizen lean production, because if an organization has inaccurate metrics to support and follow-up this production model, results will be inaccurate in showing that one of the most important indicators, cost, is increasing, because the economies of scale have been abandoned

In order to achieve efficient production and to eliminate waste it is necessary to understand and completely apply the policies as stipulated in Kaizen System. All the procedures must be followed not only by management, but also by the workforce. Focused factory networks, group technology, and quality at the source, JIT production, uniform plant loading, Kanban production control system and Minimized setup times should be taken into consideration. Additionally, lean thinking is leading to an increase in production efficiency by identifying and concentrating in activities that represent a value for the customer. Those value added activities must be connected in a whole process and must flow through the entire production route. Also it is important to keep in mind that lean thinking applies the pull system in which everything is produced according to the customer needs. The customer pulls production and every workstation pulls requirements from the previous one based on the customer.

In conclusion, it is important to remember that lean manufacturing is transferable. The keys for a successful lean manufacturing transfer include training the workforce, educating the students who will become the operations managers in the future, maintain focused process teams in order to reduce product delivery time and last but certainly not least, create, produce and manage according to customer satisfaction. Any activity that is not oriented to customer satisfaction is a non-value activity.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

The chapter highlighted the procedures that were used in conducting the study. Pertinent issues discussed in this section included the research design; sample size, sample procedure, methods of data collection and data analysis.

3.1 Research Design

The study used descriptive survey design. A descriptive study was undertaken in order to ascertain and describe the characteristics of the variables of interest in a situation. The goal of descriptive study hence is to describe relevant aspects of the phenomena of interest from an individual organizational, industry oriented or other perspective, Best and Kahn, (2007). The study obtained and described the views of the respondents with regard to the effects of Kaizen system on the financial performance of manufacturing firms in Kenya.

When very little is known about a topic or to explore a research question, a descriptive design is applied. In descriptive research, the research variable is examined as it exists without investigator interference (Yin, 2008). There was no manipulation of variables and the researcher did not attempt to control the research setting in this study. However, the data collection conditions were standardized to enhance data quality.

3.2 Population

The study targeted selected medium size and large companies using Kaizen System in Nairobi County. There has not been a report detailing the number of companies currently practicing Kaizen in Kenya but Kaizen Institute have conducted trainings to slightly over a hundred (100) Kenyan Companies. The study therefore targeted manufacturing companies that had adopted kaizen system in their operations. According to Kaizen Institute in Kenya there were 62 manufacturing companies practicing kaizen system in Kenya, three of which were listed in the NSE as at December 2013. Using such companies helped to determine the impact of kaizen system on financial performance of such companies.

3.3 Sample Design

The study purposively sampled manufacturing companies from the Kaizen Institute Africa list that had adopted kaizen system in the year 2011 so that the study can investigate 2 years before adoption (2009 and 2010) and 2 years after adoption (2012 and 2013) of the Kaizen system. Purposive sampling design is a form of sampling in which the selection of the sample is based on the judgment of the researcher as to which subjects best fit the criteria of the study (Babbie, 2010).

3.4 Data Collection

The Study used secondary sources of information and data to ensure the information used is up-to-date and relevant. Secondary data is any information that has been collected or researched recently. Sources of secondary data included the internet, libraries, company reports, newspaper among others. The data collected is useful as it allows the researcher to see the prevailing thoughts about his/her area of study (Patton, 2002). In this study the secondary data that were used were the financial statements for the manufacturing companies that adopted kaizen system in the year 2011 which were Unga Limited, Everyday E.A limited and London Distillers Limited.

3.5 Data Analysis Techniques

All data was analysed by use of computers for efficiency and high speed. Data collected was analysed using quantitative and qualitative method, which improves the validity and reliability of the research study. The data was then presented using various statistical methods such as tables. Quantitative data was analysed through the use of descriptive statistics. The effects of kaizen system on the financial performance of manufacturing firms in Kenya were examined with the help of Statistical Package for Social Science (SPSS 21) and specific statistical methods such as Linear regression analysis was used. Pearson Correlation helped to establish how a set of independent variables explains a proportion of the variance of a dependent variable to a significant level through significance test of R². It also helped to explain the relative predictive importance of independent variables by comparing the beta weights.

3.5.1 Analytical Model

The study sought to determine the effects of Kaizen System on the financial performance of manufacturing firms in Kenya by testing the changes of Profits,

Return on Assets, Return on Sales, Return per Employee and Profit Margin. Kaizen focuses on eliminating waste, improving productivity, and achieving sustained continual improvement in targeted activities and processes of an organization. The formula given below was used to calculate the linear regression.

The equation;

$$Y_1 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \varepsilon$$

$$Y_2 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \varepsilon$$

Where:

Y_1 = The financial performance of manufacturing firms in Kenya (Before Introduction of Kaizen System) as measured by Net Profits, measured by Total Revenue minus Total Expenses

Y_2 = The financial performance of manufacturing firms in Kenya (After Introduction of Kaizen System) as measured by Net Profits, measured by Total Revenue minus Total Expenses

b_0, b_1, b_2, b_3, b_4 , are constants to be estimated by the model

X_1 = Return on Assets, as measured by the ratio of annual net income to average total assets

X_2 = Return on Sales, measured by company's earnings (Revenue) divided by the amount of sales.

X_3 = Return on Investment as measured by dividing net profit by total assets

X_4 = Profit Margin as measured by net income divided by revenues

ε = Error terms

After the regression analysis, the inferences acquired were subjected to the student-*t*-test to compare and determine whether the two data are significantly different from each other. According to Hazewinkel, (2001), Student's *t* distribution can be used to determine if two sets of data are significantly different from each other, and is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known. When the scaling term is unknown and is replaced by an estimate based on the data, the test statistic (under certain conditions) follows a Student's *t* distribution

CHAPTER FOUR DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.1 Introduction

This chapter involved analysis of data collected and discussion of the results obtained. The study targeted manufacturing companies that have adopted Kaizen System. In order to fulfill the requirement of obtaining financial performance (Net Profits) before and after introduction of kaizen system, data over a period of four years 2009 to 2013 was collected from annual financial statements. The study selected companies that adopted Kaizen system in the year 2011 so that to help investigate the past 2 years before introduction of kaizen system (2009 and 2010) and later after introduction of Kaizen System (2012 and 2013). The analysis did not include year 2011 which is the year when Kaizen was introduced in the company. The analysis therefore selected the following manufacturing companies which adopted Kaizen system in year 2011; Unga holdings Limited, Eveready East Africa Ltd and London Distillers Kenya ltd to provide information on Return on Assets, Return on Sales, Return on Investment and Profit Margin

4.2 Descriptive Analysis

		Dependent Variable	Predictor Variables			
	Years	Profits	Return on Assets	Return on Sales	Return on Investment	Profit Margin
Unga Group LTD	2013	348195	0.0543	0.0321	0.09377	0.0218
	2012	441043	0.0773	0.0478	0.10871	0.0334
	2011	Year when Kaizen system was introduced				
	2010	185192	0.0333	0.0291	0.10745	0.0159
	2009	373661	0.0785	0.0597	0.17402	0.0395
Eveready	2013	70084	0.0609	0.0501	0.2967	0.051
	2012	-123994	-0.1219	-0.126	0.24262	-0.0902
	2011	Year when Kaizen system was introduced				
	2010	28271	0.0283	0.0253	0.38773	0.0172
	2009	17840	0.0213	0.0157	0.32776	0.0101
London Distillers Ltd	2013	11186113	0.204932732	0.274719992	0.93747	0.201471121
	2012	9023660	0.191771816	0.273058891	0.96665	0.2009946
	2011	Year when Kaizen system was introduced				
	2010	8262464	0.239165938	0.334429386	0.95927	0.240134051
	2009	9184385	0.283021787	0.379102855	1.16486	0.282699869

Table 4.1 Descriptive Data

Secondary data was collected from the manufacturing firms' that has adopted kaizen system in the year 2011. The study collected data on Return on Assets, as measured by the ratio of annual net income to average total assets, Return on Sales, measured by company's earnings divided by the amount of sales. Return on Investment as measured by dividing net profit by total assets, Profit Margin as measured by net income divided by revenues and Net Profits measured by Total Revenue minus Total Expenses. The study seeks to get the difference in profitability on the 2 years (2009 and 2010) before introduction of Kaizen system and the two years (2012 and 2013) after the introduction of the kaizen system on the their manufacturing companies. In order to test for multicollinearity the researcher conducted a Pearson Product Moment correlation

4.3 Correlation Analysis before Introduction of Kaizen system

Table 4.2 Correlation Analysis

Correlations						
		Profits	Return on Assets	Return on Sales	Return on Investment	Profit Margin
Pearson Correlation	Profits	1.000	.988	.998	.964	.998
	Return on Assets	.988	1.000	.996	.938	.995
	Return on Sales	.998	.996	1.000	.956	1.000
	Return on Investment	.964	.938	.956	1.000	.961
	Profit Margin	.998	.995	1.000	.961	1.000

On the correlation of the study variables, the researcher conducted a Pearson correlation. From the findings on the correlation analysis between company Profits and various indicators, the study found that there was positive correlation between Return On Assets and profits as shown by correlation factor of 0.988, the study also found a positive correlation between Profits and return on sales as shown by correlation coefficient of 0.998, association between profits and return on investment was found to have positive relationship as shown by correlation coefficient of 0.964, while profit margin on profits was found to have positive relationship as shown by 0.998. This indicated that the variables had a very high correlation on profit of the manufacturing companies even before the introduction of Kaizen system.

4.4 Regression Analysis

In this study, a multiple regression analysis was conducted to test the influence among predictor variables. The research used Statistical Package for Social Sciences (SPSS V 20) to code, enter and compute the measurements of the multiple regressions

4.4.1 Regression Analysis

Table 4.3 Model Summary for Profits before Introduction of Kaizen System

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	1.000 ^a	1.000	.999	154901.708	1.000	1025.868	4	1	.023

a. Predictors: (Constant), Profit Margin, Return on Investment, Return on Assets, Return on Sales

Adjusted R squared is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable, from the findings in the above table the value of adjusted R squared was 0.999 an indication that there was variation of 99.9% on the financial performance (between 2009 to 2010 before Introduction of Kaizen system) of manufacturing companies due to changes in Profit Margin, Return on Investment, Return on Assets and Return on Sales at 95% confidence interval. This shows that 99.9% changes in financial performance of manufacturing companies could be accounted for by Profit Margin, Return on Investment, Return on Assets, and Return on Sales. R is the correlation coefficient which shows the relationship between the study variables, from the findings shown in the table above there was a perfectly strong positive relationship between the study variables as shown by 1.000.

Table 4.4 ANOVA for Profits before Introduction of Kaizen System

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	9846095534390 9.830	4	2461523883597 7.457	1025.868	.023 ^b
Residual	23994539275.6 71	1	23994539275.6 71		
Total	9848494988318 5.500	5			

a. Dependent Variable: Profits

b. Predictors: (Constant), Profit Margin, Return on Investment, Return on Assets, Return on Sales

From the ANOVA statistics in table above, the processed data, which is the population parameters, had a significance level of 0.023 which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value) is less than 5%. The significance value was less than 0.05 and indication that the model was statistically significant.

Table 4.5 Coefficients for Profits before Introduction of Kaizen System

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-61860.636	477932.475		-.129	.918
1 Return on Assets	-27734618.675	10127260.892	-.728	-2.739	.223
Return on Sales	32717241.546	21718097.371	1.244	1.506	.373
Return on Investment	-439872.463	1165844.909	-.043	-.377	.770
Profit Margin	18435628.884	37798350.519	.521	.488	.711

From the data in the above table, the established regression equation was

$$Y = -61860.636 - 27734618.675X_1 + 32717241.546 X_2 - 439872.463X_3 + 18435628.884X_4$$

From the above regression equation, it was revealed that Profit Margin, Return on Investment, Return on Assets, Return on Sales to a constant zero, financial performance (before Introduction of Kaizen in 2009 and 2010) of manufacturing companies in would stand at -61860.636. A unit increase in return on assets would lead to decrease in financial performance of manufacturing companies by a factor of -27734618.675, unit increase in Sales would lead to increase in financial performance of manufacturing companies by a factor of 32717241.546, a unit

increase in Return investment would lead to an inverse increase in financial performance of manufacturing companies by a factor of -439872.463, finally Unit increase in profit margin would lead to increase in financial performance of manufacturing companies by a factor of 18435628.884. At 5% level of significance and 95% level of confidence, Return on assets had a 0.223 level of significance; return on assets showed 0.373 level of significance, return on investment a 0.770 level of significance, while profit margin had a 0.711 level of significance. Overall return on sales had the greatest effect on the financial performance of manufacturing companies, followed by profit margin. Return on assets and return an investment has an inverse relationship. All the variables were significant ($p < 0.05$)

4.5 Correlation Analysis after Introduction of Kaizen system

Table 4.6 Correlation Analysis after Introduction of Kaizen system

		Profits	Return on Assets	Return on Sales	Return on Investment	Profit Margin
Pearson Correlation	Profits	1.000	.806	.910	.963	.903
	Return on Assets	.806	1.000	.974	.727	.973
	Return on Sales	.910	.974	1.000	.863	.999
	Return on Investment	.963	.727	.863	1.000	.865
	Profit Margin	.903	.973	.999	.865	1.000

From the findings on the correlation analysis between company Profits and various indicators after the introduction of Kaizen system, the study found that there was positive correlation between Return on Assets and profits as shown by correlation factor of 0.806, the study also found a positive correlation between Profits and return on sales as shown by correlation coefficient of 0.910, association between profits and return on investment was found to have positive relationship as shown by correlation coefficient of 0.963, while profit margin on profits was found to have positive relationship as shown by 0.903. This indicated that the variables had a very high correlation on profit of the manufacturing companies even after the introduction

of Kaizen system, the analysis further notices that variables had an almost perfect relationship to each other.

Table 4.7 Model Summary after Introduction of Kaizen system

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.994 ^a	.988	.939	1275565.734	.988	20.305	4	1	.165

a. Predictors: (Constant), Profit Margin, Return on Investment, Return on Sales, Return on Assets

The analysis indicates that Adjusted R squared which is the coefficient of determination which tells the variation in the dependent variable due to changes in the independent variable, from the findings in the above table the value of adjusted R squared was 0.939 an indication that there was variation of 93.9% on the financial performance (between 2012 to 2013 after Introduction of Kaizen system) of manufacturing companies due to changes in Profit Margin, Return on Investment, Return on Assets and Return on Sales at 95% confidence interval. This shows that 93.9% changes in financial performance of manufacturing companies could be accounted for by Profit Margin, Return on Investment, Return on Assets, and Return on Sales while 6.1% could be accounted for by other factors not included in the model. R is the correlation coefficient which shows the relationship between the study variables, from the findings shown in the table above there was a perfectly strong positive relationship between the study variables as shown by 99.4%. The analysis finds that the sig value stands at 0.165 which is greater than 0.05 implying that there is no statistically significant difference between the variables in the determinants. It can be concluded that the differences between determinants Means are likely due to chance and not likely due to the manipulation predictors.

Table 4.8 ANOVA for Profits after Introduction of Kaizen System

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	1321483315507 85.470	4	3303708288769 6.367	20.305	.165 ^b
	Residual	1627067941849 .379	1	1627067941849 .379		
	Total	1337753994926 34.840	5			

a. Dependent Variable: Profits

b. Predictors: (Constant), Profit Margin, Return on Investment, Return on Sales, Return on Assets

The ANOVA analysis indicates whether the analysis have a statistically significant difference between the predictor means. It can be seen that the significance level is 0.165 ($p = .165$), which is above 0.05. And, therefore, there is no statistically significant difference in the mean of the predictor variables and determinates used in the years specified and in relation to the financial performance of manufacturing companies after introduction of Kaizen system.

Table 4.9 Coefficients for Profits after Introduction of Kaizen System

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-5910393.965	6008658.833		-.984	.505
1 Return on Assets	123960454.802	152524205.340	2.833	.813	.566
Return on Sales	43985837.815	112724901.326	1.323	.390	.763
Return on Investment	25698062.725	20226721.639	2.005	1.271	.425
Profit Margin	-224117029.238	135353597.623	-4.907	-1.656	.346

From the data in the above table, the established regression equation was

$$Y = -5910393.965 + 123960454.802X_1 + 43985837.815X_2 + 25698062.725X_3 - 224117029.238X_4$$

From the above regression equation, it was revealed that Profit Margin, Return on Investment, Return on Assets, Return on Sales when held constant, financial performance (After Introduction of Kaizen) of manufacturing companies in would stand at -5910393.965. A unit increase in return on assets would lead to increase in financial performance of manufacturing companies by a factor of 123960454.802, unit increase in Sales would lead to increase in financial performance of manufacturing companies by a factor of 43985837.815, a unit increase in Return investment would lead to an increase in financial performance of manufacturing companies by a factor of 25698062.725, finally Unit increase in profit margin would lead to an inverse decrease in financial performance of manufacturing companies by a factor of -224117029.238. At 5% level of significance and 95% level of confidence, Return on assets had a 0.566 level of significance; return on assets showed 0.763 level of significance, return on investment a 0.425 level of significance, while profit margin had a 0.346 level of significance. Overall return on

sales had the greatest effect on the financial performance of manufacturing companies, followed by profit margin. Return on assets, return on sales and return on investment. Profit margin had an inverse relationship. All the variables were significant ($p < 0.05$).

4.6 Student's-T-Test

The student's t- test was carried out to compare the two betas (before introduction of Kaizen system and after introduction of Kaizen system) and determine if two sets of data are significantly different from each other

Table 4.10 Betas before the Kaizen and After the Kaizen

Beta before Introduction of kaizen system (2009-2010)	Beta after Introduction of kaizen system (2012-2013)
-.728	2.833
1.244	1.323
-.043	2.005
.521	-4.907

The above data is for the betas collected or generated after carrying out regression analysis for the two data sets. The two beta sets were used to determine if two sets of data are significantly different from each other. The study used paired t-test. The paired t test is generally used when measurements are taken from the same subject before and after some manipulation such as testing the performance of the company before introduction of Kaizen system and after introduction of Kaizen system.

Table 4.11 Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 beta1	.2485	4	.83742	.41871
Pair 1 beta2	.3135	4	3.53467	1.76734

The analysis found a mean of 0.2485 on beta1 which is beta for dataset before introduction of Kaizen system and a mean of 0.3135 on beta2 which is the beta for dataset after introduction of kaizen system in companies. These mean are so close indicating that there is No significance difference on business performance before and

after introduction of kaizen system. The analysis further found a standard deviation of beta1 as 0.83742 and beta2 as 3.53467.

Table 4.12 Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 beta1 & beta2	4	-.380	.620

Paired t-test, tests whether the mean of the sum of differences of each pair are equal to zero (H0), But correlation tells us whether there is any relationship between two groups. If the sig. (p-value) is small (<0.05), the two groups are significantly correlated. In this case, the P-Value is 0.620 which is greater (>) than 0.05 hence indicating that the two groups are not significantly correlated.

Table 4.13 Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 beta1 - beta2	-.06500	3.92970	1.96485	-6.31802	6.18802	-.033	3	.976

When the Sig (2-Tailed) value is greater than .05 (>.05) it can be concluded that there is no statistically significant difference between performance of the company before introduction of Kaizen system and after introduction of kaizen system. It can be concluded that the differences between the two Means are likely due to chance and not likely due to the Independent Variable manipulation. In this case, the Sig. (2-tailed) (0.976) is greater than 0.05. The study therefore indicates there is no statistically significant difference between performance of the company before introduction of Kaizen system and after introduction of kaizen system. It can however be concluded that in the long run, there will be slight but steady financial performance of manufacturing companies for the years after introduction of Kaizen system.

4.7 Summary and Interpretation

The study selected companies that adopted Kaizen system in the year 2011 so that to help investigate the past 2 years before introduction of kaizen system (2009 and 2010) and later after introduction of Kaizen System (2012 and 2013). The study seeks to get the difference in profitability on the 2 years (2009 and 2010) before introduction of Kaizen system and the two years (2012 and 2013) after the introduction of the kaizen system on the their manufacturing companies. Return on Investment as measured by dividing net profit by total assets, Profit Margin as measured by net income divided by revenues and Net Profits measured by Total Revenue minus Total Expenses. The study collected data on Return on Assets, as measured by the ratio of annual net income to average total assets, Return on Sales, measured by company's earnings divided by the amount of sales.

From the findings on the correlation analysis between company Profits and various indicators, the study found that there was positive correlation between Return On Assets and profits as shown by correlation factor of 0.988, the study also found a positive correlation between Profits and return on sales as shown by correlation coefficient of 0.998, association between profits and return on investment was found to have positive relationship as shown by correlation coefficient of 0.964, while profit margin on profits was found to have positive relationship as shown by 0.998. This indicated that the variables had a very high correlation on profit of the manufacturing companies even before the introduction of Kaizen system.

Model Summary for Profits before Introduction of Kaizen System indicated that adjusted R squared was 0.999 an indication that there was variation of 99.9% on the financial performance (between 2009 to 2010 before Introduction of Kaizen system) of manufacturing companies due to changes in Profit Margin, Return on Investment, Return on Assets and Return on Sales at 95% confidence interval. This shows that 99.9% changes in financial performance of manufacturing companies could be accounted for by Profit Margin, Return on Investment, Return on Assets, and Return on Sales

Model Summary after Introduction of Kaizen system indicated that adjusted R squared was 0.939 an indication that there was variation of 93.9% on the financial performance (between 2012 to 2013 after Introduction of Kaizen system) of manufacturing companies due to changes in Profit Margin, Return on Investment, Return on Assets and Return on Sales at 95% confidence interval. This shows that 93.9% changes in financial performance of manufacturing companies could be accounted for by Profit Margin, Return on Investment, Return on Assets, and Return on Sales while 6.1% could be accounted for by other factors not included in the model.

The student's t- test was carried out to compare the two betas (before introduction of Kaizen system and after introduction of Kaizen system) and determine if two sets of data are significantly different from each other. The analysis further found a standard deviation of beta1 as 0.83742 and beta2 as 3.53467. The analysis found a mean of 0.2485 on beta1 which is beta for dataset before introduction of Kaizen system and a mean of 0.3135 on beta2 which is the beta for dataset after introduction of kaizen system in companies.

The study therefore indicates there is no statistically significant difference between performance of the company before introduction of Kaizen system and after introduction of kaizen system. It can however be concluded that in the long run, there will be slight but steady financial performance of manufacturing companies for the years after introduction of Kaizen system.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

From the findings on the effects of kaizen system on the financial performance of manufacturing firms in Kenya the analysis found that in the short run, there was no statistically significant difference between performance of the company before introduction of Kaizen system and after introduction of kaizen system. It was however believed that in the long run, there would be slight but steady financial performance of manufacturing companies for the years after introduction of Kaizen system.

The relationship between determinants and predictor variables showed significant difference before introduction of kaizen system and after the introduction of the kaizen system. The study found that Profit Margin, Return on Investment, Return on Assets and Return on Sales were key measures of financial performance in the manufacturing companies and therefore the study indicate a perfect relationship between variables and determinants with a near 1.000 perfection. On the correlation of the study variables, the study found that there was positive correlation between Return On Assets and profits as shown by correlation factor of 0.988, the study also found a positive correlation between Profits and return on sales as shown by correlation coefficient of 0.998, association between profits and return on investment was found to have positive relationship as shown by correlation coefficient of 0.964, while profit margin on profits was found to have positive relationship as shown by 0.998. These indicated that the variables had a very high correlation on profit of the manufacturing companies even before the introduction of Kaizen system.

The findings on correlation analysis after Introduction of Kaizen system indicated that there was positive correlation between Return on Assets and profits as shown by correlation factor of 0.806, the study also found a positive correlation between Profits and return on sales as shown by correlation coefficient of 0.910, association between profits and return on investment was found to have positive relationship as shown by correlation coefficient of 0.963, while profit margin on profits was found to have positive relationship as shown by 0.903. These indicated that the variables

had a very high correlation on profit of the manufacturing companies even after the introduction of Kaizen system

5.2 Conclusion

The study thus concludes that manufacturing companies should and ought to adopt the Kaizen system for their improved financial performances but not expect immediate financial performance since growth has to be steady and visibly bigger in the long run. The study concluded that as much as the financial performance of manufacturing companies could not be easily noticed within a short run, the long run results are the most important when using the kaizen system.

It is concluded that when adopting kaizen system, the company should always keep an investigating eye on the past performances and compare with the current financial performances of the company but on the other hand should also investigate what other factors might have played to the improvement of the financial performance or deterioration of the financial performance of the company. The study further concluded that introduction of the kaizen system is not an automatic catapult to the great financial performance of the manufacturing companies, but patience and dedication should be invested among the employee and the management system in the organization to earn the expected results.

The study further concluded that Kaizen System should not be introduced with a view of gaining the benefits almost immediately. The study concluded that Kaizen system gains and benefits are steady and are more conspicuous in the long run. The management of any organization should expect to achieve the goals intended especially in the financial performance more in the long run after introduction of kaizen than in the short run. The study concluded that company management should make sure they prepare teams to monitor the performance indicators that have been affected by the kaizen system introduction and the performance there should be measures with comparison to other factors that might affect the overall performance.

The study further concluded that the introduction of Kaizen system should be a process starting with training the staff members, ensuring the supervisors understand that small but gradual improvement are only possible when they bridge the

bureaucratic barriers and engagement of employee and relying on their views is very critical to the success of the Kaizen system.

5.3 Recommendations for Policy

The study recommends that policy makers on financial performances of manufacturing companies and other companies should investigate the importance of kaizen system in private and public institutions to help the increased productivity and performance which is greatly lacking to most of the companies. The study recommends that more should be adopted from the kaizen institute in Kenya where they offer training and knowledge about Kaizen System and how to adopt and use the same to the benefit of the company in whole.

The study recommends that the regulatory body mandated to oversee manufacturing companies should make regulations that promote kaizen system in manufacturing companies in Kenya. The study recommends that there should be made proper regulations detailing the importance of kaizen system in all companies and how such should be implemented. This should not only be adopted by the large manufacturing companies but should be adopted by the smallest companies to the biggest of the companies.

Further, the study recommends that kaizen system should not be introduced with a view of gaining the benefits immediately. The study recommends that companies should expect greater benefits of Kaizen system in the long run than in the short run. The study recommends that organizations should take the first step to train, familiarize, inform and enhance the staff skills on how to improve the organizational performance through Kaizen system.

The study further recommended that to determine the actual performance of the Kaizen system, organizations should bridge the bureaucratic barriers and allow the top management to interact freely with the lower hierarchy members of the organization and build a proper rapport to enhance effective communication, efficient development of ideas, proper adoption of generated ideas and avoid dismissing the simple little ideas given by the junior staff about improvement of the organization. The study

finally recommended that even after introduction of Kaizen system, the organization should keep checking the milestones achieved by the introduction of the system to determine the growth and financial performance of the company.

5.4 Limitations of Study

The study was faced with some limitations. The study was not conclusive as it did not include some of the other aspects that affect the financial performance of manufacturing companies but concentrated with measures of financial performance of manufacturing companies such as Profit Margin, Return on Investment, Return on Assets and Return on Sales.

The limitations of time constraints and gathering of secondary information were also encountered in the study. Getting the data from different companies on different years was a challenge. Some companies did not post their information online and therefore data was scarce and not easy to find. Analyzing 4 years financial information for manufacturing companies was the biggest challenge.

Kaizen system impact on financial performance was assumed to be the cause of any improvement of company profitability from the year the kaizen system was introduced in such a company. This was a limitation because some other factors might have also contributed to the improvement of the financial performance in such a time.

The study findings were generated on companies that are well established making it less compatible to being generalized to start up companies. It is however believed that Kaizen system can be adopted by any company or organization whether small or big. The findings for this study however concentrated on bigger companies and not the start up businesses, meaning the results might not really be quite matching the findings for start up business.

5.5 Areas of Further Study

The study as indicated was not exhaustive of effects of kaizen system on the financial performance of manufacturing firms in Kenya. There are many factors that affect the financial performance of manufacturing firms and therefore it is envisaged that future scholars and researchers will investigate into details the effects of factors such as

monetary policy, political situation, balance of payments, market judgment and speculation among others.

The study further suggest that future scholars should carry out the study in the view of identifying the relationship between financial performance before introduction of Kaizen system and after introduction of Kaizen system but over a period beyond 10 years to bring out the inferences from a long run perspective.

The future scholars should investigate the relationship between financial performance triggered by introduction of kaizen system and the impacts of inflations, interest rate and other factors that might affect the financial performance. This will help in understanding how economic constraints and factors affect the financial performance of the manufacturing companies.

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APPENDICES

APPENDIX 1: LIST OF MANUFACTURING COMPANIES IN KENYA PRACTICING KAIZEN, OBTAINED FROM KAIZEN INSTITUTE AFRICA

1.	Apex Steel Ltd
2.	Aluminum Rolling Mills
3.	Associated Battery Manufacturer Ltd
4.	Bakes N Bites
5.	Bedi Investments
6.	Bidco Oil Refineries Ltd
7.	Blow Plast Limited
8.	Booth Extrusions Ltd
9.	Canon Chemicals Ltd
10.	Capwell Industries Ltd
11.	Chandaria Industries Ltd
12.	Connix Industries Ltd
13.	C & P Shoes
14.	Cook n'Lite Ltd
15.	Country Wide Connections Ltd
16.	Crown Berger (Kenya) Ltd
17.	Deepa Industries Ltd
18.	Dodhia Packaging Ltd
19.	Enns Valley Bakery
20.	Eveready East Africa Ltd
21.	Flooring & Interiors
22.	Fontana (EA) Ltd
23.	G. North & Sons
24.	General Printers Ltd
25.	Githunguri Dairy Farmers Co operative Ltd
26.	Hamwe Ltd
27.	Homegrown Ltd

28.	Insteel Ltd
29.	Interconsumers Ltd
30.	James Finlay Ltd
31.	Java House
32.	Kalu works Ltd
33.	Karirana Estates Ltd
34.	Kariki Group
35.	Kenafic Industries Ltd
36.	Kenchic Ltd
37.	Kenpoly Manufacturers Ltd
38.	Kenya Seed
39.	Kenya Sweets Limited
40.	Kenya Tea Development Authority
41.	London Distillers Kenya Ltd
42.	Malplast
43.	Mjengo Ltd
44.	Mabati Rolling Mills (MRM) Ltd
45.	NAS Plastics Ltd
46.	NAS Servier Airport Services
47.	Orbit Chemicals
48.	Oserian Flowers Ltd
49.	Panache International
50.	Premier Industries Ltd
51.	Regal Pharmaceuticals Ltd
52.	Rosewood Ltd
53.	Sadolin Paints (EA) Ltd
54.	Safintra Roofs & Steel
55.	Spin Knit Ltd
56.	Stokman Rozen (K) Ltd
57.	Synresins Ltd

58.	Thermopack
59.	Tower Houseware
60.	Ubbink East Africa Ltd
61.	Unga Holdings Ltd