A SURVEY OF ADOPTION OF WORLD CLASS MANUFACTURING IN KENYA'S MANUFACTURING SECTOR

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DECLARATION

This is my original work and has not been submitted for a degree in any other University.

..... 14/11/2008

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

..... 18/11/2008

ONSERIO NYAMWANGE **DATE**
SUPERVISOR

DEDICATION

To my family; Carol, Molo and Loko.

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I acknowledge scholars and the academic family for providing an enabling environment in which I have managed to carry out a scholarly study with the intend of enriching what has been studied as well as giving a chance to other scholars to carry out further studies. I wish to thank all the respondents for taking time out of their busy schedules to respond to my questionnaire.

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TABLE OF CONTENTS

LIST OF TABLES

TABLE OF FIGURES

ABSTRACT

This study sought to find out how companies are responding to these challenges by surveying the adoption of World Class Manufacturing (WCM) by Kenyan manufacturing companies. World Class Manufacturing is the merger of the best aspects of the world wide existing industrial culture or initiative and encompasses other operation strategies like, Total Plant Maintenance (TPM), Kaizen, Total Quality management (TQM), Lean Manufacturing, Six sigma and Just-In-Time (JIT).

The study adopted a descriptive survey and involved collecting of primary data from a sample of 40 firms, members of Kenya Association of Manufactures (KAM). The data used in the study was collected by a way of a semi-structured questionnaire.

The findings of the study indicate that the WCM principles that were rated as more important or most important by most respondents included: total quality management, focus on the customer, and focus on cost control, policy of continuous improvement, reduced product cost, and reducing delivery time. On the other hand those that were rated less important by most of the respondents included: reducing time to market, supply chain management and optimization existing IT systems and investments.

The benefits that ranked top by the companies involved in the study included: reduced: lead times, new product launched more quickly, vertical project start ups and improved compliance to specification. The challenges that were most significant to a majority of the firms involved in the survey included lack of understanding of the approaches and existing initiatives in place of World Class Manufacturing. Nature of manufacturing facility, attitude of the board and attitude of shop floor staff were also significant challenges. Minor challenges in implementation of this level as pointed out by the participants in the survey included: lack of communication, inability to quantify the benefits, cost of implementation and multiple business locations among others.

World Class Manufacturing is a term now becoming widely recognized in manufacturing and it covers a wide range of activities. For majority of the firms involved in the survey their implementations of World Class Manufacturing had already taken off, and were already reaping the advantages of this concept. Adopting the innovations of world class innovations leads to drastic performance improvements. However the reason why such a concept is not implemented is because management fails to recognize the importance of World Class Manufacturing and the benefits offered because of the lack of proper justification methodology. WCM is a process driven approach geared to achieve a set of concepts, principles and techniques for managing and operating a manufacturing set up and must be supported by top management

CHAPTER ONE: INTRODUCTION

1.0 INTRODUCTION

1.1 Background

The development of the economy of any country is supported by the growth of its manufacturing industries. The excellence of the manufacturing facilities and continuous improvement, play key roles in the progress of any nation. Currently, the manufacturing industries are passing through a phase of very tough competition and the economic environment is becoming harsh. In order to survive, every industry has to strive to improve productivity in all spheres of activity. What is required is to devise new ways of improving manufacturing performance by optimally utilizing the resources. In this contest, adopting or implementing the philosophy of World Class Manufacturing (WCM) is imperative and it provides a significant competitive edge to an organization over its rivals (Kenya Association of Manufacturing, 2006)

World Class Manufacturing is the merger of the best aspects of the world wide existing industrial culture or initiative and encompasses other operation strategies like, Total Plant Maintenance (TPM), Kaizen, Total Quality management (TQM), Lean manufacturing, Six sigma and Just-In-Time (JIT). Schlonberger (1996) defines World Class Manufacturing as a different set of concepts, principles, policies and techniques for managing and operating a manufacturing company. It is driven by the results achieved by the Japanese manufacturing resurgence following World War II, and adapts many of the ideas used by Japanese in automotive, electronic and steel companies to gain competitive edge. It primarily focuses on continual improvement in quality; cost, lead time, flexibility and Customer Service. WCM brings to the company a focused way of eliminate losses (waste) in a team work environment (Schlonberger, 1986)

The goal of the WCM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction. It was introduced with an objective of avoiding waste and creating lean organizations in a quickly changing economic environment, producing goods without reducing product quality, reducing cost and producing a low batch quantity (flexibility). This often results in higher productivity. Companies adopting WCM also focus on speed of total throughput from order capture through delivery setting new standards for delivery without the heavy dependence on inventory. Sequential methods of performing work are being replaced with concurrent methods to compress time, and functional and hierarchical divisions of duties are being replaced by team- driven activities. It is a management process of focusing on the most priority improvements areas, aiming the Zero targets (zero accidents, zero defects, zero stock), through multi-functional small groups (Shingo, 1981, 1988)

The new way of operating has brought great changes in the way of considering the management of a company at various levels: both on the strategic, managerial as well as on the operative level. The main and most visible change introduced by the WCM concept is of particular importance given to the operative level, which is considered crucially strategic for the company (Hodgetts et al. 1994).

WCM concept is able to give a competitive edge to companies where it is applied, which is necessary in order to be successful in today's market. However, in order to make it work, the concept must be understood and shared by everybody within the organization. Continuous training programs and communication must become part of the daily routines within the company in order to manage the cultural change, which is needed. It is in direct conflict with traditional capacity-driven manufacturing mentality found in western culture. The implementation will often surface resistance to change and "we've always done it this way" arguments. The worse resistance is usually found in the lower and middle management, but can also be found in the mid-set of workers as well. A case for change has to be created along with high employee involvement. Capitalization is also a major issue when new equipment is required for quick changeover, faster cycle times, and flexibility in operations. Executives may take a piecemeal approach to save on investment costs as an alternative and find themselves disappointed with the lesser results.

1.2 World Class Manufacturing Organization

Manufactures are facing more challenges than ever: global competition, regulatory policies, and rising customer expectations, just to name a few. Some see these challenges as obstacles. But world class organizations there are opportunities to differentiate and distance themselves from the competition. World class organizations consistently deliver results that place them in the top of their industries, and they achieve this by continuously examining business process, aggressively applying solutions to improve key areas, measuring themselves on financial and operational metrics, and focusing on success. They are successful in their chosen market against any competition regardless of size, country of origin, or resources. They are able to match or exceed any competitor on quality, lead-time, flexibility, cost/price, customer service and innovation. They are in control and their competitors struggle to emulate them (Ferdows and DeMeyer, 1990)

World class manufacturers are those that demonstrate industry best practice. The company should attempt to be best in the field at each of the competitive priorities (quality, price, delivery speed, delivery reliability, flexibility and innovation). World class manufacturers embrace practices that stream line their internal processes and eliminate waste. They train their employees and make them

active participants in the organization's future. They reach out to their customers and suppliers as partners and use technology to drive improvements (Justo, 2000).

World class organizations are recognized as the best in the world and they strive to maintain that status. While some organizations have achieved World class renown in selective areas such as quality management, few have achieved the distinction of world class as whole organizations (Schlonberger, 1996)

World class organizations excel in the dimensions that drive both total quality and learning organizations and beyond. Their most important characteristic is a total customer focus with all systems and staff committed to serve external and internal customers. Their flat organizational structure keeps all staff close to the customers, gathering data connected with customer's current and future needs and thus creating new demands for their goods and services based upon a customer's wish list (Bass and Avoloi, 1994)

World class organizations continuously improve what they do; an attitude of never being satisfied prevails, as well as a persistent desire to become increasingly excellent. In pursuing excellence, World class organizations utilize global networking, partnerships, alliances and information-sharing. In an effort to respond quickly and decisively to change, world class organizations become 'virtual organizations'. Virtual organizations utilize outsourcing and temporary alliances; they are then able to take advantage of rapidly changing opportunities, and can reduce costs and share risks when appropriate. A multi-skilled work force increases fluidity and resilience; employees who have mastered multiple skills and/or have been cross-trained to perform easily in more than one area to provide the operational flexibility necessary for quick changes, continued top performance in multiple sites and quality outcomes (Brady et al. 1990).

Human resources are widely recognized in World Class organizations as their most important asset. Employees are effectively energized in creative decision-making and problem solving. There is shared ownership of problems and solutions, strong commitment and involvement by top management, communication of consistent goals and objectives to all levels, and effective use of recognition and rewards. In World class organizations an egalitarian climate prevails. The organization and its participants respect and value everyone, both those in the organization as well as those who it serves: customers, suppliers, the community, the environment, and all others, both local and global (Podsakoff et al. 1996)

World class organizations are supported and driven by advances in technology. Information, differentiation and resilience are essential, as is as a creative staff, for serving the customer most effectively. Information technology plays a leading role in supporting the World Class organization (Hodgetts, 1994).

1.3 Manufacturing Sector in Kenya

Manufacturing sector takes the output of the primary sector and manufactures finished goods or products to a point where they are suitable for use by other businesses, for export, or sale to domestic consumers. This sector is divided into light industry and heavy industry.

Kenya Industrial research development Institute (KRDI, 1994) describes manufacturing industry as the sector of economy that is concerned with the production of goods from raw materials using organized labour and production systems with aid of machinery. Manufacturing operation perform some chemical or physical process such as weaving, sewing, welding, grinding, blending, refining or assembly to transform the raw materials into some tangibles products (Dilworth,1992)

Kenya is the most industrially developed country in East Africa (Kenya Association of Manufacturers, 2006), but it has not yet produced results to match its potential. Manufacturing is based largely on processing imported goods, although the government supports the development of export-oriented industries. Major industries include agricultural processing, publishing and printing, and the manufacture of textiles and clothing, cement, tires, batteries, paper, ceramics, and leather goods. Assembly plants, which utilize imported parts, produce various kinds of commercial and passenger vehicles and even export a small quantity to other African countries such as Uganda, Tanzania, Rwanda, and Burundi. Steel processing for re-export and for the construction industry is a growing sector, with about a dozen steel mills in operation. The petroleum industry, which was deregulated in 1994, produces diesel and jet fuel from imported crude oil at a refinery near Mombasa and provides a major source of foreign exchange.

The period Kenyan economy has been substantially deregulated, has not only exposed the previous protected sectors to global competition, but also has been forcing Kenyan industries, both multinationals and indigenous to adopt new strategies like ISO certification, Total quality Management (TQM), Re-engineering to remain competitive. After the implementation of trade reforms in the first half of the 1990s, it became evident that local firms, especially textile firms and agriculture based processing firms faced stiff competition from imports. It became clear that most firms could not sustain their high levels of employment and needed to be more flexible in adjusting their employment level. As a result, the redundancy laws were amended in 1994 to allow firms to

discharge more easily the redundant workers when necessary. This measure was taken as a result of the argument that it was necessary to enable firms to restructure their operations in response to economic adjustment taking place in the country (Ikiara and Ndung'u 1997). The textile industry was seriously hit leading to closure of house hold names like Rivertex industries and to day local products like Sugar and Rice face stiff competition from imported products due to high production costs. The situation was not helped by poor governance that led to the neglect of utilities and lack of investment in infrastructure, escalating global oil prices, a strengthening shilling, poor infrastructure, high taxation levels, inflation rate, a stringent regulatory framework, an up serge of cheap imports, corruption and speed money, and above all political uncertainty coupled by rising insecurity among other factors. In spite of progressive Government reforms in trade and investment implementation in the early 1990's, sectors like manufacturing responded poorly, an indication of lack of competitiveness (Kenya Association of Manufacturers, 2006)

After a period of subdued performance in the late 1990's, the Kenyan economy has in the last two years showed strong signs of recovery registering an impressive Gross Domestic Product (GDP) growth of 4.9 % and 5.8 % in 2004 and 2005 respectively, compared to the negative growth experienced in 1997. The Gross Domestic Product (GDP) grew from Ksh 1 billion in the year 2001 to Ksh .1.4 billion in 2005. The manufacturing sector has been part and parcel of this recovery. From a low annual growth of 1.6 in 2001, it registered an impressive 5% in 2005. A close examination reveals that this growth in the manufacturing sector has been driven more by an increase in Volume of out put than by improvements in efficiency and productivity. The increase in volume of out put is largely explained by increased exports to the east African community(EAC), The rest of the common market for Eastern and Central Africa (COMESA) and the USA (under African Growth and Opportunities Act – AGOA). The biggest boost was in 2005 with the opening up of export markets in Southern Sudan, Rwanda, and Democratic Republic of Congo, with export to these countries increasing by 21, 18, and 15% respectively. Despite various provisions within the (African, Caribbean and Pacific Countries and European Union (ACP- EU) Trading arrangements- previously under the Lome convention and now Contonou, Kenya does not have significant exports to Europe, and indication of low competitiveness. It would surprise many to note that the manufacturing goods constitute over 34% of the value of export/foreign exchange earning a head of horticulture, tea, coffee, and even tourism. (Central Bureau of Statistics, 2006)

The sub-sectors that recorded remarkable growth included plastics, construction, tobacco, textiles industries respectively among others. The plastic manufacturing industry grew by 25.9 per cent in 2005. Production of plastic bottles increased by 19.2 per cent in 2005. Increases were also recorded in the production of PVC pipes with a registered growth of 17.3 per cent. The

construction industry grew by 7.2% in 2005 compared to 4.0% in 2004. This growth is attributed to the increased activities in the housing sub sector, road construction and rehabilitation of and completion of stalled Government projects. The building and construction industry accounted for 7.2% of the country's GDP in 2005. The metallic products sub-sector grew by 3.8 per cent in the review period. The transport and communications sub sector which utilizes products from the manufacturing particularly cement, iron and steel among others contributed 8.3% of Kenya's GDP in 2005. Sale from the Export Processing Zones (EPZs) accounted for 4.7 per cent of total turnover in the manufacturing sector in 2005 mainly due to increased domestic sales. Employment in EPZs accounted for 15.7 per cent of total employment in the manufacturing sector in 2005. Some of goods exported by the sector include Maize and wheat flours, Sugar confectionery, Margarine, Beer made form malt, Tobacco manufactures, Fluorspar, Soda Ash, Pyrethrum Extract, Petroleum products, Animal and Vegetable oils, Medicinal and Pharmaceutical products, Essential oils, Insecticides and Fungicides, Wood Manufactures, Paper and paperboard, Cement, Iron and Steel, wire products (Nails, screws, nuts etc), Articles of Plastic (Kenya Association of Manufacturers, 2006)

'The Economic Recovery Strategy Paper for wealth and Employment Creations' (ERSWEC) states that the manufacturing sector is projected to grow at an annual average rate of 8.6% between 2003 and 2007, compared to 0.6 % in 2006. The sector is expected to contribute 17.7% of the GDP by 2007. The Economic Recovery Strategy also states that the growth in the manufacturing is expected to be propelled by higher capacity utilization and reduced costs of production as a result of improved business environment (Central Bureau of Statistics, 2006)

The rapidly increasing global competition that many sectors world wide have been facing over the past decade, associated with rapid technological changes and product proliferation, has led to a new scenario in which industries, in order to maintain competitive, must continuously implement best practical management principles, strategies and technologies. As global competition intensifies, achieving world class organization status is not just desirable goal; it is a necessity for survival. Therefore, there is an ongoing need to compare current manufacturing practices with the best and raise them continuously to world class standard.

1.4 Problem Statement

Faster economic growth requires increased investment and higher productivity, internally the manufacturing sector today is facing other key challenges, the deteriorating physical infrastructure in the country, high energy costs, access to external markets, counterfeit products which are inferior in quality, escalating prices of raw materials, fluctuations of exchange rates and low

consumer spending. On the global stage, there are development challenges posed by globalization and liberalization of the world economies. Kenyan products must be able to compete on a level playing ground against imports as well as being of high value exports to compete with the global products. The Kenya Manufacturing sector must therefore be prepared to manufacture high quality products that will efficiently compete with others for the emerging markets such as East Africa Corporation (EAC), the common Markets for eastern and Southern Africa (COMESA), European Union (EU), the Americas, and Asia among others (Kenya Association of Manufacturers, 2006)

World Class Manufacturing concept is able to give a competitive edge to companies where it is applied; however, in order to make it work, the concept must be understood and shared by everybody within the organization. Continuous training programs and communication must become part of the daily routines within the company in order to manage the cultural change, which is needed. While alignment of the manufacturing function with the strategic priorities is core to competitiveness, the transformation of the manufacturing sector to World Class Manufacturing plays a very important complementary role in the quest for competitiveness in the long run. Firms must reduce their cost of doing business and improve there efficiencies (Jusko, 2000)

Kenya Association of Manufacturers, (2006), shows that Kenyan manufacturing sector is lagging behind in competitiveness against China, Tanzania and Pakistan, and only slightly better than Uganda and Bangladesh. The survey identified the internal and external challenges, and suggests one area of further research, to address manufacturer's internal weaknesses, to which this research is pursuing to reveal and to establish up-to-date information on the current adoption status of World Class Manufacturing by Kenya manufacturers.

1.5 Research Objectives

The objectives of the study were:

i. To establish the extent of the adoption of World Class Manufacturing in Kenya's manufacturing sector
ii. To document the perceived benefits that drive manufactures to implement World Class Manufacturing
iii. To establish the challenges manufacturers face while adopting World Class Manufacturing

1.6 Importance of the Study

The study sought to benefit the following:

1. The Manufacturing industry - The research findings are expected to provide an insight into the contributions of World Class Manufacturing as an operations strategy in improving the corporate performance. This knowledge provides yet another tool to help manufacturers improve and gain competitive advantage.

2. The Kenya Association of Manufactures and other regulatory bodies- the research will provide facts and information which, they can make a decision on which way to drive the sector. The research will act as a catalyst of faster adoption and implementation of World Class Manufacturing practice to those industries that have not.
3. The researchers – the study seeks to stimulate interest for further study in World Class Manufacturing, mainly in the manufacturing sector but also in other sectors of economy, including government institutions and service industry.

4. The Practitioners - It will provide benchmarking partners and learning mates. It will highlight the challenges being faced by the sector which needs the practitioners' intervention and guidance.

5. The academicians – the research findings will contribute to the knowledge in the area of Operations management in Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Manufacturing Strategy and Competitiveness

Manufacturing strategy specifies how the firm will employ its production capabilities to support its corporate strategy (Hill, 1994). The corporate strategy is bonded on the firm's vision and Mission and in essence it reflects how the firm plans to use its resources and functions (Marketing, Human resources, Finance, R&D etc) to gain competitive advantage.

A company must choose an appropriate set of competitive edge criteria, those things on which it plans to compete. It should answer the questions, "what do you sincerely want to be good at?" and "what could we try to be good at?" we call these the competitive edge criteria. It does this against the background of the corporate strategy, the environmental pressures which act upon it, the characteristics of the market in which it operates and of course, the strategies of the major competitors. The important thing is a company must decide operationally how it is going to compete in the market and then translate that into the appropriate marketing and Manufacturing strategies (Schonberger, 1996)

Manufacturing strategy "defines how operations will assist in the achievement of the business objectives" (Platts and Gregory, 1995). The contribution of manufacturing is realized through the deployment of strategic decisions in a number of manufacturing areas so as to align the company's skills and resources with its competitive strategy and enhance its ability to compete on dimensions generally classified as quality, cost, delivery speed, delivery reliability and flexibility (Platt and Gregory, 1991).

Skinner (1969) sounded the initial call with the observation that manufacturing has not been managed strategically, as it has been the missing link in the corporate strategy conception and development. Subsequently, skinner (1985, 1978), Wheelwright (1978), and Buffa (1984), argued that manufacturing should co-ordinate its decisions in a coherent manner so as to be consistent with and in support of the overall corporate strategy. Hence all manufacturing decisions should be screened to see that they are consistent with the corporate level strategy (Wheelwright, 1978)

Hayes and Wheelwright (1984) provided a significant breakthrough in the progression of thinking with regards to strategic manufacturing when they proposed a four – stage framework of manufacturing effectiveness in any given operation.

2.1.1 Stage 1: Internally Neutral

This is where manufacturing is expected to be neither proactive nor locked in to any particular form of technology visa-a –vis the other functions within the organization; manufacturing does not play any strategic role but internally neutral listed. This is where skinner's (1969) observation that manufacturing is missing in the corporate strategy holds true. Where; as strategic issues arise in manufacturing, experts are consulted.

2.1.2 Stage II: Externally Neutral

Manufacturing function will now seek to maintain parity with the rest of the industry. In this way industry practices are followed and adopted. At this stage parity is pursued through the primary means of capital investment.

2.1.3 Stage III: Internally Supportive

This is the role where manufacturing purposefully pursues a manufacturing strategy; seek to ensure that all its decisions are coherent and consistent, in support of the corporate strategy

2.1.4 Stage IV: Externally Supportive

Where as manufacturing can play a more significant proactive role in leading other functional areas in the corporate strategy, this means that the manufacturing should not be merely supporting the corporate level strategy, but rather, it should contribute actively to the initial conception and development of the corporate strategy itself. Hence, visa – a –vies the other traditional functional areas, operations can and should attempt to contribute proactively to the overall corporate strategy. At this stage of effectiveness, manufacturing is continually seeking for capabilities in the anticipation of needs, therefore allowing it to stay constantly a head of competitors. This is the stage where the World Class Manufacturing organizations resides and it the focus of this paper

2.2 World Class Manufacturing

The origin of WCM can be found on the shop floors of Japanese manufacturers and in particular, innovations at Toyota motor corporation (Shingo, 1981, 1988).These innovations resulting from scarcity of resources and intense domestic competition in the japans automobile industry. The core of this company paradigm is to reach global performance of the company in terms of quality, cost, flexibility, adaptability, innovation and furthermore to constantly improve the use of the full potential of company resources, which represent a high cost (mainly the personnel and the

customers). This means having a production system, which work according to the 0 logic, i.e. produce just-in-time (zero stock) and with total quality control (zero defects).

World Class Manufacturing is a term now becoming widely recognized in manufacturing and it covers a wide range of activities. A review of the literature reveals that there is no universally recognized definition of WCM. The term 'World Class Manufacturing' was first coined by Hayes and Wheelwright (1985) to describe organizations that achieve a global competitive advantage through use of manufacturing capabilities as a strategic weapon. Schonberger (1986), very interesting, defined WCM as analogous to the Olympic Games motto Citius, altius, fortius, which translates to faster, higher, and stronger. Similarly, the WCM's equivalent is continual and rapid improvement.

Womack et al (1990) provided a lead for qualifying the term world class while defining lean production, which uses less of everything: half the human effort in the factory, half the manufacturing space, half the investment tools, and half the engineering hours to develop a new product. Also, it requires keeping far less than half the inventory on site, results in fewer defects, and produces a greater and ever-growing variety of products.

Giffi el al. (1990), pointed out that, for a world class manufacturer customers and quality aspects are the focal points. Oliver et al. (1995), observed that to qualify as world class. A plant had to demonstrate outstanding performance on measures of both productivity and quality. It can be concluded that WCM is being considered as a manufacturing philosophy by some researchers, while others consider it as a tool or new a new concept. WCM when integrated with other existing manufacturing system can be considered as the amalgamation of all these (a Philosophy, a tool, and a concept) to enable manufacturers to 'be the best' in their field.

Hayes et al. (1988), identified the importance performance attributes of WCM as becoming the best competitor, growing more rapidly and being more profitable than competitors, hiring and retaining the best people, developing top-notch engineering staff, being able to respond quickly and decisively to changing market conditions, adopting a product and process engineering approach which maximizes the performance of both, and continually improving. Kinni (1996) discussed three core strategies, namely customer focus, quality, and agility, to characterize WCM and provided six supporting competencies of employees; supply management, technology, product development, environmental responsibility, employee safety, and corporate citizenship. Further, (Dertouzos et al, 1989; Hayes et al 1988; and Harmon and Peterson, 1990) have cited poor coordination of production activities as a major cause of the low performance of manufacturing

firms in the 1980s and WCM was meant to attack the effects of poor coordination, resulting in better product designs, simple floor layouts, improved response times, and better relations with suppliers and customers.

The emphasis of continuous improvement is developed by Schonberg(1986):'Today there is wide agreement that continual improvement in the quality, cost, lead time and customer service is possible, realist and necessary . One more primary goal, improved flexibility, is also part of the package. With agreement on the goals, the management challenge is reduced to speeding up the pace of improvement'.

Schonberger (1986) discuses three Dominant WCM precepts; Just-in-Time (JIT) manufacturing, based on the principle of eliminating waste and reducing batch sizes to the ultimate of one. The reduction highlights manufacturing issues such as product quality, set ups, inventory management, etc and forces the introduction of solutions which results in improved performance. Total quality control (TQC), focusing on the elimination of route causes, to produce good right first time. Total productive maintenance (TPM), which emphasizes the reliability of the production processes as a whole.

World class organization embrace practices that stream line their internal processes and eliminate waste. They train their employees and make them active participants in the organization's future. They reach out to their customers and suppliers as partners. And they use technology to drive improvements. (Justo, 2000)

2.3 Describing World Class Manufacturing

World Class Manufacturing as a system can be described in a number of ways. One way is to describe in terms of objectives, another one by the phases of development, yet another way to simply list the six most concrete elements of the system.

2.3.1 Balanced 'top-down-bottom –up'

Before setting for a WCM journey a company must ask itself what it wants to achieve. The cornerstones of the company strategy must be quantified in order to guarantee a consistent understanding of the strategy across the company, in order to enable a systematic and scientific approach to deploy the strategy into concrete action. "bottom-up" is the logical deployment of the major losses into the most important common nominators leading to launching of small problem solving teams in areas that also have the highest amounts of real practical problems. (Domingo, 2005)

2.3.2 Cross-functional teams and extended participation

Good functioning of an entire organization requires much more than maximizing the efficiency of each function. Classical mass production aimed at increasing productivity through a highly specialized work force whose work was divided into small and repetitive tasks, thus requiring low skills and offering a low cost to early industrial companies. Employees were not expected to think about what consequences their actions might have on other functions. This task was given to other groups of specialists and naturally all this required standards to be developed and much more. The implications to productivity were enormous and the drawbacks became evident only when Japanese car manufacturers learned to produce better cars than their western competitors. Yet they did it with higher productivity, higher yield, less rework, higher flexibility to change models on the production lines and faster pace of model renewal. They drove the western car manufacturers from a steady slide from the fifties into their deepest crisis ever, boosted by the oil crisis in 1973. In the past twenty years leading western car manufacturers have gone through a major transformation towards World Class Manufacturing, in order to survive the competition. (Domingo, 2005; Zahran et al. 1992)

2.3.3 Inter-functional working groups

Classical mass production created on one hand those people who perform and the other, those that think. The Japanese carmakers concluded that they need good engineering to make their lines more effective, but on the other hand a few engineers alone could not change the whole world. They needed more people engaged to improvements, and all employees were to think about the whole chain, not just their own functions. Teamwork was introduced and different functions and disciplines were gathered around common problems. Cross-functional teams evolved. This way improvement became an everyday responsibility of all employees (Takahash and Osada, 1190)

Many specialist skills will still be necessary in industry due to complexity of technology and high demands on specific skills. However the specialists are now placed within cross-functional teams, where every member has an understanding of the common goals, and develop an understanding also for the skills and demands of the other functions. Low skilled employees in line work learn basic specialist skills in order to master and take ownership of complex lines. Highly skilled specialists learn general skills in order to serve the goals of the company, not only of an isolated function. Deep-rooted culture of team work requires an unusually high level of delegation, but also concrete support in forms of time, money, training, facilitation, teams' assessments, and recognition. (Domingo, 2005

2.3.4 Continuous skills improvement

Most big companies declare that their employees form their most valuable asset, yet few companies are capable of systematic development of their number one asset. One of the basic mistakes of training and education initiatives is that they are run as campaigns, without immediate relation to the work performed or result to be expected in a near future. There's a saying: "what you hear you forget, what you see you believe, what you do, you remember" For the same logic, much of the money companies spend on training never comes in to proper use. World Class Manufacturing provides a system to establish and develop, the basic job related skills and abilities in order to guarantee consistency of work in all functions (Trofino, 1990, 1993)

2.3.5 Visual management

To make good game decisions a player in a football team must know where the ball is, where the other team members are positioned, where they are headed, the movements of the opposing team, the referees, the coach, and much more. How credible is a blindfolded team whose movements depend on a coach shouting directions through a megaphone? A worker doing a repetitive task in repetitive circumstances might be able to perform a work consistently and with good performance without any visual control. In a dynamic company, where work evolves and all employees are expected to be an active part of a never-ending circle of improvement, visual understanding and control over the goals, strategy, tactics, movements and problems becomes essential. Visual management is a way to manage communication between all groups of employees, managers or operators, to all directions – the basic requirement for a seamless team effort. (Domingo, 2005)

2.3.6 Standardized approach – methods, techniques, tools

A string of management innovations over the past 50 years has made WCM evolve to its current form. It offers a balanced and complete system for industrial management. The key concepts (or sub-systems) are called pillars. Each pillar offers specific problem solving routes to specific classes of problems. Each route involves a complete set of techniques specific to respective step of the route. The techniques range from simple to highly advanced, depending mainly on the type of problem and level of difficulty. (Domingo, 2005)

WCM has ten "traditional" pillars, which are largely the same regardless of company. A number of new pillars have been developed during recent years, partly due to special circumstances, and to large part because of WCM evolving into a corporate system with its wider requirements. The basic pillars are; Autonomous Maintenance (AM), Focused Improvement (FI), Planned

Maintenance (PM); Training & Education (E&T), Quality Maintenance (QM), Early Equipment Management (EEM), WCM in Office (WO), Safety and Environment (SHE), Cost and Supply chain (SC) (Walmott and McCarthy, 2001)

The ten basic pillars have been developed with the aim of achieving zero defects, zero machine breakdowns, zero accidents, reducing transformation cost as close as possible to the technological level with zero losses. The same underlying principles that apply for defects and breakdowns of physical products and machines can be applied just as well to services and service systems. This finding has made WCM into such an essential part of the corporate strategy of numerous large companies.

2.4 Justification for World Class Manufacturing

Many organizations around the world attempt to justify and create WCM by investing substantial amounts of time and money. Schonberger (1986) and Harmon and Peterson (1990) reported that there was an early enthusiasm for WCM, as some manufacturing firms adopting these innovations reported drastic performance improvements, but at the same time Plossl,(1990) and Zammuto and O'Connor (1992) commented that their implementation was uneven and sometimes faced problems. One of the possible reasons for such problem may be that to management fails to recognize the importance of WCM and the benefits offered because of the lack of proper justification methodology.

One school of thought concerning justification of advanced manufacturing systems states that, if manufacturing is to be a competitive tool, justification has to become more of a policy decision rather than an accounting of financial procedure, while another school of thought states that advanced manufacturing systems can be 'sold' to top level management only if all relevant costs and benefits are quantified and presented in an easy–to-understand format (Nicholas, 2000). Managers who are considering the introduction of WCM in there organization not only have to identify the application of the WCM and to plan its implementation but also need to ensure that the use of a WCM will be a viable alternative. The economic justification process has long been identified as the largest obstacle to the adoption of advances automated manufacturing systems. Today, most major organizations are struggling with their justification procedure because they are either misapplied or the information included in the calculations is inadequate for the multifaceted problem being tackled (Sheridan, 1997)

One tool to present a business case is the use of Overall Equipment Effectiveness (OEE). It is a tool that combines multiple manufacturing issues and data points to provide information about the

process. It is an all-inclusive benchmarking tool that serves to gauge the various sub-components of the manufacturing process (i.e., availability, performance and quality) and used to measure actual improvements on 5S, WCM, Lean Manufacturing, TPM, Kaizen and Six Sigma. When using OEE with these management systems the benefits become tangible and noteworthy (Peter and Dennis, 2000)

After all factors are taken into account, the OEE result is converted (transmuted) in percentage. The results (in %), therefore, can be regarded as a preview of the existing production efficiency of a particular line, cell or machine.

As we know, manufactured goods are a result of a complex production process and without the proper measuring tools and formula, expect your business to run blindly even in the light of day. Having the right metrics, OEE provides you a window to analyze out-of-the-ordinary issues and gives you an established framework for improving the whole manufacturing process (Harmon and Peterson, 1988)

There are dozens of formulas, systems and metrics being used to improve the whole manufacturing process, but only OEE correctly reduces complex production problems into simple, easy-to-follow steps in handling data and information. The OEE tool helps you to methodically improve the process using basic measurements. The good thing about using OEE is that this particular measuring tool cannot be manipulated. OEE is by far the most effective benchmarking tool in making sound management decisions. OEE is a very simple metric that immediately indicates the current status of a manufacturing process. Somehow it also becomes a multifaceted tool allowing you to understand the effect of the various issues in the manufacturing process and how they affect the entire process (Harmon and Peterson, 1988)

The classic measure of OEE is the product of terms, OEE = Actual output / Theoretical maximum output or Availability Ratio x Performance Ratio x Quality Ratio. Availability Ratio is share of the actual production time and the planned production time. All planned stops and breakdowns will reduce the availability ratio, including set-up times, preventive maintenance, breakdowns and lack of operators. The only time that you may choose to deduct from the availability ratio is lack of orders. Secondly performance ratio is loss of production due to under-utilization of the machinery. In other words, losses are incurred when the equipment is not run with full speed. Short, unregistered, stops may affect the performance ratio as well. Thirdly quality ratio is the amount of the production that has to be discharged or scrapped. (Harmon and Peterson, 1988)

When many organizations first measure Overall Equipment Effectiveness it is not uncommon to find they are only achieving around 40% - 60% (batch) or 50% - 75% (continuous process)

whereas the international best practice figure is recognized to be +85% (batch) and +95% (continuous process) for Overall Equipment Effectiveness. In effect, this means there exists in most companies the opportunity to increase capacity / productivity by 25% - 100%. (Harmon and Peterson, 1988)

2.5 Key Success Factors of World Class Manufacturing

All indicators of excellence in manufacturing operations can be conveniently grouped into five: defect-free, fast, flexible, lean, and environment-friendly. The sequence, defect-free, fast, flexible, lean, and environment-friendly is not mutually exclusive for those who wish to clear the hurdles one at a time.

The five; defect-free, fast, flexible, lean, and environment-friendly are intended to be the results or deliverables, the "what's" of any or all programs the factory or company chooses to employ. All management philosophies or schools of thought or "how's" are welcome, but do not garner points unless they achieve any of these five indicators of excellence. For example, a factory, in trying to achieve the 5 stars, may employ programs such as Total Quality Management (TQM), ISO 9000, Six-Sigma Program, Total Productive Maintenance (TPM), Kaizen or continuous improvement, Quality Circles, Business Process Reengineering, Just-in-Time, Total Quality Environmental Management (TQEM), ISO 14000, Single Minute Exchange of Die (SMED), 5S-Houskeeping, Supply Chain Management, Activity Based Costing, etc. These are means to an end. They are not ends in themselves. (Domingo, 2005)

Manufacturing companies must dedicate themselves to continual, rapid improvement in quality, response time, flexibility, and value. Whiles customers' product preferences vary over time, the targets of excellence in providing the products do not. That is all what customers want ever-better quality, flexibility, and ever – higher value. Quick response time includes time to market, supply-chain reaction time, flow time through the support offices cycle time trough the plant, delivery time to the external customer, and service recovery time when things go wrong. A measure of human-resource flexibility is number of jobs mastered; another is the firms' ability to grow and shrink labour capacity as demand rises and falls. Equipment flexibility is measured as well; speed of set up or changeover, movability of equipment, and reaction time in bring on new capacity.

. (Schonberger, 1996)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

This was a descriptive survey and involved collecting of primary data for analysis. The great strength of questioning or conducting a survey as a primary data collecting technique is its versatility. It does not require that there be a visual or objective perception of information sought by the researcher (Cooper and Schindler, 1999).

3.2 The Target Population

The target Population of the study was Kenya Association of Manufacturers (KAM) Members. The KAM has 549 members drawn from formal sector industries comprising of small, medium and large industries, and grouped into 15 different sectors according to what they manufacture (Appendix II).

3.3 The Sample

How large a sample should be is a function of the variation in the population parameters under study and the estimating precision needed by the researcher (Cooper and Schindler, 1999). Rosco (1975) proposes a rule of the thumb, a sample size of 30 to 500 is appropriate for most research.

For the purposes of the study a target sample of 100 firms was to be selected from the KAM 2006 directory. The sample was picked proportionally from each sector. Cooper and Schindler, (1999) suggests that Purposive sample is one of the best techniques used to gather qualitative data especially where population is homogenous and /or in groups, where variation exists and where comparison is required.

Sector	Total No.	Sample size
Food, Beverages and Tobacco	120	22
Paper and Paperboard	60	11
Metal and Allied	59	11
Textile and Apparels	57	10
Plastics and Rubber	53	10
Chemical and Allied	48	9
Consultant and Industrial Service	47	9
Energy, Electrical and Electronics	30	5
Motor Vehicle Assembly and Accessories	22	4
Pharmaceutical and Medical Equipment	18	3
Building, Construction and Mining	14	3
Timber, Wood Products and Furniture	12	2
Leather Products and Footwear	6	1
Affiliate Associations	2	0
Array	1	0
Grand Total	549	100

Table: 3.1 the survey sample

3.4 Data Collection

Primary data was collected by a way of a semi-structured questionnaire consisting of two parts. Section I, gathered the company profile data and section II gathered World Class Manufacturing data. The World Class Manufacturing section was divided into broad areas covering; the understanding of World Class Manufacturing, Business strategy, Lean benefits, Supply Chain Management, Equipment and Maintenance (OEE), and Information Technology sub sections.

Data collection involved both dropping and picking of questionnaires and emailing to target respondents of production/Operations managers, general managers, factory engineers, plant managers, marketing mangers and Chief Executives via email addresses contained in the directory. To improve response, reminders were sent to respondent after first week, second week and then third week.

3.5 Data Analysis

All Questionnaires were carefully edited for accuracy, consistence, uniformity, completeness and arranged to simplify coding and tabulation. Where possible, corrections were done to certify that minimum data quality standards were achieved. No quotas were set and no weights applied. Data analysis was analyzed and the results were presented in frequency distribution tables, simple, visual bar graphs and pie charts.

4.1 Introduction

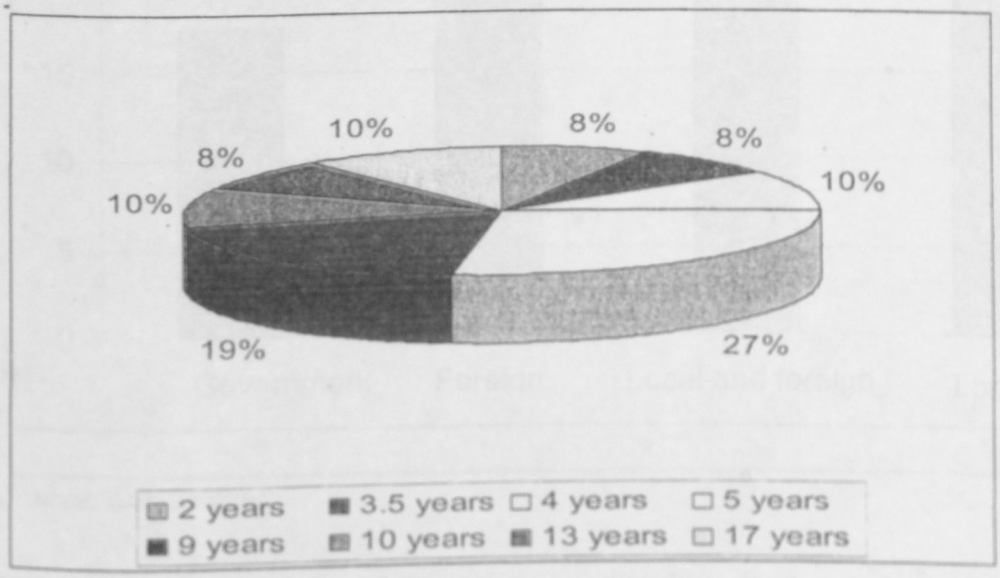
This chapter gives a detailed analysis of the data collected and presents the findings. The data has been analyzed and presented in form of frequency tables, percentages and charts. Findings in this chapter have tried to fulfill the objectives of this study. The study surveyed 40 firms out of the target of 100 firms and therefore achieving a 40% response rate.

4.2 Position of the respondent

The respondents to the study included, Assistant Engineers, Commercial analysts, Directors, Kaizen Coordinators, Industrial engineers, Management maintenances, Operations Engineers, Optimization Engineers, Production Managers, Production Supervisors Systems Co-coordinators This shows that the researcher was able to get the targeted respondents.

4.3 Number of years in the company

Figure 4.1: Number of years in the company



Source: Survey data

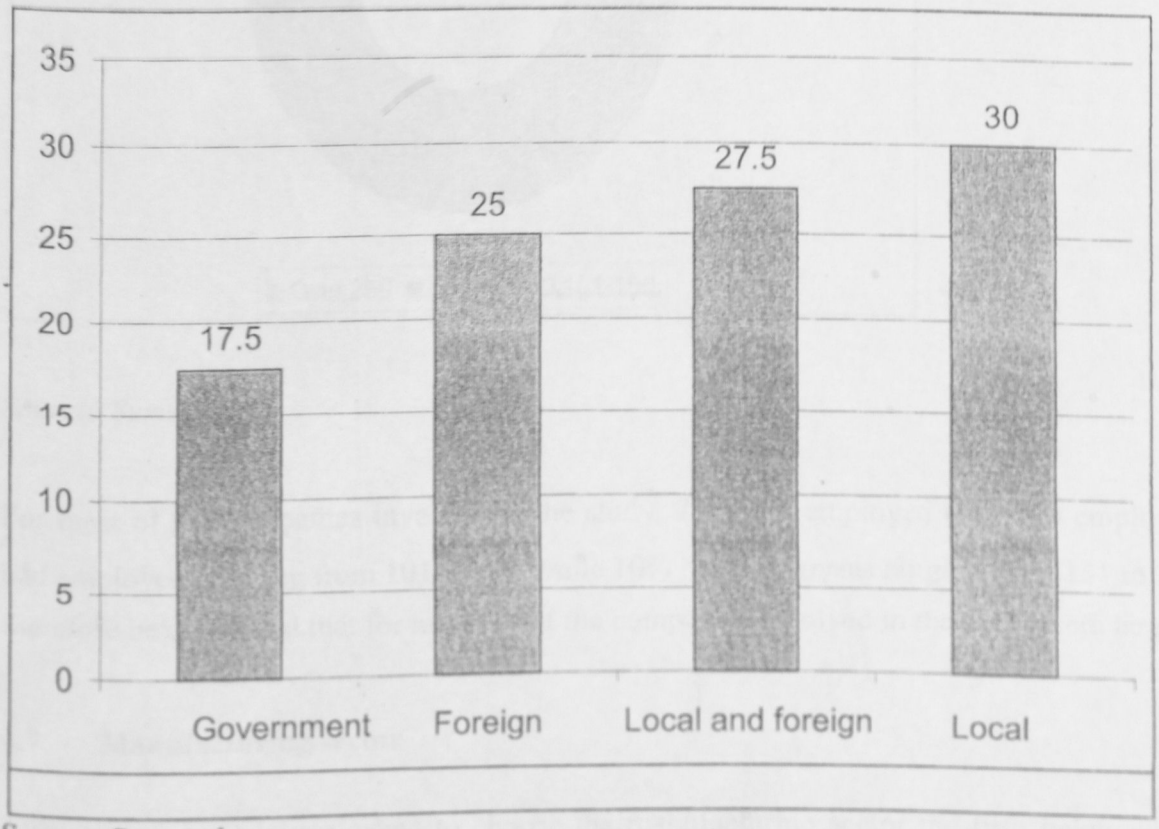
The above chart shows that 8% of the respondents had been with the company for 2 years, another 8% had been with the company for 3.5 years. On the other hand 10% had been with the company for 4 years. The remaining 76% had been with the company for 5 years and above. The researcher was therefore in a position to know that the respondents had been with the company long enough to understand the company operations.

For majority of the respondents the number of years that they had been with the company was the same as their working experience. In addition up to 82.5% of the respondent had a working experience of 5 years and above.

4.5 Ownership of the firm

The companies involved in the study had their ownership varying from being owned by foreigners, locals, both locals and foreigners and the government. In this section respondents were asked to indicate their ownership from a list of categories provided. The graph below summarizes the results as pertains to ownership.

Figure 4.2: Ownership of the firm



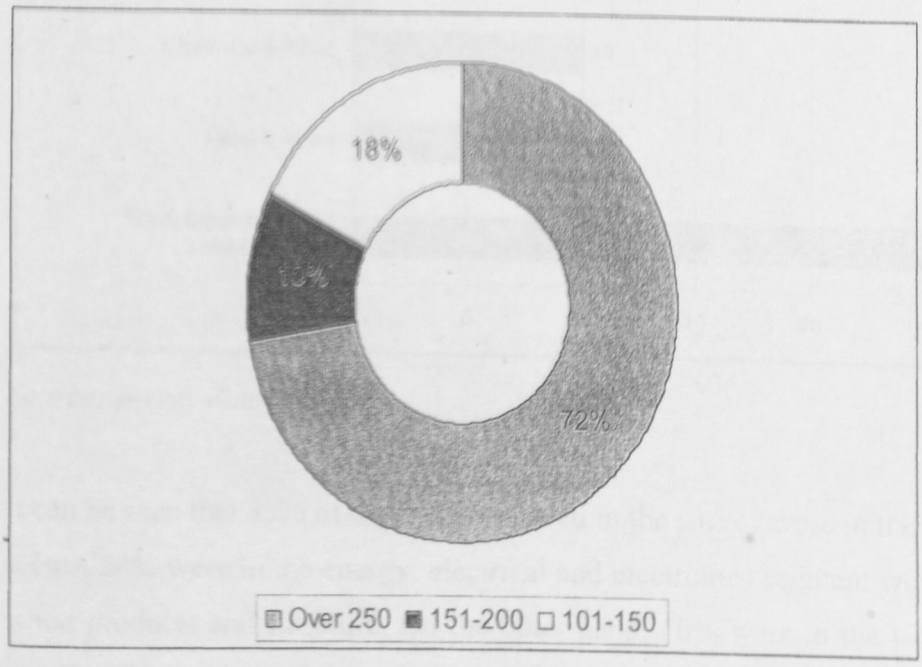
Source; Survey data

It can be seen that 30% of the companies involved in the study were owned by the locals' government, 27.5% were owned by both foreigners and locals, and 25% were owned by foreigners while on the other hand 17.5% were government owned.

4.6 Number employees

The number of employees determines the size of the company. This section sought to find out from the companies involved in the study the number of employees they had employed. The results are shown in the figure below.

Figure 4.3 Number employees



Source: Survey data

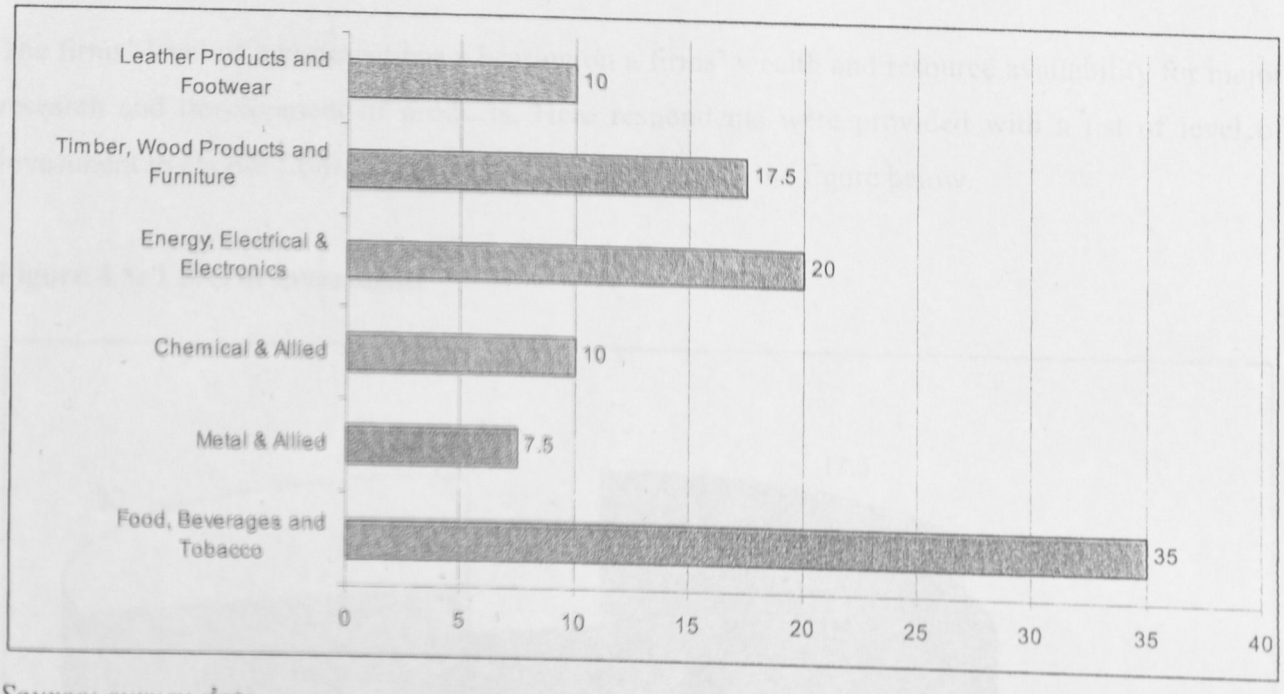
For most of the companies involved in the study, 72% had employed over 250 employees, 18% had employees ranging from 101 to 150 while 10% had employees ranging from 151 to 200. It can therefore be concluded that for majority of the companies involved in the study were large sized.

4.7 Manufacturing sector

The respondents where asked to choose the manufacturing sector the firm belonged in Kenya Association of Manufacturing?

This section sought to find out the sector to which the company belonged in the Kenya Association of Manufacturing. The graph below summarizes the results.

Figure 4.4: Manufacturing sector



Source: survey data

It can be seen that 35% of the firms involved in the survey were in the food, beverages and tobacco sector, 20% were in the energy, electrical and electronics segment while 17.5% were in the timber wood products and furniture. On the other hand, 10% were in the leather products and footwear, another 10% in the chemical and allied sector while 7.5% were in the metal and allied sector.

4.8 Market segment

Table 4.1: Market segment

Segment	Frequency	Percent
Both Local and Export	40	100.0
Local	0	0.0
Export	0	0.0
Total	40	100.0

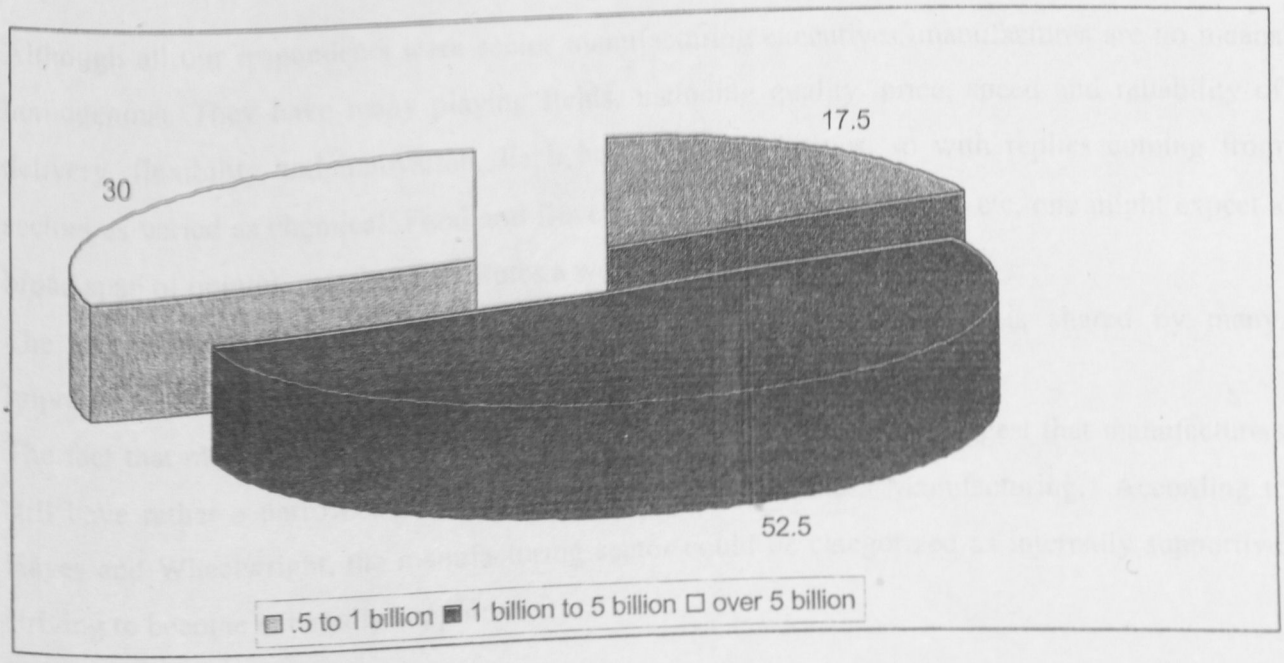
Source: Survey data

The above table shows that for all the companies involved in the survey, all of them served both the local market and the export market.

4.8 Firms' level of investment

The firms' level of investment has a bearing on a firms' wealth and resource availability for major research and development of products. Here respondents were provided with a list of level of investment to choose from. The results are summarized in the figure below.

Figure 4.5: Level of investment



Source: Survey data

Figure 4.5 shows that 52.5% of the firms involved in the survey had a level of investment of between 1 billion and 5 billion, 30% had a level of investment of over 5 billion while 17.5% had a level of investment between 500 million and 1 billion.

4.8 Have you heard the term World Class Manufacturing?

The respondents were asked here whether they had heard the term World Class Manufacturing and to give brief description of what they understood of World Class Manufacturing.

Most of the respondents comprising 80% of the respondents understood very well WCM while 20% were not too sure, about their understanding. Smaller companies are slightly less likely to have heard of the term than their larger counterparts. All multinationals companies surveyed have heard of the term.

4.9 'What do you understand by the term World Class Manufacturing?'

The respondents stated various definitions and understanding of World Class Manufacturing. The response was varied.

90% of those who indicated they understood World Class Manufacturing responded; 30% removal of waste, 25% reduction of cost, 35% improvement of efficiency and processes, while 10% gave other varied meanings

Although all our respondents were senior manufacturing executives, manufactures are no means homogenous. They have many playing fields, including quality, price, speed and reliability of delivery, flexibility and innovation. Each has its own priorities, so with replies coming from sectors as varied as chemical. Food and Beverage, paper and paper board etc, one might expect a broad span of opinion on what constitutes a world class manufacturer.

The results, however, show that the importance of certain attributes is shared by many. Improvement of efficiency was the single most common response.

The fact that many respondents chose individual aspects of the whole suggest that manufacturers still have rather a narrow view of what constitutes World Class Manufacturing. According to Hayes and Wheelwright, the manufacturing sector could be categorized as internally supportive, striving to become externally supportive.

4.10 Pillars of World Class Manufacturing are in operation

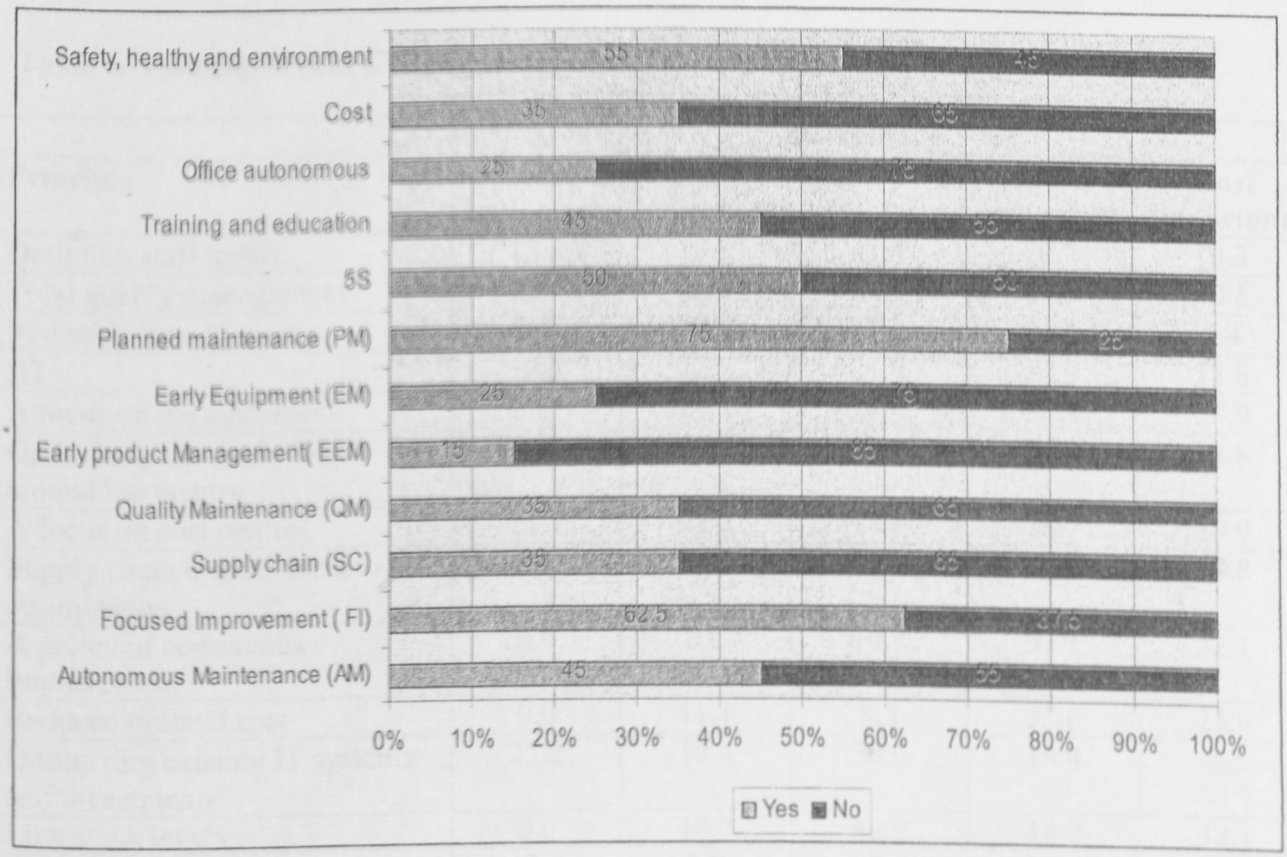
The respondents were asked to state the pillars of World Class Manufacturing that are in operation in their company. The results are as shown in the figure below:

Figure 4.6 below, shows that various pillars of World Class Manufacturing are in operation. The ones that were in use by majority of the firms involved in the study were planned maintenance by 75% of the total population, focused improvement was in use by 62.5% of the total population, while safety, health and environment was in operation by 55% of the total companies involved in the survey.

The fact that firms had lodged World Class Manufacturing Pillars, was a testimony of strive the industry is embracing the concept. As described in the literature review, Pillars provide the true spirit of balanced 'top-down-bottom up' approach, cross functional team and extended participation and bringing together a inter – functional working groups. Continues improvement, is the strategic approach of each pillar, striving to improve its sphere of influence in an established standardized approach through tested and tried methods, techniques and tools.

Autonomous Maintenance, a pillar for sustaining all the gains brought by other pillars, was rated less prominent, an indication of a gap in the implementation process.

Figure 4.6: Pillars of World Class Manufacturing are in operation



Source: survey data

4.11 World Class Manufacturing Principles

The respondents were asked to rate the importance of World Class Manufacturing principles in accordance to its applications in their firms.

The principles that were rated as more important or most important by most respondents included: total quality management, focus on the customer, and focus on cost control, policy of continuous improvement, reduced product cost, and reducing delivery time. Those that were rated important by most of the participants in the survey included: optimum staff levels, optimizing materials flow around the factory and low stock levels. On the other hand those that were rated less important by most of the respondents included: reducing time to market, supply chain management and optimization existing IT systems and investments.

A list of issues that manufacturers consider to be key priorities tells half the story. If most are focused on quality management, for instant, does the others don't care about quality. It further shows the narrow view taken on World Class Manufacturing

Table 4.2: Ratjng World Class Manufacturing Principles

	Percentage				
Principle	**Least important**	**Less important**	**important,**	**More important**	**Most important**
Optimum staff levels	13.8	13.8	41.4	20.7	10.3
Total quality management	12.5	0.0	21.9	25.0	40.6
Reducing time to market	0.0	37.5	31.3	21.9	9.4
JIT	12.5	12.5	21.9	34.4	18.8
A focus on the customer	11.1	11.1	0.0	38.9	38.9
Optimizing materials flow around the factory	0.0	12.5	46.9	21.9	18.8
A focus on cost control	11.1	22.2	11.1	16.7	38.9
Supply chain management and optimization	0.0	34.4	25.0	21.9	18.8
A policy of continuous improvement	0.0	0.0	10.7	57.1	32.1
Reduced product cost	0.0	11.1	8.3	55.6	25.0
Optimizing existing IT systems and investments	22.2	19.4	30.6	19.4	8.3
Low stock levels	0.0	10.7	42.9	14.3	32.1
Reducing delivery time	13.8	0.0	27.6	37.9	20.7

Source; survey data

4.12 Initiatives undertaken by the company:

The respondent where asked to rate the importance of World Class Manufacturing principles, in a scale of 1 to 5 (1 least important, 2 less important, 3 important, 4 more important and 5 most important),

Table 4.3 shows that for most companies involved in the survey, 78.6% maintained that total productive maintenance had made good progress, for 57.1% of the firms involved in the survey, Six Sigma had hardly been initiated. Other principles that had made good progress by the companies involved in the survey include: just in time delivery from suppliers, business process analysis, 5S and extending World Class Manufacturing principles into business processes. On the other had, removal of wasteful processes and Kaizen had been initiated to excellent levels by most of the companies jnvolved in the survey. To 80% of the firms involved in the survey Quick change over (SMED) had not performed as expected.

The principles of World Class Manufacturing are not satisfied by improving something and then thinking you have finished. It is an ever ending journey towards achieving a defect free, fast, flexible, lean and environmentally – friendly operation.

Table 4.3: Initiatives undertaken

Principle	Excellent progress	Good progress	Not as expected	Hardly any at all
Total productive maintenance (TPM)	21.4	78.6	0.0	0.0
Six sigma	42.9	0.0	0.0	57.1
Just in time delivery from suppliers	21.4	78.6	0.0	0.0
Business process analysis (BPA)	0.0	63.6	36.4	0.0
Kabans	0.0	63.6	0.0	36.4
Removal of wasteful processes	63.6	36.4	0.0	0.0
Kaizen (continuous improvements)	46.7	0.0	26.7	26.7
5S	21.4	50.0	0.0	28.6
Extending WCM principles into business processes	21.4	50.0	0.0	28.6
Quick change over(SMED)	0.0	20.0	80.0	0.0
Extending WCM principles into supply chain management	0.0	38.9	22.2	38.9

Source; survey data

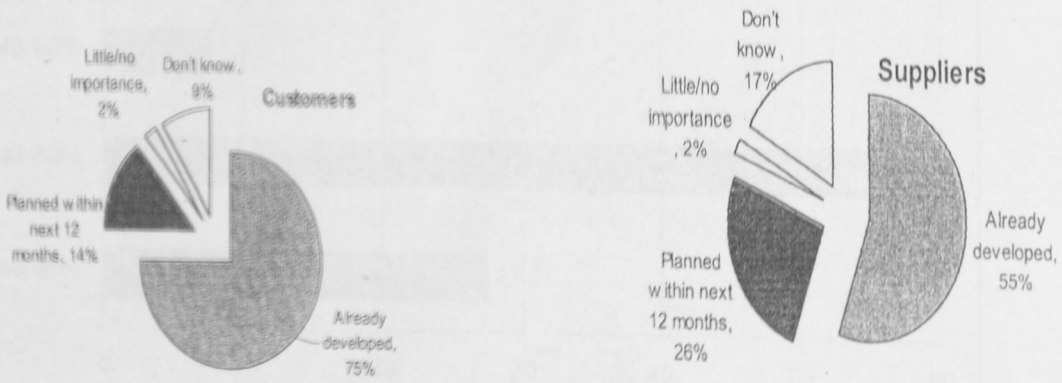
4.13 Strategic relationships

The respondents were asked if they already had a well developed strategic collaboration with customers and/or suppliers, or planning to develop strategic relationships within the next 12 months or are such relationships of little or no importance to your company?

From the responses it was found that 75% of those questioned claim to have developed strategic collaboration in place with customers, while almost the rest will have them in next 12 months. This emphasizes the current focus on customer's retention and development through out the manufacturing sector in Kenya. As expected strategic collaboration is seen as very important by the majority of those questioned, with only 2% saying they have no importance.

Strategic collaboration with suppliers is also quite significant with 55% of those questioned claiming to have developed collaborative relationships, and a further 26% seeking to establish them in the short term. Again all companies except a very few, feel that the relationships are of great importance. The manufacturing sector could be said to be forging closer partnership with the customers and suppliers.

Figure 4.7: Strategic relationships

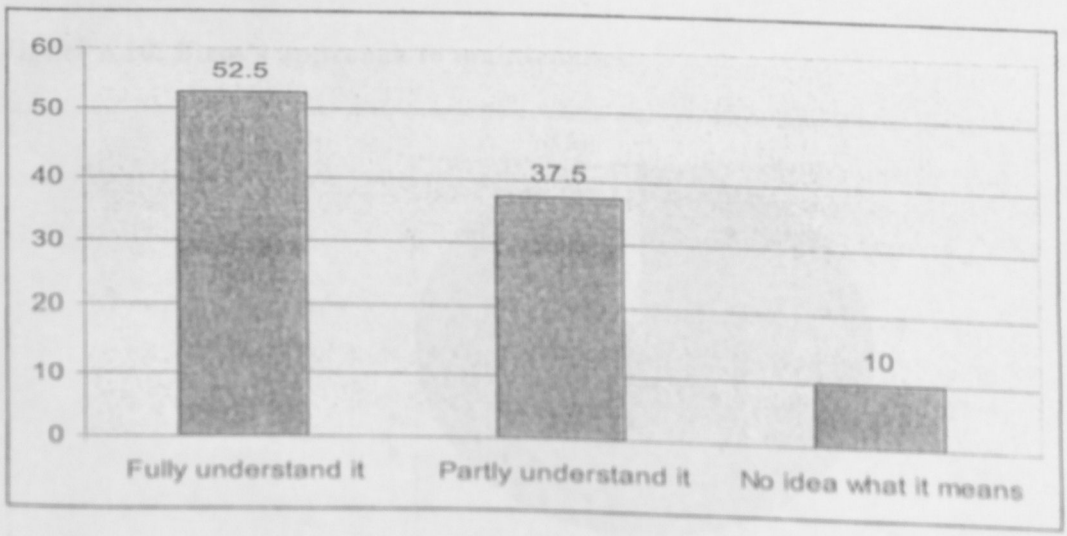


Source; survey data

4.14 Overall Equipment Effectiveness (OEE)

The respondents were asked to state how familiar they are with the concept of overall equipment effectiveness and for those familiar with the term, what their OEE for their key plant equipment was.

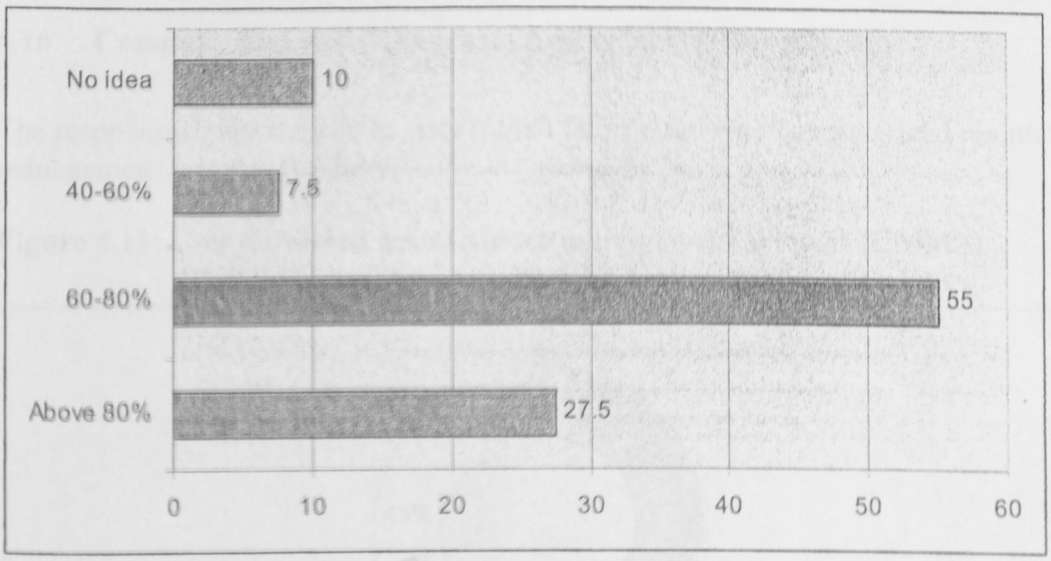
Figure 4.8: Overall Equipment Effectiveness



Source; survey data

The results indicated that 52.5% of the respondents fully understood the concept of overall equipment effectiveness, 37.5% partly understood it while 10% did not have an idea of what it meant.

Figure 4.9: Percentage of OEE of the key pieces of production equipment



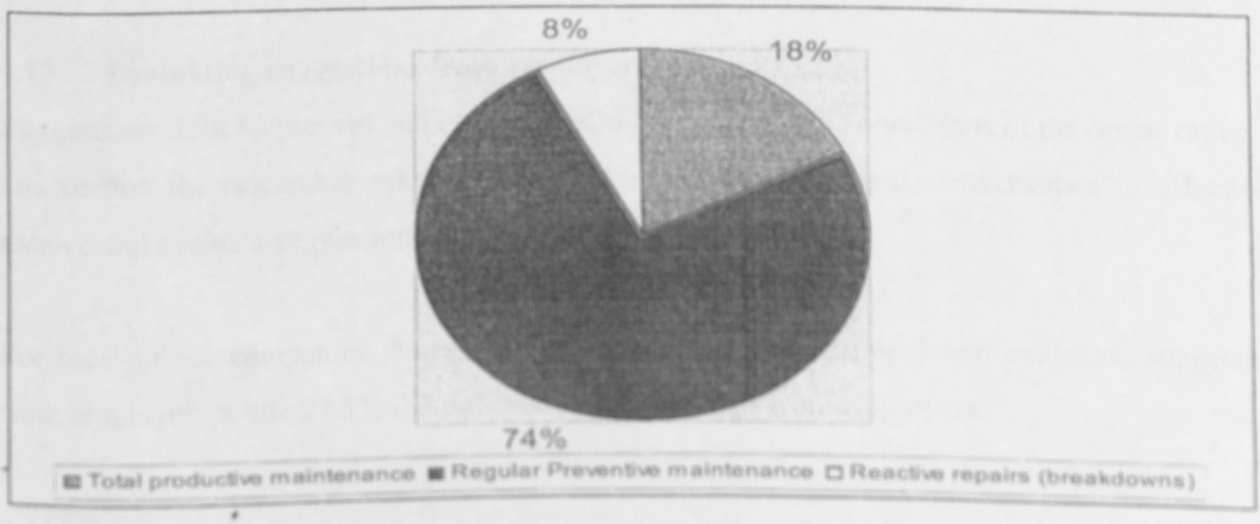
Source; survey data

For most of the firms familiar with the OEE, 55% had their key piece of equipment with OEE rate of 60-80%, for 27.5% firms OEE was above 80%, and for 7.5% OEE was 40-60%. On the other hand 10% did not have an idea to the level of OEE of their key pieces of production equipment.

4.15 Firm's approach to maintenance

The respondents were asked to choose what best describes their firm's approach to maintenance

Figure 4.10: Firm's approach to maintenance



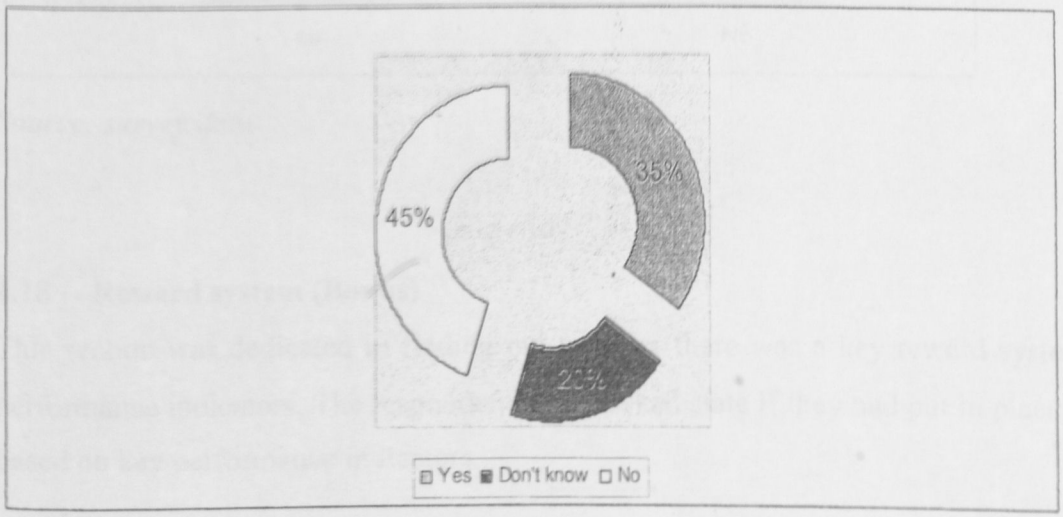
Source; survey data

The survey results shows that for 74% of the firms involved in the survey their approach towards maintenance was regular preventive maintenance, for 18% it was total productive maintenance and for 8% it was reactive repairs.

4.16 Computerized maintenance management systems (CMMS)

The respondents were asked to state if their firms employed computerized maintenance management systems (CMMS)

Figure 4.11: Computerized maintenance management systems (CMMS)



Source; survey data

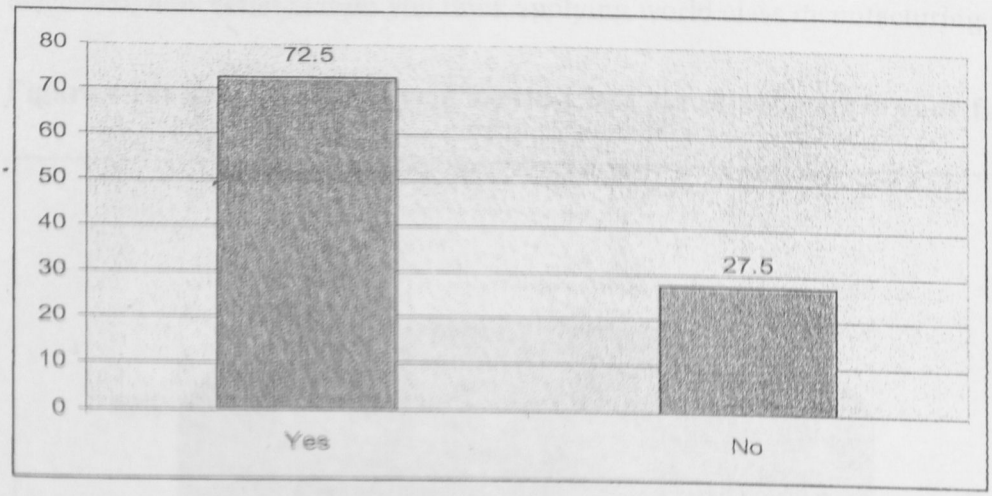
The results showed that 35% of the firms involved in the survey had implemented computerized maintenance management systems, while 45% of the total population had not implemented them. On the other had 20% of the respondents did not know whether their firm had implemented computerized maintenance management systems.

4.17 Evaluating suggestions from employees

Suggestions from employees can be very useful in improving the operations of the organization. In this section the researcher asked the respondents state if they had a mechanism to effectively receive and evaluate suggestions from employees

For most of the companies, comprising of 72.5% of the total population evaluated suggestions from employees while 27.5% did not evaluate suggestions from employees.

Figure 4.12: Evaluating suggestions from employees

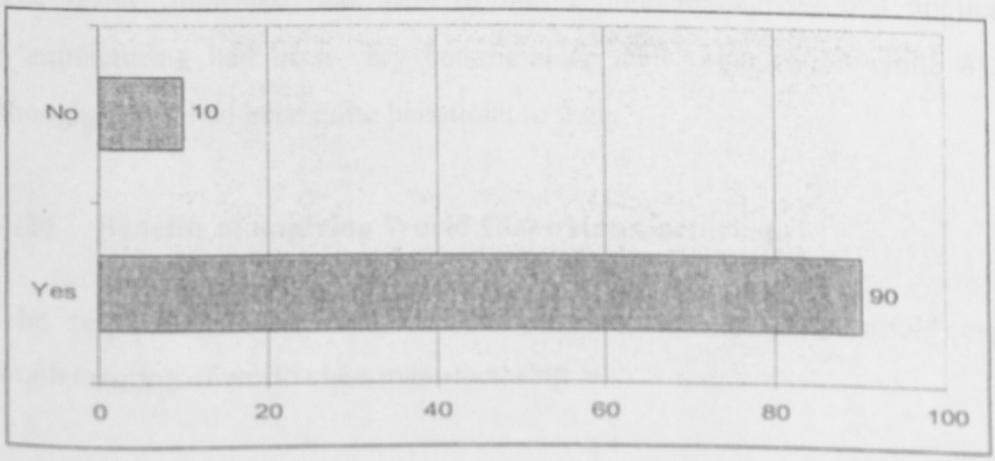


Source; survey data

4.18 Reward system (Bonus)

This section was dedicated in finding out whether there was a key reward system, based on key performance indicators. The respondents were asked state if they had put in place a bonus scheme, based on key performance indicators.

Figure 4.13: Presence of a Reward System



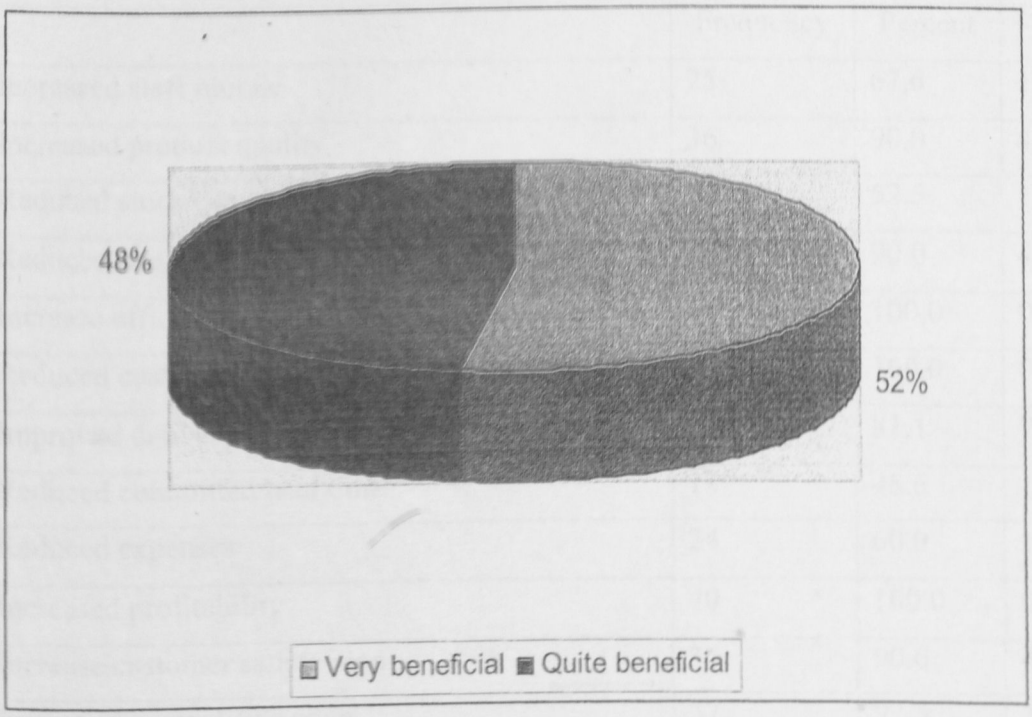
Source; survey data

The results shows that 90% of the companies involved in the survey had a reward system based on performance while 10% did not have one such system.

4.19 Benefits of applying World Class Manufacturing in your firm

The respondent were asked 'Thinking of all various aspects of World Class Manufacturing, as discussed, how beneficial do you think applying world class manufacturing in your firm would be?

Figure 4.14: Benefits of applying World Class Manufacturing in your firm



Source; survey data

The results indicated that 52% of the respondents agreed that application of World Class Manufacturing had been very beneficial to their organization while 48% of the respondents thought that it had been quite beneficial to them.

4.20 Benefits of applying World Class Manufacturing

The respondents were asked to identify the benefits they would expect to achieve from implementing of world class manufacturing

The benefits that ranked top by the companies involved in the study included: reduced wasted, increased efficiency, reduced costs, improved productivity, and reduction of accidents and incidents. Other benefits that also ranked high include: increased customer satisfaction, increased profitability, and increased product quality. The benefits that were least experienced by the firms involved in the survey included: reduced lead times, new product launched more quickly, vertical project start ups and improved compliance to specification.

Table 4.4: Benefits of applying World Class Manufacturing

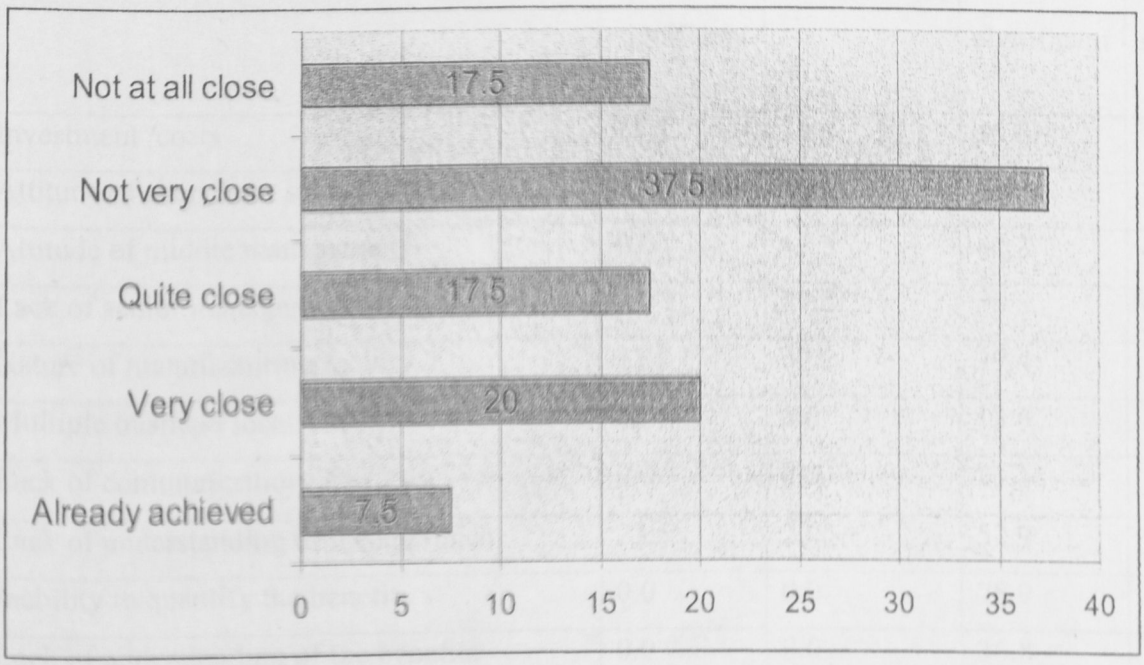
	Yes		NO	
	Frequency	Percent	Frequency	Percent
Increased staff morale	25	67.6	12	32.4
Increased product quality	36	90.0	4	10.0
Reduced stock (inventories) levels	21	52.5	19	47.5
Reduced waste	36	90.0	4	10.0
Increase efficiency	40	100.0	0	0.0
Reduced costs	40	100.0	0	0.0
Improved delivery times (OTIF)	30	81.1	7	18.9
Reduced committed lead time	18	48.6	19	51.4
Reduced expenses	24	60.0	16	40.0
Increased profitability	40	100.0	0	0.0
Increase customer satisfaction	36	90.0	4	10.0
Improved competitive edge	37	92.5	3	7.5
New product launched more quickly	18	48.6	19	51.4
Vertical project start ups	18	48.6	19	51.4
Improved productivity	37	100.0	0	0.0
Reduction of accidents and incidents	32	80.0	8	20.0
Reduced absenteeism	17	42.5	23	57.5
Increased employee suggestions	25	67.6	12	32.4
Reduced overtime	29	72.5	11	27.5
Reduced no of claims	24	60.0	16	40.0
Improved compliance to specification	8	20.0	32	80.0

Source; survey data

4.21 World class excellence Level

This section sought to find out the level at which the firms involved in the survey were close to the world class excellence level. The respondents were asked to rate how close their firm to being world class excellence level

Figure 4.15: World Class Excellence level



Source; survey data

Figure 4.15 shows that 37.5% were not very close in achieving the world class excellence level, 17.5% were not quite close, 20% were close, and 17.5% were not close at all while 7.5% had already achieved this level.

4.21 Challenges in Application of World Class Manufacturing

The respondents were asked to identify challenges that might prevent or delay the application of World Class Manufacturing in your firm and their significant

From the table blow, it shows that the challenges that were most significant to a majority of the firms involved in the survey included lack of understanding of the approaches and existing initiatives in place of World Class Manufacturing. Nature of manufacturing facility, attitude of the board and attitude of shop floor staff were also significant challenges. Minor challenges in implementation of this level as pointed out by the participants in the survey included: lack of communication, inability to quantify the benefits, cost of implementation and multiple business locations among others.

Table 4.5: Challenges in application of World Class Manufacturing

	Major significant	Significant	Minor significant	No significant
Investment /costs	14.8	14.8	55.6	14.8
Attitude of shop. floor staff	15.4	23.1	30.8	30.8
Attitude of middle management	0.0	11.5	42.3	46.2
Lack of senior management commitment	0.0	21.1	36.8	42.1
Nature of manufacturing facility	11.8	47.1	29.4	11.8
Multiple business locations	0.0	0.0	13.6	86.4
Lack of communication	0.0	0.0	21.1	78.9
Lack of understanding of the approach	23.5	23.5	52.9	0.0
Inability to quantify the benefits	0.0	0.0	78.9	21.1
Lack of understanding of the benefits	0.0	0.0	36.8	63.2
Existing or other initiatives in place of WCM	34.8	17.4	17.4	30.4
Inertia	0.0	0.0	100.0	
Attitude of board	0.0	42.1	42.1	15.8

Source; survey data

4.23 Feeling about World Class Manufacturing

They were asked,' which of the following describe how you feel about world class manufacturing?

Table 4.6: Feelings about World Class Manufacturing

	Frequency	Percent
Great in principle but very difficulty to achieve in practice	8	20.0
A realistic goal for the long term	32	80.0
Total	40	100.0

Source; survey data

The survey shows that 80% of the respondents said that WCM was a realistic goal for the long term, while remaining 20% of the population said that it was a great in principle but very difficulty to achieve in practice.

CHAPTER FIVE: SUMMARY CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter provides a summary of the findings, conclusions and recommendations into the challenges of strategy implementation by multinational companies operating in Kenya.

5.2 Summary

The objectives of the study were to establish the extent of the adoption of World Class Manufacturing in Kenya's manufacturing sector, to document the perceived benefits that drive manufactures to implement World Class Manufacturing and to establish the challenges manufacturers face while adopting World Class Manufacturing.

The findings of the study indicate that most of the firms involved in the survey were in the food, beverages and tobacco sector and a few others were in the energy, electrical and electronics segment. Most of the respondents understood very well World Class Manufacturing. The various definitions advanced by the respondents included: a continuous improvement management system. It's a way of optimizing the plant, by eradicating losses. Others stated that it was a manufacturing strategy methodology that strived for continuous improvement.

The principles that were rated as more important or most important by most respondents included: total quality management, focus on the customer, and focus on cost control, policy of continuous improvement, reduced product cost, and reducing delivery time. Those that were rated important by most of the participants in the survey included: optimum staff levels, optimizing materials flow around the factory and low stock levels. On the other hand those that were rated less important by most of the respondents included: reducing time to market, supply chain management and optimization existing IT systems and investments.

Most companies involved in the survey maintained that total productive maintenance had made good progress. Other principles that had made good progress by the companies involved in the survey include: just in time delivery from suppliers, business process analysis, 5S and extending World Class Manufacturing principles into business processes. On the other had, removal of wasteful processes and Kaizen had initiated to excellent levels by most of the companies involved in the survey. However, for majority of the firms involved in the survey quick change over had not performed as expected.

Majority of the firms involved in the survey had developed strategic relationships with customers and with suppliers. More than half of the respondents fully understood the concept of overall equipment effectiveness and for most of the firms overall equipment effectiveness comprised of over 60% of key pieces of equipment. Most of the companies involved in the survey had a reward system based on performance.

The benefits that ranked top by the companies involved in the study included: reduced: lead times, new product launched more quickly, vertical project start ups and improved compliance to specification. The challenges that were most significant to a majority of the firms involved in the survey included lack of understanding of the approaches and existing initiatives in place of World Class Manufacturing. Nature of manufacturing facility, attitude of the board and attitude of shop floor staff were also significant challenges. Minor challenges in implementation of this level as pointed out by the participants in the survey included: lack of communication, inability to quantify the benefits, cost of implementation and multiple business locations among others.

5.3 Conclusions

For manufacturing to be effective, it has to undergo four categories, these include: internally neutral where manufacturing is expected to be neither proactive nor locked in to any particular form of technology. The second stage is externally neutral where manufacturing function will now seek to maintain parity with the rest of the industry. The third stage is internally supportive, where manufacturing purposefully pursues a manufacturing strategy. The final stage is externally supportive, where as manufacturing can play a more significant proactive role in leading other functional areas in the corporate strategy.

World Class Manufacturing is a term now becoming widely recognized in manufacturing and it covers a wide range of activities. For majority of the firms involved in the survey their implementations of World Class Manufacturing had already taken off, and were already reaping the advantages of this concept. Adopting the innovations of world class innovations leads to drastic performance improvements. However the reason why such a concept is not implemented is because management fails to recognize the importance of WCM and the benefits offered because of the lack of proper justification methodology.

For World Class Manufacturing to be successfully management has to identify the application of the WCM and to plan its implementation. Management must also be assured that in the context of their organizations the use of a WCM is a viable alternative. Economic justification process should be considered with a long term mindset. Managers should consider use of Overall Equipment

Effectiveness (OEE). This is a tool that combines multiple manufacturing issues and data points to provide information about the process.

5.4 Recommendations

Manufacturing companies dedicate themselves to continual, rapid improvement in quality, response time, flexibility, and value to remain competitive. Customers' product preferences vary over time and hence achieving this objective becomes an onerous task. However application of World Class Manufacturing would ensure that such objectives are attained. WCM is a process driven approach geared to achieve a set of concepts, principles and techniques for managing and operating a manufacturing set up. A manufacturing company would therefore be implementing the industry's best practice by attempting to be best in the field at each of the competitive priorities.

Manufactures are really seeing the benefits of World Class Manufacturing, with most declaring increased efficiency and reduction in costs. To be externally supportive the manufacturing sector need to adopt and progressively pursue the implementation of World Class Manufacturing

To harness full benefit and faster progress of new entrants, we do recommend establishment of a body to oversee and guide the sector in implementing the programme.

5.5 Limitations of the Study

Every study inevitably encounters certain levels of limitations due to a variety of factors. Resource availability in time restrained respondents from responding to the emails sent to them. Respondents who were senior managers are usually very busy hence the tendency not to give in-depth attention to the unstructured parts of the questionnaire, was noted in this study.

Interviewing managers at this level in organization on strategy implementation is like asking them for a self evaluation, expected responses therefore are likely to be more positive than the true situation. Views from junior employees would have injected the necessary balance on the challenges and how the firms were responding to them.

5.6 Suggestions for Further Research

The researcher recommends that further study can be done in the following:

Future surveys should probably concentrate on a comparison of implementation of WCM among multinational companies and local companies. This would enable one to draw parallels between the implementation of this concept by the two groups.

A study should be carried out to determine the optimal implementation process, the sequence of establishing the pillars for optimal gains.

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