

**A SURVEY OF IMPLEMENTATION OF WORLD CLASS MANUFACTURING
PRACTICES: CASE OF LISTED COMPANIES**

By

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**A Research Project in Partial Fulfillment of the Requirements for the Award
Master of Business Administration Degree of the
University of Nairobi**

October 2009

DECLARATION

I declare that this research project is my original work and has not been presented for degree or any other academic award in any institution of learning.

Signature



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

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DEDICATION

To my mother Mrs. Mulunde Ngeta
and
My sister Dr Claire Ngeta Walker (Mrs.)

My nephews
Clement Mwendwa
and
Mathew Jabaliel George
May this project inspire you to excel.

ACKNOWLEDGEMENT

To God be the glory and honor, for His mercies and divine provisions during my entire periods of study.

My gratitude goes to all my lecturers and all friends and colleagues, who encouraged, inspired, challenged and in all helped me to bear the burden. Special appreciation goes to the following.

To my supervisor Mr. Ngigi, Peter thank you very much for your guidance, patience, time and concern in guiding me and shaping my project to its present state.

My colleagues and friends, Anne aindi, Munyao Albanus, Ronald Chogii and Agnes Mirugi for the synergy and laughter. Appreciation goes to all the brethren in Christ for standing with me in prayers, support, encouragement and understanding when I could not be available to carry out my responsibilities in the body of Christ. Most sincere gratitude to Pastor David Nduva for having waited with me for the opportunity and release to study

Finally to my sister Claire, for your unrelenting support in need and in deed. Thank you for bearing with the late night studies and the comfort of your house.

ABSTRACT

In response to intense global business competition, companies have implemented "new" operational philosophies to enhance competitiveness. Such World Class Manufacturing (WCM) practices include Kaizen, Just in Time, Total Quality Management and Business Process Reengineering.

This study investigates level of adoption of these World Class Manufacturing practices among quoted companies in Kenya; assesses the benefits and challenges that implementers face in the implementation process. The study finds 94% of firms applying the WCM practices with Total Quality Management (TQM) ranking highest across all sectors. Firms realized cost reduction, improved product quality and reduced lead time upon adopting the practices. However, company culture and staff attitude posed the most challenges in implementation process.

The study further finds extensive adoption in the industrial and allied sector but lesser adoption of WCM practices in both Commercial and Service, and Finance and Investment sectors.

LIST OF ABBREVIATIONS

ABC	-	Activity Based Costing
BPR	-	Business Process Reengineering
BCS	-	Balanced Scorecard
CI	-	Continuous Improvement
ERP	-	Enterprise Resource Planning
JIT	-	Just In Time
TEI	-	Total Employee Involvement
TOC	-	Theory of Constraints
TQM	-	Total Quality Management
UK	-	United Kingdom
US	-	United States
WCM	-	World Class Manufacturing
WCO	-	World Class Operation
W-I-P	-	Work- in -Progress

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study-

Businesses world over have been affected by global competition. With the higher level of competitiveness, it follows that the consumer will ultimately decide upon the products which meet their needs in the areas of production features, dependability, availability and overall value. No business can afford to stand still. In today's business environment, it is no longer good enough for a company to be better than the competition in the local marketplace. Each company must strive to meet and beat the best from anywhere in the world. A business enterprise can no longer think that failure to make it in the world markets will not affect business in the local markets. The very opportunity to compete in the world markets carries with it the explicit threat that the same opposition experienced overseas can indeed knock a company out of its local market.

Success is vested in a company's ability to stay ahead of trends and to respond dynamically to market opportunities and fluctuations hence the need to develop and execute manufacturing strategies that show tangible results and making the right connection to improve on business performance and value for all stake holders (Bucker, 2003). The response to these challenges of global competition is through the idea of World Class Manufacturing (WCM). This term refers to philosophies, policies, practices and technologies whose primary aim is to impact process improvement of the value chain activities within the organizational boundary of a manufacturing firm and describes the very best manufacturers in the world.

These World Class companies recognize the importance of manufacturing as a strategic weapon. Achieving World Class Manufacturing comes only when the improvement effort is integrated across all functions in the company. The real strength for a manufacturer lies in its ability to add value in its manufacturing process. Researchers in Japan and United States (US) have noted that all types of businesses-banks, hospitals, insurance companies and distribution companies are utilizing World Class principles to improve flexibility,

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(Bucker, 2003).

World Class Manufacturing is being worked on in many companies today under many names. They include among others Just in Time (JIT) or lean manufacturing. Total Quality Management (TQM). Kaizen/Continuous Improvement (CI), Business Process Improvement (BPI), Activity Based Management (ABM) and Total Employee Involvement (TEI).

Manufacturing firms have responded to global competition by investing in the adoption of many, if not all of these initiatives. In many instances, these adoption decisions have followed a sequential trajectory, with one initiative being replaced, within a relatively-short timeframe, by another. In other instances, these initiatives have been pursued by different functional constituents within the same manufacturing firm, but without widespread awareness of which department is doing what. Motivating these adoption decisions is the presumption that these initiatives, whether adopted sequentially or in parallel would have complementary and beneficial performance effects. These manufacturing practices are carefully evaluated and their adoption decisions are jointly determined contingent upon the unique product and process characteristics of the firm and as to their overall effect on processes (Buck *et al*, 2006).

Management accounting now focuses on planning, control and waste reduction, expanding to encompass a more strategic emphasis on the creation of firm value through the identification, measurement of the drivers of customer value, organizational innovation and shareholder value. Management accounting approaches have had to adapt to the changing business environment and embrace a holistic/system approach to capture financial and operational/processes aspects of a firm. Studies in Britain, Japan and United States (US) assert that manufacturing today, with its focus on continuous improvement, minimal inventory and speedy turnaround has led companies to embrace world-class manufacturing philosophies and techniques (Richard *et al*, 1999).

In Kenya, only two studies have focused on cost management approaches. No study has addressed World Class manufacturing practices yet, on Kenyan firms. Nzule, (1999) examines the adoption rate of Activity Based Costing (ABC), where he finds a high implementation rate of ABC among manufacturers in the motor industry, a low implementation rate in manufacturing (33%) and in service industries (21%). His study also found that most companies had costing circumstances that needed cost revision. He recommended introduction of ABC costing to supplement the traditional costing approach for such companies. The cost of operating ABC was found prohibiting to small companies.

The next study by Langat (2005) on cost allocation practices among listed firms limited himself to application of ABC alone. This evidences the gap on the implementation of World Class Manufacturing in Kenya. Hence this study focuses on assessment of the entire array of efficient WCM practices by Kenyan listed firms.

1.2 Statement of Research Problem

The "new" WCM philosophies and techniques focus on promoting value creation. Such process management practices may coffer lasting benefits if they interact with firm specific routines and associated capabilities in a way that causes complementarities among organizational activities. Kaplan (1983) argues that WCM allows managers to adapt to the volatility and uncertainty associated with changes in customer demand and business cycles: provide capabilities necessary to react to rapid changes in lot size and set up time, thus enable manufacturers to adopt flexible processes characterized by quick change over techniques to handle production of low volume orders with high productivity variety. A high level of implementation of WCM practices has been reported in Japanese manufacturing companies (Charles *et al.*, 1998) while in US, larger companies were found to have a higher implementation rate than small companies (Richard, *et al.*, 1999).

Implementation of WCM enables firms to react quickly to changes in customer demand, and thus carry lower levels of inventory, improve cost efficiencies, increase the flexibility of production facilities through use of planning and scheduling software, exactness, precision, responsiveness and repeatability to delight the customer (Banker *et al.*, 2006).

Firms implementing WCM report varying results due to discrepancies in the contextual factors (Michael. 2004). For WCM to achieve improvement, change is necessary. A problem arises when previous experiences and routines inhibit employee's ability to adopt to change often leading to poor and reduced performance.

Amanda (2006) argues that WCM practices have an inherent limitation to propel firms to achieve what such innovation promise. Much of these research findings on the implementation of WCM have been done in the developed countries, Japan, UK and the US. The costs associated with the implementation of WCM practices were found to inhibit adoption by small manufacturing firms in the United States (Rajiv D et al., 2009). Firms surveyed did not report a cost-benefit advantage associated to these practices.

Known studies on listed firms in Kenyan have not focused on World Class manufacturing practices. Nzule, (1999) examines the implementation of Activity Based Costing (ABC), where he finds a high implementation rate of ABC among manufacturers in the motor industry, a low implementation rate in manufacturing (33%) and in service industries (21%). Langat's (2005) study assessed cost allocation practices among listed firms, he finds *inter-alia*, ABC significantly used for its accuracy and precision in cost allocation.

Unlike Nzule, (1999) and Langat (2005) who focused on ABC alone, this study examines the implementation of World Class Manufacturing practices in business processes to effect continuous improvement by Kenyan firms. The study notes the difference in business environment, organizational culture, staff attitude, *inter alia*, between developed countries where these practices have been implemented successfully as opposed to Kenya. Consequently, the study sort to find an answer to the question; to what extent have Kenyan listed firms implemented WCM practices? What factors influenced the implementation of the approaches?

1.3 Objectives of the Study

1. To asses implementation extend of World Class Manufacturing practices among listed Kenyan firm.
2. To establish the benefits of WCM to its implementers.
3. To find out limitations if any, to implementation of WCM.

1.4 Importance of the Study

The research findings can sensitize firms to a broader approach to corporate strategy. This would result in efficient operations, which result in cost reduction. With reduced average costs, firms would gain a competitive advantage in the face of increased global competitiveness.

The research findings provide managers with reliable information that can help them to initiate continuous improvement in planning, decision making and in manufacturing. In economies that are faced with limited resources, managerial decisions must be based on tested efficient techniques to attain global competition.

These research findings cast light on current global business developments in continuous process improvement to cope with global competition, thus adding to the existing body of knowledge. A survey of the state of usage in Kenya confirms the state of efficiency with which firms are operating. This serves as an attraction to foreign investors.

The academic fraternity stands to enhance their analysis, now that the extent of adoption of WCM practices is established. If Kenyan firms are not excelling in efficient operations, what other reasons could explain? What is the state of application of the techniques etc? Consequently, this study provides a firm bed upon which to enhance further studies in process improvement techniques.

Competing firms get a wake-up call to apply the WCM practices so as to keep pace with similar firms within their industry. Service industry stands to benefit most since it is the least in utilizing these practices, yet some firms which have adopted are fully implementing, up to the very latest practice.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the related literature on the subject under study as presented by various researchers, analysts and authors. The review has mainly drawn materials from journals on management accounting and other sources closely related to the objective of the study. The chapter contains several areas discussed in the following order: a review of the Theory of Constraints and the concept of Activity Based Costing to show how they supports implementation of world class manufacturing techniques, a review of the world class manufacturing practices and how they are used in manufacturing processes, advantages of implementing WCM and the challenges that implementers of WCM face. The next section reviews the empirical studies on WCM followed by a conclusion of the literature review.

2.2 Theoretical Framework

2.2.1 Theory of constraints (TOC)

The theory of constraints is the brain child of Israeli physicist Eliyahu Goldratt (Robin and Regime, 1999). It is a process improvement philosophy that looks at an organization as a system. Its primary tenet is that all complex systems are governed by inherent simplicity, that at all times there are very few factors that actually dictate the outcome of a system. Theory of Constraints is holistic approach that allows the company to identify the few physical and logical leverage points in an organization; how they can be used to address the fundamental core problems at the root of the symptoms where improvement can quickly cause quantum improvement for the organization as a whole. Eliyahu's work describes how to optimize performance of complex systems through management of critical constraints. The theory's principles focus on improving the throughput from the system. By increasing throughput, the end results will be improved. The theory compares the system to a chain or a network of chains. The weakest link within the system is the

systems constraint. By improving the performance of the constraint, the weakest link is strengthened and throughput is improved.

A constraint is a condition that impedes the efficient flow of a process. Excessive amount of W-I-P inventories at certain process points are indicative of constraints. The build up inventories also shows the cycle time in production. The theory of constraints is the best tool to accommodate constraints. It assumes that production capacity is fixed in the short run and it can not be changed readily. Its economic concept focuses on whether the production capacity of the constraint can be increased or reduced. The TOC approach to constraint management includes identifying the systems constraint and exploiting it. If constraints are physical, firms apply the rule of synchronized manufacturing (Poniman *et ai*, 1999) and the dynamic relationship between productive capacity, protective capacity and levels of inventory to get the absolute maximum out of the existing resources. Constraints related to policy demand behavioral change.

The TOC is essentially a philosophy about change. It poses questions at system level: what to change, how to cause the change and how to implement the change. It requires organizations stake holders to know what the ultimate goal of the system is. It takes peoples feelings and the organization culture seriously when identifying obstacles. Change is never painless, but a judicious application of TOC tools can dramatically smooth the transition and reduce discomfort (Christoph, 2005). This helps organizations to refocus smoothly, systematically and routinely achieve goals. The application of constraint management sets out to achieve: improvement in results both in financial and non-financial terms, speed and quality in decisions, a move to global decision model from local 'cost' thinking thus putting emphasis on throughput, change management and enterprise analysis which yields coherent organization wide process of problem analysis and solution creation.

Blocher *et al.*, f2006) asserts that firms using TOC could achieve the following remarkable results: lead time collapse dramatically, manufacturing operations expose huge hidden capabilities; inventory fall to a fraction of previous record; inventory turn accelerates and Return on Investment jumps. World Class Manufacturing primarily

applies constraint management in its implementation and operationalisation. Under Kaizen, workers generally have superior knowledge about detecting constraints, how to improve processes and reduce costs, JIT manufacturing which closely knots with suppliers helps to reduce waste and quality problems and deliver defect-free materials and components (Rajiv *et al.*, 2009). Theory of Constraints by its principles focuses on change management therefore keeps firms from sub-optimizing in decision making and operations at all activities in the value chain and by measuring success at the system level.

2.2.2 New Institutional Theory

Institutions have been defined by institutional theorists since the 20th century to mean rules-the predetermined patterns of conduct that are generally acceptable by individuals in the society. Theory on institutional analysis has generated valuable insight into the causes of changes in the features and operations of organizations and the processes by which organizations secure legitimacy endorsement and survival through conformity with norms, practices and expectations of the institutional environment (Mayer and Rowans, 1977). Institutional theory argues that firms survival depends on, *inter-alia*, the acquisition of cognitive legitimacy, which implies the degree to which an organizations activities are taken for granted and sociopolitical legitimacy, which is the extent to which firms conform to recognized principles or accepted rules and standards. Legitimacy enhances survival by making it easier for firms to obtain access to resources, attract customers and combat threats (Baum and Oliver, 1991).

The New Institutional theory emphasizes on cultural, normative and cognitive factors; claiming that external institutional pressure shapes organizational structures and practices. Organizations that do not conform to these domains either ceremonially or actually will loose legitimacy or be denied resources. Moreover, people come to perceive institutional beliefs, policies, processes and rules as a reality and thence take them for granted (Richard *et al.*, 1999). Institutionalized perceptions may be myths, enforced by law, public opinion, education and constituents' views but organizations that conform are socially defined as successful and hence more likely to survive.

Institutions become isomorphic within the institutional environment. Isomorphism is a "constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions". Institutional isomorphism can be directly attributed to the diffusion of WCM practices from their origin in Japanese manufacturers to the rest of the world. Coercive isomorphism stems from general expectations in organizations. Managers may use authority or coercive power to get their companies to conform to the practices and operations that have been adopted by similar companies in similar environment, and thus seen to be succeeding. Change imposed by authority meets less resistance. Mimetic isomorphism on the other hand is driven by firms' **uncertainty** and imitation. When organizational technologies, goals and environmental expectations are uncertain, organizations tend to copy successful companies. Thus companies become receptive to fashionable business techniques such as WCM (Scott, 1999). It was on such a basis that the WCM practices diffused from the vibrant Japanese manufacturing companies to the manufacturing companies in the US that had lost competitiveness in the 1990s (Maria, 2003). This study posits that the diffusion of WCM may be driven by isomorphism.

2.2.3 The concept of Activity Based Costing (ABC)

In the early 1980's, challenges of cost calculation were beginning to occur. Cooper and Kaplan (Kaplan *et al.*, 1987) developed the Activity Based Costing system as an alternative approach to cost allocation. Interest in ABC has developed as a solution to obsolescence and limitations of traditional costing systems. Activity Based Costing is a cost accounting concept based on the premise that products require an organization to perform activities and that those activities require an organization to incur costs. In Activity Based Costing, systems are designed so that any costs that cannot be attributed directly to a product flow into the activities that make them necessary, that the cost of each activity then flows to the product(s) that make that activity necessary based on this respective assumption of that activity. The emphasis is not on the measurement, timing and recording of costs but on the interpretation and analysis of cost data for effective decision making.

Management accounting systems that provide misleading targets for productivity and efficiency efforts make large corporations vulnerable to smaller, more focused competitors (Cooper, 1988). Cost figures play a key role in many important decisions. If these figures result from cost allocation bases that fail to capture the cause and effect relationship, managers make decisions that conflict with maximizing long run share value. Products may be under-costed or over-costed. The intense global competition and technological sophistication has made expensive the decision errors due to poor cost information. Firms are under pressure to maintain leadership in their industries and still remain profitable (Gupta et al, 2003). This stresses the need for more accurate information on profitability: new products/services, market share, product mix, abandonment decisions, and their effects on a firm's profitability. Activity-Based Costing (ABC) has been promoted and adopted as a basis for making strategic decisions, and for improving operations and processes.

Organizations are moving from managing manufacturing operations vertically to managing horizontally. It's a move from functional orientation to process orientation. Michael, (2004) identifies process management strategies e.g. JIT, TQM and BPR as examples of horizontal management initiatives designed to improve organizations work processes and activities to effectively and efficiently meet or exceed customer requirements. Management information systems have lagged significantly behind the needs of its managers.

Activity Based Costing fills this information gap by providing cost and operational information that mirrors the horizontal view. While ABC focuses on accurate information about the true cost of products/services, processes, activities, distribution channels, Drury, (2004) argues that management uses this information (Activity based Management) to providing value analysis, cost drivers and performance measures to initiate, drive or support the improvement efforts and to improve decision making at both the operational and strategic levels. Activities are the basics of ABC, which also are the common denominator of the horizontal, process-based view of the organization.

The use of ABC information supports the process-based organization by providing accurate cost data needed to plan, manage, control and direct the activities of a firm to improve processes, products/services, by eliminating waste and non-value added activities. ABC therefore forms a bed rock on which WCM can be established. Activity Based Costing focuses on accurate identification of cost drivers for each activity along the horizontal flow of processes in a firm directly impact on production processes through providing management with the following information: cost of activities and business processes (Christoph,2005). Activity Based Costing provides relevant information about what a business does; the cost of non-value added activities. This identifies waste and provides a focal point for process improvement efforts; activity based performance measures such as product quality, cycle time, lead time and time to market.

Activity Based costing information helps managers to improve quality through the role it plays in quantifying the costs of quality. These costs include prevention (i.e. costs of activities performed to prevent errors from occurring); appraisal (i.e. costs of inspection such as determining if products meet standard specifications); internal failures (i.e. the cost of correcting errors before they reach the final customer, such as scrap, rework and change orders); external failures (i.e. costs associated with errors that reach the final customer such as correcting errors, handling complaint, and ill will resulting from error), Derek, 2005). This system also helps to identify and reduce inventory carrying costs at all stages-from raw materials to W-I-P and finished goods. This is the basis upon which Kaizen and Business Process Reengineering practices are successfully integrated into production processes.

Activity Based Costing supports measures that place emphasis on the whole firm and not individual units or departments and thus make it move from the unit or department standpoint to lower inventory costs. For example, if the purchase department is rewarded on the basis of lower costs, large lots may be ordered to attract quantity discounts. If the lot size is more than what is needed for the task at hand, inventory build up occurs. This is good foundation for implementation of JIT in production processes (Hassan et al., 2007).If individual units are evaluated on their throughput; they will produce as much as

possible without regard to whether the products move to the next stage or to the warehouse. Such operations would hurt overall firm performance.

Activity Based Costing makes a significant impact on firm's employees- the kaizen way, particularly on areas of employee empowerment and accountability, roles and responsibilities and performance. By identifying activities that are performed in a firm, performance measures can be described in meaningful terms. An employee becomes aware of how his activities contribute to firm financial performance (Monir, 2009). Activity Based Costing gives the employee the tool he needs to evaluate not only how he is currently contributing, but how he might improve his performance to increase that contribution. Operators who know the full cost of raw material and the full cost of reworking defective units are able to decide whether to scrap bad production or rework it, without intervention by more senior management. Employees empowered to make such decisions helps to prevent costly reworks and poor quality output.

Further, department- focused performance evaluation causes managers to act against the best interest of the firm in order to improve their units/department rating. To combat this narrow approach, and steer managers towards integrated, company-wide goals, ABC is used to establish benchmarks as basis for performance evaluation. The actual achievements of such benchmarks need to be continually assessed against both absolute terms and also against other important criteria such as service levels, quality and timeliness and customer satisfaction (Monir, 2009).

2.3 World Class Manufacturing (WCM)

The focus on WCM was first conceptualized by Heyes *et al.*, (1984) as a distillation of insight gained from Japanese manufacturing in the 1970's when western manufacturing was perceived as failing and unable to compete. It was seen to provide a new form of accountability and control that more faithfully represents the nature and causal processes of manufacturing. It has a strong focus on accountability to the customer and monitoring progress according to benchmarks derived from principles and practices of the best manufacturers internationally to engage the minds of managers and employees alike. Such a perspective of WCM depicted a distaste of management accounting. According to

World Class International (1996), world class business is "organized to serve the customer" but to do so it must return to the basics: continual and rapid improvement in serving customers through better quality, lower cost and quicker and more flexible responses. The emphasis is how WCM techniques mesh together.

World Class International specified eight areas necessary for a company to achieve world class status: structural management - a skilled management team that can lead the company through any significant cultural change., total quality ethics- elimination of waste and management efficiency., employee involvement- including cross functional and multi-skilled teams., responsiveness to customers., co-operation with and control of suppliers., business process management to simplify processes and reduce overheads., integration, simplification and automation and innovation of new competitive products/services. A later view on WCM by Denplan (1998) defines WCM as consisting of: flexible processes and facilities, small warehouses and work-in-progress(W-I-P) areas, advanced information technology, planning and controls (i.e. demand stabilization with minimum rescheduling, zero changes, short lead times), product design (i.e. 100% quality right first time), financial controls (that identify product /customer profitability), maximizing value-added, benchmarking, employee involvement leading to quality among others.

Bucker (2003) identified four practices that characterize a world class manufacturer: an on-going company wide education and training initiative for human resource development to allow every one to actively participate in the improvement process. Studies have shown that World Class Manufacturers provide a minimum of forty hours of education and training per employee on an annual basis; relentless pursuit of continuous improvement in all business activities. The management focus is on establishing operating performance measurements that drive the behaviors consistent with global continuous improvement in both process and product; dedication to developing a competitive advantage based on superior quality and service. The world Class Company creates a level of customer satisfaction through being not only 'easy to do business with', but by exceeding customer expectations; utilization of an integrated business system that

links people and processes. Amanda, (2006) asserts that all business functions pursue a process of factory and process simplification resulting in a system of integrated approach. This perspective of WCM has a strong orientation to today's manufacturing where continuous improvement targets customer satisfaction through cost-reduced processes.

2.4 The use of WCM in manufacturing

Kaplan (1983) noted that these WCM systems must be tightly integrated with plant production planning and scheduling systems so that production managers are rewarded for efficient utilization of resources and reduced inventory levels throughout the plant. The world Class Company creates a level of customer satisfaction through being not only 'easy to do business with', but by exceeding customer expectations; utilization of an integrated business system that links people and processes. All business functions pursue a process of factory and process simplification resulting in a system of integrated approach (Bucker, 2003). World Class manufacturer is characterized by practicing: an on-going company wide education and training initiative for human resource development to allow every one to actively participate in the improvement process.

In the US, process improvement has been seen to be significantly driven by the implementation of advanced manufacturing practices (Rajiv *et al.*, 2008). World Class Manufacturers provide a minimum of forty hours of education and training per employee on an annual basis; relentless pursuit of continuous improvement in all business activities. The management focus is on establishing operating performance measurements that drive the behaviors consistent with global continuous improvement in both process and product; a dedication to developing a competitive advantage based on superior quality and service. A non-exclusive listing of the WCM practices includes Total Quality Management (TQM), Just in Time (JIT), Kaizen or Continuous improvement and Business Process Improvement (BPI).

2.4.1 Just in Time (.JIT)

Just in Time, whose origin is in Japanese manufacturing is more of a philosophy than an actual process. Just in Time philosophy emphasizes the performance of activities based on immediate demand or need. This system provides little opportunity for workers to

build up any kind of slack or relief (through W-I-P) into the production process (Richard *et al.*, 1999). Just in Time philosophy revolves around four major points: the elimination of activities that do not add value to a product or service, a commitment to high level of quality, a commitment to continuous improvement in the efficiency of an activity and an emphasis on simplification of processes.

Investment in JIT and flexible manufacturing practices helps to reduce set up times permitting shorter production runs, and thus allowing efficient inventory control and lower product defect rates. Just in Time implementation deploys techniques such as pull systems, lot-size reductions, cycle time reductions and quick change-over techniques (Hassan *et al.*, 2007).. The benefits of implementing JIT include reduced W-I-P and finished goods, better quality and higher firm productivity. Just in Time enables firms to align themselves better to customer needs, have shorter lead times and faster time to market.

2.4.2 Total Quality Management (TQM)

This is a philosophy in which management improves operations throughout the value chain to deliver products and services exceed customers' expectations. It is an unyielding and continuous effort by every one in the firm to understand, meet and exceed the expectations of the customers. Organizations develop their own approach to total quality management to suit their particular culture and management style (Bart *et al.*, 2000). Total Quality Management encompasses designing the product or service to meet the needs and wants of the customers, as well as making products with zero defects and waste and with low inventories.

Total Quality Management significantly alters the way jobs are designed, requiring new behaviors, roles and responsibilities for all organization members. Workers are encouraged to report quality problems and stop the production line to make corrections. If necessary peer pressure is used both to ensure that errors are reported and to force workers to master their jobs in order not to call attention to themselves too often. Implementation of TQM in firms often shows that costs can be reduced and differentiation levels increased. Higher quality implies lower costs and improved

productivity which in turn gives a company a higher market share and enhanced competitive levels (Enrique *et al.*, 2006). Quality management success critically depends on executives commitment, employee empowerment and organizations openness. Total Quality Management is founded on three principles, customer focus, continuous improvement and team work. Efficient implementation of TQM results in more satisfied customers, higher perceived value, lower return rate, faster throughput time, lower inventory and manufacturing costs (Blocher *et a. I.*, 2006).

2.4.3 Kaizen/Continuous improvement.

Kaizen is a Japanese concept that means continuous improvement in quality, technology, processes, company culture, safety and leadership involving every one in the organization. Features that identify Kaizen include the continuous nature that is a never ending journey for quality and efficiency; it is incremental in nature and a drive to always improve, and participation requiring the work force involvement and intelligence. Kaizen relies more on employee empowerment. They are assumed to have superior knowledge on how to improve processes because they are closest to manufacturing process and customers. In Japan, the essence of kaizen is seen as simply improvement.

Kaizen's philosophy assumes that peoples way of life, their social life or their home life deserve to be constantly improved. The idea is so deeply ingrained in the minds of both Japanese managers and workers that they often don't even realize they are thinking kaizen. Pearce *et al.*, (2000) attributes continuous improvement to the following: change in business culture, increased responsibility of top management, a systemic approach to improve service rendering, structured approach to problem solving, participation by employees and team work.

2.5 Advantages of implementing WCM

According to MAPICS (2003), firms that have efficiently implemented world class manufacturing practices have documented the advantages, *inter alia*, reduced lead times where firms achieve the ability to deliver products sooner and win business from competitors, command a price premium, the best combination of price and lead times often coming from a stable buyer/supplier relationship based on long-term contracts;

reduction in operations costs where companies achieve a lower cost structure thus retaining the option to use prices as a lever for keeping or gaining market share. Better management of labor resources enables firm to reduce unplanned overtime and expediting, and effective sourcing strategies achieve reduced material costs; increased business performance visibility so that a well implemented enterprise information system delivers overall visibility into the health of a company and detailed information for performance measurement and on-going feedback; speed time-to-market such that well managed product life cycle bring new products into the market with changes and improvements made earlier when they are less costly; exceed customer expectation, where supporting quality improvement, on-time performance and promising realistic delivery that are achieved has helped implementing companies to achieve and exceed customer expectations; and streamlining outsourcing processes, such that World Class Manufacturing supports outsourcing of manufacturing processes yielding flexibility to implementers and an opportunity to exploit economies of scale (www.mapics.com).

2.6 Factors impeding successful implementation of WCM

Potential barriers to successful implementation of WCM have been documented as company culture, cost of investment, staff attitude and resistance to anything new, lack of understanding to the approaches of the techniques, nature of business and manufacturing facility and managements attitude and inertia (Oliver, 2003).

2.7 Empirical Studies

In Japan, many of the world class manufacturing practices have been successfully implemented. The success has been accredited to the Japanese work ethics which exhibits a cultural phenomenon and the historical legacies of Confucianism and Shintoism (Charles et al., 1998). Cua et al., (2001), in their study focuses on the effect of implementing both TQM and JIT in both manufacturing and service sectors. He observes a compatibility and trade off between the implementation both TQM and JIT. He notes that manufacturing performance is associated with the level of implementation of both JIT and TQM. Phan and Yushiki, (2007) in their focus on manufacturing firms only however observe that firms benefit more from JIT if it is implemented first than when both systems are simultaneously adopted. They further observe that manufacturing

performance is associated with the level of implementation of both socially and technologically oriented practices of these systems.

There is significant research on the use of WCM in the US. Richard *et al.*, (1999) in his study on implementation of WCM found out that these methods had been adopted more by the large US manufacturing companies, small companies recorded lower implementation levels. Organization culture was found to be the leading challenge to successful implementation. Their study found out that the motivation for firms to implement WCM practices was the threat that Japanese companies had on US manufacturers in the global market. This study identified conflict in culture as the key impediment to successful implementation of WCM in US. The manufacturing focus of WCM on zero inventories contravenes the conventional manufacturing policy in American companies that focuses on buffer W-I-P in anticipation of demand.

Paul *et al.*, (2002) in his research on manufacturers in US found out that firms using these continuous quality and process improvement techniques reported reduced cycle time, lead time improvement, and reduced unit manufacturing cost. Steven (2003) studied how the Toyota Company has been able to build process improvement capacity as a renowned company with outstanding improvement owed to WCM. His research found out that implementation of WCM enabled Toyota to input better problem solving, gained insight into developing other peoples skills which led to skill-building based on continuous improvement for assembly lines. The company also developed the capacity to develop skills of people engaging in superlative process improvement.

Eitan *et al.*, (2004) in their study on adaptation of quality improvement paradigm among Israeli manufacturers found that cultural values played a significant role. Their study asserts that as culture gradually changes, so does performance and improvement of processes in the manufacturing firms. Teams and good relations, cooperation between management and employees were seen to be key in the ability of world class manufacturing practices and other innovations ability to beat tangible results.

In United Kingdom (UK), researches show that while companies profess to be adopting WCM techniques, the reality is that many of these implementations are piecemeal initiatives centered on only one or two techniques. Their research finds that firms preferred piecemeal implementations due to the internal resistance they faced: that a total overhaul of production procedures was viewed as expensive while the tangible benefits of such innovations were not guaranteed. Implementation of these manufacturing complementary initiatives has helped firms to enhance responsiveness to quality, employee improvement and improve their cost structure (Buck *et al.*, 2006).

Hassan *et al.*, (2007) in their study of implementation of JIT in the United States (US) found out that some companies were implementing it. They further found JIT to be more suited to companies that have uniform flow of operations. A higher adoption rate was found to be in the manufacturing sector though their study argues that JIT is a philosophy that can be implemented by all types of business operations. Their study also records that implementing JIT calls for changes in the accounting systems to eliminate some of the detailed accounting information previously maintained. Cost accounting systems need to be evaluated and modified to fit JIT systems.

While studies have been done in other countries since 1999, only two studies known to the researcher have addressed the influence of process improvement techniques on the value chain. Nzule (1999) focused on the adoption of Activity Based Costing among manufacturing companies in Kenya, a concept and costing approach that is key to successful implementation of WCM. His findings showed that the adoption of ABC was high among large manufacturing companies and low among small manufacturing companies. The motor vehicle industry was found to have successfully implemented ABC. The cost of implementing ABC was found to be prohibitive to small companies. Management inertia was found to be a limiting factor to the implementation of new innovations. Companies reported improved costs and quality as a result of the implementation. Implemented faced challenges in identifying cost drivers and in selecting optimal cost pools. Secondly Langat (2005) examined cost allocation practices among listed companies.

Evidently there was need to assess the level of implementation of World Class Manufacturing practices by Kenyan firms. This study focused on companies listed at the Nairobi Stock Exchange.

2.8 Summary of Literature Review

Competitive market forces and technology impacts have made it necessary for firms to adjust to new manufacturing processes. Firms are under pressure to maintain leadership in their industries and still remain profitable. The revolution towards excellence will be based on new philosophies like WCM. This study is based on two theories, the Theory of Constraints (Christoph, 2005) focuses on identifying bottlenecks that impede a company's ability to achieve its operational goals and maximize the productivity of that constraint. Firms use WCM practices to identify and optimize constraints yields. The New Institutional Theory (Scott, 1999) posits that firms will conform to the policies and practices adopted by other firms operating in the same environment and engaged in similar activities as long as such firms are seen to be successful. This theory is the driver of the spread of WCM from Japan to US and to other countries. The concept of ABC is the bed rock of precision in cost allocation and cost tracing, two very important cost concepts in determining firms' bottlenecks and in effective implementation of WCM.

Previous studies on NSE focused on ABC. Nzule, (1999) looked at the implementation of ABC among companies operating in Kenya. His findings show a low implementation rate of ABC among small companies as compared to larger companies. He points out that traditional costing system is still widely used despite its publicized weaknesses. Firms reported low information level on ABC among employees and the cost of implementing ABC system as the main reasons for low implementation. Langat's (2005) study, *inter-alia*, focuses on ABC as a cost allocation practice among Kenyan listed firms. He finds a significant use of ABC in cost allocation. Difficulty in identifying cost drivers and the decision on what number of cost pools is optimal are found to be the main challenges to using ABC in cost allocation.

Evidently, no study has yet assessed the level of usage of WCM practices in Kenya. With global liberalization of commerce and industry, Kenyan firms, of necessity must conform

so as to manage the competitive environment. It is for this reason that this study sort to asses the extent of implementation of WCM practices among listed Kenyan firms. Ideally, the study identifies factors that influence the adoption and the challenges which are faced in the process of implementation.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter shall cover the design of the study, the target population and sample of study, data collection method, data quality, measurement of variables used in analyzing the data, statistical technique to be used for data analysis , and the software to be used in analysis.

3.2 Research Design

This study surveyed the extend of implementation of WCM, the reasons that predispose companies to implement WCM, challenges in implementing the practices, the benefits of implementation as well as the policies and practices that needed to be in place for effective implementation. A survey was used to gather data for the study. Descriptive research design was used. This approach allowed for analysis of opinion of management employees in providing insight into the extent of the implementation of world class manufacturing practices among companies listed at NSE.

3.3 Population and Sample

The target population was the companies listed at The Nairobi Stock Exchange as at 31st march 2009 (as listed in appendix 11). A sample of 34 was successfully interviewed in the study. The choice of quoted companies was preferred because large firms were perceived to have great resources available for investment in process innovations and advanced management accounting practices. It was hence expected that this population would give more accurate and reliable results.

3.4 Data collection

Primary data was collected through a questionnaire administered by the researcher through personal interviews. The target respondents were financial officers, cost accountants and operations managers, procurement managers, corporate affairs managers and management accountants. The researcher visited five firms in day one to book

appointments with the respondents. Only one interview was fixed. Access to the targeted respondents proved very hard due to the policies guarding company information. The researcher then devised an alternative method of quicker access to respondents where one manager accessed was used to volunteer other manager's contacts in the target companies. This made access to the right respondents much easier as the researcher used the so gathered contacts to book appointments with the respondents directly. Almost 90% of the respondents were accessed through such referrals. On average this approach yielded 5 interviews in a day.

The questionnaire (Appendix 111) had three sections. Section A consisted of open-ended demographic question (Q1-4) for analyzing respondents. Section B three questions (Q5-7), two closed ended questions were to establish if companies had implemented WCM and further, the particular philosophy that implementers had used. A third question on a five-point Likert Scale was to gather information on the importance of all WCM philosophies that companies had implemented. Section C had six questions (Q8-13). On a five point Likert Scale, Question 8 sought information on the factors that predispose companies to adopt WCM. Question 9 sought information on the policies and practices that implementers of WCM found necessary for effective implementation. Question 10 on a five point Likert Scale sought to establish the benefits that firms had achieved as a result of implementing WCM. Question 11 on a five point Likert Scale sought information on the challenges that implementers face in the implementation. Question 12 sought to identify the reasons for non-implementation of WCM. Question 13 was open ended and sought to get post-implementation recommendations by companies that already were using WCM.

The researcher visited the target companies and booked appointments for interview with the respondents. Follow up phone calls were made to keep the respondents reminded of the appointments. However not all appointments were fulfilled. Some respondents would not find time for the interviews and requested for the questionnaires to be dropped and picked later. The response rate from such requests was however negligible. It was also realized that the level of awareness of WCM practices was very low even among managerial staff especially among the local financial and investment and commercial and

allied sectors. Interviews among the multinational firms and the industrial and allied sectors were very successful. Managers went into details on the operationalisation of the WCM in their companies, and displayed enormous insight into WCM.

3.5 Data Analysis and Presentation

The demographic information in Section A was used to categorize respondents into their years of service with their respective employers. This helped to know the degree of reliability of the information that the respondents gave. This information was presented in a tabular form. In Section B, information from Q5 that sought to establish the extent of implementation of WCM was analyzed through a pie chart. Across tabulation was further carried out on the WCM practices against the sectors. Information from Q6 that was to identify the specific practices that firms had implemented was analyzed through bar graph. Question 7 which sought information the perceived importance of WCM to implementers was analyzed through descriptive statistics that is, mean and standard deviations.

A test statistic (t-test) was also carried out to determine the significance of each of the philosophies to implementers. Question 8 sought information on the predisposing reasons to implementation of WCM. A factor analysis was carried out to determine the reasons that weigh heavily on implementation decisions. Question 9 which sought to establish the policies and activities that firms need to put in place for effective implementation of WCM was analyzed through a cross tabulation of the identified policies and activities against the sectors. Question 10 sought information about the extend of benefits achieved on identified measures of performance. This information was analyzed through cross tabulation of the means and standard deviations per sector against the stated measures of performance. This helped to rank the performance measures by their levels of achievement.

Question 11 was to gather information about the challenges in the implementation of WCM. This information was analyzed through cross tabulation of the mean and standard deviations per sector against the identified challenges to implementation. This was to enable ranking these challenges according to their degree of impact. Question 12 which

sought to establish reasons why companies may not be implementing WCM was omitted from the analysis since the number of respondents was two and each gave a single reason for not implementing WCM. This data was too scanty for meaningful analysis. Question 13 was open ended. It sought to get post- implementation recommendations from the implementers. This information was incorporated in chapter 5 under recommendations.

CHAPTER FOUR

4.0 DATA ANALYSIS AND FINDINGS

4.1: Introduction

This chapter presents the analysis and findings of this study. A total of 34 firms of the 54 quoted companies targeted for interviews were accessed. The interviewed respondents represented 63% of the target population. The analyses of these findings are presented in this chapter. The findings are presented in percentages, frequency distributions, pie charts, bar graphs, Scree plots, mean and standard deviations.

The first part of this analysis focuses on the profile of the respondents. This is presented in two ways, in terms of their length of service with the employer company and a focus on their responses per sector. The findings are presented in bar graphs.

The second part analyses the implementations extend of WCM. This analysis reflect both the overall rate of implementation captured in a pie chart and a cross tabulation of WCM practices against each respondent sector. Implementers and non- implementers were expressed as percentages of the total respondents. Factor analysis was also done to establish if the nine WCM practices that firms are implementing could be reduced to and explained by a fewer of them. The tool of analysis used was SPSS. The importance of each practice to firms was analyzed and presented in a tabular form. Measures of central tendency (mean and standard deviation) were used to rate the perceived importance of each of the WCM practices.

The third part of this chapter analyzed the reasons for implementation of WCM. Descriptive statistics (Mean and Standard deviation) were used to explain variation in implementation reasons. Further, principal factor analysis was used and the tool of analysis was SPSS. The thirteen reasons were effectively reduced to three that explains the variations in implementation.

The fourth part of this chapter analyses the practices and activities that companies institute as they implement WCM. Mean and standard deviation were the tools of analysis. The results showed that staff training and instituting a policy on continuous improvement were the key activities that implementers of WCM mostly focused on.

The fifth part of this chapter covers findings on the benefits and challenges firms have had on implementation of WCM practices. Descriptive statistics and factor analysis were used for analysis. A mean above 3.5 was rated as influencing implementation to a large extend while a mean of between 3.5 and 2.5 was categorized as influencing to some extend. The analysis showed high variations among the departments. Company culture and staff attitude were ranked the strongest challenges to implementation of WCM. Factor analysis was further done for both the perceived benefits and challenges effectively reducing the benefits and challenges into two factors each using SPSS.

4.2: Profiles of the respondents

The study finds (Figure 4.1 below), that fifty percent, (50 %) respondents have been with the organization for four (4) to five (5) years, 35% have been in the organization for over six (6) years while 15% have been in the organizations for a period of two (2) to three (3) years. The distribution of respondents is mainly senior staff in the organization.

Figure 4.1: Length of Service with Organization (years)



Source: Researchers Data

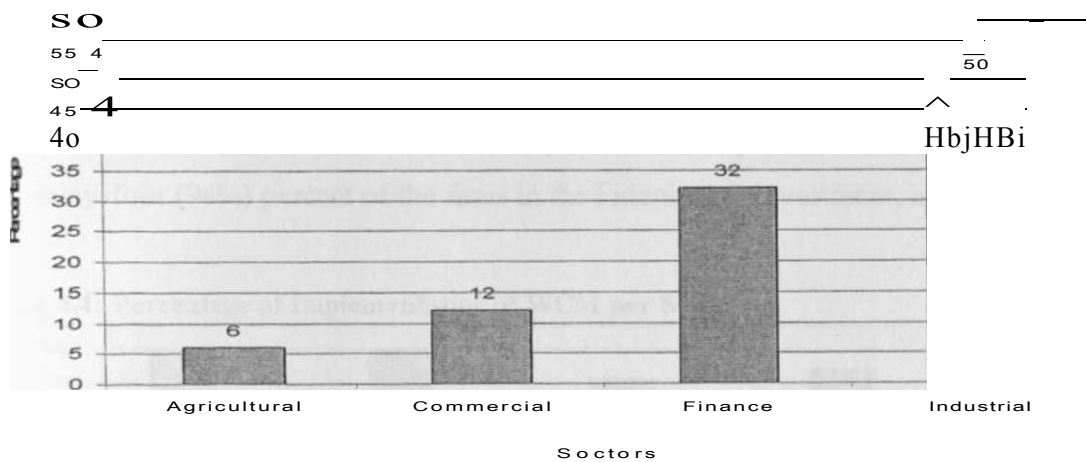
Ordinarily, members of senior management are involved in the implementation of world class manufacturing practices since they are involved in policy formulation and hence

implementation. The study finds that most managers attain the senior position within a range of five to six years and seems to move firms as shown by declining number.

4.2.1 Response rate

A total of fifty-four (54) questionnaires were issued out from which only 34 were returned. The returned questionnaires' represented a response rate of 63%, which the study considered adequate for analysis. The completed questionnaires were edited for completeness and consistency. Nairobi stock Exchange is dominated by Industrial and

Figure 4.2: Respondent companies distribution by sector



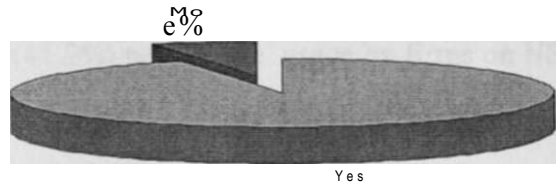
Source: Researchers Raw Data

firms, (Figure 4.2 above). The respondents constituted fifty percent (50%) from Industrial and Allied sector, thirty-two (32%) from financial, twelve percent (12%) from Commercial and Services sector while six percent (6%) came from Agricultural sector.

4.3: The extend of implementation of WCM

Ninety-four percent (94%) (Figure 4.3 below), of the respondent organizations had implemented world class manufacturing practices. By implication, only six percent 6% had not implemented the practices. The firms which had not implemented cited high cost of implementation and irrelevance of the practices (weak diffusion of WCM into the service sector) as their reasons, especially in the financial sector.

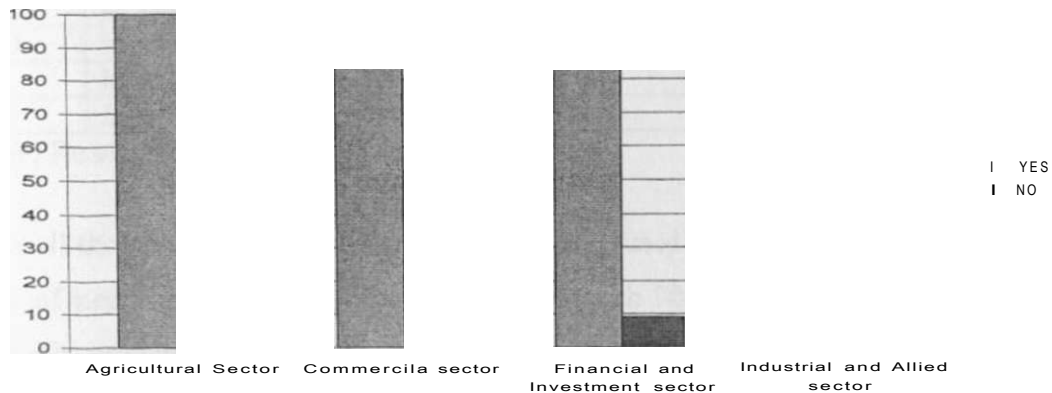
Figure 4.3: Percentage representation of WCM Implementers



Source: Researcher Raw Data

The implementation rate per sector is analyzed in Figure 4.4 below. All firms in the Agricultural and Commercial sectors had implemented the practices while ninety (90%) and ninety-four (94%) percent of the firms in the Financial & Investment, and

Figure 4.4: Percentage of Implementation of WCM per Sector



Source: Researcher Raw Data

Industrial & Allied sectors respectively. Notably, the listed firms rate of adoption of WCM practices is in excess of ninety percent. The lowest implementers are however found among the Financial and Investment sector. They reported apparent irrelevance of manufacturing practices to finance industry.

4.3.1 Cross Tabulation: Implementation against Sector

The analysis of respondents of different practices across different sectors (Table 4.1 below) show that TQM, KAIZEN, BPR, JIT, and ABM are used by firms in all sectors and they attained seventy six (76%), seventy one (70.6%), sixty-seven (67%), fifty (50%) and forty-one(41.2%) percentage usage by firms on NSE respectively. The result showed that a total of nine world class manufacturing practices had been implemented by the respondents.

Table 4.1: Cross tabulation of WCM practice Implemented against Sectors

		Agricultural	Commercial	Finance	Industrial	Total
JIT	In use	5.9%	2.9%	11.8%	29.4%	50%
	Not in use	0%	8.8%	20.6%	20.6%	50%
KAIZEN	In use	5.9%	2.9%	20.6%	41.2%	70.6%
	Not in use	0%	8.8%	11.8%	8.8%	29.4%
TQM	In use	5.9%	8.8%	23.5%	38.2%	76.5%
	Not in use	0%	2.9%	8.8%	11.8%	23.5%
BPR	In use	5.9%	5.9%	23.5%	32.3%	67.6%
	Not in use	0%	5.9%	8.8%	17.6%	32.3%
ABM	In use	2.9%	2.9%	17.6%	17.6%	41.2%
LEAN	In use	0%	0%	0%	5.9%	5.9%
WCO	In use	0%	2.9%	0%	0%	2.9%
BSC	In use	0%	0%	0%	2.9%	2.9%
ERP	In use	0%	2.9%	0%	0%	2.9%

Source: Researchers Raw Data

Across all the sectors, TQM was the most commonly used philosophy by 76.5% against a 23.5% of non-implementers followed by Kaizen with 70.6% of implementers. JIT was commonly used in the industrial and allied sector (29.4%). Kaizen was commonly used in agricultural sector (5.9%), financial and services and industrial and allied sectors (41.2%). TQM is used in all the sectors (76.5%). The other four methods were minimally used. BPR was used in agricultural, financial and services and industrial and allied sectors. ABM is used in all sectors. LEAN is used in commercial and industrial and allied sectors. WCO (World Class Operations) and ERP (Enterprise Resource planning) were used in commercial sector only while BSC (Balanced score Card) was used in industrial and allied sector only.

4.3.2 Factor Analysis on Implementation

To confirm the applicability of Factor analysis, a student t-test was carried at 95% level of significance. The t-test statistics (Table 4.2 below) shows that all the identified world class manufacturing practices were significant since the t-critical (1.96) is less than

Table 4.2: t-test Statistics

	Test Value = 1.96					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
JIT	7.597	33	.000	2.5882	1.8951	3.2814
KAIZEN	8.726	33	.000	3.0588	2.3456	3.7720
TQM	11.450	33	.000	3.5588	2.9265	4.1912
BPR	8.800	33	.000	3.0294	2.3290	3.7298
Others	5.895	33	.000	2.0294	1.3290	2.7298

Source: t-test Output from Researchers Raw Data.

the t-calculated for all practices. Consequently, the application of Factor Analysis was found valid and undertaken as discussed below.

There were nine WCM practices. These were reduced to five as follows: 1-JIT, 2-KIZEN, 3-TQM, 4-BPR and 5-Others (ABM, WCO, ERP, BSC and LEAN) before running factor analysis. Table 4.3 (below) shows the eigen values for the practices as extracted using principal component analysis. It shows the relationship between the variables and the identified factors.

Table 4.3: Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1-JIT	2.199	43.972	43.972	2.199	43.972	43.972
2-KAIZEN	1.154	23.076	67.049	1.154	23.076	67.049
3-TQM	.800	15.992	83.041			
4-BPR	.445	8.901	91.942			
5 -Others	.403	8.058	100.000			

Extraction Method: Principal Component Analysis.

From the Eigen values in Table 4.3 above, practices with Eigen values above one were sampled out. This reduced the five WCM practices effectively into two factors explaining 67.049 percent of the variation as indicated in the table.

Using Varimax rotation method the two factors are as follows (Table 4.4 below),

Factor one is explained by the main stream WCM practices which are applicable in most of the organizations (JIT, KAIZEN, TQM and BPR). It is expressed in the model below. The analysis yielded two components as approaches with the following practice loadings in a model form;

$$F1 = 0.830JIT + 0.707KAIZEN + 0.720TQM + 0.675 BPR \dots\dots\dots 4.1,$$

Table 4.4: Rotated Component Matrix

PRACTICES	Component	
	1	2
JIT	.830	.038
KAIZEN	.707	.269
TQM	.720	-.145
BPR	.675	-.535
Others	.079	.896

Extraction Method. Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

Factor two is explained by the customized WCM practices composed of the following practice loadings;

$$F2 = 0.896 \text{ other (ABM, WCO, ERP \& LEAN)} \dots\dots\dots 4.2.$$

Where others include (ABM, LEAN, ERP, and WCO). These practices relating to factor two are unique to specific organizations. However, the magnitude of the factor loading of 0.896 is an indication that one of these practices, ABM, as the prior analysis revealed has a wide spread usage of 41% (Table 4.1 above).

4.3.3 Overall Rating of Perceived WCM Importance.

The findings in (Table 4.5 below) indicate that the WCM practice perceived most important to implementers was TQM with a mean of 3.5588, followed by KAIZEN mean of 3.0588, BPR mean of 3.0294, JIT mean of 2.5882 and others (ABM, LEAN, BSC and EPR) mean of 2.0294 respectively. This is consistent with the results from factor analysis discussed above

Table 4.5: Rating of Perceived WCM Importance

	N	Mean	Std. Deviation	Std. Error Mean
JIT	34	2.5882	1.98659	.34070
KAIZEN	34	3.0588	2.04408	.35056
TQM	34	3.5588	1.81227	.31080
BPR	34	3.0294	2.00734	.34426
Others	34	2.0294	2.00734	.34426

4.4 Reasons for Implementation of WCM

Table 4.6 below shows a tabulation of the descriptive statistics (Mean and Standard deviation) explaining the variations in the reasons firms have for implementing WCM.

Table 4.6: Descriptive Statistics

Variables		Mean	Std. Deviation
Reduction in inventory	X ₁	3.12	1.75
Improved time-to-market	x ₂	3.88	1.56
Reduced lead time	X ₃	3.67	1.73
Improve input per worker	X ₄	3.18	1.70
Increase equipment utilization	x ₅	3.30	1.74
Reduced employee supervision	X ₆	3.18	1.70
Reduce time taken to note errors and their correction	x ₇	3.58	1.62
Increased customer satisfaction	X ₈	4.15	1.25
Increased Staff morale	X ₉	2.91	1.57
1 Reduced Waste	X ₁₀	3.79	1.32
Improved Product quality	X ₁₁	4.03	1.47
Improved competitiveness	X ₁₂	4.18	1.41
Reduced product Cost	X ₁₃	3.94	1.39

Source: Researchers Raw Data

The highest mean scores were, variable 12 (Improved competitiveness with a mean of **4.1818**), variable 8 (Increased customer satisfaction with a mean of 4.1515) variable 11 (Improved Product quality with a mean of 4.0303) and variable 13 (Reduced product Cost with a mean of 3.9394). These were very important variables in determining a company's predisposition to implement WCM into their processes. The lowest mean score was variable 9 (Increased Staff morale with a mean of 2.9091).

4.4.1 Factor Analysis on Reasons for WCM Implementation

Factor analysis has been used because of the concern of decomposing the information content in a set of variables into information about an inherent set of latent components/factors. This assisted in reducing a number of variables into fewer factors which are of similar characteristics. The analysis was carried out and the results have been presented in terms of: Descriptive Statistics, Scree Plot, Total Variance Explained 'Eigen values, Initial Component Matrix and Rotated Component Matrix (Varimax).

Table 4.7 shows below the relationship between the variables and identified factors. It was used to write the factor equations. From the total variance explained table/Eigen values above, factor extraction was done the using Eigen values greater than 1.00. Factors with Eigen values less than 1.00 were not used because they account for less than the variation explained by a single variable. The result indicates that 13 variables were reduced into 3 factors. The three factors explain 71.632% (Cumulative percentage) of the total variation, the remaining 10 factors together account for 28.368% of the variance.

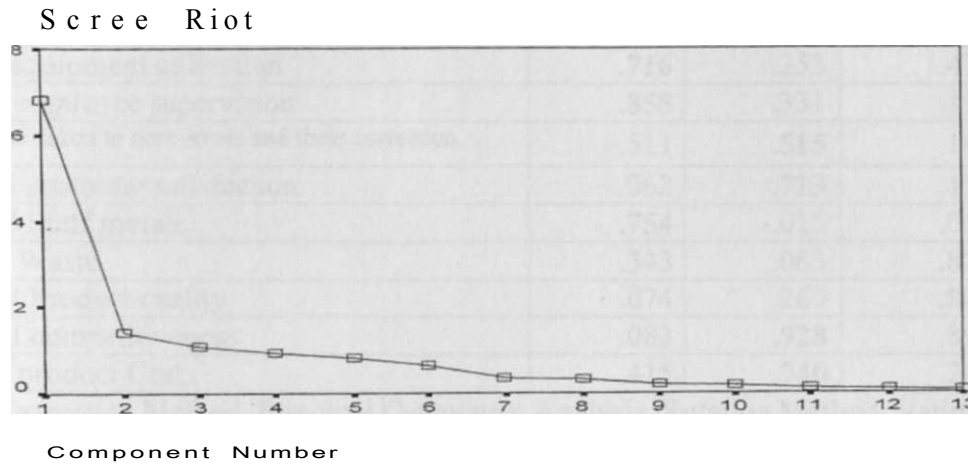
Table 4.7: Total Variance Explain

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumu %	Total	% of Variance	Cumu %	Total	% of Variance	Cumulative %
1	6.823	52.486	52.486	6.823	52.486	52.486	3.716	28.587	28.587
2	1.402	10.783	63.269	1.402	10.783	63.269	3.477	26.744	55.331
3	1.087	8.363	71.632	1.087	8.363	71.632	2.119	16.301	71.632
4	.949	7.301	78.933						
5	.811	6.236	85.169						
6	.656	5.050	90.218						
7	.348	2.676	92.894						
8	.315	2.422	95.316						
9	.211	1.625	96.941						
10	.165	1.272	98.213						
11	.107	.825	99.039						
12	.075	.576	99.615						
13	.050	.385	100.000						

Source: Authors Extraction Method: Principal Component Analysis.

The explained variation 71.632% is greater than 70% and therefore. Factor Analysis can be used for further analysis. The model with 3 factors may be adequate to represent the data.

Figure 4.5: Scree plot



Source. Researchers Raw Data

A Scree Plot (Figure 4.5 above) to show the total variance associated with each factor. It showed a distinct break between steep slop of the large factors and gradually trailing off of the rest of the factors. From the Scree Plot, it appeared that a three (3) factor model was sufficient (factors with Eigen values greater than 1) in the analysis, that is, 13 variables have been reduced into three distinct factors.

Table 4.8 below shows the relationship between the variables and identified factors. Factors with eigen values above 0.50 were extracted for each factor and used to write the factor equations. The rotated component matrix is to transform the complicated matrix (initial matrix into simpler one).The purpose of rotation is to achieve a simple structure i.e. we would like each factor to have non zero loading for only some of the variable so that we can easily interpret the factors. A factor loading of 0.5 has been used to determine the variable belonging to each factor.

Table 4.8: Rotated Component Matrix

	Component		
	1	2	<i>f^t</i>
Reduction in inventory	.516	.518	.313
Improved time-to-market	.467	.624	.272
Reduced lead time	.502	.544	.296
Improve input per worker	.771	.299	.168
Increase equipment utilization	.716	.253	.470
Reduced employee supervision	.858	.331	.197
Reduce time taken to note errors and their correction	.511	.515	.107
Increased customer satisfaction	.062	.713	.152
Increased Staff morale	.754	-.015	.068
Reduced Waste	.343	.063	.826
Improved Product quality	.074	.269	.883
Improved competitiveness	.083	.928	.899
Reduced product Cost	.415	.740	.263

Source: Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 5 iterations.

Factor one: Focus on employees. Reasons that are closely relating on factor one have been identified as customer focused. They are: improvement of input per worker (77.1%); increase equipment utilization (71.6%); reduced employee supervision (85.8%); and increased Staff morale (75.4%). The analysis showed that employee involvement, empowerment and increased equipment utilization were strong predisposing factors for companies to implement WCM. This led to the deduction that companies are aware of and keen on kaizen implementation. The model of factor one is represented by,

$$F_1 = 0.771 X_4 + 0.716 X_5 + 0.858 X_6 + 0.754X_9, \dots \dots \dots 4.3$$

Factor two: customer and competitor focus: The reasons that are closely relating in factor two have been identified as customer and competitor focused. They are reduction in inventory (51.8%); improved time-to-market (62.4%); reduced lead time (54.4%); reduce time taken to note errors and their correction (51.5%); increased customer satisfaction (71.3%); improved competitiveness (92.8%) and reduced product Cost (74%).

These results showed that companies were keen to achieve increased customer satisfaction, improved competitiveness and reduced product cost, reasons that drive the

implementation of TQM. Companies are also keen on reducing inventory, improved time to market, and reducing lead time, factors that are associated with implementation of JIT. The mathematically model for factor two is represented by:

$$F_2 = 0.518 X_1 + 0.624 X_2 + 0.544 X_3 + 0.515 X_7 + 0.713 X_8 + 0.928 X_{12} + 0.740 X_{13}$$

4.4

Factor three: Product focused; the factors closely relating in factor three have been identified as product quality focused. They are reduced waste and improved product quality. These reasons relate generally to improvement product quality which is achieved by companies that implement TQM. The mathematically factor two is represented as follows.

$$F_3 = 0.826 X_{10} + 0.883 X_A \dots \dots \dots 4.5$$

All the variables were significant in the factor analysis; that is all the variables were classified into one of the three factors.

4.5 Practice Necessitated by WCM Implementation

Table 4.9 below shows the cross tabulation of operational practices against each sector.

Table 4.9: Cross tabulation: Practices against sectors

		Agricultural	Commercial	Finance	Industrial	Total
A policy on continuous improvement	In place	5.9%	11.8%	26.5%	47.1%	91.3%
	Not in place	0%	0%	5.9%	2.9%	8.8%
Staff training	Undertaken	6.1%	12.1%	30.3%	48.5%	97%
	Not undertaken	0%	0%	0%	3%	3%
Focus on new product development	Focused on	5.9%	5.9%	17.6%	23.5%	52.9%
	not focused on	0%	5.9%	14.7%	26.5%	47.1%
Improved machine maintenance	Focused on	2.9%	8.8%	11.8%	44.1%	67.6%
	not focused on	2.9%	2.9%	20.6%	5.9%	32.4%

Source: Researchers Raw Data

The results indicate that among the most commonly focused on activities were; staffs training at 97%, policies on continuous improvement at 91%, optimizing existing IT

systems at 85.3%. investing in new IT systems 85.3% and improved machine maintenance at 67.6%.

4.6 Benefits and challenges in implementing WCM practices

In table 4.10, Measure of central tendency (mean) and a measure of variation (standard deviation) was used to analyze the perceived benefits of implementing WCM.

		X1	X2	X3	X4	X5	X6	X7	X8
Agricultural	N	2	2	2	2	2	2	2	2
	Mean	2.00	3.50	3.50	3.50	2.50	3.50	2.00	2.00
	<i>a</i>	1.41	0.71	0.71	0.71	2.12	0.71	0.00	0.00
Commercial and Service	N	4	4	4	4	4	4	4	4
	Mean	3.00	4.00	2.25	3.25	2.00	2.50	2.25	2.25
	<i>a</i>	1.41	1.15	0.96	1.71	1.15	1.29	1.50	1.26
Finance and Investment	N	11	11	11	11	11	11	11	11
	Mean	3.64	3.45	3.64	3.36	3.45	2.82	3.09	2.09
	<i>a</i>	1.694	1.63	1.69	1.63	1.63	1.78	1.70	1.59
Industrial and Allied	N	17	17	17	17	16	17	17	17
	Mean	3.65	3.59	4.12	3.53	3.19	3.47	3.18	3.12
	<i>a</i>	1.27	1.18	1.17	1.12	0.98	1.55	1.74	1.54
Total	N	34	34	34	34	33	34	34	34
	Mean	3.47	3.59	3.71	3.44	3.09	3.15	2.97	2.62
	<i>a</i>	1.44	1.28	1.40	1.31	1.33	1.56	1.65	1.52

Source: Researchers Raw Data

The analysis categorized the variables in to two categories using mean values, that is, mean > 3.5 (large extents). This category includes; Increased business performance and cut operation costs. Mean of 2.5 to 3.5 (some extent) including; reduced lead time, speed time-to-market, increased number of jobs mastered by employees, exceeded customer expectations, improved product quality and improved staff morale

4.6.1 Factor analysis on implementation benefits

Table 4.11 (below) is a tabulation of the eigen values extracted for the factor components. It shows the relationship between the variables and the identified f factors.

Table 4.11: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.342	54.273	54.273	4.342	54.273	54.273
2	1.242	15.525	69.797	1.242	15.525	69.797
3	.776	9.704	79.501			
4	.561	7.012	86.513			
5	.389	4.859	91.372			
6	.333	4.168	95.540			
7	.234	2.923	98.464			
8	.123	1.536	100.000			

Extraction Method: Principal Component Analysis.

The benefits of implementing WCM have been classified into two factors explaining 69.80 percent of the variation leaving 30.20 percent unexplained as indicated in Table 4.11 above.

Table 4.12 below shows the rotated component matrix from which is derived the factor loadings. Factors that have a loading of above 0.50 are extracted (considered significant in explaining the variations in the benefits firms have in implementing WCM practices).

Table 4.12: Rotated Component Matrix

	Component		
		1	2
Reduced lead time	X₁	.781	.222
Cut operation costs	X₂	.803	.152
Increased Business performance	X₃	.567	.611
Speed time-to-market	X ₄	.509	.721
Exceeded customer expectations	X₅	.872	.170
Increased number of jobs mastered by employees	X ₆	.237	.801
Improved product quality	X₇	.731	.199
i Improved staff morale	X ₈	.008	.850

Source: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 3 iterations.

Using Varimax rotation method the two factors are as follows:

Factor one-Market Oriented Reasons. Issues loading heavily on factor one are as shown in model 4.6 below. They include reduced lead time, cut operation costs, exceed customer expectations and improved product quality.

$$F1 = 0.781 X_1 + 0.803 X_2 + 0.872 X_5 + 0.731 X_7 \dots \dots \dots \mathbf{4.6}$$

Factor two-Internal Business Oriented Reasons: Issues heavily loading on factor two are as shown in model 4.7 below. They include increased business performance, speed time to market, increased number jobs mastered by employees and improved staff morale.

$$F2 = 0.611 X_3 + 0.721 X_4 + 0.801 X_6 + 0.850 X_8 \dots \dots \dots \mathbf{4.7}$$

4.6.2 Challenges of implementing WCM

The results shown in table 4.12 point that the challenges faced as a result of the implementation of WCM vary from sector to sector. In the agricultural sector the main challenges are Lack of proper understanding to the approaches (mean of 4.00) and cost of investment (mean of 3.5000). In the commercial sector Lack of proper understanding to the approaches (mean of 3.7500) and attitude of staff (mean of 3.2500) were the main challenges, in the financial sector company culture (mean of 3.8182) and attitude of staff (mean of 2.7273) were the main challenges and in the industrial and allied sector company culture (mean of 3.5294), staff attitude (mean of 2.3529), Lack of proper understanding to the approaches (mean of 2.3529) were the main challenges. Existence of multinational sites and Existence of multiple locations were not major challenges in all the sectors.

In general, the findings rank the challenges in the following descending order: company culture (mean of 3.3824), attitude of staff (mean of 2.7647) and lack of proper understanding to the (mean of 2.6471). On a moderate extent; Cost of investment (mean of 2.5882), Existence of multiple locations (mean of 2.1765) and Existence of multinational sites (mean of 2.0000). There was however high variation amongst the respondents opinion, this was indicated by high values of the standard deviations for each statement.

table 4.13: Cross tabulation: Descriptive statistics against challenges

		X1	X2	X3	X4	X5	X6
Agricultura 1	N	2	2	2	2	2	2
	Mean	1.00	3.50	2.50	4.00	1.00	2.00
	a	0.00	2.12	0.71	0.00	0.00	0.00
Commercia 1	N	4	4	4	4	4	4
	Mean	2.75	3.00	3.25	3.75	2.50	2.50
	a	2.06	1.41	1.71	1.26	1.91	1.29
Finance	N	11	11	11	11	11	11
	Mean	3.82	2.73	3.27	2.45	2.27	2.45
	a	1.60	1.69	1.42	1.57	1.85	1.81
Industrial 1	N	17	17	17	17	17	17
	Mean	3.53	2.29	2.35	2.35	1.82	1.94
	a	1.59	1.53	1.46	1.66	1.33	1.67
Total	N	34	34	34	34	34	34
	Mean	3.38	2.59	2.76	2.65	2.00	2.18
	a	1.69	1.56	1.46	1.59	1.54	1.60

Key: X1 Company Culture; X2= Cost of investment; X3 = Attitude of Staff; X4 = Lack of proper understanding to the approaches; X5 = Existence of multinational sites; X6 = Existence of multiple locations, a = Std. Deviation.

Source: Authors Raw Data

4.6.3 Factor analysis on challenges

Component	Initial Eigen Values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.314	55.241	55.241	3.314	55.241	55.241
2	1.169	19.475	74.717	1.169	19.475	74.717
3	.697	11.617	86.334			
4	.397	6.620	92.954			
5	.250	4.167	97.121			
6	.173	2.879	100.000			

Source: Extraction Method: Principal Component Analysis.

From the rotated matrix (Table 4.15 below), the challenges of implementing WCM have been classified into two factors explaining 74.717 percent of the variation leaving 30.203percent unexplained.

Table 4.15: Rotated Component Matrix

	Component		
		1	2
Company Culture	X₁	-.064	.870
Cost of investment	x₂	.855	-.005
Attitude of Staff	X ₃	.438	.761
Lack of proper understanding to the approaches	x ₄	.636	.486
Existence of multinational sites	x₅	.876	.150
Existence of multiple locations	x ₆	.866	.197

Source: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 3 iterations.
Using Varimax rotation method the two factors as discussed under 4.6.1 and 4.6.2 below.

4.6.3.1 Factor one: Structural and Policy factors

The reasons relating in factor one were collectively addressed as the structural factors. These include cost of investment, lack of proper understanding of the approaches, existence of multinationals and existence of multiple locations. They are represented in the model below:

$$F1 = 0.855 X_2 + 0.636 X_4 + 0.876 X_5 + 0.866X_6 \dots \dots \dots 4.8$$

4.6.3.2 Factor two: Human factors

The reasons that closely relate under factor two, company culture and staff attitude have been identified as the human factors. They are represented in the model below.

$$F2 = 0.870X_1 + 0.761 X_3 \dots \dots \dots 49$$

These analyses indicate that the companies' policies on human capital as well as the structural and operations policies are very important factors challenging successful implementation of WCM.

4.7 Summary and Interpretations

The research findings have shown that there is an extensive implementation of WCM among listed firms. The implementation rate reported in this research reports captures firms implementing at least one WCM practice. This rate was over 90%. From the findings this research posits that Kenyan firms on average are aware of the developments and evolution in the world of commerce and industry. This implies that the management in charge of these companies are of necessity well informed, educated, and experienced to keep at pace with trends in world standards in trade. This report has the potential of increasing the confidence that the general public from where investors come build and have increased confidence in these firms. These firms stand to achieve increased investor confidence, easier and more borrowing power.

The research findings show that, *inter-alia*, Company culture and staff attitude are the biggest challenges to effective implementation of the WCM. This indicates there still exists a gap between the management and the implementing staff. Employee involvement, dialogue and management by consultation may largely be missing in the Kenyan companies. The Japanese success on implementation of these practices is based on the fact that the Japanese have internalized the demands of the processes at their work place. Kenyan firms have a lesson to learn if employees are to be bought into production processes. Issues of employee empowerment, motivation and room for employee innovation need to be created to counter the effects of change resistance.

The research findings also show that the factors that mainly motivate companies to adopt WCM are customer focused a drive to beat competition. This implies that Kenyan firms have invested much in product research and development, and I market research. With this level of focused production, this is indicative that Kenyan firms are prepared to be market leaders in their specific industries. This guarantees firm survival.

CHAPTER FIVE

5.0 CONCLUSION, LIMITATION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, we discuss the main findings, draw conclusions and make recommendations. The objective of the study were; to establish the degree of implementation of World Class Manufacturing practices among listed companies, to establish the benefits of WCM to its implementers and to find out limitations if any, to implementation of WCM.

5.2 Conclusion

The study identified nine world class manufacturing practices in their organizations, that is, JIT, KAIZEN, TQM, BPR, ABM, LEAN, WCO, BSC and ERP. Specifically JIT is commonly used in the agricultural sector and industrial and allied sectors, Kaizen is used mostly in agricultural, financial and services and industrial and allied sectors, TQM is used in all the sectors, BPR is used in agricultural (5.9%), financial and services (23.5%) and industrial and allied sectors (32.3%), ABM is used in all sectors (41.2%), LEAN was in use in industrial and allied sectors (5.9%) WCO (world class operations) was found to be in use in Kenya Airways only in the commercial and services sector (2.9%), BSC was used in the industrial and allied sector only (2.9%) and ERP in commercial sector only (2.9%). It was noted that the commonly used world class manufacturing practice was TQM with a mean of 3.5588. followed by KAIZEN mean of 3.0588, BPR mean of 3.0294, JIT mean of 2.5882 and others (ABM, LEAN, BSC) mean of 2.0294 respectively.

Factor analysis was significantly used in the study. In analyzing reasons for a company's predisposition to implement WCM factor analysis was used to reduce 13 variables explaining the variations into three factors (focus on employees, customer and competitor focus and focus on product quality). The three factors explain 71.632% (Cumulative percentage). All the thirteen variables were significant in the factor analysis; that is all the variables were classified into one of the three factors. The three identified factors

were; factor one: the employees, factor two: customer and competitor focus, and factor three: product quality focus. Factor analysis was used to analyze the challenges in implementation of WCM. The seven factors were effectively reduced into two factors (human factors and structural and policy factors) where both explained 74.7% of the variations in implementation setbacks. This analysis was further used to identify the chief benefits attained by firms after implementation of WCM. From the results two factors explaining 69.8% of the variations in the benefits were identified.

All the organizations most commonly focused on the following activities when implementing WCO: staffs training at 97%, policies on continuous improvement at 91%, optimizing existing IT systems at 85.3%, investing in new IT systems 85.3% and improved machine maintenance at 67.6%

The major challenges to implementation were evidenced as company culture (mean of 3.38), and staff attitude (mean of 2.76). From these research findings, it was evidenced that WCM, though may be associated with manufacturers has successfully diffused into the other non manufacturing sectors. There was a high percentage implementation however among industries in industrial and allied sector. There was a notable variation in awareness and the degree of implementation of WCM between local companies and multinationals mainly in the financial and investment and commercial and service sectors.

5.3: Limitations of the Study

In the course of the study, the following limitations were observed; the target respondents were not easily accessed for booked interviews. This seriously impeded the researcher's effort to conduct a census.

Respondents in service industries were reluctant to book appointments with the researcher. The general feeling was that most of the WCM practices were not of much **value** to them in their cost and operationalisation unless they tailored them to suit their needs. This was aggravated to a large extent by a lack of awareness of the general term

(WCM) used in the questionnaire. This research limited itself to listed firms. It may not be possible to generalize these findings. The case of small companies may not have been effectively addressed.

The study was also hampered by company policies regarding their information outflow. The formal procedure expected of a researcher to get access to data was found to be too long, without necessarily getting positive response.

This study gives a general view of the level of implementation of WCM. It does not give a detailed analysis of the operationalisation of these philosophies by the implementers. In the course of the study, it was found out that some of the organizations have richly internalized these philosophies to the extent of using Japanese language to increase precision in articulating their implementation. This study could not capture such details.

5.4 Recommendations

From these findings, there arises a need for company management to prioritize investing in change management since company culture and staff attitude seriously impede successful implementation of WCM. Companies need also to consider tailoring the WMC to suit their unique operating environments.

From the research findings, the respondents strongly advocated that policies should not always from up-down. The need for employee participation in making decisions that affect their duties was strongly advocated for. This research therefore recommends increased consultation and dialogue between the implementing employees and management. The management staff to device methods of increasing employee participation.

This research finds that managers feel that WCM is at times implemented without adequate education to implementers and ill fitting financial and operating structures. It thus recommends that proper understanding of the demand placed by implementation of these practices on the resources of a firm should be well assessed before implementation.

From the challenges experienced in the research, the researcher recommends increased education on junior staff as well as the senior managers on the significance of research work. This will help to create a positive attitude on the respondents towards researchers. This will increase data validity and thus the usefulness of the findings of research findings.

5.5 Suggestion for Further Research

From the limitations of the study, the researcher recommends; Case studies in the companies that have reported extremes (very high/low) implementation rate. This is because the population of study was not homogenous in operations. Some unique factors of implementers may not have been captured.

The researcher recommends a study the performance impact of the implementation of WCM to user firms over time and establish the cost benefit among users.

A study to establish the factors contributing to low implementation rate of WCM in the financial and investment sector among local companies compared to multinational financial and investment firms. Such study should be able to provide a 'new' perspective of competitive strategy to local companies as they seek to trade in the world market.

The study also recommends further research on the success of the implementation of each of these practices since it gives the ground information that WCM practices are of necessity widely practiced by Kenyan firms.

This study also recommends researches on the cost of implementing each WCM in different sectors. Such a study would provide valuable information to implementing and non-implementing firms to evaluate the requisite resource commitment for successful implementation.

Research is needed to capture the population of companies that are not listed in the NSE, comprising of small companies. It would be of importance to the public and entrepreneurs to know the challenges that small firms face in adopting practices that are necessary in improving their operations to world class.

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APPENDIX 1

Letter of Authorization to Collect Data

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
A PROGRAM - LOTTEFET KABETE CAMPUS

Telephone: 020-2059162
Telegrams "Varsity", Nairobi
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P.O. Box 30197
Nairobi, Kenya

DATE: *10/11/2007*

TO WHOM IT MAY CONCERN

The bearer of this letter. . . . *J. C. S. U. E. U.*

Registration No:

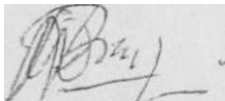
DG1/70257/2007

is a Master of Business Administration (MBA) student of the University of Nairobi.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate if you assist him/her by allowing him/her to collect data in your organization for the research.

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

Thank you.



DR. W.N. IRAKI
CO-ORDINATOR, MBA PROGRAM

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA OFFICE
P. O. Box 30197
NAIROBI

APPENDIX 11

List of Respondents

QUOTED COMPANIES SURVAYE1)

AGRICULTURAL	
1	Rea Vipingo Plantations Ltd
2	Sasini Ltd
COMMERCIAL AND SERVICES LIMITED	
3	Kenya Airways Ltd
4	Marshalls (E.A) Ltd
5	Nation Media Group
6	Standard Group Ltd
FINANCE AND INVESTMENT	
7	Barclays Bank Ltd
8	CFC Stanbic Ltd
9	Diamond Trust Bank Kenya Ltd
10	Equity Bank Ltd
11	Housing Finance Co Ltd
12	Jubilee Holdings Ltd
13	Kenya Commercial Bank Ltd
14	Olympia Capital Holdings
15	National Bank of Kenya Ltd
16	Pan African Insurance Holdings Ltd
17	Standard Chartered Bank Ltd
INDUSTRIAL AND ALLIED	
18	Athi River Mining
19	BOC(K)
20	Bamburi Cement Ltd
21	British American Tobacco Kenya Ltd
22	Carbacid
23	Crown Berger Ltd
24	E.A Cables Ltd
25	E.A. Portland Cement Ltd
26	East African Breweries Ltd
27	Eveready East Africa Ltd
28	Kenya Oil Co Ltd
29	Kenya Power and Lighting Ltd
30	Kengen Ltd
31	Mumias Sugar Co Ltd
32	Sameer Africa Ltd
33	Total Kenya Ltd
34	Unga Group Ltd

APPENDIX III

Questionnaire

PART A: BIO DATA

- 1. Respondents Name (optional): _____
- 2. Name of organization _____
- 3. What is your designation _____
- 4. For how many years have you worked for your current organization
 - a. Below 1 year
 - b. 2-3 years
 - c. 4-5 years
 - d. Over 6 years

PART B

Implementation of World Class Manufacturing practices

5. Has your organization implemented any of the World Class Manufacturing/process improvement practices?

Yes Q NO

(If NO in question 5, please move to question 13)

6 If yes, Please tick the World Class Manufacturing practices being used by your organization.

	Tick
Just in Time (JIT)	
Continuous Improvement (KAIZEN)	
Total Quality Control/Management(TQC/M)	
Business Process Improvement/Reengineering (BPI/R)	
Activity Based Management (ABM)	
Others, please specify	

7. In order of degree of usage, please rate World Class Manufacturing practices implemented in your organization:

Key: 1 means used minimally while 5 means used always.

	1	2	3	4	5
Just in Time (JIT)					
Continuous Improvement (KAIZEN)					
Total Quality Control/Management (TQC/M)					
Business Process Improvement/Reengineering (BPI/R)					
Activity Based Management (ABM)					
Others, specify					

PART C:

Reasons for Implementation of World Class Manufacturing Practices

8. On a scale of 1-5 rank the reasons for implementing the word class manufacturing practises by your organization; **1 means not at all important while 5 means very important.**

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

9. Please identify the activities or initiatives that your company has focused on when implementing world class manufacturing (WCM) practises (**please tick as applicable**)

Optimizing existing IT systems	
Investing in new IT systems	
Focus on new product development	
Staff training	
A policy on continuous improvement	
Investing in new production equipment	
Improved machine maintenance	

10. On a scale of 1-5 rank the benefits your organization has achieved after implementing the word class manufacturing practises; **1 means to a little extend while 5**

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

Challenges to Implementation of World Class Manufacturing/ process improvement Practices

11. On a scale of 1-5 rank how these general factors have affected implementation of world class manufacturing practises in your organization.

1 means least affected while 5 means most affected.

	1	2	3	4	5
Company culture					
Cost of investment					
Attitude of staff					
Lack of proper understanding to the approaches					
Existence of multinational sites					
Existence of multiple locations					

12. Please identify the reasons why your organization has not implemented world class manufacturing practises (please tick)

Not aware of them	
Investments are too expensive	
Not aware of their quantifiable benefits	
Staff lack the necessary skills and training	
Management very not keen of change	
Employee resistance and sabotage	
Not relevant/suitable in our company	

13. What recommendations would you make on implementation of world class manufacturing/process improvement practises?

THANK YOU FOR YOUR RESPONSES