

**INFLUENCE OF LEAN SIX SIGMA METHODOLOGY ON
PERFORMANCE OF SERVICE ORGANIZATIONS IN KENYA: A
CASE OF THE KENYA INSTITUTE OF MANAGEMENT**

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**A Research Project Report Submitted in Partial Fulfillment for the Requirements of
the Award of the Degree of Master of Arts in Project Planning and Management,
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DECLARATION

This research project report is my original work and has not been presented for any award in any other university.

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

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DEDICATION

This research project is dedicated to my mum Pamela Oguda and dad Mr. Henry Oguda, my brothers Kevin, Allan and Felix and sister Shirleen. Thank you for your unconditional love and support. Special thanks to one Andrew Esamai we brainstormed about this course and look how far we have come. Thank you.

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ABBREVIATIONS AND ACRONYMS

| | |
|------------|--------------------------------|
| BPR | Business Process Reengineering |
|------------|--------------------------------|

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|--------------|--|
| CFS | Critical Success Factors |
| DMAIC | Define, Measure, Analyze, Improve, Control |
| DMADV | Define, Measure, Analyze, Design, Verify |
| KIM | Kenya Institute of Management |
| LSS | Lean Six Sigma |
| SS | Six Sigma |
| TOC | Theory of Constraints |
| TQM | Total Quality Management |

ABSTRACT

Lean Six Sigma is one of the many process improvement methodologies. It is a set of powerful tools and techniques employed by an organization to help it improve its efficiency, effectiveness and productivity. Although they originated from the manufacturing environment their principles can be applied to businesses operating in any

sector. The study aimed to assess the influence of lean six sigma methodology on performance of organizations, a case of the Kenya institute of Management. More specifically, it aimed at examining how quality, cost, lead time and waste influence performance of the Kenya Institute of Management. The study adopted a descriptive survey design. The target population of the study was 145 employees based at the head office of the Kenya Institute of Management. Using Cochran's 1977 formula the desired sample size of 106 respondents and stratified random sampling method were used to achieve the desired representation from the various sub groups. Pilot testing of the data collection instrument was performed by administering the questionnaires to 10% of the sample size. To establish the validity of the research instrument content validity was used; to check reliability of the instrument, Cronbach's alpha methodology based on internal consistency of the research instruments was used. An alpha value of 0.8 was obtained, thus the research instrument used was reliable. Primary data was collected using self-designed questionnaires and secondary data from e-journals, books and publications by the Kenya Institute of Management. After data collection, the questionnaires were cleaned, coded organized and analysed. Descriptive statistics and Correlation (using Karl Pearson's product moment coefficient of correlation) were used to analyse the data and establish the relationship between the dependent variables and the set of independent variables using SPSS software. The study established that cost had the strongest influence on performance of an organization with a correlation coefficient of (- 0.743). Lead time and Wastes also had significant influence on performance of an organization with correlation coefficients of (- 0.628) and (- 0.318) respectively lastly was quality of services which had a minimal influence on performance of an organization with a correlation coefficient of (0.23). This means that the three variables of cost, lead time and waste had significant negative relationships with the dependent variable, performance of organization while the variable quality had a positive relationship with the independent variable performance of an organization. It was therefore concluded that the Lean Six Sigma methodology positively influences the performance of an organization. This however is only possible if an organization is willing to invest adequate resources, make goals very clear and actively monitor these goals. Equally there should be management commitment and support, internal process ownership, metrics, staff involvement staff training to make them experienced staff, providing enhanced understanding and tailoring improvement training. Future studies could evaluate the influence of Lean Six Sigma in other service sector organizations like banks, hospitals etc. and equally its impact on organization culture.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The demand for process excellence professionals is increasing globally in all industrial sectors irrespective of the size and their nature. Process excellence is achieved when all activities are in total alignment with the vision, mission, strategy, values and objectives of an organization. An organization that has a high level of process excellence is cost efficient, effective at serving its customers, higher productivity, superior cycle times, higher process capability and process throughput. One of the most successful process excellence models is Six Sigma. Since its development by Motorola in the late 1980s six sigma has gained considerable attention, especially since its adoption by high profile companies such as General Electric (GE) in the mid-1990s, six sigma has spread like “wildfire” (Caulcutt, 2001; Goh, 2002; Chakrabarty and Tan, 2007). Many organizations in manufacturing and services, public and private, large and small have joined the six sigma band wagon. In addition to Motorola and GE, many other Fortune 500 companies such as American Express, Boeing, Caterpillar, Fidelity Investments, Honeywell International, J.P. Morgan Chase, Johnson and Johnson, Kodak, Lockheed Martin, Maytag, Northrop Grumman, Sony, and Texas Instruments have applied six sigma to a myriad of projects.

In East Africa for example a key segment of World Vision staff has caught the vision of process excellence, understood and applied TQM concepts and tools, and significantly improved key processes, for example, reduced by 40-80% the average time to procure items and recruit new staff. We have reduced annual expenses by nearly \$1,000,000. Such improvements help World Vision to achieve better outcomes with existing funding, people, and other resources (Andrew, 2013). Academicians agree that Six Sigma is a distinct management methodology and it holds an important role in management theory as the practices of Six Sigma complement traditional quality management to enhance business performance. Lean is a very successful system focused on problem solving, waste elimination, efficiency, and making changes (Schroeder et al. 2008).

Heuvel et al (2011) postulates that competition has become more and more fierce, customers are demanding higher quality at lower prices and profit margins seem to be falling especially in times of crisis. An efficient and effective strategy to become more competitive is to adopt Lean

Six Sigma. Quality is more than making things without errors. It is about making a product or service meet the individual perception of a customer about the quality or value. Therefore, in what regards Lean Six Sigma, the concern is not only to "do the things right" but also to "do the right things right"(Antony, 2010). The study's focus is on the key elements of Lean Six Sigma, highlighting the effect of implementing Lean Six Sigma on companies, seeking to indicate the requirements of a company for its implementation and investigate the strategy to obtain the maximum practical outcome. Lean thinking is about efficiency. It is about removing variation between the steps. It is the passionate belief that there is always a better way of doing something. It is a methodology of eliminating wastes and smoothing the process flow. Emphasis is on empowering employees to drive improvement, speed up things and thus reduce lead time. It is the endless transformation of waste into value from the customer's perspective.

The Kenya Institute of Management (KIM) is a membership based non-profit making professional management development organization committed to the promotion of excellence and integrity in the practice of management. The institute was established in 1954 as a premier institute that provides management consultancy and capacity building services to corporate organizations and other institutions. The mission of Kenya Institute of Management is to steer and champion excellence, integrity and competitiveness in individuals and organizations throughout Africa and beyond. KIM which has been in operation for nearly six decades has undergone major transformation in the recent past. The Institution was initially a membership based organization whose focus was to build capacity among the present and future leaders of Kenya. Currently, KIM boasts of a portfolio of business units that include; an SME Solution Centre, the "Management Magazine" a publication that targets upper and middle level decision makers within the organization, the KIM school of Management that offers Diploma and certification courses for upcoming and established professionals and has sponsored a university – The Management University of Africa (MUA) – whose main focus is to offer degree, master and doctorate degrees in leadership and management (KIM, 2010).

From the above portfolio it is evident that the organization is in the service industry. It only produces one product for its customers the Management magazine. To be able to deliver with such a wide portfolio, various units/departments each carrying out different processes has to work in sync to ensure the single client being targeted is satisfied. Over time this wide spread

portfolio has created room for duplication of roles among the various units/departments thus leading to wastes and increased operational costs. With various colleges and universities offering the same courses springing up in every corner of the country, there has been increased competition with students opting for colleges offering the courses at the same cost, at a cheaper cost or even more expensive fee depending on their preferences and what they perceive as value. For the organization to maintain a competitive edge, it has to be flexible to adapt to market conditions; reduce costs while increasing productivity. The question was what is value to our customers and how fast can we as an organization provide this value to the customers to enable them perceive us as their service provider of choice. Change was thus inevitable. It is against this backdrop of duplication of roles among departments and units, increased operational costs and cut throat competition within the industry that the organization had to relook how it does its business. Given that the organization had tried other business process improvement tools like the Organizational Performance Index (OPI) weighing its pros and cons and evaluating the gaps it had not addressed, Lean Six Sigma was the methodology to address the gap. (KIM, 2012)

The focus of Lean Six Sigma is not on counting the defects in processes, but the number of opportunities within a process that could result in defects so that causes of quality problems can be eliminated before they are transformed into defects (Antony, 2010). From a business perspective, Six Sigma could be described as a process that allows companies to drastically focus on continuous and breakthrough improvements in everyday business activities to increase customer satisfaction. Quality management has long been established as an important strategy for achieving competitive advantage (Chua, 2011). Traditional quality initiatives such as statistical quality control, zero defects, and total quality management have been key initiatives for many years. Six sigma can be considered as a recent quality improvement initiative that has gained popularity and acceptance in many industries across the globe (Gupta, 2010). With high profile adoptions by companies such as General Electric (GE) in the mid-1990s, six sigma spread like wildfire towards the end of the twentieth century (Basu, 2008).

A widely accepted definition of lean manufacturing is the “systematic approach to identify and eliminate waste (non -value-adding activities) through continuous improvement by running the product at the pull of the customer in the pursuit of perfection. It focuses on reducing the business cycle time so as to become more responsive to customer demand, while using less

resources and improving products and processes (Woodard, 2009). This materializes in lower costs, increased productivity and highly profitable and flexible production capability. In 1990 the lean concept became popular in American factories after a study by the Massachusetts Institute of Technology on the shift from mass production to a disciplined, process-focused production (Lazarus & Butler, 2011). The term “lean” refers to the cut off the “fat” (waste) – anything bringing no added-value for a customer or something he is unwilling to pay for (Goel, et. al, 2010). The aim of Lean is to create simplified, efficient value-adding processes while sharing information. Successful Lean initiatives yield lower inventory cost, higher productivity and flexibility, and faster response time to the customer (Young, et. al 2012).

Six Sigma is about effectiveness. It is a measure of performance laying emphasis on metrics. The concept behind Six Sigma was developed by Bill Smith, an engineer, within Motorola in the 1990s as a powerful methodology to improve the reliability of products by reducing excessive variation which results in defects in manufacturing processes. It is a never ending journey to competitive leadership by satisfying customer requirements profitably. It is a continuous drive to reduce defects and variability in the process by finding and solving the root causes of failure. Six Sigma programs aim at improving competitive positioning and increasing the value of the company as perceived by the customer (Eckes, 2009). A Six Sigma process has, as a statistical quality goal, the achievement of a quality level equal to maximum 3.4 defects per million opportunities for defects, which is +/- six standard deviations from the mean. It also focuses on reducing variability within a formalized project management structure (Antony& Coronado, 2012). This implies the stability and the predictability of results. In fact, the management structure for executing and managing projects is a real strength of the Six Sigma approach. When executed well, Six Sigma can help an organization achieve very significant improvements in quality, reduction of defects, and ultimately lower cost (Lee, et. al 2008). The principles of Six Sigma (SS) includes: Focus on customer needs; Continuous effort to reduce process variation using statistical analysis; Improvement and control of processes; Teamwork and involvement from all levels of organization, especially from top-level management.

Six sigma targets the following types of waste materialized in costs: rework; scrap; excessive cycle times and delays; unsatisfied customers with the goods and/or services provided; cost of opportunities lost due to lack of resources to take advantage of; poor quality (.Stamatis, 2011a)

The integration of the Lean Principles into Six Sigma (or reversely) makes it possible to achieve effective improvements (Wyper & Harrison 2008). This methodology was named Lean Six Sigma. LSS uses the methodology of DMAIC (Do, Measure, Analyze, Improve and Control) and DMADV (Define, Measure, Analyze, Design and Verify) which bring out measurable and repeatable results. Lean uses "Kaizen events" - intensive, typically week-long improvement sessions - to quickly identify improvement opportunities. The most common indices used to measure process capability are: Cp (process capability) and Cpk (process performance). Cp is a measure of the width of a distribution of outputs of the process and Cpk also indicates how close the average value to the target value is (Rucker, 2010).

According to Nonthaleerak and Hendry (2008), rolled throughput yield is a better metric. It is the probability that a single unit can pass through all the steps in a process free of defects. The cost of poor quality, another metric for SS, is the cost of doing things wrong, the total of all the costs of all defects in the processes (Schmidt & Aschkenase, 2008). Both Lean and Six Sigma are built around the view that businesses are composed of processes that start with customer needs and should end with satisfied customers currently or after using the product or service (Nonthaleerak & Hendry, 2008). However, the goal of Lean Six Sigma is growth, not just cost-cutting. It aims at both effectiveness and efficiency. This way, a Lean Six Sigma approach drives organizations not just to do things better, but to do better things (Kwak, & Anbari, 2010).

1.2 Statement of the Problem

In year 2012, some operations at the Kenya institute of Management were wasteful, took a lot of time and thus were not very responsive to the market demands and in ensuring services reach the clients in good time (KIM, 2012). The customer satisfaction index had dropped from 70% to 66% and in turn the organization had lost a considerable number of its clients to its competitors. This in turn had affected the organizations bottom line (Research and Business Intelligence, 2012). Operations in Nairobi office alone were scattered in different locations. 4 at the central business district (CBD) and 1 in Westland's office. This in turn led to increased operational costs in terms of rent. With the support unit in CBD, there was a lot of shuttling back and forth from and to Westland's office to either have documents signed or something delivered. This in essence was a waste. The waste of motion. Transport costs in terms of taxi equally increased.

The waste that was being experienced in the organization had over the years lead to a steady increase in direct and operational costs as evidenced in appendix IV which gives an extract from the audited accounts for years 2011-2013. The table gives a comparison between budgeted direct and operational costs against actual direct and operational costs. From the table the direct and operational costs have always been pegged at 60% of the overall turnover. This is after factoring the inflation rate in the country. As at 2011, the actual cost incurred was at 58% but in 2012 it inflated to 62% and from that year it has been an upward trend. It was therefore imperative to review the runway costs and find a way to bring them back to normal. LSS was the approach that was adopted. The current processes therefore were reviewed and analyzed in light of lean six sigma implementation to determine if the success factors were attributed directly or indirectly to the LSS methodology.

1.3 Purpose of the Study

The purpose of this study was to assess the influence of the lean six sigma methodology on the overall performance of the Kenya Institute of Management.

1.4 Objectives of the Study

The research objectives that guided the study were;

- 1) To determine how quality of service influences performance of the Kenya Institute of Management
- 2) To establish the influence of costs on performance of the Kenya Institute of Management.
- 3) To determine how lead time influences performance at the Kenya Institute of Management.
- 4) To examine how wastes influences the performance of the Kenya Institute of Management

1.5 Research Questions

The study was guided by the following research questions:

- 1) How does quality of goods and services influence the performance of the Kenya Institute of Management?
- 2) To what extent does cost influence performance of the Kenya Institute of Management?

- 3) How does lead time influence performance of the Kenya Institute of Management?
- 4) To what extent does waste influence performance of the Kenya Institute of Management?

1.6 Significance of the Study

It is hoped this study will contribute to the existing body of knowledge to researchers and academicians seeking secondary data on the influence of Lean Six Sigma on organization performance. It is also hoped that it will contribute to the wider global debate on the readiness for Lean Six Sigma in a service setting. It is also hoped that its findings and recommendations will inform current practice and the relevant authorities in institutions of higher learning who would want to replicate the same and other sectors like the banking sector which can learn a lot from these and customize it to their industry in order to help enhance performance.

Decision makers at the various levels of management at KIM will gain value added information on Lean Six Sigma as a key enabler of enhancing performance and productivity.

1.7 Delimitation of the Study

The study was delimited to the geographical boundaries of Nairobi County where the head office of the Kenya Institute of Management is based. The other 20 branches of the Kenya Institute of Management located in all the major towns and counties of the country were not be covered by the study. The period of study was year 2012-2013. The study was also delimited to the variables under study: Quality of services, cost of doing business, lead time and wastes.

1.8 Limitations of the Study

Major research has been done on Lean six sigma. However most of it is in relation to the manufacturing industry world wide. Very little has been done and documented within the service industry moreso in institutions of higher learning in Africa. However in Europe and America Lean Six Sigma is a big thing and has been implemented by prestigious institution like Masseur Institute of Technology. Their findings, results and recommendations are well documented, published and available in some accessible sights like the emerald. This helped the the researcher overcome the hurdle of getting relevant literature to proceed with research.

Secondly, being a relatively new concept which deals with each an every aspect of the organization including its financials, it was projected that respondents would be concerned with the extent to which the management might want them to volunteer information and relevant documentation without any repercussions or fear of victimization. This was curtailed by providing a letter of introduction from the National Council of Science and Technology and providing the necessary assurances to the key respondents.

The third limitation was in regards to the fact that this was additional responsibility to the respondents who already had their overwhelming day to day duties. Ample time was given to the respondents with polite reminder once in a while to ensure a good return rate of the questionnaires.

1.9 Assumptions of the Study

The researcher assumed that the respondents were available and willing to fill in the questionnaires. The researcher also assumed that the questionnaires would be filled truthfully and returned on time. The researcher had also assumed that funds required for the research would be available on time. The researcher further assumed that access to relevant research data throughout the study would be granted on time.

1.10 Definitions of Significant Terms

Service Sector Organization This term has been used in this research to mean portion of the economy that earns its revenue through providing intangible services.

Lean Six Sigma Methodology LSS represents a management approach with emphasis on customer satisfaction, a culture of continuous improvement, the search for root causes, and comprehensive employee involvement.

Lead Time This is the amount of time between initiation and completion of a process in this case from when the customer seeks to be served to when the customer walks away either satisfied or dissatisfied.

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| Performance | Standards of accuracy and completeness. In the study, performance is deemed to be the fulfillment of an obligation in a manner that Kenya institute Offers optimum services like quality education and prompt services. |
| Quality of Services | A measure of how the services offered meet the customer expectations based on specific determinants: Reliability, Responsiveness, Believability and Accessibility |
| Waste | This is anything that does not add value to the customer. In this context the waste of transportation is moving from office to office to have a document signed and the waste of inventory is having stores to hold up stationery and or material, purchasing excess promotional material. |

1.11 Organization of the Study

The research project is organized into five chapters: Chapter one which is the introduction includes the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, basic assumptions of the study, limitations of the study, delimitations of the study and definitions of significant terms. Chapter two contains the literature review and focuses on the four key areas as described in the objectives of the study. Chapter three presents the research methodology that was used in conducting the study. Chapter four consists of data analysis, presentation interpretation and discussion of findings. Chapter five presents a summary of findings, conclusions and recommendation made there-to.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section extensively reviews literature on the previous related studies relevant to the study topic. It is organized into the following sections: the concept of Lean Six Sigma methodology, how quality of services influences the performance of an organization, the influence of costs on performance and effects of lead time and waste on the overall performance of an organization. It will also include the conceptual framework and the theoretical framework of the study.

2.2 Process Improvement Methodology in Service Sector Organizations

Continuous Improvement is something of an umbrella term and may encompass a variety of disciplines and methodologies including Business Process Management, Performance Management, Quality Management, Compliance, Lean, Six Sigma and more. Despite all the different terms, techniques and methods available, there are commonalities between these different approaches - they all seek to continuously improve business processes in order to enhance business results. Increasingly, continuous process improvement is being touted as a competitive differentiator.

According to Bowen and Youngdahl (1998) , Lean in service sector started gaining momentum in the late 80s as a result of McDonald's utilization of the Lean production flow concept in order to meet their customer's expectations and Taco Bell's being recommended as an example of a Lean production line in the service industry (Psychogios et al. 2012). Piercy and Rich (2009) outlined Lean as a concept comprising a set of principles, practices, tools and techniques which, when implemented by following a systematic approach, would improve resource utilization, quality and delivery with respect to products and services. In the early 1990s, Lean was successfully implemented in service industries such as banking sectors and public sectors, and even hospitals and airlines were adopting this methodology to improve efficiency within their organizations (George 2003).

Applications of Lean Six Sigma in service industries is gaining momentum as there are currently numerous academic papers on Lean and Six Sigma in service applications in the industry. Table 2.1 shows some of the work carried out in different sectors. George (2003) and Allyway and Corbett (2002) report on companies such as McDonalds and Taco Bell who have implemented Lean principles and tools effectively and have gained a competitive edge and increased their productivity. The question is, can other service sectors implement Lean effectively to such a level that will increase their competitiveness and profitability? The focus of this study is on assessing the implementation of Lean and six sigma manufacturing principles and tools in service industries specifically the education sector in order to establish whether they can be applied to service industries effectively and whether their implementation will result in improved performance, just as it did in the manufacturing industries.

Table 2.1: Review of Lean in the Service industry

| Sector | Authors | Results |
|---------------|--|---|
| Hospitals | <p>Allyway, M. and S. Corbett, Shifting to lean service: Stealing a page from manufacturers' playbooks. Journal of organizational excellence 2002</p> <p>Burgess, N. and Z. Radnor, Evaluating Lean in healthcare. International Journal of Health Care Quality Assurance, 2013. 26(3): p. 220-235.</p> <p>Aronsson, H., M. Abrahamsson, and K. Spens, Developing lean and agile health care supply chains. Supply Chain Management: An International Journal, 2011. 16(3): p.176-183.</p> | Successful implementation in Hospitals particularly in the USA |
| Public Sector | <p>Radnor, Z., Transferring Lean into government. Journal of Manufacturing Technology Management, 2010. 21(3): p. 411-428.</p> <p>Pedersen, E.R.G. and M. Huniche, Determinants of lean success and failure in the Danish public sector: A negotiated order perspective. International Journal of Public Sector Management, 2011. 24(5): p. 403-420.</p> <p>Arlbjørn, J.S., P.V. Freytag and H.D. Haas, Service supply chain management: A survey of lean application in the municipal sector.</p> | Successful implementation after strategic direction from Top management |

| | | |
|--------------------|---|--|
| | International Journal of Physical Distribution & Logistics Management, 2011. 41(3): p. 277-295. | |
| Food | <p>Bowen, D.E. and W.E. Youngdahl, "Lean" service: in defense of a production-line approach. International Journal of Service Industry Management, 1998. 9(3): p. 207- 225.</p> <p>Kundu, G.K., B.M. Manohar and J. Bairi, Comparison of Lean and CMMI for service (CMMI-SVC v1.2) best practices. The Asian Journal on Quality, 2011. 12(2): p. 144-166.</p> | Problem during initial implementation; however, improved after review of some Lean tools |
| Airline Industries | <p>Bowen, D.E. and W.E. Youngdahl, "Lean" service: in defense of a production-line approach. International Journal of Service Industry Management, 1998. 9(3): p. 207- 225.</p> <p>Parast, M.M. and E.H. Fini, The effect of productivity and quality on profitability in US airline industry: An empirical investigation. Managing Service Quality, 2010. 20(5): p. 458-474.</p> <p>Tiernan, S., D.L. Rhoades, and W. Blaise Jr, Airline service quality: Exploratory analysis of consumer perceptions and operational performance in the USA and EU. Managing Service Quality, 2008. 18(3): p. 212-224.</p> | Successful implementation with good rewards |
| Financial Sectors | Ahlstrom, P., Lean Service operations: Translating lean production principles to service operations. International Journal of Services Technology and Management 2004. 5(5/6): p. 545-564. | Successful implementation in many insurance companies |
| Education | Comm, C.L. and D.F.X. Mathaisel, An exploratory study of best lean sustainability practices in higher education. Quality Assurance in Education, 2005. 13(3): p. 227- 240. | Successful implementation with challenges on implementation strategy. |

(Source: MG, Kanakana. 2013)

2.3 The Concept of Lean Six Sigma Methodology

Lean Six Sigma is a combination of two concepts. Lean concept which is about efficiency and the six sigma about effectiveness. It is a management approach for driving innovative processes inside a company in order to achieve superior results. It involves a practical analysis based on facts, aiming not only on the efficiency of processes but innovation and growth. It is a long term

process of gradual and continuous improvement (Catherwood, 2012). It provides specific methods to re-create the process so that defects and errors never arise in the first place (Harry and Schroeder, 2009). The application of Lean Six Sigma in companies led to attaining superior financial performance by addressing new needs, by differentiating the products and services or by adjusting the business lines to new processes. (Does et. al, 2013). Quality is more than making things without errors. It is about making a product or service meet the individual perception of a customer about the quality or value (Tague, 2011). Therefore, regarding Lean Six Sigma, the concern is not only to "do the things right" but also to "do the right things right". Focus will be on the influence of implementing Lean Six Sigma approach on institution performance, seeking what changes and benefits it brings. The key elements it aims at are achieving the best quality, the lowest cost, getting the shortest lead-time, stressing on waste elimination. The requirements of a company for its implementation and the strategy to obtain the maximum practical outcome are investigated.

Most Lean experts agree that companies cannot become lean by applying Lean tools (such as Kanban and Poka Yoke) alone. They must apply Lean thinking and principles. Spear & Bowen (1999) identified four basic rules of how work in Toyota is specified, connected, flowed, and improved. Spear (2004) identified the following four fundamental principles underlying the Lean system: One must observe the actual work being done; Experiment (test) proposed changes; Experiment as frequently as possible and managers should coach, not fix market share.

The integration of Lean and Six Sigma methodologies provides organizations with the methods, tools and techniques for superior improvements (Snee, 2010). Lean Six Sigma (LSS) is a powerful methodology for achieving process efficiency and effectiveness resulting in enhanced customer satisfaction and improved bottom line results. Lean is a powerful business process improvement methodology to minimize or even eliminate different forms of waste or non-value added activities or steps whereas Six Sigma has proved to be an effective methodology to reduce variation within a business process and thereby achieve process robustness. Six Sigma is an approach to process improvement and organizational excellence focused on eliminating variation and making data-driven decisions. Motorola started Six Sigma as they realized the need to significantly reduce variation in order to compete successfully. General Electric, under the leadership of Jack Welch, made Six Sigma a cornerstone of its corporate culture and used it to

generate billions of dollars of savings annually (Pande, et al., 2000). The key elements of Six Sigma are: Gather and analyze data to make informed decisions; eliminate the variation that drives waste; solve the root causes of problems, rather than fixing recurring mistakes and defects. Lean and Six Sigma overlap in many of their concepts and tools. For example, both standardize and measure processes, and both insist on continuous improvement. Both Lean and Six Sigma also require a fundamental paradigm change from accepting problems and poor performance to revealing and solving problems, and making improvements in pursuit of excellence. And both rely on an equipped and empowered workforce to make improvements (Harbert, 2006).

We have witnessed a number of service organizations in Kenya embarked initially on Lean management practices to tackle the so-called “low-hanging” fruits and then move on to more complex problems using the principles of Six Sigma, especially when variation has been an issue in their business processes. On the other hand, we have seen a number of product making organizations like Unilever embarking initially on Six Sigma and then realized at a later stage that they need to set up standard operating procedures at the workplace and reduce total lead-times of their end-to-end business processes using the principles of Lean thinking. Since the success or failure of quality management initiatives is associated more with their implementation process than their content (Moosa and Sajid, 2010), the same issue arises regarding Lean six sigma and its implementation in different organizations and industries.

Performance management systems allow an organization to align its business activities to its strategy and to monitor performance toward achieving strategic goals over time. Organizational performance is one of the key ingredients in determining the success or failure of the organization. Measuring performance is not an easy fete to achieve, especially when that which is to be measured keeps changing (Manz, 2011). Having the appropriate tools to identify performance strengths and gaps gives an organization and its workforce clarity and allows for there to be a platform for addressing performance issues in a structured manner. There are different ways through which organizations can measure performance. Management by objectives – high performing organizations actively identifies “key performance indicators,” and measures their progress against established target values for those indicators, as a way of measuring individual and organizational effectiveness (Drucker, 1954).

Use of the balanced score card – It integrates four sets of measurements (financial, internal business processes, learning and development and the customer) complementing traditional financial measures with those driving future performance. TQM firms focus on serving the external customers. They first should know the customers' expectations and requirements and then should offer the products/services, accordingly. By the aid of successful customer focus efforts, production can be arranged with respect to the customers' needs, expectations, and complaints. This encourages firms to produce high quality and reliable products/services on time with increased efficiency and productivity. When customer expectations are met, their satisfaction will be increased, and the firm's sales and the market share will increase. (Harbert, 2006)

Use of Six Sigma- A measure of performance whose one vital benefit is its emphasis on metrics. Developed and popularized by Motorola in the 1980s it refers to the statistical level of variation where difficulties impacting customers are very rare signifying almost perfect quality.

2.4 Quality of Service and Performance of Organization

For a long time, academic institutions have preferred to focus on their internal academic needs rather than viewing students as their main customers. This attitude has served them well as long as the demand was greater than the supply. In the last two decades, more and more universities and academic colleges (virtual and real) have been established to answer the demand for higher education (HE) and many customers are willing to study out of their countries. The shift in the HE market from a suppliers' market (where there is less supply than demand and the suppliers dictate quality) to a customers' market (where there is higher supply than demand and the customers dictate quality) has intensified the competition between academic institutions. The competition for potential students has become more and more challenging. In light of the varied alternatives, the students are becoming more and more assertive and critical and consequently the HE institutions have to address the increasing dissatisfaction with the performance of HE systems by improving them (Mizikaci, 2006). Both the students and their parents are looking for added value for their money and the HE institutes have to deliver quality that is compatible with the students' expectations and needs (Smith et al., 2007).

Only 5 percent of all dissatisfied clients complain. (Carr and Littman, 1997; Goodman 1999). This number has not really changed in the past 30 years (Grainer, 2003) despite the investment of billions of dollars in service recovery systems. Negative publicity threatens to cause serious damage to an organization .While a satisfied client shares his feelings with one or two people; a dissatisfied client shares his negative feelings with nine to ten people (Carr and Littman, 1997). Therefore, even if only one in ten students is dissatisfied, their negative influence overshadows the positive influence of the other nine students. In view of these sentiments, only those institutions focusing primarily on the needs of their customers will win this competition. Implementing the principles of customer centrality and focusing on organizational aspects, which contribute to improving services, may enhance an academic institution's suitability to this new reality.

In services, because of the inseparability between production and consumption of the service, quality consists not only of the result, but also of the process (Sureshchander et al., 2002). Even if the result is favorable (an academic degree), if the process is flawed, the quality is considered low since quality is meeting customer expectations in service characteristics (Srikanthan and Dalrymple, 2005). If lecturers are boring or rude or teach obsolete knowledge and if the administrative units (e.g. academic departments, the students' dean, the operations department, the finance department, the training department and the examinations) supply poor service, the graduates will not be pleased with the institution. Focus needs to be on external customers, and their satisfaction with both the result and the process. In addition, customer's expectations towards particular services are also changing with respect to factors like time, increase in the number of encounters with a particular service, competitive environment, etc. (Seth et al., 2005). Accordingly, there is a continuing need to define the quality dimensions in HE and to measure the students' satisfaction based on the relevant quality dimensions in order to improve the HE systems (Martin and Palmer, 2004; Van Kemenade et al., 2008).

When inquiring about the location of problematic areas dealing with quality within an organization which provides services, one has to consider the different levels/tiers of service organizations, as developed by Schneider and Bowen (1995) in order to understand the "the service game" and how to win it in a competitive environment: The boundary tier which consists of those who have direct contact with the customers and are on the receiving end of most of the

customers' complaints; The coordination tier- those units which provide services to the boundary tier, such as operations, finance ,procurement, human resources (HR), senior management, etc.;; The Customer tier who are students with different needs and expectations.

From the different tiers, the managers' main role is to constantly improve work processes by being attentive to employees, implementing their ideas and suggestions for improvement while allowing them to lead the change (Deming, 2000; Zelnik et al., 2012). Increasing, the quality of the work processes achieved by opening communication channels with the employees and providing ongoing training will minimize mistakes, complaints and criticism and increase employees' commitment to provide quality service (Sharabi, 2010; Lobo et al., 2012). Zelnik et al. (2012) further emphasize that the success of quality management system (QMS) is dependent on the top management's (coordination tier) communication with employees. Through effective communication, managers can impart their expectations and priorities to their employees and involve them in organizational efforts which eventually results in motivated and satisfied workers. The service provided by the coordination level, especially the way in which human resources are managed, contributes to the quality of work life within an organization and, ultimately, to the customers' satisfaction. There is no way to separate the quality work life from the quality of the service. Both are necessary for a high quality organization (Sharabi, 2010).

Deming (2000) claims that workers are responsible for 15 percent of errors, while 85 percent of errors are due to incorrect and illogical work processes that make it difficult for the worker to achieve high service and product quality: new work methods are added to old ones, new equipment and raw materials are melded to the old, new forms and procedures are layered over the old ones, and the overall effect is to create a "patchwork" with multiple fail points. Sharabi and Davidow (2010) indicate that every coin spent on fixing poor service quality is a cost, and directly lowers profit by a dollar. Thus by improving service quality, we are directly improving profits (Tanninena et al., 2010). Correcting the fault in the process contributes to its improvement. This allows constant improvement, which is a never ending process. One successful method to constant improvement of work processes and quality is the "Six Sigma quality improvement methodology. Through implementation of this quality improvement process in manufacturing Motorola saved \$1.5 billion during the period 1986-1990 (Dahlgaard-Park, 2011).

Six Sigma is a management philosophy based on a continual pursuit of improvement in customer-centric corporate strategic targets and product development standards. (Cheng and Chang 2012) Business processes with better process sigma will have significantly lower prevention and appraisal costs as shown in figure 1. Although you will never fully eliminate appraisal and prevention costs (as opposed to failure costs that in an ideal zero defect world would also be zero), their reduction due to better process performance will be significant.

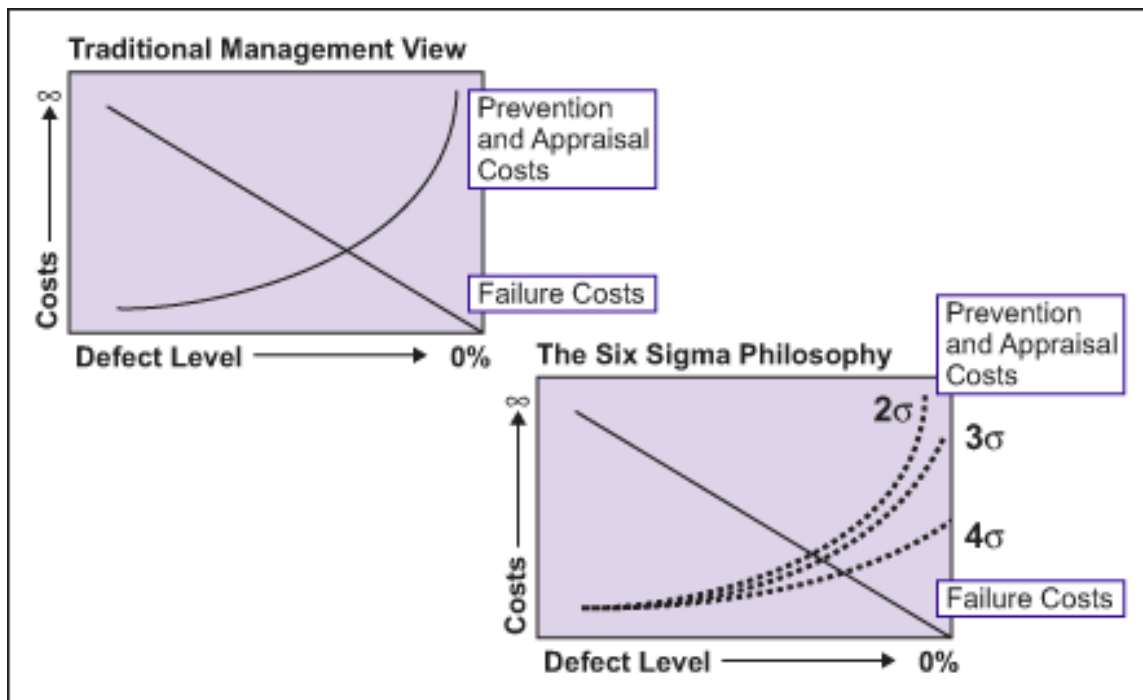


Figure 1: Traditional Management View vs. Six Sigma Philosophy

Table 2.2: Sigma Level and the Cost of Quality

| Sigma Level | DPMO | Cost of Quality as Percentage of Sales |
|--------------------|-------------|---|
| 2 | 298,000 | More than 40% |
| 3 | 67,000 | 25-40% |
| 4 | 6,000 | 15-25% |
| 5 | 233 | 5-15% |
| 6 | 3.4 | Less than 1% |

Source: (Swartwood, 2012)

Table 2.2 shows how the cost of quality as a percentage of sales decreases dramatically if the process sigma improves. Assuming that the average performance of a company is 3 sigma, 25 percent to 40 percent of its annual revenue gets swallowed up by the cost of quality. Thus, if this company can improve its quality by 1 sigma level, its net income will increase hugely.

Workers must be committed to quality. This can only be achieved by raising their awareness on the issues at hand and involving them in problem solving and in the improvement of processes (Zelnik et al., 2012). Workers need to be trained to inspect the quality of their work, identify problems and suggest solutions. This is important in ensuring pride and ownership of ones work and thus eliminating indifference and lack of concern on their part. Equally necessary resources must be supplied to reach the quality goals which need to be defined together with workers. Statements demanding quality from workers without supplying the necessary means and equipment frustrate the worker and lead to contrary results (Deming, 2000). Furthermore, the use of old equipment and machinery often in need of repair and tools not in proper working order, resulting in the worker's constant need to improvise, will affect his willingness and readiness to produce a quality product. Investment in workers and quality work tools will have a quick return in the long run.

In the tiers discussed above, students are an important, crucial level and need to be considered as part of an organization. An institution success depends on the level of students' participation in the process of providing service as they are the ones experiencing various aspect of the service. Ignoring the customers' remarks and complaints will ultimately harm the organization's success. Customer complaints should be viewed as a means of improving service. Close contact with customers, attention and response to their complaints, criticism and suggestions will help the organization implement improvements in its system (Sharabi, 2010).

With the ever changing technology and accessibility to internet connections, students are more equipped and sophisticated than ever before. With this kind of access, a minority of students who are dissatisfied will probably have the power to greatly damage the image of an academic institution. Attention to these customers enables the management of an organization to fine-tune itself to expectations and needs, as well as anticipates future demands. The major reason for attending to consumer complaints is rather simple; it is more cost effective to maintain existing

customers than to invest extra marketing budgets to find new ones (Harrison-Walker, 2001). Service providers should not only monitor consumer issues, but also encourage dissatisfied consumers to help remedy service problems. Responsive handling of complaints not only facilitates effective resolution of consumer problems, but also provides opportunities to improve long term relationships with customers (Estelami, 2000; Kirkby et al., 2001). It has been noted that customers who are satisfied with the complaint handling process are found to be up to 8 percent more loyal than if they had had no problem at all (Goodman, 1999). It is also not surprising that sometimes dissatisfied customers are actually more beneficial to a company than satisfied ones since unhappy customers provide insights into service failures (Harrison-Walker, 2001).

In conclusion, the cost of quality isn't the price of creating a quality product or service. It's the cost of not creating a quality product or service. Every time work is redone, the cost of quality increases. To meet the students' and other clients' needs and expectations and to discover the quality gaps, there is a need for consistent interaction. Beside focus groups, it is necessary to implement periodic satisfaction questionnaires that include different measurements of quality relevant to each organizations service provider (lecturers and administration assistants of the different departments, students' dean, admission process and tuition fees units, Examinations departments etc.). The purpose of this kind of periodic surveys is to give the top management a clear picture of the service provider's quality from the student's point of view and to identify the gaps which have to be reduced (Sharabi, 2010).

2.5 Cost and Performance of Organizations

Defects and errors in all operations are a hidden cost to an organization. These errors and defects negatively impact on production or service costs, profitability, and morale and customer satisfaction. The problems that cause these impacts may lay hidden deep in processes. Six Sigma aims to uncover these problems, get to their root causes and eliminate them. What is most important in an organization performance management? One may ask. Is it sales or financial performance? The answer is dependent on which you ask but to most people it is neither. Using the analogy of a vehicle, sales and financial performance are like rearview mirrors that show you where you have been. Process excellence is like the set of the vehicles headlights that shows where you are headed. In companies where sales performance or financial performance is bad,

quite often process performance is the root cause of failures, and the reverse is true also. If sales performance or financial performance is very good, often you can trace this success back to process excellence.

Minimizing cost is a critical part of every investor's toolkit. This is because in investing, there is no reason to assume that you get more if you pay more. Instead, every dollar paid for management fees or trading commissions is simply a dollar less earning potential return. The key point is that—unlike the markets—costs are largely controllable. In any market, the average return for all investors before costs is, by definition, equal to the market return. However, once various costs are accounted for, the distribution of returns realized by investors moves to the left, because their aggregate return is now less than the market's. The actual return for all investors combined is thus the market return reduced by all costs paid. One important implication of this is that, after costs, fewer investors are able to outperform the markets (Kaplan, 2009)

In the LSS perspective, cost is a monetary valuation of effort, material, resources, time and utilities consumed, risks incurred, and opportunity forgone in production and delivery of a good or service. According to Process Excellence Network in an interview with Brad Power a consultant and researcher in process innovation, there is a problem with how organizations go about the cost cutting measures. A lot of companies are quite reactive when it comes to cost cutting; they grow when things are good and then they just cut and slash and burn as soon as things get bad. The organizations don't maintain an ongoing approach to improvement, even in the good times, so that they are better prepared when there is a downturn (Tague, 2011)

Poor process trumps good people, so process excellence enables all employees to consistently deliver superior results. Lean adds powerful tools for identifying and eliminating waste in processes and drastically reducing cycle times. Putting the two together makes a winning combination. Boost your success by getting Lean! In the world of Lean thinking, your primary goal is to operate more efficiently by eliminating not only defects in products and services, but other forms of waste: inventory, processing, waiting, motion, transportation and overproduction. Lean Six Sigma techniques help professionals in both service and manufacturing industries. Lean Six Sigma principles-based methods will change how you manage your business and sustain

positive change into the future. Its data-based structure drives how management will make reality-based decisions and govern day-to-day employee performance (Truscott, 2008)

Both Lean and Six Sigma are built around the view that businesses are composed of processes that start with customer needs and should end with satisfied customers currently or after using the product or service. However, the goal of Lean Six Sigma is growth, not just cost-cutting. It aims for both effectiveness and efficiency. This way, a Lean Six Sigma approach drives organizations not just to do things better, but to do better things. Six Sigma aims to systematically decrease process variation so as to approach a quality level of near zero defects and increased stability. The standard deviation is to be reduced so that it can fit within the specification limits. At that level of process capability, a shift of 1, 5 sigma from the center materializes in a defect rate of 3, 4 defects per million opportunities (Emiliani, 2008).

The methodology requires significant commitment from all levels within an organization especially at the top. A process that is Lean is one that delivers products or services that the customer wants at a price that reflects only the value that the customer is willing to pay for. Lean Six Sigma for service is a "business". According to Manz, (2011), Six Sigma does not directly address process speed and so the lack of improvement in lead time in companies applying Six Sigma methods alone is understandable. These companies also generally achieve modest improvement in Work in Process (WIP) and finished goods inventory turns. In a similar manner, those companies engaged in Lean methodology alone show limited improvements across the organization due to the absence of Six Sigma organizational infrastructure. In essence, an integrated approach utilizing the best of Six Sigma and Lean Strategies will maximize shareholder value by accomplishing dramatic improvements in customer satisfaction, cost, quality, speed and invested capital. The companies practicing the integrated approach will gain four major benefits (Manz, 2011): Become faster and more responsive to customers; strive for Six Sigma capability level; operate at lowest costs of poor quality; and achieve greater flexibility throughout the business. Teamwork is not a concern for particular fields alone. Many industries have recognized the critical role that teamwork plays in effective operation, particularly industries that deal with high-risk, critical safety environments and tasks such as aviation, military operations, and power generation (Kozlowski and Ilgen, 2006).

Moreover, in industries such as automotive manufacturing, the value of creating high-performance teams has long been recognized. In this process, organizational complexity should be reduced by decreasing functional concentration and increasing local control capabilities in order to create the optimum conditions for collaboration and cross-functional teamwork. The intensive collaboration provided by cross-functional teams accelerates the development of routines, thereby reducing interference and facilitating the team's ability to cope with interference when it arises (Manz, 2011).

2.6 Lead Time and Organizational Performance

Time is the single best indicator of competitiveness. There exists many times in lean six sigma: Set-up or change –over time, manufacturing time, product development time and customer lead time or delivery time. Lead time is the time from when the customer gets in touch with the organization until he or she is served with the required product or service. This is also called customer-to-customer time. It is the summation of value added, non-value added and business value-added time. Value added time is that time spent in doing the value-adding activities in a process or the activities that the customer is willing to pay for. Non-value added time is the time taken to do the activities in a process that the customer is not willing to pay for. Business value-added time is the time taken to do the activities in a process that the customer is not willing to pay for but is required for doing business (includes activities done for control, assurance, regulation) (Schmidt and Aschkenase, 2008).

Revenue growth typically is top of mind for most executives and is directly impacted by the supply chain. The importance of a reliable delivery system for getting products to market goes without saying. However, the importance of transportation's impact on revenue goes beyond just delivering the product to the customer. A good example is the relationship between time and revenue as affected by transportation. Goods with short lifecycles, perishable goods and goods which are essential for production runs rely on transportation capacity and a reliable transportation network to maintain their value. The order of holiday sweaters sitting in a Port of Los Angeles warehouse during the crush of peak-season transportation demand does not produce revenue for either the retailer or the vendor. Transportation impacts the top line in other ways as well. For example, vendors who must guarantee delivery of goods within their retail customer's tight time parameters will readily plan expedited transportation services rather than the penalty

of charge backs and dissatisfied customers. And manufacturers practicing just-in-time and lean operations are more likely to use vendors capable of offering the added value of visibility to transportation and delivery information (Nonthaleerak & Hendry, 2008).

Lead time, the ability to meet market demand, customer satisfaction and sales all have an impact on revenue growth. And all are affected by the shipper's ability to assure the customer that it will receive delivery of the right shipment, at the right time, at the right place and in good condition. Transportation has a significant impact on the company's operating expenses. Companies easily can identify the transportation in their cost of goods sold (COGS) calculations. In addition, if supply chain management truly is about process excellence, and we agree the less time it takes to get products to market the more profitable the operation, then it follows that improvements in transportation management will impact profitability. Since COGS typically accounts for a significant percent of revenue, any actions that reduce the cost of goods sold as a percentage of revenue will deliver a welcomed improvement in the financial performance of the company (Mathieu et al. 2008).

To better understand a process, process lead time must be calculated. This calculation is a foundational metric for both Lean and Six Sigma, or what is commonly referred to now as Lean Six Sigma. Work in Process is anything that has entered the system and has not yet come out. More than just the physical materials found in manufacturing, Work in Process can be unanswered emails, customer requests, etc. For example, a team is currently working on five reports and the Average Completion Rate is 2 hours. The Process Lead Time is calculated as $5 / 2 = 2.5$. To decrease the Process Lead Time, either the WIP may be decreased or the Average Completion Rate can be increased. Process Lead Time is also used to calculate Process Cycle Efficiency (PCE) (Manz, 2011).

Lean management is a management style that promotes reducing waste through the elimination of non-value added activities (streamlining operations), eliminating work in process and inventory, and increasing productive flexibility and speed of employees and equipment. Average Lead Time = (Average amount of WIP per period of time) / (Average completion rate per period of time). In other words, the average lead time is the average length of time a "thing" waits to be completed in a process (Schmidt & Aschkenase, 2008).

2.7 Waste and Performance of an Organization

Wastes are non-value adding activities. Activities that take time, resources, or space, but do not add value. Waste only adds to time and cost. George (2003) holds that services are full of wastes and goes further to explain that service processes are usually slow processes and expensive processes. They have far too much work-in-progress, e.g. Reports waiting on desks, e-mails in an in-box, sales orders on a database etc. 90% of its time is waiting. He further adds that in any slow process, 80% of the delay is caused by less than 20% of the activities. Lean philosophy dictates that anything that does not add value to a process or product, or that the customer is unwilling to pay for, is waste and should be eliminated. Each step of a process in the production of a good or service either adds value or waste to the end product. Ultimately, the elimination of waste increases an organization's productivity and profit.

While creating the Toyota Production System, (Ohno, 1988) discovered that there are 8 wastes of Lean manufacturing which have a universal application as discussed below. Despite what some practitioners may say or write, the 8 wastes of Lean are applicable not just in a Lean manufacturing system but also in services. These 8 wastes are: Waste from producing defects, Waste of transportation; Waste from inventory; Waste from overproduction; Waste of waiting time; Waste in processing; Waste of motion and Waste of skills.

According to Kippenberger (1997) the first type of production waste is over-production, which relates to producing goods that are not needed at the moment. Martins (2010) further defined over-production as the anticipation of changes in customer demand requirement would lead to wastage of materials and labor. The effect of this creates longer process cycle times and higher costs. Thus in a lean environment, its practitioners make an effort in eliminating this type of production waste by matching available capacity to actual demand thereby only producing when it is needed. According to Rother and Shook (2003), over-production waste is the most significant source of production waste. In their opinion they claim it amounts to shortages as the wrong things are produced and that it results to longer lead-time as it impair your ability to be adaptable and easily respond to customer requirement.

The second type in Kippenberger (1997) perspective is waste as a result of waiting by employees either due to movement of goods or for a process to complete. This waste results when people wait for materials, information or resources necessary to begin or finish their work, or when equipment is left idle, loss of process time, and cycle time and production cost increases (Martins, 2010). Amongst the many negative effect caused by this waste of waiting is the delay in moving production to downstream work operations. This type of production waste results when time is not used effectively, Hines and Rich (1997) points out that this waste is encountered when products are not moving or is being worked on and the result of this is that both the product and employees are thus forced to wait unnecessary. In their view they assert that waiting time should be used to train employees, maintenance or Kaizen activities.

The third waste is that of transportation, where goods are moved from one point to another unnecessary amounts to transportation cost which creates waste. Transportation waste result when information or materials have to be moved through unnecessary intermediaries. Cost is increased whenever unnecessary work, inspection, or storage locations are added to a process thereby leading to transportation waste. When parts are transported from one location to another within the factory, value is not added to the product only to manufacturing lead-time thus its reduction according to Karlsson and Ahlstrom (1996) is very important.

Over-processing waste forms the fourth type and it is the result of different circumstances. Adding of unnecessary features and functions to a product leads to increased cycle time and cost associated to design and production of that product (Martins, 2010). Hines and Rich (1997) claims that over processing is as a result of making use of over complex solutions for simple procedures that is to say when large inflexible machines are used rather than small flexible ones. They stressed that the outcome of this situation discourages employees and it gives room to poor layout thus leading to excessive transport and poor communication. Another factors that leads to over processing is using machines without having sufficient safeguards such as poke-yoke or jidoka devices.

Inventory waste forms the fifth type of production waste. This form of waste occurs when a work object that has not being requested by a customer is produced. The risk associated with this type of production waste is building-up of inventory that leads to tied down capital. This waste can

however be minimized if demand is matched with supply. The waste of inventory in Karlsson and Ahlstrom (1996) opinion is the most important source of waste which is associated with the keeping of parts and products in stock. According to them this does not add value thus it should be eliminated. They asserted that waste of inventory could be reduced through the reduction of lot size which indirectly has positive effects such as increasing flexibility.

The sixth is the waste of motion, which has to do with unnecessary movement of employees from one point to another (Kippenberger, 1997). This type of waste results when a specific work process is not performed efficiently; this leads to higher cycle times and cost. Avoiding this type of waste requires an understanding of the different processes involved in performing a task and devising the best way to achieve it (Martins, 2010). Hines and Rich (1997) states this waste results when employees have to stretch bend and pick up thereby causing unnecessary movement when such actions could have been avoided. They claim that the outcome of such wasteful activities makes employees to be tired and might lead to poor productivity and sometimes lead to quality problems.

Lastly is the waste of defects, which relates to the mistakes in the production process that requires rectification in Kippenberger (1997) opinion. Where work products do not meet customer's specification and rework is done leads to higher cycle time and production cost. Minimizing the waste that results from defects would lead to increased customers' satisfaction amongst other benefits (Martins, 2010).

2.8 Theoretical Framework

This study will be based on the business process reengineering theory which was made known in the 1990s by Michael Hammer and James Champy in the 90's and theory of constraints which was introduced by Eliyahu M. Goldratt in the late 70's.

2.8.1 Business Process Reengineering Theory

The business process re-engineering (BPR) theory is a business management strategy, originally pioneered in the early 1990s, focusing on the analysis and design of workflows and business processes within an organization. BPR aimed to help organizations fundamentally rethink how they do their work in order to dramatically improve customer service, cut operational costs, and

become world-class competitors. BPR seeks to help companies radically restructure their organizations by focusing on the ground-up design of their business processes. According to Davenport (1990) a business process is a set of logically related tasks performed to achieve a defined business outcome. Re-engineering emphasized a holistic focus on business objectives and how processes related to them, encouraging full-scale recreation of processes rather than iterative optimization of sub processes.

Business Process Reengineering (BPR) is the practice of rethinking and redesigning the way work is done to better support an organization's mission and reduce costs. Reengineering starts with a high-level assessment of the organization's mission, strategic goals, and customer needs. Basic questions are asked, such as "Does our mission need to be redefined? Are our strategic goals aligned with our mission? Who are our customers?" An organization may find that it is operating on questionable assumptions, particularly in terms of the wants and needs of its customers. Only after the organization rethinks what it should be doing, does it go on to decide how best to do it (Schmidt and Aschkenase, 2008).

Within the framework of this basic assessment of mission and goals, re-engineering focuses on the organization's business processes—the steps and procedures that govern how resources are used to create products and services that meet the needs of particular customers or markets. As a structured ordering of work steps across time and place, a business process can be decomposed into specific activities, measured, modeled, and improved. It can also be completely redesigned or eliminated altogether. Re-engineering identifies, analyzes, and re-designs an organization's core business processes with the aim of achieving dramatic improvements in critical performance measures, such as cost, quality, service, and speed (Davenport 1990).

Companies use BPR to improve performance substantially on key processes that impact customers. BPR helps reduce costs and cycle times by eliminating unproductive activities and the employees who perform them. Reorganization of teams decreases the need for management layers, accelerates information flows, and eliminates the errors and rework caused by multiple handoffs. Workers gain responsibility for their output and can measure their performance based on prompt feedback. Reengineering is a total reconstruction of business processes. It is not a

simple modification to existing practices. It is an all-or-nothing proposition with an uncertain result. It is not tinkering with what already exists or making incremental changes which leave basic structures intact. It involves going back to the beginning and inventing a better way of doing work (George, 2003).

2.8.2 Theory of Constraints

Theory of Constraints (TOC) is a management philosophy originally developed by Dr. Eliyahu M. Goldratt in the late 70s that focuses on constraint management. "A chain is no stronger than its weakest link" is the fundamental tenet of theory of constraint. Similarly, in any complex system, at any point in time, more often than not there is always that one aspect of the system that limits its ability to achieve its goal. The same is true for an organization. Therefore, for any organization to attain significant improvement the constraint must be identified and the whole system must be managed to keep that constraint in mind. TOC considers the fact that the entire system is a collection of interrelated processes and each system having one or more constraints.

A constraint can be defined as any process that limits the ability of entire system to achieve its intended goal. TOC seeks to achieve process of continuous improvement by following some 5 steps:

Identify the constraint – Determine the weakest link which in this case is anything that delays or stops a process from achieving its goal.

Exploit the constraint – Look for ways and means to utilize the existing capacity of constrained process to get the most out of it.

Subordinate the complete system to the constraint – Align all the other process to enable the constraint operate at maximum effectiveness. This could involve letting the resources that have excess capacity remain idle, or spend capacity to help the constraint. Avoid unnecessary inventory.

Elevate the constraint – Raise the throughput rate of the constraint by making changes to break the constraint. Do not let inertia become the constraint. If the constraint is broken go back to step 1 to identify new constraint and repeat the subsequent processes.

There are however limitations of Six Sigma and TOC. Six Sigma attempts to reduce variation in all the processes so as to achieve overall improvement in system. System interdependencies are not taken into account and processes are improved independently. As a result, there is probability

of many potential projects which in itself are improvement opportunities in any system improvement initiative. This in turn could make it difficult to identify which ones to prioritize. TOC on the other hand provides clear guidelines on how to identify the constraint or bottleneck but it lacks statistical tools to quantitatively measure and analyze the performance of the process making this methodology slightly less effective.

2.9 A Conceptual Framework Analysis Model

Figure 2 is a conceptual framework analysis model providing the relationship of variables as would be used in the study.

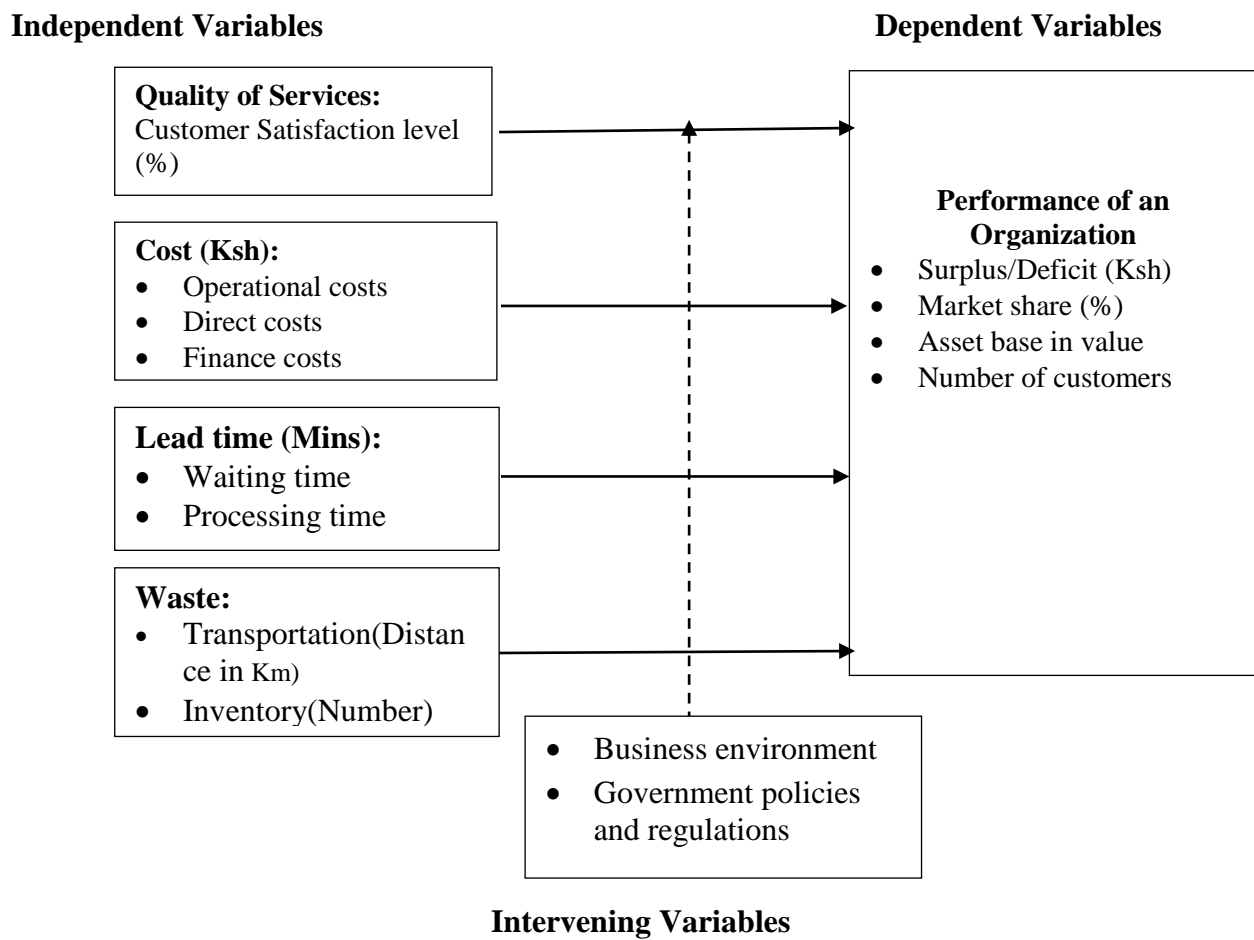


Figure 2: Conceptual Framework

2.9.1 Conceptualization of Variables

The section assesses the use of indicators that influence the performance of an organization. The quality of services, cost, lead time and waste parameters will be analyzed as the independent variables, to measure their influence on performance the dependent variable. The quality of services evaluation will be done taking into account the leadership/ supervision style and the main parameter of measurement being the customer satisfaction level.

Quality of Services can modify a customer's perception on an organization. The quality will be assessed if the services offer optimum satisfaction and value substitute to the client's money. A quality product or service is what is perceived by the customer and understood by the supplier. It is what the customer is willing to pay for and not defective products.

Cost entails the finance costs, direct and indirect costs incurred by the organization. These are the expenditures incurred by an entity in producing their products or in rendering their services. This will be assessed through establishing total revenue in relation to expenditure costs. Generally if total revenue is more than total cost, there is profit, while if total cost is more than total revenue that is a loss to the organization. If total Revenue equals total Cost, there is break even. This means that the profit is zero. If the profits received are high then this portrays a good performance. In companies where sales performance or financial performance is bad, quite often process performance is the root cause of failures, and the reverse is true also.

Lead time is the time from when the customer gets in touch with the organization until he or she is served with the required product or service. Clients would like to receive services at the touch of the button without delays and being taken round and round the organization. Lead time therefore entails the ability to meet market demand, customer satisfaction and sales all of which have a great impact on revenue growth and thus the organization performance.

Waste refers to the non-value adding activities that take time, resources, or space, but do not add value. Waste only adds time and cost to service rendering and thus dispels customer quest for services and inquiries. Each step of a process in the production of a good or service either adds value or waste to the end product. Ultimately, the elimination of waste increases an organization's productivity and profit and hence the organization performance.

2.10 Gaps in Literature Review

Most of the literature reviewed dealt with Lean Six Sigma in manufacturing industries. The service sector has been considerably slower in embracing six sigma than the manufacturing sector (Furterer and Elshennawy, 2005). Managers of a service organization attempting to apply Lean Six Sigma often find their task complicated by two mitigating circumstances. First, much of Lean Six Sigma terminology and many of its techniques were originally intended for manufacturing, and applying them to services has been challenging. Secondly, services by their nature possess special characteristics, for example, the importance of information and the abundance of cross-functional process flows.

Hensley and Dobie (2005, p. 87) identify some of the problems that come about when implementing six sigma in the service sector: it is hard to collect data in service industries and even harder to measure due to various things that happen when customers and service providers interact and the data collected may not be as reliable since the data are collected through more direct (“face to face”) means giving room for subjectivity. Very little has been done on educational institutions that have adapted the six sigma model like the Kenya Institute of Management, thus giving the urge to investigate the performance of organizations which have adopted the lean six sigma methodology in the education sector.

2.11 Summary of Literature Review

Lean Six Sigma is viewed as a valuable approach in the portfolio of management improvement programs that can be undertaken by organization executives. When waste is removed from a service process, the lead time will always decrease. Re-engineering identifies, analyzes, and re-designs an organization's core business processes with the aim of achieving dramatic improvements in critical performance measures, such as cost, quality, service, and speed. The goal of Lean Six Sigma should be to improve service and ultimately lower the cost of its delivery. But this goal should be accomplished through a combination of employee attrition, workforce reallocation, and contractor attrition, so that additional services are provided to the public.

The integration of the Lean Principles into Six Sigma (or reversely) makes it possible to achieve effective improvements. It provides organizations with the methods, tools and techniques for superior improvements. Lean Six Sigma (LSS) is a powerful methodology of achieving process efficiency and effectiveness resulting in enhanced customer satisfaction and improved bottom line results. Lean is a powerful business process improvement methodology to minimize or even eliminate different forms of waste or non-value added activities or steps whereas Six Sigma has been proved to be an effective methodology to reduce variation within a business process and thereby achieve process robustness.

Selection of a process improvement methodology is dependent on the culture of your organization. If many popular programs appear to end up in the same place addressing the same issues after a number of years of use, the main issue left to explore is the speed at which a method will be accepted into an organization:

If your organization values analytical studies and the relationships of data, charts and analysis, Six Sigma is a perfect program for you to start with.

If your organization values visual change and immediate results, then lean thinking might be the way to go since lean is about speed of delivery.

More and more organizations are trying to determine what improvement method will work best and fit best with their culture. When one is working through the apparent conflicting claims of performance improvement programs various scholars advice one to concentrate on the primary and secondary effects of their philosophies. Once the values of a specific improvement program are identified, the comparison of those values with the values of the organization can make the method of selection easier, if not obvious.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents and provides description of the research methodology that was used to carry out the study. It was guided by the research objectives as in chapter one. The methodology of this study covered research design, target population, sampling procedure, the sampling size, data collection instruments, data collection procedures, data analysis, interpretation of data and ethical issues involved.

3.2 Research Design

The study adopted descriptive survey research design in order to provide a framework to examine current conditions, trends and status of events. Descriptive research design is more investigative and focuses on a particular variable factor. It is analytical and often singles out a variable factor or individual subject and goes into details of describing them. According to Cooper & Schindler (2003), such a study is concerned with finding out who, what, when, where and how of the relevant phenomena.

3.3 Target Population

The target population of the study was the 145 employees from Kenya Institute of Management, head office as shown in table 3.1 (HR Records, 2013)

Table 3.1: Target population

| Department | Target Population | Percentage |
|---------------------------|--------------------------|-------------------|
| Management | 14 | 10 |
| Finance department | 37 | 26 |
| Administration department | 45 | 31 |
| Operations Department | 49 | 33 |
| Total | 145 | 100 |

Source: (HR Records, 2013)

3.4 Sample Size and Sampling Procedure

A sample is a section of the population that is suitable enough to represent the characteristics of the whole population. A sample size must be large enough to adequately represent the significant characteristics of the reachable population (Mugenda and Mugenda 2003). Selection of the sample size depends on factors such as the number of variables in the study, the purpose of the study, population size, the risk of selecting a bad sample, the type of research design, the method of data analysis and the size of accessible population and the allowable sampling error (Israel, 1992).). The sample size was 106 respondents selected by the Cochran's (1977) formula as shown:

$$n = \frac{N}{1 + N(d)^2}$$

Where;

'n' is the desired sample size, (When the population is less than 10,000)

'N' is the target population and

'd' is the acceptable margin of error estimated at 0.05 (at 95% CL).

$$d^2 = (0.05)^2 = 0.0025$$

Therefore, Sample size (n) =

$$n = \frac{145}{1 + 145(0.0025)}$$

$$n = \frac{145}{1 + 0.3625} = \frac{145}{1.3625}$$

$$n = 106$$

Stratified random sampling was used to select the desired sample size from a complete list of the target population. According to Mugenda & Mugenda (2003) the goal of stratified random sampling is to achieve the desired representation from various sub groups in a population. Sampling procedure is explained as process or technique of sampling a suitable sample or representative of population for purpose of determining parameters of the whole population (Likert, 1992). The ultimate test of a sample design is how well it represents the characteristics of the population it purports to represent (Cooper & Schindler, 2003)

3.5 Data Collection Instruments

The study utilized mainly, primary and secondary data from individual departments executing and implementing the Lean six sigma methodologies at Kenya Institute of Management as well as those who did not. Prior to field work, desk research was conducted on the organization. Field work was then conducted with support from the research team.

Data collection instruments involve methods which were used to collect data from the selected respondents. This research study used self-designed structured questionnaires to collect primary data from respondents. Questionnaires were used because each respondent receives the same set of questions in exactly the same way and thus yielding data more comparable than information obtained through an interview. The questionnaire had both open and closed ended questions to allow respondents to express their opinions. They were developed with a set of semi structured questions for pilot testing to check the reliability and validity of instrument of data collection. The researcher finally prepared open and closed questionnaires with brief instructions which allowed the respondents to tick the opinions they agree or disagree with, and express their views with regards to the questions that were being asked. The questionnaires were administered through drop and pick later method. The questionnaire was structured into 3 broad categories. It started with the background information of the respondent, seeking to identify the gender of the respondent, their level of education and the department they belong to. Section 2 contained general information on the knowledge and information the respondents had regarding implementation of lean six sigma in the organization. Section 3 sought information about the various elements of LSS and their influence on organization performance.

3.5.1 Pilot Test

Pilot-testing is an important step in the research process because it reveals vague questions and unclear instructions (Nachmias et al, 1996). The data collection assistants administered 10 questionnaires and the interview guides to the staff in Lutheran plaza a couple of days before the study initiation. It is important to note that the data collected was used for testing the data collection tool and not for the purpose of the study. The data collected was analyzed and interpreted. After completion of the pilot testing all the data collection tools were reviewed and suitable corrections and adjustments made to ensure the tool was fit for collection of objective data.

3.6 Validity of Research Instruments

Validity is the degree by which the sample of test items represents the content the test is designed to measure. Content validity a measure of the degree to which data collected using a particular instrument represents a specific domain or content of a particular concept was employed by this study. The researcher sought expert opinion from the lecturers in the department of project planning and management on the representation and suitability of questions and suggestions for corrections on the structure of the research tools was given. This helped to improve the content validity of the data collected. It also facilitated the necessary revision and modification of the research instrument thereby enhancing validity.

3.7 Reliability of Research Instruments

Cronbach's alpha test was used to check the reliability of the instrument, it is based on internal consistency of the research instruments. Cronbach's Alpha was established for all the themes in the questionnaire, which formed a scale in order to test the reliability of the questionnaires.

Table 3.2 Reliability Test

| Variable | Cronbach's Alpha | N of Items |
|--------------------------|------------------|------------|
| Quality of Service | .713 | 4 |
| Cost of doing Business | .805 | 3 |
| Lead Time | .841 | 2 |
| Waste | .888 | 2 |
| Organization Performance | .867 | 1 |
| Average | 0.823 | 2 |

The table 3.2 shows that waste had the highest reliability ($\alpha= 0.888$), followed by lead time ($\alpha= 0.841$), cost of doing business ($\alpha= 0.805$) and quality of service ($\alpha= 0.713$). The dependent variable organization performance, had a reliability alpha of $\alpha= 0.867$. This illustrates that the scales measuring the objectives met the reliability criteria as the alpha value for each scale exceeded the prescribed threshold, ($\alpha>0.7$) with the average reliability for all the constructs being ($\alpha= 0.823$). This shows that the research instrument (questionnaire) was sufficiently reliable and needed no amendment.

3.8 Data Analysis Techniques

The Statistical Package SPSS version 20 was used in the analysis. After data collection, the data was organized and edited to remove any inconsistencies, repetitions or errors that made analysis difficult. The cleaned data collected was analysed using both quantitative and qualitative methods. Frequency tables were used to present the data collected for ease of understanding and analysis. Karl Pearson's Product Moment correlation was conducted to determine the relationship between the independent variables: Quality of services, Costs, Lead time and Wastes against the dependent variable of Organization performance. Qualitative data are based on meaning expressed through words. It involves the collection of non-standardized data that require classification and are analysed through use of conceptualization. Content analysis was used to analyse the qualitative data and the findings have been presented in prose form.

3.9 Ethical Considerations

Throughout the study there was adherence to the rules of collecting and analyzing data. Confidentiality of the information was upheld at all stages of the study. The research is based on factual truth. The principal of "least harm" and anonymity was given the highest priority. The principle of informed consent was applied. Permission was sought from relevant authorities and a letter obtained to allow the researcher to carry out the research. Furthermore, the researcher explained the purpose of the study to the respondents and assured them of confidentiality of their responses and identities.

3.10 Operational Definition of Variables

According to Mugenda and Mugenda (1999), operational definition refers to the measurement of a variable. It is the description of the operation that will be used in measuring the variable. Table 3.3 summarizes operational definition of variables in this study.

Table 3.3: Operational Definition of Variables

| Objectives | Variable | Indicator | Measurement scale | Data Collection Methods | Tools of Analysis | Data analysis |
|---|---|--|-------------------|----------------------------|-------------------|--|
| To determine how quality of goods and services influence performance of the Kenya Institute of Management | Customer Satisfaction Level | Number of complaints and compliments Customer referrals Efficiency levels | Ordinal | Questionnaire | Correlation | Descriptive Analysis Mean, Percentage, Standard deviation |
| To establish the influence of costs on performance of the Kenya Institute of Management. | Operation Costs Direct Costs Finance Costs | Rent & rate costs, Trade licenses, Property and general insurance Lecturers salaries, Corporate training cost Bank loan and bank overdraft interests | Ordinal | Questionnaire & Interviews | Correlation | Descriptive Analysis Mean, Percentage Std. Deviation |
| To determine how lead time influences performance at the Kenya Institute of Management. | <ul style="list-style-type: none"> • Waiting Time • Processing Time | Response time to customer needs Process Capability Cycle time. | Ordinal | Questionnaire | Correlation | Descriptive Analysis Mean Percentage Std. Deviation |

| Objectives | Variable | Indicator | Measurement scale | Data Collection Methods | Tools of Analysis | Data analysis |
|---|--|---|--------------------------|--------------------------------|--------------------------|--|
| To examine how wastes influences the performance of the Kenya Institute of Management | Transportation waste Inventory waste. | Time taken to move a document between different points of service. Excesses of assets promotional material and supplies purchased Time taken to retrieve records from the existing documentation. | Ordinal | Questionnaire | Correlation | Descriptive Analysis Mean, Percentage, Std. Deviation |
| Performance of the Organization | Surplus/Deficit Market share Asset base Customer base | Turnover and expenditure Assets and Liabilities Number or students & corporate clients per year Employee and customer retention rates per year | Ordinal | Questionnaire & Interviews | | Descriptive Analysis Mean, Range, Std. Deviation |

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter covers the presentation and interpretation of the findings. The purpose of this study was to establish the influence of lean six sigma methodology on performance of organizations: a case of the Kenya Institute of Management. The study further sought to determine the influence of quality of goods and services, cost of doing business, lead time and waste on performance of organizations. The findings are presented in tables.

4.2 Questionnaire Response Rate

The study had a sample of 106 respondents drawn from different departments of the Kenya Institute of Management. Of the 106 questionnaires distributed, 87 were filled in and returned which represents 82% of the respondents. This is a reliable response rate for data analysis. Mugenda & Mugenda 2003 point that a response rate of 60% is good and a response rate of 70% and over is excellent. The above response rate was achieved because of the collection procedure of drop and pick later method. The respondents were regularly reminded through phone calls to fill the questionnaires and any help or additional clarifications needed by the respondents were accorded. However, 18% of the respondents were either reluctant to participate or misplaced the questionnaires.

4.3 Demographic Characteristics of Respondents

The study sought to establish the background information of the respondents which includes the respondents' gender, level of education and the number of staff trained on lean six sigma.

4.3.1 Distribution of the Respondents by Gender

The study sought to find out the gender of the respondents. The findings obtained are as shown in table 4.1.

Table 4.1: Distribution of Respondents by Gender

| Gender | Frequency | Per cent |
|---------------|------------------|-----------------|
| Male | 39 | 44.8 |
| Female | 48 | 55.2 |
| Total | 87 | 100 |

From table 4.1 majority of the respondents 48 (55.2%) were female while male contributors were 39 (44.8%). This is a very good representation of gender and shows that both genders are well represented within the organization.

4.3.2 Distribution of the Respondents by Level of Education

The study sought to establish the respondents' highest level of education. The level of education was important in order to determine the capability of the respondents to understand the questions and give the appropriate answers.

Table 4.2: Distribution of Respondents Highest Level of Education

| Level of Education | Frequency | Per cent |
|---------------------------|------------------|-----------------|
| Primary | 0 | 0 |
| Secondary | 0 | 0 |
| Middle level College | 23 | 26.4 |
| University | 64 | 73.6 |
| Total | 87 | 100 |

From the findings in table 4.2, 23 (26.4%) respondents indicated that their highest level of education was middle level college while 64 (73.6%) indicated that their highest level of education was university. These findings show that the highest number of the respondents have university education a level sufficient to influence favorably their comprehension of antecedents to performance of organizations.

4.3.3 Trained Personnel in Lean Six Sigma

The study sought to get information on the number of staff trained on lean six sigma within the organization. The data collected was as follows:

Table 4.3: Trained Personnel in Lean Six Sigma

| Staff Trained | Frequency | Per cent |
|----------------------|------------------|-----------------|
| Black belt | 4 | 4.6 |
| Green belt | 21 | 24.1 |
| Yellow belt | 26 | 29.9 |
| White belt | 36 | 41.4 |
| Total | 87 | 100 |

From table 4.3 it is evident that the lean six sigma culture is somehow embedded at the Kenya Institute of Management with majority of the respondents 36 (41.4%) having been trained at the white belt level which is a level that aims to create awareness of the methodology

4.4 Influence of Lean Six Sigma Methodology on Organizational Performance

This section sought to gather information on the level of influence of lean six sigma methodology on the performance of the Kenya Institute of Management. The respondents were asked if lean six sigma methodology has influenced the performance of the organization. Their response is as shown in table 4.4;

Table 4.4: Influence of Lean Six Sigma Methodology on Organizational Performance

| Measure | Frequency | Per cent |
|-------------------|------------------|-----------------|
| Not at all | 3 | 3.4 |
| Small extent | 08 | 9.2 |
| Moderate extent | 11 | 12.6 |
| Great extent | 30 | 34.5 |
| Very great extent | 35 | 40.2 |
| Total | 87 | 100 |

Results from Table 4.4 show that implementation of lean Six Sigma had quite a significant influence on the performance of the organization. 3(3.4%) of the respondents felt that lean six sigma did not have an influence on the organizations performance at all, 8(9.2%) felt that it influenced performance but only to a small extent, 11(12.6%) felt that the influence was moderate. 65 respondents representing 74.7% felt that to a great extent and very great extent, the performance of the organization was influenced by implementation of lean six sigma.

4.4.1 Quality of Goods and Services and Performance of an Organization

The study sought to determine the influence of the quality of services on the performance of the organization. The respondents were asked to rate how they agree or disagree with the indicated quality determinants and their influence on the performance of an organization. The results were as shown below.

Table 4.5: Quality Determinants

| | Range | Mean | Std. Deviation |
|----------------|--------------|-------------|-----------------------|
| Reliability | 3.00 | 3.278 | .819 |
| Responsiveness | 2.00 | 3.278 | .733 |
| Accessibility | 3.00 | 3.573 | .717 |
| Believability | 3.00 | 3.377 | .840 |

From the findings in Table 4.5, the respondents strongly agreed that the services within the organization were accessible and thus a high mean of 3.57 and standard deviation of 0.717. They equally agreed that the services offered at the organization were believable at a mean of 3.377 and standard deviation of 0.840. Responses regarding reliability and responsiveness of services were moderate with a mean of 3.278 and a standard deviation of 0.819 and 0.733 respectively. From the above responses it is evident that these determinants in one way or the other affect how customers interact and view the organization and have an eventual influence on the performance of the organization

The respondents were further asked to indicate whether based on the services offered in the organization they would recommend the organization to other people and the responses were as shown below.

Table 4.6: Recommendation of Organization to Others

| Response on Recommendation to Others | Frequency | Percentage |
|---|------------------|-------------------|
| Very Unlikely | 5 | 5.8 |
| Somewhat unlikely | 11 | 12.6 |
| Neutral | 34 | 39.1 |
| Somewhat likely | 22 | 25.3 |
| Very Likely | 15 | 17.2 |
| Total | 87 | 100 |

From the responses in Table 4.6, 34 (39.1%) of the respondents were neutral on whether they would recommend the organization to other people. 22 (25.3%) said they would somewhat likely recommend the organization to others while 15 (17.2%) indicated they would very likely recommend the organization to others. On the other hand 11 (12.6%) indicated that they would somewhat unlikely recommend the organization to other people while 5(5.8%) indicated they were very unlikely to recommend the organization to others. It can thus be concluded that there is a high possibility that 18.4% of the respondents would not recommend KIM to others, 39.1% are neutral about meaning if some conditions are fulfilled or not fulfilled they can either recommend or not recommend respectively. The possibility of the remaining 42.5% recommending the organization to others is very likely.

4.4.2 Cost of Doing Business and Performance of an Organization

The study also sought the perception of the respondents on whether the cost of doing business influences the general performance of an organization specifically in terms of surplus or deficit. The respondents were presented with the different fundamental costs that are incurred by the organization and were required to rate each of the costs and its influence on the overall performance of an organization. The results were as shown below:

Table 4.7: Components of Cost of Doing Business

| | Range | Mean | Std. Deviation |
|------------------|--------------|-------------|-----------------------|
| Operations Costs | 3.00 | 3.862 | .970 |
| Direct Costs | 4.00 | 3.573 | 0.904 |
| Financing costs | 4.00 | 3.000 | 1.140 |

From the results of the study the respondents agreed at a mean of 3.862 and a standard deviation of 0.970 that operations costs have a high effect on the surplus of an organization. From the qualitative data collected the respondents were of the general opinion that the organization incurred very high costs on rent and salaries. Direct costs were also said to have high effect on the surplus or deficit of an organization which in turn affects the performance of an organization. This was indicated with a mean of 3.573 and a standard deviation of 0.904. Lastly with a mean of 3.0 and a standard deviation of 1.140 financing cost was found to have a neutral effect on the deficit or surplus of an organization.

4.4.3 Lead Time and Performance of an Organization

The study also sought to find out if the following time aspects taken to receive a service within an organization would have an impact on how they rate the performance of an organization. The findings were as shown on the table below:

Table 4.8: Components of Lead Time

| | Range | Mean | Std. Deviation |
|-----------------|--------------|-------------|-----------------------|
| Waiting time | 2.00 | 3.508 | .595 |
| Processing time | 2.00 | 3.618 | .568 |

The results indicated that the waiting time and the processing time have a high effect on how a client would rate an organization. The processing time was rated at a mean of 3.618 and a standard deviation of 0.568 while waiting time was at a mean of 3.508 at a standard deviation of 0.568.

4.4.4 Wastes and Performance of an Organization

The study sought to determine how the following types of waste influence the performance of an organization. The results were as shown in table 4.9.

Table 4.9: Facets of Wastes

| Waste | Range | Mean | Std. Deviation |
|----------------|--------------|-------------|-----------------------|
| Transportation | 2.00 | 3.00 | .495 |
| Inventory | 2.00 | 2.518 | .661 |

The findings indicated that the respondents agreed at a mean of 3.0 and standard deviation of 0.495 that waste of transportation and waste of inventory at a mean of 2.518 and standard deviation of 0.661 influence the performance of an organization

4.5 Correlation Analysis

A correlation is a number between -1 and +1 that measures the degree of association between two variables. A positive value for the correlation implies that when one variable increases in value the other variable also increases and vice versa. This is called positive correlation. A negative value for the correlation implies a negative or inverse association i.e. When one variable increases, the other decreases. This is called negative correlation.

Table 4.10: Correlation Analysis

| | | Quality of service | Operation cost | Direct cost | Financing cost | Waiting time | Processing time | Transportation | Inventory | Performance of the organization |
|---------------------------------|---------------------|--------------------|----------------|-------------|----------------|--------------|-----------------|----------------|-----------|---------------------------------|
| Quality of service | Pearson Correlation | 1 | .210 | .168 | .154 | .210 | .359 | .012 | .025 | .227 |
| | Sig. (2-tailed) | | .472 | .566 | .599 | .472 | .207 | .966 | .933 | .435 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Operation cost | Pearson Correlation | .210 | 1 | .862** | .506 | .673** | .676** | .554* | .353 | -.855** |
| | Sig. (2-tailed) | .472 | | .000 | .065 | .008 | .008 | .040 | .216 | .000 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Direct cost | Pearson Correlation | .168 | .862** | 1 | .722** | .504 | .668** | .584* | .388 | -.887** |
| | Sig. (2-tailed) | .566 | .000 | | .004 | .066 | .009 | .028 | .170 | .000 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Financing cost | Pearson Correlation | .154 | .506 | .722** | 1 | .154 | .514 | .547* | .569* | -.488 |
| | Sig. (2-tailed) | .599 | .065 | .004 | | .599 | .060 | .043 | .034 | .077 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Waiting time | Pearson Correlation | .210 | .673** | .504 | .154 | 1 | .718** | .623* | .410 | -.625* |
| | Sig. (2-tailed) | .472 | .008 | .066 | .599 | | .004 | .017 | .145 | .017 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Processing time | Pearson Correlation | .359 | .676** | .668** | .514 | .718** | 1 | .693** | .346 | -.632* |
| | Sig. (2-tailed) | .207 | .008 | .009 | .060 | .004 | | .006 | .226 | .015 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Transportation | Pearson Correlation | .012 | .554* | .584* | .547* | .623* | .693** | 1 | .825** | -.439 |
| | Sig. (2-tailed) | .966 | .040 | .028 | .043 | .017 | .006 | | .000 | .117 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Inventory | Pearson Correlation | .025 | .353 | .388 | .569* | .410 | .346 | .825** | 1 | -.197 |
| | Sig. (2-tailed) | .933 | .216 | .170 | .034 | .145 | .226 | .000 | | .500 |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Performance of the organization | Pearson Correlation | .227 | -.855** | -.887** | -.488 | -.625* | -.632* | -.439 | -.197 | 1 |
| | Sig. (2-tailed) | .435 | .000 | .000 | .077 | .017 | .015 | .117 | .500 | |
| | N | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 | 87 |

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

From correlation analysis in table 4.10, the study found that there is a positive relationship between the quality of service and performance of an organization, where the correlation coefficient was 0.227. The study also found that costs and overall performance of an organization correlate strongly negative with an average correlation coefficient of (-.743) with (-.855) for operation costs, (-.887) for direct cost and (-.488) for the financing costs. The study further established that there is a strong negative correlation between time and performance with an average correlation coefficient of -0.628 (-.625 being the coefficient of waiting time and -.632 being the coefficient of processing time). Lastly, the study found that there is a weak negative correlation between waste and performance with a correlation coefficient of (-.318) with (-.439) being the correlation coefficient of waste of transportation and (-.197) being the correlation coefficient of the waste of inventory.

From these findings we can infer that cost of doing business and lead time had the most significant influence on overall performance of the organization with Karl Product moment correlation coefficient of -0.743 and -0.628 respectively. They were followed by waste which had a correlation coefficient of -0.318 and lastly quality of services which had the least correlation coefficient of 0.23

4.6 Discussion of Findings

This section looks at findings of the four variables, that is: the influence of operating costs, wastes, lead time and quality of service influence the performance of organizations. This section further looks at how these findings are linked to previous literature.

The findings show that though the variables have an influence on organization performance, the significance varies from variable to another. All this is in line with the findings in the literature review which indicates that the main motivation for organizations deciding to implement Lean six sigma usually boils down to the following: greater predictability of the process; Less waste and rework which lowers costs; products and services that perform better and last longer and finally happier customers who value you as a supplier, according to Michael et al (2002)

4.6.1 Quality of Service and Organization Performance

The study established that quality of services influences organization performance to a small/weak extent. From literature review, quality consists not only of the result, but also of the

process (Sureshchander et al., 2002). This is because of the inseparability between production and consumption of the service. Even if the result is favorable but the process is flawed, the quality is considered low since quality is meeting customer expectations in service characteristics (Srikanthan and Dalrymple, 2005).

Research findings in the last decade have started to elaborate on the process by which delivering high quality goods and services influences profitability through customer satisfaction. Building from the individual-level model of customer satisfaction proposed by Oliver (1980), several studies discuss and/or observe a strong link between customer satisfaction and loyalty (Anderson and Sullivan 1993; Bearden and Teel 1983; Bouding et al. 1993; Fornell 1992; LaBarbera and Mazursky 1983; Oliver and Swan 1989). Reichheld and Sasser (1990) discuss why increasing customer loyalty should lead to higher profitability. Rust and Zahorik (1993) empirically demonstrate the relationship between customer satisfaction and profitability for a health care organization.

It has been long recognized that customer satisfaction is dependent on value (Howard and Sheth 1969; Kotler and Levy 1969), where value can be viewed as the ratio of perceived quality relative to price or benefits received relative to costs incurred (Dodds, Monroe, and Grewal 1991; Holbrook 1994; Zeithaml 1988). The greater the value the higher the probability of a repeat customer and the greater the chances of referral. This will in turn affect the bottom line of the organization which is one of the indicators of measuring an organizations performance.

Fornell (1992) enumerates several key benefits of high customer satisfaction for the firm. In general, high customer satisfaction should indicate increased loyalty for current customers, reduced price elasticity, insulation of current customers from competitive efforts, lower costs of future transactions, reduced failure costs, lower costs of attracting new customers, and an enhanced reputation for the firm. Increased loyalty of current customers means more customers will repurchase (be retained) in the future. If a firm has strong customer loyalty, it should be reflected in the firm's economic returns because it ensures a steady stream of future cash flow (Reichheld and Sasser 1990).

From the various scholars above it is evident that quality is multifaceted. There is what goes into production of quality and there is the consumption of quality. The weak positive correlation

obtained in this research can thus be justified by the fact that the research considered only one aspect of quality; consumption.

4.6.2 Cost of Doing Business and Organization Performance

The study established costs as having the strongest association with performance of an organization. Operating cost concept is conceptualized by Datta & Roy (2013), as the sum of an organization's transaction and production costs while financing cost is the total expense associated with securing financing for a business. From the literature review Kaplan (2009) argues that for any investor in any market, once costs have been accounted for, very few are able to outperform the market as now their aggregate return is now less than the markets. He goes on to say that cost is that necessary evil one cannot do without. However according to him unlike the markets, costs are largely controllable. One either accepts it or keeps it at manageable levels or when the costs are excess then they are transferred to other institutions (outsourcing).

From the findings it was evident that increased operational and direct costs had an influence on organizational performance when considering the surplus/deficit aspect. The relationship between this two was found to be inverse i.e. All factors remaining constant, an increase in one in this case cost resulted in decreased surplus at the end of the year. This is supported by Sharabi and Davidow (2010) who indicate that every coin spent on fixing poor service quality is a cost that directly lowers profit/surplus by a dollar.

4.6.3 Lead Time and Organization Performance

The third objective was to establish the influence of lead time on organization performance. According to Schmidt & Aschkenase (2008), time is the single best indicator of competitiveness. Scott and Thomas (1989), the longer the waiting time and completion time i.e. the time experienced by a customer waiting for a product or service and the due date or specified time to complete a task respectively, the more disgruntled the customer becomes. While a satisfied client shares his feelings with one or two people, a dissatisfied client shares his negative feelings with nine ten people (Carr and Littman, 1997). Negative publicity threatens to cause serious damage to an organization. Organizations have spent millions of dollars on a charm offensive mission to appease disgruntled clients.

Lead time affects both surplus and cost. Short lead time is valuable to buyers of a given product or service because it reduces the time to consumption and realization of cash flows to an industrial purchaser. From a cost perspective lead time is proportional to work in progress inventory, it cause the firm to hold finished goods. Short lead time reduces agency costs which are costs associated with measurement, control and divergence of interest of the managers and firm (Jensen and Meckling, 1976)

From the research findings there was a strong influence of lead time on performance of the Kenya Institute of Management. Schmidt and Aschkenase (2008) defined lead time as the summation of value added, non-value added and business value-added time. Literature according to Lederer and Seung-Kyu (1996) is of the argument that reducing non- value added time causes two favorable effects on an organizations profit in this case surplus. First the firms cost is reduced and lead time to customer is reduced leading to higher sales. This directly increases profits (in this case surplus). Second, the divergence between marginal costs and average cost declines: the effect is that the firm makes better production rate decisions, reducing opportunity costs and increases firm profits.

4.6.4 Waste and Organization Performance

The fourth objective was to establish the influence of waste on the performance of the Kenya Institute of Management. From the research findings, waste had a weak negative correlation with organization performance. This is not to say that it does not influence performance. In fact, various scholars are of the opinion that elimination of waste through the lean six sigma methodology helps improve organization competitiveness and thus increasing the chances of superior performance.

Engelund et al (2009) sees lean six sigma as a tool to abolish waste so as to create wealth for companies. Hanes and Taylor (2000) state that for companies to achieve profitability in the short run and long term expectations, processes that amount to production of wastes should be reduced or eliminated. They further explain that defect wastes relates to lack of quality which in turn demands rework and is not value adding to either the company or their customers and as a result it should be eliminated.

Chen et al, (2010) proposed that eliminating waste enables companies to better understand their customers and what they need thereby delivering it just how they want it and when they want it. They mentioned that identifying the specific production waste and successfully eliminating them transcend to reduce cost of manufacturing, higher product quality, improved customer satisfaction, and increased profits.

4.6.5 Organization Performance

The study established that lean six sigma influences organizational performance for the better. These findings agree with Michael et al (2002) argument that following lean six sigma concept and using its accompanying methods helps an organization: have a measurable way of tracking performance improvement; focus its attention on process management at all organization levels; improve their customer relationship by addressing defects and finally improve efficiency and effectiveness of their process by aligning them with their customers' needs.

The above argument is further supported by Harry and Schroeder (2009) that conducting measurable tracking keeps an organization informed about what changes are working and which ones are not. This can speed up significant improvement. Having a process focus lets you define defects and calculate sigma levels. Aligning a process with one's customer needs can result in greater customer loyalty and retention. Also by being in touch with one's customers and their needs, one can more easily develop new ideas for improvement and enhancement to ones products and services.

It did not escape the researcher's eye that there are mechanisms by which performance in one time period is affected positively by performance in previous periods. Many of the cognitive and affective factors that seem likely to influence performance e.g. investors, customer and worker confidence in the organization are themselves likely to be influenced by prior performance. Good performance rankings lead both to self-assurance and to being treated favorably by others. Unfortunately the vice versa is true for poor performance. Equally executives strongly influence organization performance because they make strategic decisions (viz., upper echelon theory; Hambrick & Mason, 1984).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of key data findings, conclusions drawn from the findings highlighted and recommendations made. The conclusions and recommendations drawn were focused on addressing the objectives of the study.

5.2 Summary of Findings

The study sought to examine the influence of Lean Six Sigma on the performance of organizations. From the findings it can generally be said that the four objectives had an influence on organization performance albeit others were strong and others were weak and thus the main reason for implementation of lean six sigma in an organization is not cost cutting as most have been made to think but for process improvement with cost savings, customer satisfaction and maintaining a competitive edge as some of the rewards reaped.

The overall findings generally indicate that costs and specifically operational costs and direct costs highly influence the performance of an organization. This is confirmed with the Karl Pearson's Product Moment correlation of - 0.743 which indicates a strong negative association between costs and organization performance. The higher the costs (operating, direct and financing) the lower the organization performance as these extra costs eat into the profits/surplus of the organization. Cost savings are bound to be the biggest rewards of an organization that systematically and consistently applies the Lean Six Sigma methodology in their day to day activities. Primarily, these costs savings are realized due to having a measurable way of tracking performance improvement and focusing attention on addressing defects thus reducing reworks, and finally improving efficiency and effectiveness of processes. The study established that operation costs, direct and finance costs (with means of 3.862, 3.573, and 3.000 respectively), greatly influence organization performance. These are the components that an organization would endeavour to control in order to reduce its overall costs Vis a Vis its profits or surplus.

The study also established that quality of service with a correlation coefficient of 0.227 slightly influenced the performance of an organization. The study established that quality is multidimensional .This is because of the inseparability between production and consumption of

the service. Delivering high quality goods and services influences profitability through customer satisfaction and as such organizations should strive to give superior customer experience resulting into satisfied customers who in turn translate to a wider customer base, more referrals, more sales and definitely improved profits/surplus.

The study established that availability of wastes with a correlation coefficient of -0.318 moderately influenced organization performance. An increase in waste reduces performance. The study established that when the processes of an organization are full of wastes the probability of reworks and not delivering on time according to customers demand are inevitable. Lean six sigma is thus a tool that can be adopted by various organizations who want to eliminate wastes in their processes, improve efficiency and effectiveness and in turn create wealth for the organization

The study found out that lead time with a correlation coefficient of 0.628 also had a significant influence on an organization performance. The longer the time one has to be in an organization to receive a service the lesser the confidence they have in the organization. Organizations need to react rapidly to customer requirements more so because customers' needs keep evolving and their tastes and preferences keep changing. The time taken from when a customer contacts an organization for a product or service to when it is delivered should be as short as possible. This is seen as delivering at the demand of the customer and organizations which are capable of this have a competitive edge above the rest.

5.3 Conclusion of the Study

The aim of this study was to determine the influence of Lean Six Sigma methodology on the performance of an organization. The objectives were: To determine how quality of goods and services influence performance; to establish the influence of costs on performance; to determine how lead time influences performance; to examine how wastes influences the performance of the Kenya Institute of Management. The results of this study indicate that the Lean Six Sigma methodology has a positive influence on the performance of an organization. This study has established that specifically the Lean Six Sigma methodology influences process improvement within the organization.

All factors remaining constant, with process improvement comes efficiency in the operational execution of business processes. This in turn has enabled organizations meet new opportunities thus generating business benefits and competitive advantage. The study has established that the use of the methodology has had a positive impact on various processes in the Kenya Institute of Management. The organization was able to consolidate some of its operations which were scattered within Nairobi as noted in the problem statement (1.2). This involved incorporating; the Westland's office with the head office based at Lutheran plaza and development house operations with emperor plaza. This in turn helped lower the rental costs by close to Kshs 10 million annually. The waste of transportation was also addressed as there was no movement of people and taxis shuttling between head office and Westland's to have documents approved or to attend meetings. The waste of inventory was also addressed. The holding area for stationery, promotional materials and other items needed to run the Westland office was consolidated with the central store at the head office.

5.4 Recommendations for Policy and Practice

Selection of a process improvement methodology is dependent on the culture of the organization. If many popular programs appear to end up in the same place addressing the same issues after a number of years of use, the main issue left to explore is the speed at which a method will be accepted into an organization. Lean Six sigma is just one of the many process improvement methodologies. It is viewed as a valuable approach in the portfolio of management improvement program that can be undertaken by organization executives. Once the values of a specific improvement program are identified, the comparison of those values with the ones of the organization can make selection of an improvement program easier. For an organization that value analytical studies, the relationships of data, charts and analysis, Six Sigma is a perfect program for you to start with. If on the other hand the organization values visual and immediate change, then lean thinking might be the way to go. Based on the results that have been yielded at the Kenya Institute of Management and other places like the banking sector -National bank of Kenya, Kenya Commercial Bank just to mention but a few, a combination of the two yields superior results.

The relative importance of organizational processes cannot be overlooked when making the decision to implement lean six sigma. Organizations must put in place process performance measurement systems in place in order to be able to evaluate and manage the overall organization performance effectively. It is virtually impossible for an organization to know how its performing if it cannot develop clear and measurable; quality determinants to estimate how satisfied its customers are, service turnover times i.e. from the customer and back to the customer and at the same time monitor its costs to ensure that they do not outstrip the benefits of the services to the clients.

5.5 Suggested Areas for Further Research

1. Future studies on the influence of Lean Six Sigma Methodology on the performance of Organizations could be conducted on other service sector organizations other than the education one e.g. Hospitals, Banks, Retail chain stores. Results from such a study would be essential in testing the validity of this study's findings in a number of settings so that additional insights into influence of lean six sigma and performance of organizations might be generated.
2. There is equally room for other researches to "evaluate the impact of Lean Six Sigma on the organization culture.

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APPENDICES

APPENDIX I: LETTER OF TRANSMITTAL OF DATA COLLECTION INSTRUMENT

Shiela Oguda

University of Nairobi,

P.O. Box 30197-00100, GPO, Nairobi

30 September 2014

Dear Respondent,

RE: REQUEST FOR YOUR PARTICIPATION IN MY RESEARCH STUDY

My name is Sheila Oguda, a student from the University of Nairobi carrying out a survey entitled “The influence of Lean Six Sigma Methodology on performance of Organizations: A Case of Kenya Institute of Management”. This is in partial fulfillment for the requirement for the award of degree of masters of Arts in project planning and management. It is in this regard that I am humbly requesting for your participation in filling this questionnaire. Kindly give answers to the best of your knowledge. Any information collected will be treated with confidentiality and only used for academic purposes. Thank you in advance.

Yours Faithfully,

SHEILA OGUDA.

APPENDIX II: QUESTIONNAIRE

IMPORTANT NOTE:

Participation in this survey is voluntary. Information provided through the questionnaire will be treated with confidentiality and will be exclusively for academic purpose. All answers will be considered right.

INSTRUCTIONS:

- I. Do not write your name on the questionnaire.
- II. Please read each question carefully.
- III. Kindly answer all the questions by ticking or filling in the spaces provided

SECTION I: PERSONAL INFORMATION

A. What is your gender?

- I. Male []
- II. Female []

B. What is your highest level of formal education?

- I. Primary []
- II. Secondary []
- III. Middle level college []
- IV. University []

C. Which category/department are you representing?

- I. Top Management []
- II. Finance department []
- III. Administration Department []
- IV. Operations Department []

SECTION II: GENERAL INFORMATION

A. How many trained Lean Six Sigma personnel does your organization have?

- I. Yellow Belts
- II. Green Belts
- III. Black Belts
- IV. White Belts

B. If the organization has successfully implemented lean six sigma projects, are there any financial benefits that have been gained so far?

- I. None []
- II. Little []
- III. Neutral []
- IV. Moderate []
- V. Very significant []

C. What are the key benefits of Lean Six Sigma implementation?

- I. Increased staff motivation []
- II. Process Improvement []
- III. Increased Customer Satisfaction []
- IV. Lead time reduction []
- V. Reduction of Waste in Processes []

SECTION III: INFLUENCE OF LEAN SIX SIGMA ON ORGANIZATIONAL PERFORMANCE

A. Quality of Services

1. Do the following quality determinants influence the performance of an organization?

Please Tick and briefly explain how

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|----------------|--------------------------|-----------------|-----------------------------------|--------------|-----------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Reliability | | | | | |
| Responsiveness | | | | | |
| Accessibility | | | | | |
| Believability | | | | | |

2. Based on the services offered how likely is it that you would recommend KIM to others?

| | Unlikely | Somewhat likely | Neutral | Somewhat unlikely | Very likely |
|------------------------|-----------------|------------------------|----------------|--------------------------|--------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Tick where appropriate | | | | | |

B. Cost of Doing Business

1. To what extent do the following costs influence the expenditure of an organization? Please Tick

| | Very Low extent | Low extent | Neutral | High extent | Very High extent | Please explain |
|--|-----------------|------------|---------|-------------|------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Operation costs(e.g. staff salaries, rent and license costs) | | | | | | |
| Direct costs(e.g. lecturer salaries and general insurance) | | | | | | |
| Financing costs(e.g. Bank loan interest and Bank overdraft interest) | | | | | | |

2. Which is the key cost driver in your organization? Please explain

C. Lead Time

In your opinion, do the following times have an impact on how a client would rate the performance of an organization? Please Tick and explain briefly

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|-----------------|-------------------|----------|---------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| Waiting Time | | | | | |
| Processing Time | | | | | |

D. Wastes and Performance

In your opinion, do the following wastes influence the performance of an organization? Please tick and briefly explain

| Waste | Never | Rarely | Occasional | Often | Very Often |
|--|-------|--------|------------|-------|------------|
| | 1 | 2 | 3 | 4 | 5 |
| Transportation (e.g. client turnaround time) | | | | | |
| Inventory(e.g. Excess promotional material sent to the market) | | | | | |

E. To what extent does lean six sigma methodology influence organizational performance?

Briefly explain

| | Not at all | Small extent | Moderate extent | Great extent | Very great extent |
|------------------------|-------------------|---------------------|------------------------|---------------------|--------------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Tick where appropriate | | | | | |

Thank you very much for your time and participation

APPENDIX III: EXCERPTS FROM THE ANNUAL REPORT AND CONSOLIDATED FINANCIAL STATEMENT OF KIM, 2012 AND 2013

| YEAR | BUDGETED DIRECT COSTS (%) | BUDGETED OPERATIONAL COST (%) | ACTUAL DIRECT COSTS (%) | ACTUAL OPERATIONAL COSTS (%) |
|------|---------------------------|-------------------------------|-------------------------|------------------------------|
| 2011 | 25 | 35 | 25 | 33 |
| 2012 | 25 | 35 | 27 | 35 |
| 2013 | 25 | 35 | 30 | 44 |

Source :(KIM Annual Reports 2011-2013)