

**EFFECT OF LEAN SIX SIGMA IMPLEMENTATION ON  
OPERATIONAL PERFORMANCE OF MICRO-FINANCE  
INSTITUTIONS IN KENYA**

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## DECLARATION

I declare that this research project is my original work and has never been submitted for award of a degree or diploma at the University of Nairobi or any other educational institution.

Signature.....Date.....

Zipporah Munguti

D61/76992/2012

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

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## **DEDICATION**

My dear parents Paul and Agnes and my sibling have been a pillar of support and encouragement, special dedication to them and will forever be grateful.

## **ACKNOWLEDGEMENT**

The milestone to accomplishment of this project has been not only challenging but also exciting. I am so grateful to almighty God for taking me this far. I wish to appreciate the University of Nairobi for refining and increasing my knowledge in project planning and management. I owe debt of gratitude to my supervisor for his patience, positive critiques, constant support and constructive recommendations throughout the writing of this research project. I am grateful to the respondents for their assistance who without their cooperation this project would not have been possible. Last but not least, my friends and classmates who in one way or the other have made a positive impact in my life and even pushing me to complete his research work.

## **ABSTRACT**

Lean Six Sigma is means by which organizations achieve efficiency and effectiveness. The impact of these practices influences the sustainability of operational performance. The study aims to establish the impact of Lean Six Sigma on operational performance of microfinance institutions in Kenya and the challenges of implementing Lean Six Sigma Practices. Lean Six Sigma practices under study are Customer focus, Organizational flexibility, Organizational leadership and Organizational culture. The study is anchored on three theories namely theory of constraints, Resource dependency theory and Organizational learning theory. The population under study was 51 registered microfinance institutions in Kenya. A census survey was used to determine the relationship between Lean Six Sigma and operational performance of microfinance institutions in Kenya. Original data which was collected through a questionnaire was used. 53.8% of the response rate was achieved. Diagnostic test was done on study variables which included the test of normality and reliability test. The test of normality showed that data was a little skewed and kurtotic and did not differ significantly from normality. Cronbach alpha test was used to measure reliability and showed that there was internal consistency of the study components. Descriptive statistics was used to determine Lean Six Sigma Practices adopted by Microfinance Institutions in Kenya. Pearson correlation coefficient was used to test the strength of the relationship between variables. There was a positive relationship between operational performance and customer focus, organizational flexibility, leadership and culture. Multiple regression model of the study variables revealed that independent variables are the key determinants of Operational performance among microfinance institutions. Analysis of variance of the study variables pattern indicated that the assumption was that the residuals are normally distributed at each level of operational performance and constant in variance across levels of operational performance. The results of the study also indicate that that organizational flexibility as a Lean Six Sigma practice has a lot of impact with the highest mean of 14.4 imply that the microfinance institutions are easily adaptable to practices that improve operational performance. The challenges of the study were that much microfinance is that a lot of resources especially technology is required to implement the lean six sigma practices. The study commends that more studies to be done on the topic so as to establish unknown factors that influence the performance of microfinance institutions in Kenya. Out that all the independent variables (Customer focus, leadership, organizational flexibility and organizational culture) the study found out they have a positive correlation with the dependent variable. The study concluded that implementation of Lean Six Sigma affected operational performance of microfinance institutions in Kenya, the effect was 53.8 percent of the total variation. The study recommends adoption and implementation of Lean Six Sigma practices as a continuous process of creating, acquiring and transferring knowledge as one or two practices may not yield the desired results. The study also recommends that Microfinance institutions in Kenya should embrace technology so as to enhance effectiveness and efficiency.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

<b>AMFI</b>	Association of Micro Finance Institutions
<b>ANOVA</b>	Analysis Of Variance
<b>CBK</b>	Central Bank of Kenya
<b>DMAIC</b>	Define Measure Analyze Improve and Control
<b>LSS</b>	Lean Six Sigma
<b>MFI</b>	Micro Finance Institutions
<b>NGO</b>	Non Governmental Organization
<b>TOC</b>	Theory Of Constraints
<b>TQM</b>	Total Quality Management
<b>SACCO</b>	Savings And Credit Co-Operative
<b>SME</b>	Small & Medium Enterprise
<b>VSM</b>	Value Stream Mapping

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## **CHAPTER ONE : INTRODUCTION**

### **1.1 Background of the Study**

The current business environment has forced organizations to establish practices that consider both market requirements and development of operations resources that enhance sustainability of business operations. This has led to the popularity of continuous improvement tools such as Lean Six Sigma. Lean Six Sigma is a merger of two continuous change concepts, that is, Lean and Six Sigma. They are contemporary approaches to improvement of customer value by enhancing quality, speed, minimization of lead time and elimination of waste (Arnheiter & Maleyeff, 2005). Lean Six Sigma has evolved to a more instrumental concept that is very essential to improvement of performance. Linderman et al, (2003) argue that the concept has been essential to companies gearing for operational excellence.

This study is anchored on three theories. The theory of organizational learning, theory of constraints and organizational dependence theory. The theory of organizational learning states that organizations experience recurrent decision situations and in the response develop programs for responses. Processes that spread organizational knowledge within or between organizations are important part of organizational learning (Cohen & Levinhal, 1990). The theory of constraints is a more recent tool of continuous improvement. It is based on principles that improvement made in the areas that already have operational spare capacity cannot give improvement on performance to the system so that the most efficient means of enhancing performance is to direct improve the system's shortcomings. Goldratt and Cox, (1992) argue that concentrating on improvement in such a manner increases return on investment and that the results are significantly effective than use of other improvement methods. Resources create capabilities of the firm. The theory of resource dependence is

concerned with how external resources influence the behavior of organizations. Pfeffer, (1982) argue that organizations enhance capabilities by ensuring sourcing and acquisition of significant resources which are relevant to organizations growth and survival.

Millions of populations across the globe depend on microfinance institutions to provide financial services. According to Harris (2002), microfinance lending provides low income earners in economy with an effective way of increasing their income, building their wealth and mortgage their risks. Microfinance Institutions (MFIs) offer a wide range of financial services which include loans, asset financing and credit financing. The management of MFIs need to be supplied with the relevant professional and management expertise so that they may serve their clientele better to produce the desired results with minimal waste (Ondoro & Omena, 2012). The operational performance environment of microfinance institutions is characterized mainly by informality, dealing mainly with SMEs in most parts of the world. Their structure, operational capacity and limited resources among other factors influence their performance.

### **1.1.1 Lean Six Sigma**

Lean Six Sigma is a blend of methodology which has been refined over the years to meet the needs of the ever dynamic needs of the society. While lean is more concerned with minimization of waste, six sigma focuses on reducing products and services variation by minimizing errors and failures. The essence of application Lean Six Sigma is to enhance smooth flow of processes and procedures with the ultimate goal of achieving efficiency and effectiveness. Linderman et al, (2003) argue that combination of Six Sigma and Lean can be successful if built on a DMAIC cycle (Define, Measure, Analyze, Improve and Control) the five stages of Lean Six Sigma practice. It is useful in an existing process as an improvement tool. Paulo and Mary (2014) argue that where as Six Sigma is a statistical tool which

concentrates its application in DMAIC cycle its combination with Lean usually enables a company to stay focused in shading light on the critical areas of operation that the company needs to improve on.

Six Sigma methodology has been complimented by a number of Lean principles. These principles include, Value Stream Mapping, the 5S, Poka Yoke and Fish bone diagram. Value Stream Mapping (VSM) is an economic sustainability tool aimed at reducing no-value adding activities and waiting time in a process. In the analyze phase of the DMAIC cycle, VSM is used to direct the flow of materials and information and categorize activities in order of priority. Poka Yoke is a Japanese's word meaning mistake proofing. It is aids in DMAIC cycle of a newly introduced procedure in operations. It is essential in new products development. The 5S is an acronym for Sort (Seiri), Set in order (Seiton), Shine ( Seiso), Standardize (Seiketsu) and Sustain (Shitsuke). This principle ensures that work place is kept orderly to enhance efficiency. The Cause and Effect diagram is a principle of identifying and eliminating bottlenecks in a process.

According to Tony (2006), Lean and Six Sigma strengthen each other since each philosophy has unique features and approach which strengthen the applicability of each other. Whereas the Six Sigma philosophy is all about the customer, it means other factors of consideration held constant including costs of improving quality to fit customer satisfaction, the lean philosophy on the other hand reminds the managers and employees that minimization of waste is the key including cost minimization.

### **1.1.2 Operational Performance**

Operations performance can be termed as measurement against predetermined indices of effectiveness, efficiency and operational performance which outlines such in time cycle, waste reduction, regulations agreement, and productivity. Poor results are largely associated with the firm's inability to continuously improve its procedures and processes. Operations

performance is usually and serviced by objectives. According to Slack et al, (2004), there are five major operational objectives that are mostly applicable in operations which include speed, cost, quality, flexibility and dependability. The operational performance objective is about production of goods and services that satisfy customer needs which is a measure of effectiveness, maximization of resources which is a measure of efficiency, ensuring that products conform to pre-set quality specifications, reduction of lead time, enhance capacity utilization and cost minimization. These objectives are combined with continuous improvement tools and techniques such as Lean and Six Sigma to enhance realization (Hill, 2000).

Over the years performance measurement has been deemed to be supported by three main objectives which is to ensure attainment of performance goals, appraise, manage and enhance steps and processes, benchmark and assess the performance of different organizations, teams and individuals. The theory of financial measure brought forward by Walters (1997) who is majorly acknowledged as one of the pioneers of financial performance measurement. He initiated financial ratios to facilitate financial measurement. However, throughout 1970s, 80s, and 90s a number of authors have sighted discrepancies with previous performance measurements of 19<sup>th</sup> century such as accounting based performance measurements. According to Hill and McAdam, (2004) profits is not the best measure of performance but it is a though it can be relevant in performance measurement. Over the years, performance measurement has now moved to quality and customer satisfaction through establishment and implementation of the best practices such as Lean Six Sigma. A more recent concept of performance has emphasized on operational performance as part and parcel of performance measurement.

### **1.1.3 Microfinance Institutions in Kenya**

Central Bank of Kenya (CBK) which regulates the financial sector in Kenya that consist of the; Commercial banks, SACCOs and societies, non-bank financial institutions, mortgage finance institutions, insurance, building societies, capital markets, forex bureaus, pension schemes and microfinance institutions (MFI) which are further grouped as deposit taking and non-deposit taking MFIs. The main goal of Microfinance Act is business creation and control of banks and microfinance institutions in Kenya constitutionally. The Association of Microfinance Institutions (AMFI) was registered in 1999 under the Societies Act by the leading MFIs in Kenya to build volumes for the microfinance industry. AMFI currently has 59 member institutions and serves a large number of marginalized families especially of low earnings with monetary services ([www.amfi.co.ke](http://www.amfi.co.ke))

According to Association of Microfinance Institutions Report (2013/2014), the last decades or so has seen a tremendous growth of MFIs and this has been attributed to high demand for credit facilities by small business commonly known as SMEs who as a result of their fragmented nature of their finance sources find it difficult to secure credit from commercial banks. Their development and growth revolve around formal and informal groups usually known as chamas. The financier of such chamas who are mainly NGOs and individual contributions saw a niche in the financial sector and designed a financial product that give and take from a pool of the chamas savings. The fast establishment of MFIs in the financial sector has seen major banks in Kenya re-strategizing to maintain their market share.

### **1.2 Research Problem**

Lean Six Sigma is not a new idea. The blend has been discussed by scholars in depth for decades. The available literature provides a wide range of evidence of the use and realization of Lean Six sigma successes as continuous improvement tools. This has been advocated by a number of scholars who have viewed the concept from different perspectives. The application



of LSS is more depended on managerial support (Cusumano, 1994; Kotter, 1995). These two concepts must complement each other with lean as the philosophy to change should be driven by six sigma's desire for effectiveness and efficiency. Lean Six Sigma (LSS) should never be implemented separately. According to Smith, (2003) implementing the concepts separately lead to competition for resources thus deviating from the set objectives.

Microfinance institutions (MFI) having been the latest entrants flooding the financial sector in Kenya have been keen on solidifying their position in a tough and competitive financial sector. MFI takes much of the required space within the financial sector by offering significant amount of loans to clientele who cannot access conventional banking loan services. The current literature shows that financial intermediation by government and donors has been the only way to offer financial services to the low income earners, (Robinson. M. S, 2001). The desired results of MFIs are higher where service quality to customers is good which is usually associated with continuous improvement on operations of such MFIs. Inadequate details about clients affects MFIs focus that is significant for designing financial products that suit low income earners. The knowledge level of the customers result to unawareness concerning the priorities of their business and that of their personal needs thus resulting to irregular cash flows which in the end affect operations and growth of the MFIs. Although the significance of microfinance institutions as a way of eradicating poverty, majority of them face challenges of survival. Schmidt and Zeitiger (2003) argue that, microfinance institutions need to be stable financially so as to sustain its operations.

Several studies have been done on Lean Six Sigma. According to Kholopane, (2016) Lean Six Sigma is a tool that has led in reduction of obsolete stock and control of inventory in manufacturing imply that every year millions of South Africa Rand worth of products losses is usually associated with poor operational practices. Ndaita et al, 2015 studied Lean Six

Sigma implementation at National Bank of Kenya. The focus was on the five stages of LSS implantation on which the bank had based the concept namely: initiation, deployment, implementation, expansion and sustainability. There exists a gap on LSS effect on operational performance on MFIs in Kenya leading to limitation of in-depth information of our understanding of LSS. Most of the studies focus much on implementation and not much attention has been placed on operations performance. The research study was to show the relationship between Lean Six Sigma and operational performance of MFIs in Kenya.

### **1.3 Research Objective**

The study objective was to determine the effect of Lean Six Sigma on operational performance of microfinance institutions in Kenya

### **1.4 Value of the Study**

Operations management play a fundamental role in coordination of all processes, procedures and people in transformation of inputs to outputs that give value to end users. This study would be valuable to all operational managers in all the sectors of the economy to aim at achieving a long lasting relationship that improve performance by implementing Lean Six Sigma as continuous improvement method among the many other contemporary tools of improvement.

The findings of the research will assist other researchers understand more on relationship between Lean Six Sigma and operational performance. The study also adds more theory to the existing literature as a source of reference to scholars and academicians and also provide gap that forms the basis for further study in the future

The government and policy makers would use the study to evaluate their policies which would enhance conducive environment for microfinance institutions registered and operating

within Kenya encourage growth of many Microfinance institutions given the role they play in economy and living stands of the low income earners.

## **CHAPTER TWO : LITERATURE REVIEW**

### **2.1 Introduction**

This chapter investigated various aspects of theories associated with Lean Six Sigma methodologies and provided clarifications to the connection between selected qualities of Lean Six Sigma and operational performance. It further studied the earlier empirical research work in this area of the study and was followed by the explanation of variables in the analysis model before making remarkable conclusion.

### **2.2 Theoretical Review**

Various theories were reviewed which include the theory of constraints, organizational learning and resource dependency theoretical structures have been studied to find out whether there will be a relationship between Lean Six Sigma and operational performance of microfinance institutions.

#### **2.2.1 Theory of Constraints**

The theory has been credited to Goldratt which forms the basis of his first scholarly work and hence his first book 'The Goal'. The theory focuses on system improvement. It is a chain philosophy of interdependent chains working together for the same goal. The main understanding of Theory of Constraints (TOC), is that majority of organizations usually has at least a limitation that makes it impossible for the management to achieve the organization goals.

TOC creates a set of a system of methods and principles to identify and improve on the limitations. This system has been described as a general rule for the application of TOC to various sections of operations such as production, distribution, project scheduling and control (Sheu et al, 2003). TOC consists of five steps of continuous improvement namely; identification of the constraint, exploitation of the constraint, subordination of other activities

to constraint and elevation of the constraint. The implementation of these steps can improve operations substantially since constraints usually limit organizations ability to continuously improve its operations.

### **2.2.2 Theory Resource Dependency**

This describes how the resources outside an organization influence their behavior. The theory argues that for organizations to continue existing, a firm must obtain resources. Pfeffer and Salancik, (1978) argue that where and how to acquire resources is an important decision that management should make. Resources are vital capabilities which include various assets, processes, information and knowledge which contribute to efficiency and effectiveness.

According to Vitali (2010), Resource dependency may act on advantage or disadvantage to organizations ability. This means that resource allocation may lead to conflict between stakeholders as in many cases the management would not be keen on such influences. In order for an organization to survive in the eternal environment, there must be an interaction and negotiations between the organization and the external environment.

### **2.2.3 Theory of Organizational Learning**

Organizational Learning operationary has been defined by Nelson and Dowling (2008) as a process of generating, obtaining and passing knowledge followed by change of behavior. OL has five branches of knowledge which include; knowledge of skill (aspirations and formulation of mental pictures), shared image of the future (discipline of reflection and skills), shared vision (discipline of mutual purpose), group learning (collective thinking) and systems thinking (understanding of change).

Organizational learning depends on firm's capability and how they are utilized. Organizational learning influences development and growth of organization by improving operations. Zollo and Winter (2002) states that organizational process change over time and

need to be modified and evaluated to suit the needs with the changing organization. Continuous learning of the organization results in building up of organizational.

### **2.3 Lean Six Sigma Implementation practices**

Thompson et al. (2004) describe implementation process as an internal driven activity. Lean Six Sigma is facilitated by practices which are built upon the organizational goals and objectives.

#### **2.3.1 Customer Focus**

An organization needs a shared direction through which goals are achieved by focusing on customer. Understanding of customer needs to and create value is a step to creating lasting relationship. Building strong relationships with a customer have a positive influence on exchange. Kotter (1996) state that creation of strong relationships enhances lasting relationship with customers. Companies create customer based sales units so as to cater for coordinative needs which are brought about by specialization. Over the years, initiatives such as Total Quality Management (TQM) were aimed at not only building a lasting relationship with customers but also strengthening relationship with the suppliers and other business partners along the supply chain.

#### **2.3.2 Organizational Flexibility**

Flexibility is the capability of an organization to proactively appreciate change at the right time. Organization is a set of agreed unit comprising of interdependent and coordinated units. Flexibility is the organizations ability to adapt to change. The more organized and interdependent a section of people is the more the more challenging it is to appreciate change. Farson (1996) noted that organizations that transform to change are more likely to develop survival capabilities.

Organizations adapt by surviving calamities. Flexibility enhances organization to adapt to complex situations by freely interacting in all the levels of management. Under complexity theory, Beinhocker, (1997, 1999) suggests significant components of complicated adaptive theory. It suggests that new skills and ideas by managers usually replace traditional ideas of management and make it difficult for them to make decisions. To carefully tackle complex situations, managers need to choose new ideas that fit the organization capabilities.

### **2.3.3 Organizational leadership**

Leadership is crucial part of implementation process. Leadership may be defined in relation to the concept of Lean Six Sigma implementation as a form of direct or indirect influence over formal programs, structural systems and structural forms. Organizations have duty for significant activities or units, where the units are accredited to resolve issues that were initially made by individual managers. Lean six sigma implementation cannot be complete without the ‘champions’. Champions are the Six Sigma gurus who have gained skills over time by climbing ladder from level one to six. Six Sigma certification is the process that give rise to a Six sigma champion after undergoing the training.

A champion perceives the concept of Six Sigma management but does not yet have skills to act as an active Six Sigma project team member. Executives in Six Sigma act as champions of Six Sigma projects and are assigned significant roles as leaders of project (De Koning, 2010).

### **2.3.4 Organization Culture**

Uttal (1983) regard culture as a set of shared values and beliefs that interact with people structures, systems and organizations to produce acceptable way of doing things. Culture in many cases is referred as the software that managers need to understand so as to be able to analyze the functionality of the organization. Implementing of the Lean Six Sigma Culture

plays a vital role in as employees incorporate the new ideas with the existing culture. A rigid culture that does not give a room for change should be abolished to encourage adaptation of new ideas.

Hofstede (1997) argue that culture impact the way people face situations. Senge et al (1999), state that organization culture is realized when employees create a sense of identity by committing to the organization and engaging each other positively to create a shared culture which they usually pass to new employees.

#### **2.4 Lean Six Sigma and Operational Performance**

Organizations are successful through interrelated network of people, technology and processes. The strength of the organization growth depends with organization behavior changes and use of action plan to increase output and organizational desired results. Lean Six Sigma presents its benefits as a compliment apply with other less practical methods when inventions are required to improve organizational operations (Tony, 2006). Understanding for the processes makes it possible for the organization to be able to visualize the processes and the improvements to be made and the associated risks. Jenkins et al, (2007) state that a company need to create resources to increase strength of the organization. It is an operations ability to enhance value and develop value it adds to be competitive. For a company to undertake Lean Six Sigma as means to achieve high performance the company should develop a distinct mix of resources and expertise that offer advantages of Lean Six Sigma. Lean Six Sigma approach also need a company to focus on competency based approach since the company requires core competencies and skills required for some specific activities in order to attain competency. Huq, (2006) argue that these competencies are both corporate and individual competencies. Individual skills include the practical knowledge and personality of the Lean Six Sigma trainers thus facilitating the LSS deployment and certification as either



black belts or master black belts. Corporate capabilities include aggregate of experiences and know how that enables an organization to execute change.

## **2.5 Empirical Review**

Process decisions must be made in organizations that impact the organization internally and externally. The mix of the decisions to be made encompass all the aspects of the organization thus the need to constantly evaluate the best practices to be implemented to achieve organizational goals and objectives. Lean Six Sigma enables organizations to achieve these goals and objectives by continuously improving their operations. Ndaita et al (2015) argue that there is significant effect in implementation of Lean Six Sigma on operational performance. The study also indicate that LSS methodology can only work in some organization thus it is not advisable to generalize the study implications to other organizations. Dahgaard & Dahgaard-Park, (2006) argue that LSS works well when the two are not implemented in isolation as this may lead to loss of focus and drain resources. Bendel, (2006) argue that there may rise conflicts in implementation of LSS stating that the use of lean principles to eliminate waste in a process in a Six Sigma phase need controls to eliminate barriers.

## **2.6 Summary of Literature Review**

Previous studies on the concept of lean six sigma has concentrated on the Lean Six Sigma application in manufacturing sector like Toyota, Motorola, General electric and others. However, with dynamic nature of the needs of the society, these tools have been applied in the service sector which according to world banks report of 2016, forms about 66 % of the economy in most parts of the world. Whereas most of research work in the financial sector now focuses in Lean Six Sigma or Six Sigma implementation in financial sector, none has shade light on the operations of the microfinance sector in Kenya.

Lean Six Sigma is an important tool for measuring continuous improvement and can be supported by various continuous improvement tools and techniques. Such improvement tools and techniques are particularly important within certain improvement activities such as TQM, organizational learning and knowledge management as the basis for improvement. Ayon and Michael (2013) discussed in depth Six Sigma application in financial services. Their work revolves around the key success stories of Six Sigma methodology on a TQM framework. This study will focus on the lean six sigma implementation in microfinance sector in Kenya to fill the gap.

## 2.7 Conceptual Framework

**Figure 2.1 Conceptual Framework**

**Independent variable**

**Dependent variable**

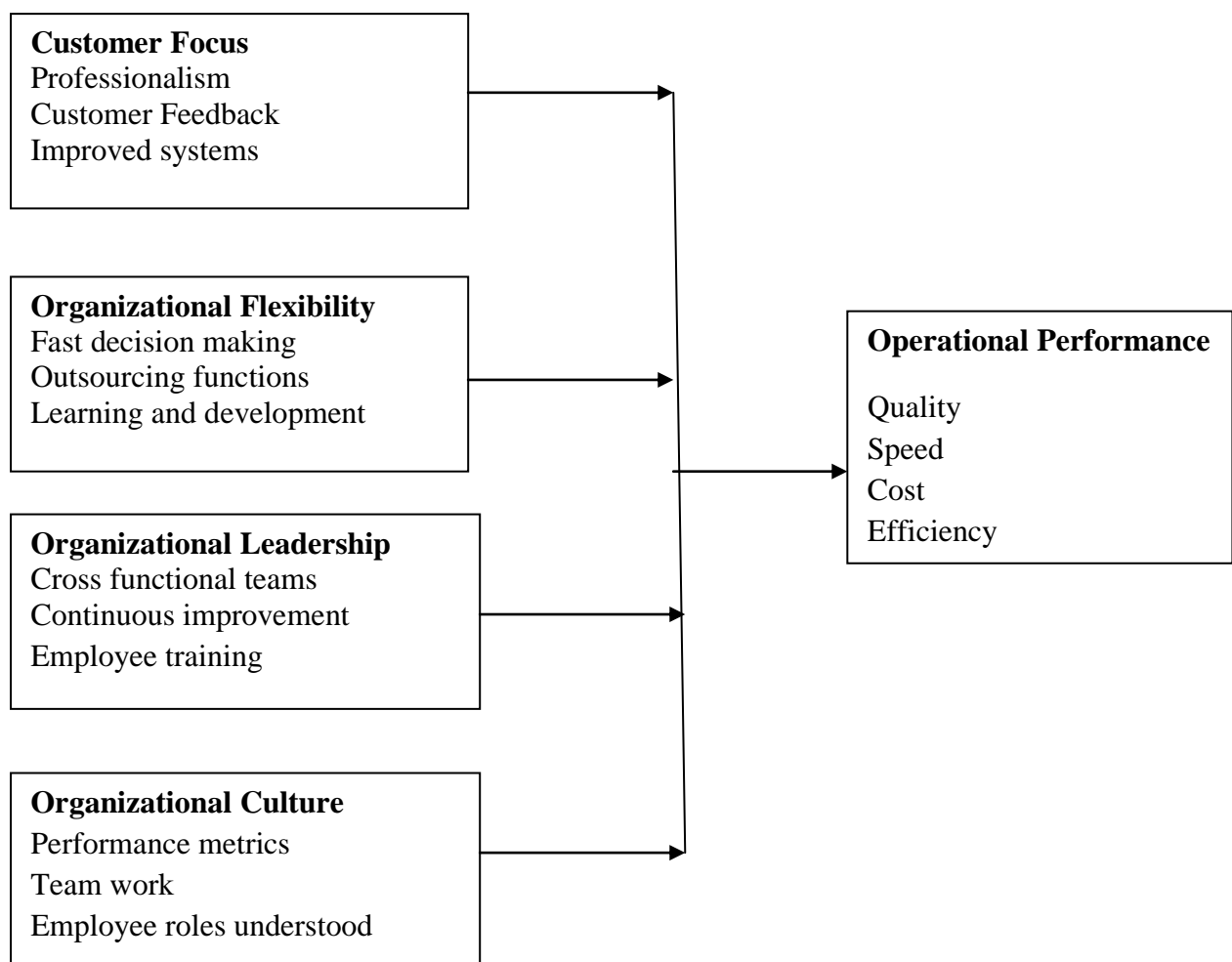


Figure 2.1 above shows the independent variables Customer focus, Organizational flexibility, Organizational leadership and Organizational culture as Lean Six Sigma practices and how they affect operational performance.

## **CHAPTER THREE : RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter outlines in details the steps and approaches used in research study execution. It consists of research design, population of the study and population, data collection methods and data analysis instruments

### **3.2 Research Design**

The research study was of a survey design. A census was conducted among microfinance institutions for in-depth understanding of the phenomena under study. It was used due to its ability in defining phenomenon that differ in one single characteristic. Research design is the map that help understand the study so as to obtain answers to research questions. It helps to understand the problem and set of actions required to analyze the relationships

### **3.3 Population of the Study**

The study used a poll of all 51 licensed microfinance institutions in Kenya that is both banking and non-microfinance institutions in Kenya according to the report of Association of Microfinance Institutions of Kenya 2017

### **3.4 Data Collection**

To collect primary data a semi structured questionnaire was used. It was chosen since it was easy to administer and provided variety of responses which assisted the researcher to make informed judgment. The pick and drop method of administering was used so as to enable the respondents to fill the questionnaire by themselves at their own convenience. It was to be filled by the operational managers or equivalents as they oversee day to day operations of the company. The questionnaire addressed and provided general information to the study question. Part A addressed the general information, part B addressed six sigma information (variable X) and part C addressed the operational performance (variable Y).

### 3.5 Data Analysis

A correlation and multiple regression was applied on data generated through field work. Correlation and regression models were used since they enabled the researcher to measure the strength of the relationship between variables of the study. Regression analysis was used for individual operations performance measures (dependent variable) against the lean six sigma techniques (independent variable). A regression was done to evaluate the overall relationship between lean six sigma implementation and operations performance.

Regression model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots \text{Equation 3.1}$$

Where

Y= Operational performance

$\epsilon$ = error term which captures all the model issues not addressed by the four variables.

The model captured the following independent variables

Customer Focus ( $X_1$ ), Organizational Flexibility( $X_2$ ), Organizational Leadership ( $X_3$ ) and Organizational Culture ( $X_4$ ). The dependent variable for this study was operational performance (Y). The contribution of or weight of each independent variable was measured using beta coefficient  $\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$  which capture the change in Y when the respective variables change by one unit.

## **CHAPTER FOUR: DATA ANALYSIS AND FINDINGS**

### **4.1 Introduction**

This research investigated the effect of lean six sigma on operational performance implementation in micro-finance institutions in Kenya. This chapter presented findings from the data analysis in line with the research objectives. The findings were presented in tables and figures.

### **4.2 Response Rate**

The study was conducted on all 51 licensed microfinance institutions in Kenya. These consisted deposit taking and non-deposit taking microfinance institutions in Kenya. Out of the 51 questionnaires administered 36 were returned which represented 71.5%, this was deemed fit for the study, a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. According on the assertion, the response rate was considered to be remarkable.

### **4.3 General Information**

The respondents were characterized by the name of the company, their position in the company and years of experience. This particular information enabled to establish the popularity of the products that MFIs offer, the skills and experience of the respondents which shade light on whether the MFIs employ the Lean Six Sigma practices and if they did, the popular Lean Six Sigma method they employed. The position in the company and years of experience was used to establish the adoption rate of Lean Six Sigma practices and challenges facing implementation in microfinance operations in Kenya. The respondents were mainly from operations department. The position in company highlighted challenges that microfinance institutions face in implementation of Lean Six Sigma.

### 4.3.1 Position in the Company

The results of the research data indicated that the operations managers formed the highest response of 54 percent as they oversee day to day operations of the financial institutions followed by the relationship managers with 33 percent and finally the bank clerks with 13%

**Table 4.1 Position in the Company**

	Frequency	Percent	Valid percent	Cumulative percent
Operations managers	35	54	54.0	54.0
Relationship managers	24	33	33.0	87.0
Clerical officers	34	13	13.0	100.0
TOTAL	93	100	100	

### 4.3.2 Core Products

The results of the research data indicate that loans are the most popular product in all the MFIs with 42 percent response rate followed by savings with 40 percent, asset financing with 18 percent lastly other products such as banc assurance and other newly developed products.

**Table 4.2 Core products**

	Frequency	Percent	Valid percent	Cumulative percent
Loans	24	42.0	42.0	42.0
Savings	10	40.0	40.0	62.0
Asset financing	6	18.0	18.0	80.0
Other	4	12.0	10.0	100.0
TOTAL	44	100.0	100.0	

### 4.3.3 Number of Branches

The researcher gathered data from 37 branches of different microfinance institutions spread across the country. The analysis of the data was categorized into different geographical regions namely; Coast, Central, Western and Northern Kenya.

The response indicated that Central Kenya had the highest number of microfinance branches with 42 percent, followed by Coast with 38 percent, Western with 7 percent and lastly North Kenya with 3 percent.

**Table 4.3 Number of Branches**

	Frequency	Percent	Valid percent	Cumulative percent
Central Kenya	15	42.0	42.0	42.0
Coast	12	38.0	38.0	80.0
Western	6	17.0	17.0	97.0
North Eastern	4	3.0	3.0	100.0
TOTAL	37	100.0	100.0	

### 4.3.4 Respondents years of experience

The respondents filled in the duration of time they have been working for the MFIs. From the data collected, majority have been employed for MFIs for about 6-10 years which is the highest with 43 percent, followed by those who have worked for less than five years with 37 percent. Those with a lot of experience had 11-15 years of experience with 12% followed by those above 16 years with 8 percent.



**Table 4.4 Years of experience**

percent	Frequency	Percent	Valid percent	Cumulative
Less than 5 years	13	37.0	37.0	37.0
6-10 years	18	43.0	43.0	80.0
11-15 years	8	12.0	12.0	92.0
Above 16 years	5	8.0	8.0	100.0
TOTAL	43	100.0	100.0	

#### **4.4 Diagnostic Tests of the Study Variables**

The data was subjected to various diagnostic tests before the analysis so as to enable subsequent analyses.

##### **4.4.1 Tests for Normality**

Procedures such as analysis of variance (ANOVA), Discriminant analysis, linear regression, Pearson correlation, F-Test and T-test usually entails that the dependent variable is precisely normally distributed for each independent variable (Razali & Wah, 2011). Normality tests can be measured using the Skewness and Kurtosis Z-values which should be in the span of -1.96 to +1.96. Skewness and Kurtosis was used in this study.

**Table 4.5 Skewness and Kurtosis Measure Results**

	Statistic	Std. Error
Mean	3.8333	.10541
95% Confidence Interval for Mean	Lower Bound 3.5624	
	Upper Bound 4.1043	
5% Trimmed Mean	3.8426	
Median	4.0000	
Variance	.067	
Std. Deviation	.25820	
Minimum	3.50	
Maximum	4.00	
Range	.50	
Interquartile Range	.50	
Skewness	-.968	.845
Kurtosis	-1.875	1.741

Table 4.3 shows measure of skewness -0.968 (SE 0.845) and Kurtosis measure of -1.875 (SE 1.741) the values for skewness and Kurtosis are all within the span of -1.96 to 1.96. This shows a little skewed and kurtotic and it does not differ considerably from normality. Hence we can assume that the data is approximately normally distributed in terms of skewness and kurtosis.

#### **4.4.2 Reliability Test**

Cronbach's alpha test was used for reliability test. It is used to measure closeness of a group of components. The Cronbach's alpha values for this research are as indicated in Table 4.4. Cronbach (1951) argued that in most social science research situations a reliability coefficient of 0.70 is considered "acceptable"

**Table 4.6 Cronbach Alpha for the Study Variables**

<b>Variable</b>	<b>Cronbach Alpha</b>
Operational Performance	.793
Customer Focus	.791
Organizational Flexibility	.733
Organizational Leadership	.838
Organizational Culture	.810
<b>Total</b>	<b>.793</b>

All the values of the Cronbach's Alpha were all greater than 0.70 and hence the instrument of research was considered being reliable to be used in the study. This is because the findings reveal that most of the elements have relatively high internal consistency.

#### **4.5 Descriptive Analysis of Lean Six-Sigma Practices**

The respondents indicated the level at which their organizations had implemented LSS practice. This was measured on a scale of 1-5 where 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Moderately Agree and 5=Strongly Agree Results are shown in the various tables in the subsections below.

##### **4.5.1 Customer Focus**

Improvement of systems to enhance customer satisfaction had the highest mean of 4.11 implying it was the most preferred amongst customer focus and shows it was moderately agreed that systems were improved. The standard deviation .667 was the least which shows that it was the nearest to the overall mean. Quick response to customer complaints was the second with a mean of 4.08, this indicated that it was moderately agreed hence there was quick response and its standard deviation however was the second largest meaning it was the second farthest from the overall mean. The overall mean of 3.93 shows that all the micro-

finances in Kenya agreed that customer focus as a practice of lean six sigma was implemented. The various practices under customer focus were analyzed and the subsequent descriptive statistics were tabulated below.

**Table 4.7 Customer Focus**

<b>Customer Focus</b>	<b>Mean</b>	<b>Standard Deviation</b>
Systems have been improved to enhance customer satisfaction	4.11	.667
There is quick response to customer complaints	4.08	.806
There is quality in the services	3.92	.649
Customers are handled professionally	3.86	.683
Customer feedback is highly regarded	3.69	1.037
<b>Overall Mean</b>	<b>3.93</b>	

#### **4.5.2 Organizational Flexibility**

The organization having clear set goals had the highest mean of 4.14 implying that most micro-finance organizations moderately agreed that this practice was implemented towards organizational flexibility. Its standard deviation of .762 was the third smallest meaning that it was the third nearest to the overall mean. Next, is fast managerial decision, with a mean of 4.08, most moderately agreed the presence of this practice. The standard deviation of .732 meant that it was the second smallest implying that this practice was the second nearest to the overall mean. Generally, the overall mean of 3.96 implies that organizational flexibility as a practice in Lean Six Sigma was generally agreed in all Kenya Micro-finance institutions. The various practices under organizational flexibility were analyzed and the subsequent descriptive statistics were tabulated below;

**Table 4.8 Organizational Flexibility**

<b>Organizational Flexibility</b>	<b>Mean</b>	<b>Std. Deviation</b>
My organization has clear set goals	4.14	.762
Managerial decision making is fast	4.08	.732
My organization is open and supportive to new ideas	3.97	.696
Learning and development is encouraged	3.86	.899
Most of the functions are outsourced	3.75	1.052
<b>Overall Mean</b>	<b>3.96</b>	

#### **4.5.3 Organizational Leadership**

Under Organizational Leadership, the process matching the skills had the highest mean of 4.31 hence the most preferred of the practices. This also indication it was moderately agreed that this practice was done in the institutions. However, its standard deviation of .951 was the largest implying that it was the farthest from the overall mean. Secondly, fast management response had the second highest mean of 4.25 implying it was the second most preferred of the practices. This also means that it was moderately agreed that this practice was done in the institutions. Its standard deviation however, of .806 was the second smallest implying that it was the second nearest to the overall mean. Thirdly, employees being versed with continuous improvement tools had the third highest mean of 4.11, the third most preferred practice. This also means that it was moderately agreed that this practice was done in the institutions. The standard deviation of .919 was the second largest thus the second farthest from the overall

mean. Generally, the overall mean of 4.00 showed that organizational leadership was moderately agreed as a practice that was implemented towards Lean Six Sigma in all Kenya Micro-finance institutions. The various practices under organizational leadership were analyzed and the subsequent descriptive statistics were tabulated below;

**Table 4.9 Organizational Leadership**

<b>Organizational Leadership</b>	<b>Mean</b>	<b>Std. Deviation</b>
The processes match the skills	4.31	.951
Management response is very fast	4.25	.806
Employees are well versed with continuous improvement tools	4.11	.919
Cross-functional teams have been set to evaluate performance	4.06	.826
Employees are trained on continuous improvement	3.67	.756
Managers encourage employee to work unsupervised	3.58	.906
<b>Overall Mean</b>	<b>4.00</b>	

#### **4.5.4 Organizational Culture**

On organizational culture, setting of performance metrics and targets had the highest mean of 4.31, implying that this practice was moderately agreed by most micro-finance institutions. This practice was the most preferred amongst all in organizational culture. Its standard deviation of .856 was the third smallest hence third nearest to the overall mean. Feedback is highly regarded had the second highest mean with a value of 4.25, implying that this practice was moderately agreed by most micro-finance institutions. This practice was the second most preferred in organizational culture. Its standard deviation of .732 was the second smallest and

thereby the second nearest to the overall mean. The general overall mean of 3.92 indicate that organizational flexibility as a practice was agreed as having been implemented towards Lean Six Sigma in all Kenya Micro-finance institutions. The various practices under organizational culture were analyzed and the subsequent descriptive statistics were tabulated below;

**Table 4.10 Organizational Culture**

<b>Organizational Culture</b>	<b>Mean</b>	<b>Std. Deviation</b>
This company has set performance metrics and targets	4.31	.856
Feedback is highly regarded	4.25	.732
My organization value team work	3.75	.906
Employees understand their roles	3.69	1.009
Continuous improvement culture is the pillar of the organizations values	3.61	.645
<b>Overall Mean</b>	<b>3.92</b>	

#### 4.6 Multiple Regression Analysis

The model used in this study is

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots \text{Equation 4.1}$$

#### 4.6.1 Correlation of the Study Variables

The Pearson Correlation coefficient was used to test the strength of the association between variables. The task is one of quantifying the strength of the association and direction of the variables. This is shown in Table 4.11 below;

**Table 4.11 Correlation of the Study Variables**

Variable	Pearson Correlation	Sig.(2 tailed)
Operational Performance	1	
Customer Focus	.771	.000
Organizational Flexibility	.268	.115
Organizational Leadership	.400	.016
Organizational Culture	.695	.000

As shown in Table 4.7, there was a positive relationship between operational performance and customer focus, organizational flexibility, organizational leadership and organizational culture. This implies that as these variables change (increase or decrease), operational performance changes in a similar direction. Overall, the differences between the dependent and independent variables lie in the strength of the relationships. This study assessed the significance of the relationship as well as its strength where the smaller the p-level, the more significant the relationship. The results show most of the independent variables had a strong and significant relationship with operational performance ( $p < 0.05$ ). Organizational Flexibility had an insignificant relationship with a p-value of .115.



#### 4.7 Regression Analysis of the Study Variables

After the correlation, the regression analysis was conducted to reveal the linearity of the relationship between the study dependent and the independent variables. The results were tabulated and discussed as shown in the subsections here-below

##### 4.7.1 Multiple Regression Model Summary

Table 4.12 shows the coefficient of determination  $R^2$  as .538. The value of R-square implies that 53.8 percent of the total variance of operational performance is explained by the model. This means that 46.2 percent of the total variance of operational performance cannot be explained by the model. Hence the results reveal that the independent variables are key determinants of operational performance among micro-finance institutions. The Table 4.12 below shows the results for variations between the dependent and independent variables.

**Table 4.12 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733 <sup>a</sup>	.538	.478	.28639

a. Predictors: (Constant), Organizational Culture, Customer Focus, Organizational Leadership, Organizational Flexibility

b. Dependent Variable: Operational Performance

##### 4.7.2 Coefficients of the Regression Model

The co-efficient of the regression model were obtained from the analysis and presented as below

**Table 4.13 Coefficients of the Regression Model**

Model	Unstandardized		Standardized	t	Sig.
	Coefficients				
	B	Std. Error	Beta		
(Constant)	.966	.422		2.286	.029
Customer Focus	.296	.124	.481	2.388	.023
Organizational Flexibility	.136	.171	.190	.800	.430
Organizational Leadership	.029	.102	.045	.281	.780
Organizational Culture	.102	.110	.139	.932	.359

The regression equation is as shown below

$$Y=0.966+0.296X_1+0.136X_2+0.029X_3+0.102X_4..... \text{Equation 4.2}$$

When the independent variables are all zeros, this means that operational performance will be at 0.966 units. When customer focus adds by one unit, operational performance adds by 0.296 units. When organizational flexibility increases by one unit, the operational performance increases by 0.136 units. When organizational leadership increases by one unit, operational performance increases by 0.029 units and finally when organizational culture increases by one-unit operational performance increases by 0.102.

### 4.7.3 Variance Analysis

The table below clearly shows that the ratio of regression to residuals is positive, implying there was a significant relationship between the dependent and independent variables used in the study. From the ANOVA above, it was established that Organizational Culture, Customer Focus, Organizational Leadership, Organizational Flexibility affected Operational performance, since  $0.000 < 0.05$  at 5 percent level of significance. Therefore the null

hypothesis is unaccepted and the other option of hypothesis is accepted. This implies that lean six sigma practices influenced operational performance for Micro-finance institutions in Kenya.

The ANOVA table was generated from the Analysis and is as below;

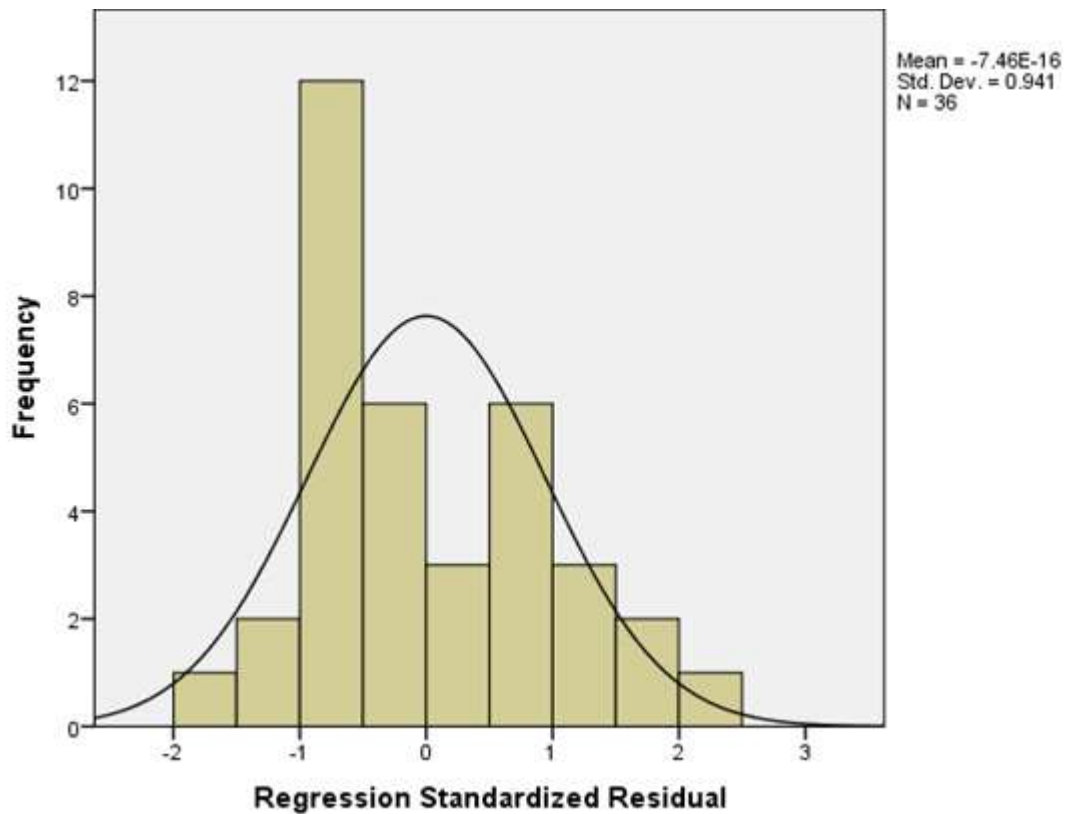
**Table 4.14 Variance Analysis**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.958	4	.739	9.015	.000 <sup>b</sup>
Residual	2.543	31	.082		
Total	5.500	35			

a. Dependent Variable: Operational Performance  
b. Predictors: (Constant), Organizational Culture, Customer Focus, Organizational Leadership, Organizational Flexibility

A histogram for the regression residuals was generated and is shown in Figure 4.1 below with a plot of residuals against prediction of operational performance. The plot shown here show no problems with the assumption that the residuals are normally distributed at each level of operational performance and constant in variance across levels of operational performance.

**Figure 4.1 Histogram of Regression Residuals**



4.8

#### Challenges of Implementing Lean Six Sigma Practices

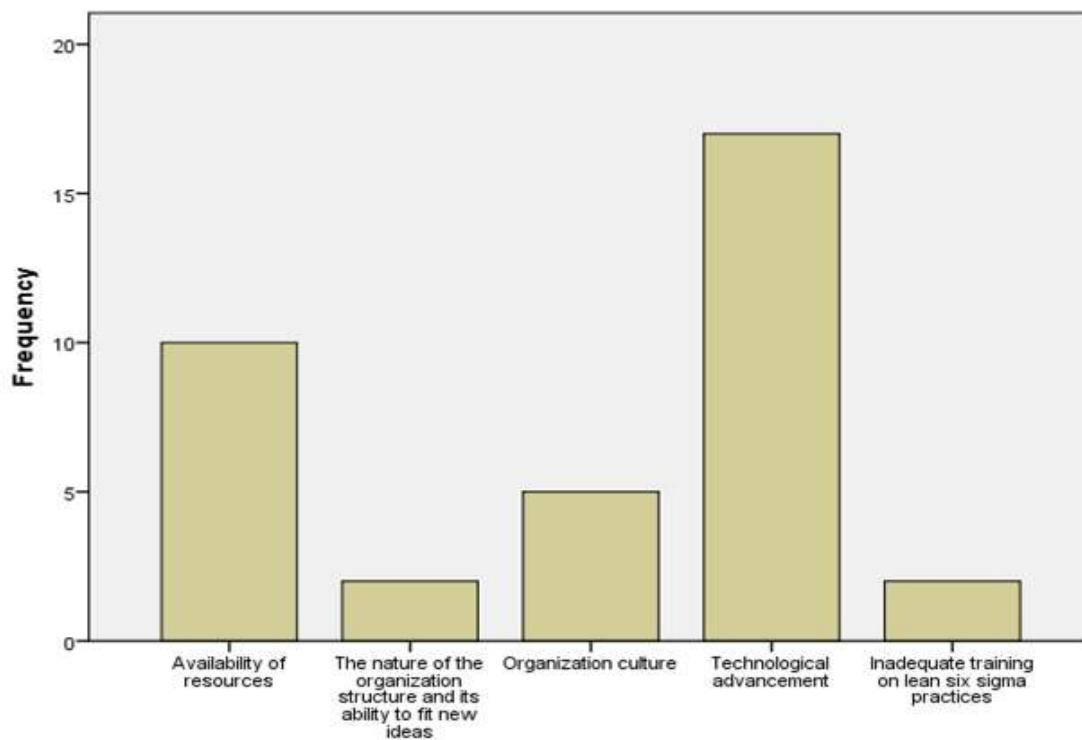
The respondents were asked to tick against the threats that they agree they were facing in the implementation of the Lean Six Sigma practices; the challenges were resources availability, the level of management support and leadership, the nature of the organization structure and its ability to fit new ideas, Communication barriers, Organization culture, Technological advancement, Complication of the lean six sigma tools and techniques and Inadequate guiding on lean six sigma practices. Three challenges were not answered to, these are the level of management support and leadership, communication barriers and complication of the lean six sigma tools and techniques. The rest were tabulated as below;

**Table 4.15 Challenges of Implementing Lean Six Sigma Practices**

Challenges	Frequency	Percentage
Availability of resources	10	27.8
The nature of the organization structure and its ability to fit new ideas	2	5.6
Organization culture	5	13.9
Technological advancement	17	47.2
Inadequate training on lean six sigma practices	2	5.6
<b>Total</b>	<b>36</b>	<b>100.0</b>

Most respondents regarded technological advancement as the greatest challenge, 17 out of 36 said so which is a whopping 47.2%, this was followed by availability of resources which had 10 out of 36 respondents which is 27.8%. Thirdly, organizational culture had 5 out of 36 respondents which represented 13.9%. The rest had 2 each representing a combined total of 11.2%. The same information was represented in a bar chart as shown in figure 4.3 below

**Figure 4.2 Challenges of Implementing Lean Six Sigma Practices**



It can be deduced therefore that the challenges of implementing Lean Six Sigma Practices for the Micro-Finance Institutions in Kenya are as follows in the order of strength; technological advancement, availability of resources, organizational culture, the nature of the organization and its ability to fit new ideas and finally inadequate training on lean six sigma practices.

## **CHAPTER FIVE : SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter discusses the findings of the research study work, conclusions are drawn recommendations and ends by highlighting suggestions and recommendation's for further exploration.

### **5.2 Overview of Findings**

The purpose and objective of the research was to determine effect of lean six sigma implementation on operational performance of MFIs in Kenya. The study was a census of all 51 licensed microfinance institutions in Kenya. Of the 51 questionnaires administered 36 were returned which represented 71.5%, this was considered fit for the study. The data was subjected to various diagnostic tests namely, normality and reliability tests. The questionnaire had an overall Cronbach Alpha of 0.793 > 0.7 an indication that the questionnaire was a reliable tool for the study and it had the internal consistency required. The data was subjected to normality tests and the data was found to be normal. The summary was also divided per independent variable as shown below. Data analysis and interpretation of the questionnaire responses revealed that organizational leadership was the most influential practice on implementation of lean six sigma with a mean of 4.00 though the practice of other Lean Six Sigma practices varied from one microfinance to the other.

The study also wanted to find out the effect of Lean Six Sigma implementation on operational performance of microfinance institutions in Kenya. The study shows a coefficient of correlation of 0.110 meaning that there is a strong relationship between Lean Six Sigma implementation and operational performance, which gave rise to the following equation:

$$Y=0.966 + 0.296X_1 + 0.136X_2 + 0.029X_3 + 0.102X_4..... \text{Equation 4.3}$$

### **5.2.1 Customer Focus**

Improvement of systems to enhance customer satisfaction had a mean of 4.11 meaning it was the most popular amongst customer focus. Quick response to customer complaints had the second highest mean of 4.08, the rest of the factors; quality in service, professional handling of customers and high regard of customer feedback followed in that order of preference. On correlation, customer focus was established to have a positive correlation with operational performance and this relation was significant. The increase in customer focus led to the increase in operational performance. The same is also shown in the regression tables.

### **5.2.2 Organizational Flexibility**

The organization having clear set goals had the highest mean of 4.14 implying that most micro-finance organizations moderately agreed that this practice was implemented towards organizational flexibility. Next, is fast managerial decision, with a mean of 4.08, most moderately agreed the presence of this practice. Generally, the overall mean of 3.96 implies that organizational flexibility as a practice in Lean Six Sigma was generally agreed (implemented) in all Micro-finance institutions. On correlation, organizational flexibility showed a positive correlation with operational performance and this relation was insignificant. The increase in organizational flexibility led to the increase in operational performance. The same is also shown in the regression tables.

### **5.2.3 Organizational Leadership**

For Organizational Leadership, the process matching the skills had a mean of 4.31 hence the most common of the practices. Followed by, fast management response with 4.25 indicating it was the second most preferred of the practices. Generally, the overall mean of 4.00 shows that organizational leadership was moderately agreed as a practice that was implemented towards Lean Six Sigma in all Micro-finance institutions. On correlation, organizational leadership had a positive correlation with operational performance and this relation was



significant. The increase in organizational leadership led to the increase in operational performance. The same is also shown in the regression tables so generated from the analysis.

#### **5.2.4 Organizational Culture**

On organizational culture, setting of performance metrics and targets a mean of 4.31, an indication that this practice was the most preferred amongst all in organizational culture. Feedback is highly regarded had the second highest mean with a value of 4.25, implying that this practice was moderately agreed by most micro-finance institutions. The general overall mean of 3.92 indicate that organizational flexibility as a practice was agreed as having been implemented towards Lean Six Sigma in all Micro-finance institutions. On correlation, organizational culture was established a positive correlation with operational performance and this relation was significant. The increase in organizational culture led to the increase in operational performance. The same is also shown in the regression tables so generated from the analysis.

#### **5.2.5 Effect of Six Sigma Implementation on Performance of Microfinance Institutions in Kenya**

The study found out implementation of six sigma affects the operational performance of microfinance institutions in Kenya. This is in line with Ndaita et al (2015) who got similar results and asserted implementation of lean six sigma significantly impacts the operational performance. All the independent variables (customer focus, organizational flexibility, organizational leadership, and organizational culture) have a positive correlation with dependent variable of the study. This relation is also significant.

#### **5.2.6 Challenges of Lean Six Sigma Practices Implementation.**

There were quite a number of problems in implementing Lean Six Sigma Practices for the Micro-Finance Institutions in Kenya. These are as follows in the order of strength; technological advancement, availability of resources, organizational culture, the nature of the

organization and its ability to fit new ideas and finally inadequate training on lean six sigma practices.

### **5.3 Study Conclusions**

The study concluded that the implementation of lean six sigma affected operational performance of micro-finance institutions in Kenya. The effect however was 53.8% of the total variation. This means that 46.2% of the variation of operational performance was not captured in this study.

### **5.4 Study Recommendations**

Organizational learning according to Nelson and Dowling (2008) is a endless process of developing, acquiring and disseminating knowledge accompanied by change of behavior. This study recommends improvement in adoption and implementation of Lean Six Sigma practices such as customer focus, organizational flexibility, organizational leadership and organization culture amongst others. In a bid to improve the operational performance of the institutions all practices should be adopted. As one or two practices of LSS may not bring out the desired operational performance compared to all practices working in synergy.

### **5.5 Suggestions for Further Research**

More factors could have influenced the operation performance of micro-finance institutions in Kenya; hence a recommendation that these unknown factors be studied to establish what the 46.2% exactly is.

More studies can be done in other jurisdictions to ascertain whether the same or different results may be obtained. The study also recommends that Micro-finance institutions use this results study to guide them in policy making and running their departments affected herein.

## REFERENCES

- Association of Microfinance Institutions of Kenya (2013, 2014) – Reports, Microfinanza Rating.
- Arnheiter, E.D. and Maleyeff, J.I (2005), 'The integration of lean management and six sigma', *The TQM Magazine*, 17 (1), 5-18.
- Ayayi, G. & Sene, M. (2010), 'What drives Microfinance Institutions financial sustainability', *The Journal of Developing Areas*, 44 (1), 303-24.
- Ayon, C. & Michael, L.(2013). *Developing Six Sigma framework. Perspective from financial service companies*. International journal of Quality & Reliability Management, 30(3). Pp.256-279.
- Basu, R. (2010). Six sigma to fit Sigma. IIE Sol, 33. 28-33.
- Berger, A & Mester, L. (1997), Inside the black box: what explains differences in efficiencies of financial institutions? Federal Reserve Bank of Philadelphia, Research Department, working paper, No. 97-1.
- Beinhocker, E. D. (1999). *Robust Adaptive Strategies*. Sloan Management Review
- Business Daily Newspaper, 2016 August 25
- Business Daily Newspaper, 2016 September 5
- Chakraborty, A. & Leyer M. (2013). 'Developing Six Sigma Framework: Perspective from Financial Service Companies', *International journal of Quality & Reliability Management*, 30(3) 256-279.
- Cohen, W.M and Levinthal, D.A. (1990). 'Absorptive Capacity: A New Perspective on Learning Innovation. *Administrative Science Quarterly*, 35, 128-152
- Cusumano, M. A. (1994), 'The limits of lean', Sloan Management Review, 35(4).
- Dalley-Harris, S. (2002). *Pathways out of poverty: Innovations in Microfinance for the poorest families*. (Ed), USA: Kumarian Press, Inc.
- De koning, H. & Donald, J. M. M. (2008). Lean Six Sigma in Financial Services. *International journal, Six Sigma and Competitive Advantage*, 4(1).

- Dettmet, H. (1997), Goldratt's theory of constraints: *A systems approach to continuous improvement*.
- Donaldson, L. (1995). American anti-management theories of organization: *A critique of paradigm proliferation*, Vol. 25. Cambridge University Press.
- Dunphy, D. Turner, D. & Crawford, M (1997), "organizational learning as the creation of corporate competencies", *Journal of Management and Development*, 16, 232.
- Farson, R. (1996). *Management of The Absurd*. New York: Touchstone.
- Goldratt, E. (1994). *The Goal: a process of ongoing improvement* 2<sup>nd</sup> Edition. Great Barrington: North River Process.
- Goldratt, E. (1994). *It's not luck*. Great Barrington: North River Press.
- Goldratt, E. M. & Cox, J. (1992). *The Goal*. The Great Barrington, Mass: The North River Press.
- Harry, M. J. (1986). *The nature of Six Sigma Quality*. Motorola University Press, Motorola Inc, Schaumburg Illinois.
- Hill, T. (2000), *Operations Management- strategic context and managerial analysis*, Macmillan, London.
- Hofstede, G. (1997). *Culture and Organizations: Software of the mind. Intercultural cooperation and its importance for survival*. McGraw-Hill.
- Huq Z. (2006). "Six-sigma implementation through competency based perspective (CBP)" *Journal of Change Management*, 6, 277-289.
- Jenkins, M. Ambrosini, V. & Collier, N. (2007). *Advanced Strategic Management*, Basingstoke: Palgrave.
- Kotter, J. P. (1996). *Leading Change*. Harvard Business Press, Boston, MA.
- Linderman, K. Schroeder G. Zaheer, S & Choo, S. (2003). Six sigma: A goal theoretic perspective. *Journal of Operations Management*, 21(2), 193-203.

- Mugenda & Mugenda, (1999). *Research Methods. Qualitative and Quantitative Approaches.* Nairobi Acts Press.
- Nelson, L. G. & Dowling, P. J (1998). Electricity Industry Reform. A case analysis in Australia. *Journal of Change Management* 11(6) 481-95.
- Ndaita, P. M. Gachie, T. & Kiveu, C. (2015). The implementation of Lean Six Sigma concept at National Bank of Kenya-operation division. *The TQM Journal* 27(6).
- Ondoro, C. & Omena, D. (2012) Effect of microfinance services on the financial empowerment of youth in Migori county, Kenya, *business and management review*, 22(3), 22-35.
- Paulo, A. & Mary, M. (2014). *Benchmarking six sigma implementation in service companies operating in emerging economy*, 4(3) 479-486
- Pfeffer, J. & Salancik, G. (1978). The external control of organizations: a resource dependence perspective. *The external control of organizations: A resource dependency perspective.*
- Ray, K & Sahu, S (1990). *Productivity measurement through multi-criteria Decision Making, Engineering costs and production economics*, 20(2), October, 151-63.
- Robinson, M. S. (2001). *The microfinance Revolution: Sustainable Finance for the Poor.* The World Bank: Washington, D.C.
- Senge, M. Charlotte, R. Rick, R. George, R. Bryan, S. & Art, K. (1999). *The dance of change: The challenges of sustaining momentum in learning organizations.* New York, Currency/ Doubleday. Page 32.
- Shah, A. & Linderman, K. (2008). *In pursuit of implementation patterns: the context of lean and six sigmas.* *International journal of production Research*, 46(23), 6679-6699.
- Slack, N. Chambers S. & Johnston R. (2004). *Operations Management*, 4<sup>th</sup> Ed, Prentice Hall, Harlow.
- Tony, B. (2006). *A review and comparison of Lean Six Sigma Organizations.* *TQM Magazine*, 18(3) 255-262.

- Tomkins, C. & Groves, R (1983). Every accountant and researching his reality, *Accounting Organizations and Society*, 8(361-374).
- Uttal, B. (1983). The Corporate Culture Vultures. *Fortune*, 17(66).
- Vitali, A. (2010). The advantages and limitations of developing an external perspective for analyzing corporate strategic alignment, *Economic and environmental Studies*. 10(1) (13/2010), 35-48, March 2010.
- Waters, D. (1997). Developing and implementing value based strategy, *Management Decision*, 35, 9-10, 709 (12).
- Wisner, J. & Stanley, L. (2008). *Process Management: Creating value along the supply chain*. Thomson Higher Education. 5191. Natorp Boulevard Mason, OH 45040 USA
- Womack, P. & Daniel, J. (1996). *Lean Thinking: Banish Waste and create Wealth in your Corporation*. New York.
- World Bank Report, 2016.
- Zollo, M. & Winter, S. G. (2002). Deliberate Learning and Evolution of Dynamic Capabilities. *Forth coming in organization science. Special issue on knowledge, knowing and organization*.

## **APPENDICES**

### **Appendix I: Questionnaire**

This is a research aimed at understanding the relationship of lean six sigma implementation and operational performance of microfinance institutions in Kenya. There are no right and wrong answers. Results are strictly for academic use only. Your honest participation will be highly appreciated

#### **PART A. GENERAL INFORMATION**

1. Company name .....
2. Position in the company.....
3. Main products offered by microfinance institutions.....
4. Number of branches.....
5. Years of experience.....

#### **PART B. LEAN SIX SIGMA IMPLEMENTATION**

The extent of lean six sigma implementation in the scale of (1-5). The following is a list of issues on which lean six sigmas is implementation is based on. Please indicate the level to which they are implemented in a scale of 1-5 1 = strongly disagree; 2 = Disagree; 3 = Agree; 4 = Moderately agree; 5 = Strongly agree

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Customer Focus</b>					
There is quick response to customer complains					
There is quality in the services					
Customers are handled professionally					
Customer feedback is highly regarded					
Systems have been improved to enhance customer satisfaction					
<b>Organization Flexibility</b>					
My organization is open and supportive to new ideas					
Managerial decision making is fast					
My organization has clear set goals					
Most of the functions are outsourced					
Learning and development is encouraged					
<b>Organizational leadership</b>					
Management response is very fast					
The processes match the skills					
Employees are trained on continuous improvement					
Employees are well versed with continuous improvement tools					
Managers encourage employee to work unsupervised					
Cross-functional teams have been set to evaluate performance					
<b>Organizational culture</b>					
My organization has set performance metrics and targets					
My organization value team work					
Continuous improvement culture is the pillar of the organizations values					
Employees understand their roles					
Feedback is highly regarded					



## PART C. OPERATIONAL PERFORMANCE

The extent in the scale of (1-5) of the key performance measures that have been applied ranging from **STRONGLY DISAGREE** (1) to **STRONGLY AGREE**

Indicate the extent to which operational measurements have been applied  1 = Not at all; 2 = small extent; 3 = moderate extent; 4 = great extent; 5 = very great extent	What is the extent			
	Not at all	Small extent	Moderate	Great
<b>Quality</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
a. Customer complaints				
b. Average number of calls handled and responses				
c. Number of system errors				
<b>Speed</b>				
a. Loan processing duration				
b. Loan repayment duration				
c. Percentage of overdue loans applications per month				
<b>Cost</b>				
a. Interest rates rating				
b. Loan application transaction charges				
c. Asset valuation charges				
d. Cost of operating a call centre				

<b>Efficiency</b>				
a. Training of staff				
b. Team work and open communication				
c. Adherence to schedules and plans				

**PART D: CHALLENGES OF IMPLEMENTING LEAN SIX SIGMA PRACTICES**

The following list contains a set of challenges facing implementation of lean six sigma practices, tick those that are relevant to your organization.

1	Availability of resources	
2	The level of management support and leadership	
3	The nature of the organization structure and its ability to fit new ideas	
4	Communication barriers	
5	Organization culture	
6	Technological advancement	
7	Complication of the lean six sigma tools and techniques	
8	Inadequate training on lean six sigma practices	

**Appendix II : Work plan**

ACTIVITY	AUGUST 2017	SEPTEMBER 2017	OCTOBER 2017	NOVEMBER 2017	DECEMBER 2017
Proposal writing					
Questionnaire structuring and approval and presentation					
Collection of data					
Data analysis					
Report presentation					

**Appendix 111 : Research Budget**

ITEM	COST (KSHS)
Transport	2700
Stationery	2500
Secretarial work	5000
Airtime	4700
Miscellaneous	4000
Printing and binding	5000
TOTAL	23,000

#### **Appendix IV: List of Microfinance Institutions in Kenya**

1. Rafiki Microfinance Bank Ltd
2. Kenya Women Finance Trust Microfinance Ltd
3. Faulu Microfinance Bank Ltd
4. Choice Microfinance Bank Ltd
5. SMEP Microfinance Bank Ltd
6. Uwezo Microfinance Bank Ltd
7. Century Microfinance Bank Ltd
8. Remu Microfinance Bank Ltd
9. SUMAC Microfinance Bank Ltd
10. U&I Microfinance Bank Ltd
11. Daraja Microfinance Ltd
12. Caritas Microfinance Bank Ltd
13. Maisha Microfinance Bank Ltd
14. Musoni Credit
15. Yehu Microfinace Ltd
16. Milango Microfinance
17. Watu credit Ltd
18. Platinum credit Ltd
19. Vision Fund Ltd
20. Real People Kenya Ltd
21. ECLOF Kenya Ltd
22. Ngao Finance

23. SAMCHI Credit
24. Mwananchi Credit
25. Fountain Credit Services Ltd
26. Premier Credit
27. Jitegemee Credit Ltd
28. Credit Bank Ltd
29. Metropol Corporation
30. Meridian Loans Ltd
31. Housing Finance Kenya Ltd
32. Angaza Credit Ltd
34. Jamii Bora Microfinance Ltd
35. Guardian Bank LTD
36. Fountain Enterprise Programme
37. Hazina Development Trust Ltd