PRODUCT DESIGN-CHANGE PRACTICES AND OPERATIONAL PERFORMANCE OF DEPOSIT TAKING MICRO-FINANCE INSTITUTIONS IN NAIROBI, KENYA

NJIRIH MAGU

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DECLARATION

I declare that this research project is my original work and it has not been previously presented for a degree course at the University of Nairobi or any other university.

Signed: _____ **Date:** _____

Njirih Magu

D61/77225/2015

This research project has been written under my supervision and submitted for examination with my approval as the University Supervisor

Signed: _____ Date: _____

Dr Magutu P. Obara

Department of Management Science

School of Business,

University of Nairobi

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God bless you all.

Amen.

Abstract

As the world's financial markets become increasingly integrated and globalizes, the demand for new types of investments continues to grow. Ability to innovate and the effects of innovation become the major element results in the existential threat to deposit taking Micro Finance institutions. Whole-life support for complex products requires coordinated approach. Existing shortcomings of the design-change management process currently operated within key action in the Microfinance banking industry. The role that information technology must play in achieving greater efficiency and productivity is developed. Organizations have to be alert to match the current configured status of need for new or modified products as customers become more sophisticated. The adaptation of ever changing environment, organizations have to sustain high level of operational performance.

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LIST OF ACRONYMS

CBK	Central Bank of Kenya
MFIs	Micro Finance Institutions
DTMFIs	Deposit Taking Microfinance Institutions
KBRR	Kenya Bankers Reference Rate
PDC	Product Design-Change
ADB	African Development Bank
CBR	Central Bank Rate
CGAP	Consultative Group to Assist the Poor
PG	Prudential Guideline
SME	Small and Medium Entrepreneurs
KRA	Kenya Revenue Authority
ROI	Return in Investments
KYC	Know Your Customer
FSD	Financial Sector Deepening
BI	Business Intelligence

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Complex and high value products designs will most likely change during this era of continuous technological growth. These design changes will be there for a long time and will keep on occurring in the stages of product's lifecycle thus resulting to variations of products. The continuous change of products designs may cause proliferation of product. Most institutions have outlined procedures oh how to handle the product design-change process. Challenges may occur to institutions during the process of design changes especially when dealing with their businesses and customers. Therefore a structured design-change management is needed to overcome these challenges. The design change process can involve significant volumes of information and can cut across specific and common areas of different organizations. To mitigate these challenges there should be clear communication and understanding of information about the process product design-changes within and between these similar (Setchi, Howlett, Naim and Seinz, 2014)

There is need for the process of management of product design-change to evolve. Past change control and management of design methods have been overtaken by events and obsolete to be used for modern complex products. Organizations and businesses need to adapt new methods of management of product change, information sharing and working ways as new ways of operating practices. The product design must meet several features and specifications such as reliability, availability and maintainability so as to meet the required operating standards. This is commonly referred to as design integrity. This necessitates that scholars should research further to come up with a findings that will assist in the area of unified process model of product design-change practices (Morris, Halpern, Setchi and Prickett 2016).

1.1.1 Product Design-Change Practices

Product Design-Change (PDC) can be defines as the process of developing or revising a product after identifying customer's tastes and preferences or from experiences of already launched products. This forms part of detailed specification of a produced item and how it functions as whole. This process of product design needs to consider how the item will function in an efficient, safe and reliable manner. The cost of production needs to be considered in order to make the item be economically viable and affordable to the targeted consumers (Riley, 2001).

In this period there is need for integration of various systems to meet the industry trend rather than the previous model of one monolithic coherent enterprise architecture solution that connects the various stages of the product design, production and support processes. Practices such as through-life design-change practices need to sustain performance by continuous developments rather than tweaking or reconstructing the products. While some organizations are reaping benefits and getting revenues through practices such as leased purchasing and after-sale services commonly referred to as extended product support practice (Morris, Halpern, Setchi and Prickett, 2016). Practices such as embedded software and sensors differs from the commonly used software in environmental conditions such as desktop and enterprise resource planning software because of various issues such as , performance issues, , inhomogeneous environments, ever-changing platforms and maintenance exertion (Ebert and Capers, 2010). The main stumbling block has been adoption of older business Intelligence (BI) since it takes time to implement and integrate the embedded software with the raw data. Clean and reliable data is doubtlessly the business' single main asset, which means that product data integrity is a very importance practice since every other organization is working to parachute its power and stamp prowess in the industry (Cotton, 2014).

The main aim of using PDC is because complex products are emerging and the rapid evolvement of technology. These abrupt changes necessitate the use of these practices in order to be relevant and remain competitive in the business industry (Ulrich and Eppinger, 2008). Organizations are beginning to recognize that quality in designs translates to a number of factors in customer experience such as trust and loyalty as well as improving operational performance by cutting costs from redundant products, processes and meeting customer satisfaction. Internal processes in most banks have been improved to raise the quality of services so as to meet customer expectations and preferences. This process requires forming a team from various departments consisting of specialists and designers to oversee the project. Developing outstanding new products is problematic, consumes time and can be very costly. A lot of time is needed during this exercise of new product development and it also utilizes resources. To design an outstanding product various steps are required. These include research, analysis, design findings, engineering and prototyping methods, testing, customizing and modifying, and re-testing the products. Great products are not designed for the very first time but it is a rigorous and tedious process that involves repetitions a number of countless times and modifying over time the already designed products. This approach is strives to achieve perfection (Zwicky, 2014).

1.1.2 Operational performance

Nigel, Stuart and Robert (2010) describe operational performance as the degree to which an operation fulfills the four core service operation performance objectives of cost, quality, speed and flexibility. The four core service operation performance objectives can be regarded as the dimensions of overall performance that satisfy an organization's customers.

Performance can be measured using indicators to monitor, evaluate and establish the: the organization's financial, people, services and processes metrics. The main aim of organization operations is to create and increase shareholders wealth, increase profit and meet the community expectations at large. To determine an organizational performance the strategic plan is the best starting point. The plan includes the key strategic goals and priorities. Trying to find out out how well you are striving to meet these goals can be a good indicator of the general organization operational performance (Nigel, Stuart and Robert, 2010). This can be measured using several key performance indicators (KPIs). These are classified into four main categories namely financial metrics, customer metrics, process metrics and people metrics. Financial metrics comprises indicators such as Profit, revenue, cost. Customer metrics includes indicators such as customer acquisition, customer satisfaction & retention, number of customers. While process metrics include customer support and service efficiency. People metrics covers indicators such as employee turnover rate and employee satisfaction (Jackson, 2015).

Operational performance is measured to know the change and trend in the value of a variable or its value relative to other variables. There should be a reference for comparison, all measures are meaningless numbers. Consequently, if something is to be measured, one of the first considerations is what to use as a basis for comparison. However, for the purpose of providing managers with information they can use to improve the timeliness and quality of their decisions, precise measurements are not required (Kaydos, 1999).

1.1.3 Deposit Taking Micro-Finance Institutions in Nairobi, Kenya

The term microfinance can be defined as building financial systems that serve the poor and the less fortunate in the society. In most developing countries of the world like Kenya, majority people are the poor. These people will not likely get services from the mainstream banks. The microfinance industry is seen as a peripheral sector that donors and funders, governments, or investors might be interested in, but not the main part of the country's mainstream financial

system. Hence there is need to is integrate this industry into the financial sector so as to reach the majority of number of poor people in these third world countries (CGAP, 2003)

The microfinance Act of Kenya, 2006 and the Microfinance (Deposit Taking Institutions) Regulations, 2008 establishes the Deposit Taking Microfinance Institutions (DTMFIs) as those financial institutions that have been licensed by CBK to mobilize deposits from the general public that is customers, in order to promote competition, efficiency and easy access of funds. These institutions are regulated under the MFI Act, 2006 by CBK and efforts have been put in place to modernize and uplift their operations. For proper management of the mobilized savings from public deposits the (ADB, 2000) derived a policy that was deemed necessary for this initiate which was collectively referred to as the prudential regulations. The prudential requirements enable DTMFIs to improve the efficiency and loan costs as well as manage resources properly. The Microfinance Act gives powers to CBK to regulate, license and supervise this industry in terms of business and operations of DTMFIs in Kenya. The sector has adopted initiatives such as FSD to promote the growth of financial services and products to the majority of the Kenyans (Central Bank, 2006).

The Microfinance Act of Kenya 2006, seeks to streamline the operations of the Microfinance Institutions MFIs in Kenya, through guidelines such issuing of licenses, setting out the minimum capital and minimum liquid assets requirements, submission of statutory returns to CBK, inspection and supervision by the Central Bank and setting limits on loans and credit facilities. The Deposit Taking Microfinance Institutions (DTMFIs) are regulated under the bill to provide savings, credit and financial facilities to small and medium enterprises (SMEs) as well as small income earners in both rural and urban areas. There are thirteen (13) licensed Deposit Taking Microfinance Banks in Kenya (Central Bank, 2016)

However, a Microfinance institution has to measure its performance in order to rate its services. It is imperative for it to disclose this information accurately and in a standardized performance for both financial information and social information such as loan repayment schedules, interest rates, cost recovery, number of clients attained and their level of poverty. There are a number of users who need to use information from DTMFIs for analysis such as investors, government policy makers, donors, customers and bank supervisors and customers (CGAP, 2003)

The bank Supervision report (2015) indicates that most DTMFIs in Kenya initially started off as NGOs and built progressive milestones in supply side competencies, as such, funding structure had no relevance. However, with growth and commercialization, MFIs are spinned off to become fully independent, the puzzle of funding structure that will ensure sustainability and profitability becomes relevant. MFIs are classified into two categories namely: Deposit Taking MFIs; and Non-deposit Taking MFIs otherwise known as Credit-only MFIs. Under the Microfinance (Categorization of Deposit-Taking Microfinance Institutions) Regulations (2008), deposit-taking MFIs are further categorized into: Community microfinance institutions licensed to carry out deposit-taking microfinance business within the relevant district, city or other specified region approved by the Central Bank of Kenya; and Nationwide microfinance institutions licensed to carry out deposit-taking microfinance business countrywide. Community MFI may be converted into a nationwide MFI with the written approval of the CBK. However, a nationwide MFI cannot be converted into a community MFI. A deposit-taking MFI cannot operate outside Kenya.

A deposit-taking MFI is required to maintain a minimum capital of at least 60 Million for a nationwide MFI and 20 Million for a community MFI. Further, deposit-taking MFIs must maintain such minimum holding of liquid assets of twenty per cent of all its deposit liabilities, matured and short term liabilities. The institution cannot lend out a loan or credit facility to a single borrower or his close associates in case the loan or credit facility if the aggregated sum exceeds core capital set out as it has been authorized by the Central Bank. Further, it is not supposed to grant a loan or credit facility against the shares as the security of its deposit taking business. Lastly, lending loans to the insiders cannot exceed 2% of core capital and aggregate of 20% of core capital (Bank Supervision report, 2015).

The KBRR was introduced by CBK in July 2014 to guide banking institutions on the lending base rate across the banking sector to enable general public be able to compare prices and costs of loan products and enhance transparency in credit provisions. This was rolled out through a letter/circular to commercial banks and microfinance banks to enhance disclosure on costs of credits as well as promote transparency by banks. This rate is calculated as the average of the CBR and the two month weighted average of the 91 day Treasury bills interest rate which is reviewed every six months. The first KBRR was set at 9.13 percent in July 2014 and has always been revised downwards or upwards depending on the performance of the treasury bills. Institutions are required to disclose to CBK and the customers how they have computed the risk

premium (k) and its composition that is being levied above set out KBRR. In conclusion deposit taking MFIs are heavily regulated. The rationale for the stringent regulation of deposit-taking MFIs is to protect investor funds and ensure the stability of financial institutions in Kenya (Bank Supervision report, 2015).

1.2 Research problem

For several years scholars and operations managers lacked conclusive evidence on the need for spending sometimes in innovative product design changes and how it is directly related to high revenue generation and business prosperity. To digress this, further research and standardization is necessary (Jun, Kiritsis, and Xirouchakis, 2007).

The Deposit Taking Microfinance Institutions (DTMFIs) are relatively new in the Kenya financial industry and due to the high level of competition between themselves and commercial banks there is need to study how their products designs impacts overall on their level of operational performance. In this era when DTMFIs needs to grow and expand they have to determine how they get the funding sources such as commercial sources (commercial banks loans, deposits, equity and bond issuance), it is imperative to have rigorous and stringent measures, policies, set of reports and procedures on how they design their products to meet all these basic requirements. Traditionally, microfinance institutions have offered short duration term loans along with life insurance cover for the borrower and her spouse. The loans are disbursed to individuals where the group stands as co-guarantors for repayment, and repayment collected on fixed frequency. Locally, a few studies have been done on the issue of product design-change practices and how they affect the operational performances of DTMFIs sustainability (Mutua, 2006).

Past studies show that a number of researches have been done to establish the models of product designs by MFIs and how they contribute to their financial performance. Anyango, Sebstad and Cohen (2002), in their research identified that a DTMFI can attract a wide range of clients, reduce drop-out rates and become more competitive by designing new and improved products and services. Much more studies indicate that there are elements of product proliferation which are increasingly common amongst the DTMFIs that try to tailor products partially to focus on individual market segments with certain specific needs. Hence the reason they find themselves offering many slender different products (Wright, 2006). None of these studies has put more

emphasis on product design-change practices and how they relate to operational performance. Therefore there exists a gap that needs to be extensively researched further on how DTMFIs can become more innovative through the adoption of product design-change practices techniques in order to increase their operational performance.

DTMFIs in Nairobi commonly use models of systematic or methodical approaches to develop new products as change practices. These practices revolve around the conventional business methods of a thorough market research, designing products, marketing them and optimizing profit (Brand, 2009). Two questions keep on lingering: Are DTMFIs trying to bring change in products change-designs? What is the relationship between product design-change practices and operational performance adopted by DTMFIs in Nairobi?

1.3 Objectives

1.3.1 General objective

The principal objective of this research study is to identify the various product design-change practices adopted by Deposit Taking Micro Finance Institutions in Nairobi and how they affect their operational performance for revenue generation and customer focus.

1.3.2 Specific Objectives

i. To determine the product design-change practices used or adopted by Deposit Taking Microfinance Institutions in Nairobi
ii. To establish the relationship between product design-change practices and operational performance of DTMFIs in Nairobi.

1.4 Significance/Value of the Study

This research will add and contribute to academic information for scholars and open an avenue for further expansion of the knowledge in this concept area.

It will also enable the DTMFIs in Nairobi, Kenya to know the current product design-change practices and how they relate to operational performance

The government is a key player in financial inclusion hence this study will assist in formulating policies that relate to the regulatory framework of the country as far as products designs by DTMFIs are concerned. It will also come up with policies that address the various challenges

faced by these institutions with the aim of enabling a fair and competitive environment in the industry.

AMFI will as well understand their responsibilities in facilitating a relationship between the two concepts and how the various DTMFIs associate to each other.

Operations Managers will learn from this study the significance of investing good products design-change practices to optimize operational performance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter canvasses the theoretical and empirical findings on the value of products design-change practices by DTMFIs in Nairobi, Kenya. It also describes the concepts of product design practices and organizational operations performance and their relationship.

2.2 Theoretical Foundations

The product design process is coming up with a product that originates from the transformation of an idea, customer needs or wants or the marketplace at large that fulfills or satisfies or addresses these needs. This is usually tasked and done by innovative people that are willing to face the process head on. It involves developing a prototype as a sample test and later implementing the idea or process to full scale. Traditionally this process was implemented sequentially; every stage was done consecutively after one previous one. This process led to iterations in the design process so as to correct mistakes identified in the earlier stage. This led to increase in production costs and also cause products to be delivered to the oligopoly late. Therefore the designer needs to consider all the stages carefully to try to eliminate any potential issues that may arise. First, a conceptual design needs to be sketched outlining the key components with detailed information left out for the later stages. Therefore it is important during design phase to consider the activities downstream and their relevant detailed specifications (Jay, 2013).

Over the previous several years, the marketplace performance management system has been utilized to introduce products that support scorecards, measure metrics through dashboards (for visualization), forecasting and budgeting and planning which leads steady growth within the mainstream BI by vendors. Mainly, this effort has been centrally rotating around the balanced scorecard performance management system. Other methodologies of performance management system used world over have been the implementation of Six Sigma which has been nicknamed strange names such as “black-belt”. This method is about identifying and rectifying defects in order to strive to achieve quality products so as to improve efficiency and ultimately achieve performance. Operational performance management system in recent time entails introduction of operational dashboards, reports as well as business activity monitoring (BAM), notifications and automated way forwards (Ferguson, 2007).

2.3 Product Design-Change Practices

The demand or urge for a new product usually originates from an opening or market opportunity or from the introduction of a new technology. New products are broadly classified into categories; namely market pull products and technology push products. Market pull products are the ones where the marketing department of the company discovers that first the sales can be increased if new products are designed to appease or cater for a particular segment of its customers. The company's engineering department then undertakes a technical feasibility of the new product idea and vice versa for the technology push product the methodology. This is where if a technical breakthrough opens up for a new product the marketing department attempts to determine the feasibility study prospects in the marketplace. However in many cases, the technology exploration may not particularly point to a specific product, but instead, to a method, more capabilities hence more benefits if the idea is put into use resulting to creation of a number of different products (Riley, 2001).

2.3.1 Through-life Design-Change Practices

These are the changes that happen after the design phase due to upgrades or repairs or rectifications. For several years, complex products such as aircrafts are refitted with state-of-the art technology when they are being serviced. This is in line with meeting new needs or to reengineer the product's existing technology. Organizations need to sustain performance by adding components or accessories instead of incremental developments. This lead to great demands after the updated products are configured and changes introduced. The bulk of changes and revisions happen in the design stage, others lead to redesigning, and others to lead to introduction of versions of the product. While in the manufacturing and operation industry the changes either require upgrades of the product or initiate a new design process of a product discrepancy (Ariyo, Eckert, and Clarkson, 2009).

Empirical studies of the change processes have pacified a distinction between the initiated and emergent kinds of changes. Initiated changes are micro based that is they are caused by factors such as regulation and legislation or customer requests while emergent changes come forth from issues in the design or use. An example of this changes are the knock-on or propagation changes that arise from changing other components after they have been identified as a major poser since the designers had not foreseen such knock-on changes (Alexiou, Johnson and Zamenopoulos, 2010).

The process of managing changes during life is a challenging task. For example, the design phase of an airplane within a fleet of new aircraft will easily deviate during operational service since the repair and maintenance activities are done on an individual basis. The management of this change process entails the coordination of several activities that includes spanning design, , production procurement, sales & marketing and continuous support. All these activities rely on precise product information which ultimately improves efficiency due to discouraging tolerance for error. Forthrightly it is the duty of the design authority to monitor the compliance of the rules set down during this process (Vianello and Ahmed-Kristensen, 2012).

Atasu and Subramanian (2012) states that the concept of design authority seeks to enumerate control and greater coherence during product's design. This is realized by focusing on two qualities: the technical knowledge which basically is to manage the design together with organizational power. Therefore it is the duty of an organization or a group of organizations that are acting as design authority to ensure a design is effectively controlled by executing the controls necessary to maintain design integrity. This depends on the existence of a regulatory system in order to exert control. The role and responsibility of a design authority varies according to product circumstances. The establishment of a design authority means that it is important to recognize that it represents one constituent of a broader system that is responsible for reasserting design integrity.

2.3.2 Extended Product Support Practices

It is inevitable for businesses to extend their services from whole lifecycle up to and including end-of-life. Organizations are reaping revenue from activities such as product innovations in the field of leased purchasing, after sale services and extended product support. The environmental legislation is introducing more producer responsibilities. This practice surfaced in the early 1990s and recently manufactures have the responsibility to accept environmental accountabilities (ElBaradei, 2003).

Ouertani, Baïna, Gzara, and Morel (2011) reiterated that clearly there are a number of similar engineering management practices and concurrent engineering that have found a close characteristics with more new supply chain management practices. The two techniques envisage integrating activities such as product design, manufacturing, operations and finally disposal. It has been proven that the approach for sharing product knowledge, much of the required information may be released in the different organizations enterprise information systems.

2.3.3 Product Data Integrity Practices

Organizations have hugely invested in the development and adoption of product data exchange standards, but still the current software and systems are unable to fully meet business requirements. This is due to market demands. Therefore this necessitates a close working relationship between business strategy and product strategy. Stringent efforts across organizations are considered to be fragmented and to sort out this menace it is important to integrate change management systems and Product Design Management (PDM) systems (Rangan, Rohde, Peak, Chadha, and Bliznakov 2005).

2.3.4 Embedded Software and Sensors Practices

Ebert and Capers (2010), notes that the design and engineering constraints influence heavily embedded systems due to the respective surrounding systems and contrariwise. Innovations such as embedded software need to be considerably adjusted in order to manage and get benefit. This software continues to constantly grow at a rate between 10 and 30 percent per year depending on the application domain hence changing complexity which results to extra defects and costs. Embedded software has overwhelmingly penetrated the world. They have also contributed to innovations. They utilize about 98 percent of the micro-processors produced worldwide. The degree of variance of development practices is relative across different industries. In many cases, they evolve at different rate and without major cross-fertilization.

Over the past eight years the cross examination of change propagation within a complex sensor system has resulted to the have realization of about 40,000 plus change requests. This indicated that changes can exist between loins that do not seem to be directly connected especially with software contexts and electro-mechanical. Therefore this invokes the requirement for close monitoring between different information systems with the ultimate goal that being that access to proprietary information will be crucial and that standardized systems will be important (Giffin, Keller, Eckert, de Weck, Bounova, and Clarkson, 2009).

2.4 Operational Performance and Product Design-Change Practices by DTMFIs

A number of factors influence the decisions related to new product development in a DTMFI. These factors are broadly classified as organization specific internal conditions, external factors or market factors, and those related to product under development. Research studies (Yapa 2008,

Kapoor and Sinha 2013) have identified factors such as organizational strategy, mission of organization, organizational culture, customer orientation, organizational capacities and leadership and also resources as important macro determinants that influence new product development process.

Chakraborty (2015) research identified that several MFIs have launched pilots to try out new products. Unfortunately, these experiments have not graduated to the mainstream. There may be several reasons for this outcome: a) the new products were part of public relations exercise to look good; b) financially the new products were not profitable; c) the staff either did not have the capacity or were not sufficiently incentivized to push new products; and finally d) since the vanilla loan business is so good, that scaling up new products is seen as a distraction to regular work.

In developing products one has to consider this concept: New a product new to the MFI that is marketing it; Refined an improvement or addition to an existing product. The products development takes the following process which includes preparation and evaluation, market research, product design, pilot test and product launch (Ulrich and Eppinger, 2008)

Hepperle et al. (2010) argued that organizational structure, organizational culture and the available resources influence the impact of the new product development process. Abir and Chokri (2010) reiterated that diversification of the nature of business, organization size, financial resources and variance spread as major internal factors that affect the decisions related to new product development in microfinance industry. Similarly, Mbogo and Ashika (2011) have tried to establish the positive correlation between internsl organizational factors and new product development in their study of Kenyan DTMFIs.

Chakraborty (2015) identified that before the launch, a successful product in the market place will pass through eight distinct stages of new product development. This includes idea generation, screening, developing of concept, marketing strategy, analysis, product development, testing, commercialization and roll-out (launching). Recent examples show that successful DTMFIs have achieved commercial roll out in partnership with financial agencies and technical support providers. In the case of distributed products, participation of other companies has been useful in addressing logistics issues.

Many leading DTMFIs have one or more professional to support product introduction, performance monitoring, and tweaking. MFI provide core products in the form of credit to their customers as well as distributed products as a BC, collect insurance premium, pension contributions, and sometime act as the sales point for mobile phones, solar products and other consumer durables. An important task of product lead persons is to select branches where distributed products should be targeted. Further, they assist training instructors to communicate appropriate instructions on product sales (Chakraborty, 2015).

2.5 Empirical Literature

Author	Research study	Gap
Mbogo and Ashika (2011)	The researched identified the relationship between organizational specific factors for DTMFIs and new product development in their study of Kenyan MFIs	There was no study relating to products design-change practices. The study concentrated on product development hence no study in this area of research proposal
Chakraborty (2015)	The author researched on the stages of new product development in a new market place for DTMFIs. The researcher also found out that most DTMFI launch products but do not mind about the change practices	Similarly the research singled on product development and introduction and did not try to find out product design-change practices of DTMFIs
Hepperle et al. (2010)	The author found out that organizational culture, organizational structure, and available resources have substantial impact on the new product development process.	There was no study relating to product design-change practices and their effects to operational performance.
Kapoor and Sinha 2013	The author zeroed on how product designs are influence by organizational strategic objectives.	No study relation to these concepts

Fig: 2.1 Empirical Literature

2.6 Conceptual Framework

This shows the relationship of concepts, variables and ideas. It is an intellectual representation of some aspect of reality that is derived from some observations made from the phenomena. It also helps connect ideas to achieve research objective.

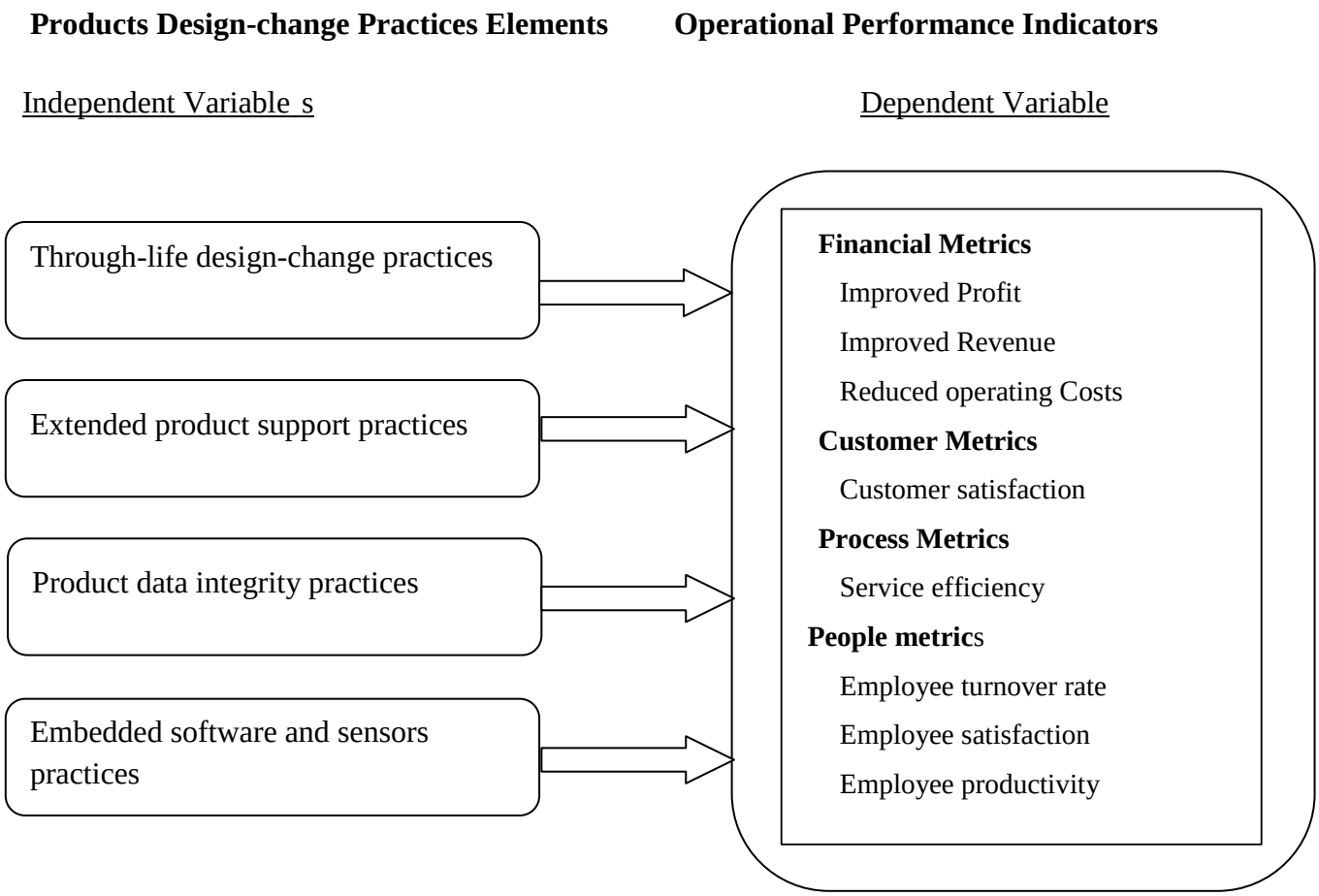

Fig: 2.2 Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

The study involved qualitative descriptive design since it aimed at finding an in-depth, narrative description of the problem. The research also used description as a tool to organize the data that was collected into patterns that emerged during analysis hence discovering inferences or the causal relationships. The study aimed at utilizing multiple variables during the analysis to aid to validate the findings.

3.2 Population

The study constituted surveying all the DTMFIs in Nairobi commonly referred to as a census. This method would reduce bias and would assist in further analysis of the study to get conclusive evidence. According to the Bank Supervision department of CBK register, there were 12 registered DTMFIs in Nairobi Kenya which offered services to SMEs, individual and corporate customers in Kenya. One DTMFI had been licensed close to the date of this study and had not yet fully started its operations hence it was omitted from this study thus bringing the total number of institutions targeted for this study to eleven.

3.3 Data Collection

Some secondary data was obtained from CBK through the published returns that had been submitted to CBK. The study considered data from Quarter 1 - Q1 (Apr – Jun 2015), Quarter 2 - Q2 (Jul – Sep 2015) and Quarter 3 - Q3 (Oct – Dec 2015). The data that was collected was assumed to be very reliable since some of it was obtained from the regulator since the DTMFI institutions are required to practice high degree of professionalism and ethical standard when submitting these returns. The validity of the data was about one to two years due to consideration of inflation and rise of cost of living.

3.4 Data Analysis

The data collected was tabulated and analyzed using descriptive statistics with the help of Microsoft Excel package as per the requirements of various statistical tests. The study used correlation and regression model to show the relationship between product design-change practices and operational performance of DTMFIs in Nairobi.

The product design-change practices (X_i) variable was determined by taking the average for each design-change practice for all the institutions under study using the formula below: -

Where $X_i = \frac{\sum X_n}{\sum n}$

X is the score between 1 and 5 on the Likert scale

The operational performance for each institution was determined through the collected data from primary and secondary sources for the three quarters. Primary data was analyzed as collected from the questionnaires and some secondary data was obtained from the statutory returns submitted to CBK. These returns included the traditional financial statements and other disclosures returns. Finally the operational performance index (I) was the weighted average-of-relatives index calculated by taking arithmetic mean as tabulated below:-

	Q_1	Q_2	Q_3	Weight			
Performance Indicator	V_1	V_2	V_3	W	V_1W	V_2W	V_3W
Profit				20			
Revenue				15			
Operating costs				10			
Customer satisfaction				10			
Service efficiency				15			
Employee turnover rate				8			
Employee satisfaction				12			
Employee productivity				10			
Total				**100**			

Fig: 3.1 Operational performance tabulation and calculation

Where $I = \frac{\sum V.W}{\sum W}$

$$V = \frac{P_n}{P_0} * 100\%$$

Hence the Operational performance ($\bar{I}$) was the average operational performance index (I)

Analyzing further the collected data to determine the relationship between the two concepts we had the data represented in the table below: -

Institutions n=11 (no of DTMFIs)	Operational performance ($\bar{I}$) Y	Through-life design-change practices (X_1)	Extended product support practices (X_2)	Product data integrity practices (X_3)	Embedded software and sensors practices (X_4)
1					
2					
3					
….					
n					

Fig: 3.2 Tabulated data to calculate the regression coefficients

The relationship was to be determined by the regression model:

$$\boldsymbol{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon}$$

Where:

Y = Operational Performance

β_0 = The intercept

β_i *For i = (1 – 4)* = Regression coefficients

X_1 = Through-life design-change practices

X_2 = Extended product support practices

X_3 = Product data integrity practices

X_4 = Embedded software and sensors practices

ϵ = Standard error

The relationship was clearly revealed by the regression analysis.

3.5 Ethical Considerations

The study observed high level of ethical standard as well as strong code of conduct during the research period with the intention to make the analysis as accurate as possible. Therefore the researcher ensured that there was no biasness or manipulation of the data so as to achieve any outcome.

3.6 Summary of the Methodology

Objective	Data Collection	Data Analysis
To determine the operational performance of DTMFIs over a period of 3 quarters	Mainly secondary data collected through returns submitted to CBK such as financial statements and the primary data collected through the questionnaire	The operational performance index (I) will be a weighted average-of-relatives index calculated by taking arithmetic mean over the three period quarter
To determine the product design-change practices used by DTMFIs in Nairobi	Primary data that was collected through the questionnaire as well as secondary data collected through returns submitted to CBK such as Financial disclosures.	The weighted average for the factors for each design-change practice.
To establish the relationship between product design-change practices and operational for DTMFIs in Nairobi.	Utilizing the data collected in the above objectives	Using the regression model

Fig: 3.3 Summary of methodology

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATIONS

This chapter covers data analysis and interpretation on the products design-change practices and the relationship between product design-change practices and operational for DTMFIs in Nairobi.

The data for this study was collected through the questionnaire and the CBK repository located at Bank Supervision Department for the 11 DTMFIs and tabulated for analysis.

The data was collected in order to respond to the 2 key objectives which were; determine the product design-change practices used by DTMFIs in Nairobi and; to establish the relationship between product design-change practices and operational for DTMFIs in Nairobi.

4.1 Data Collection and Response Rate

Data was collected from 11Deposit Taking Microfinance Institutions located within Nairobi through a questionnaire. Each institution was required to fill one questionnaire.

The questionnaire was dropped and the researcher waited as is was being filled. The data was collected from the customer service finance and operations departments of the DTMFIs.

Data from CBK was collected from the Bank Supervision Department repository area through returns that have been filed by the DTMFIs as a statutory requirement. The sources were mainly the balance sheet and income statements. It was filled into a table ready for analysis.

Table 4.1.1: Analysis of Response Rate

No of Institutions	No of Questionnaires	No of respondents	Percentage
11	11	10	90.9%

Source: Research data

Of the 11 questionnaires distributed to the microfinance institutions 10 were received back making the response rate to 90.9%.

The one that failed to fill in the questionnaire gave the reasons that they were relatively new in the industry and were not comfortable giving out the information.

The study found that (70%) of the respondents were in managerial positions (operations or finance managers), 60% had worked at the DTMFIs for more than 3 years and 20% had worked in the microfinance field for more than 10 years. This indicates that the statistics finding agrees well with that of organizational hierarchy. Further analysis of the demographic data shows that

all the respondents had achieved at least graduate qualifications with 50% held postgraduate degrees while 50% were graduate degrees. This makes acquired information more reliable. More so, the results indicate that majority of the respondents had worked in the microfinance industry for more than 4 years with good experience and a clear understanding microfinance operations. The findings and conclusions drawn are based on the 10 institutions that responded to the study.

4.2 Background of the studied information

This includes information on product design-change practices used by DTMFIs in Nairobi. This comprised of product through-life design-change practices, extended product support practices, product data integrity practices, embedded software and sensors practices and operational performance.

4.2.1 Product Through-Life Design-Change Practices

Product through-life design-change practices are one of the methods used by microfinance institutions in Nairobi, Kenya.

The respective respondents were asked to indicate to what extent do they ascertain with the statement in relation to product through-life design-change practices in the institution and they responded to various aspects under the variable on a five-point Likert Scale (5=Very Great Extent, 4=Great Extent, 3=Moderate Extent, 2=Small Extent and 1=Very Small Extent). The research findings are as indicated in the Table 4.2.1 below showing the resultant means and standard deviations of the variables.

Table 4.2.1: Findings of product through-life design-change practices in the DTMFIs

Product Through-Life Design-Change Practices	N	Mean	Std Deviation
The microfinance follows and is compliant with the rules set down by the regulatory institution during products design or upgrade.	10	5.0	0
The legislation or customer requests necessitates the microfinance to amend or redesign new products	10	4.7	0.483
The regulatory authority maintains design integrity by controlling designs in the microfinance industry	10	4.7	0.483
The microfinance always is able to meet new customer needs by refreshing existing technology for products	10	4.6	0.516
Changes in the operations and the industry triggers the microfinance to upgrade or design new products	10	4.5	0.527

The microfinance has mechanisms of changing the product-design after products deployment	10	4.4	0.516
The microfinance upgrades its newly deployed products as part of product design-changes	10	4.1	0.568
Updated and changed products creates more demands for the microfinance	10	3.8	0.632
The microfinance manages the products design-changes through coordination of activities such as design, procurement, production, marketing sales and support.	10	3.8	0.632
Before products design the microfinance has accurate information to assist in improving efficiency	10	3.8	0.632
The microfinance maintains performance by modifying or adding new features to existing products already launched	10	3.7	0.675
The microfinance changes the products designs if some problems such as knock-on or propagation arise from the design phase.	10	3.6	0.699
Overall Mean		**4.225**	

Source: Research data

To a great extent (mean ≤ 4.225 and standard deviation 0.530) through-life design-change practices is commonly used by DTMFIs, the respondents agreed to a very great extent that the DTMFIs follows and is compliant with the rules set down by the regulatory institution during products design or upgrade (5), that the legislation or customer requests necessitates the DTMFIs to amend or redesign new products (4.7), that the regulatory authority maintains design integrity by controlling designs in the DTMFIs industry (4.7), that they always are able to meet new customer needs by refreshing existing technology for products (4.6), changes in the operations and the industry triggers the microfinance to upgrade or design new products (4.5), the DTMFIs have mechanisms of changing the product-design after products deployment (4.4), upgrades its newly deployed products as part of product design-changes (4.1).

Further the respondents agreed to a great extent that updated and changed products creates more demands for the microfinance (3.8), that the DTMFIs manages the products design-changes through coordination of activities such as design, procurement, production, marketing sales and support (3.8), that before products design the microfinance has accurate information so as to improve efficiency (3.8), the DTMFIs maintains performance by modifying or adding new features to existing products already launched (3.7) and that the DTMFIs changes the products designs if some problems such as knock-on or propagation arise from the design phase (3.6).

This indicates that the DTMFIs uses product through-life design-change practices to a very great extent with an overall mean of (4.225).

This finding is in tandem with the Ariyo, Eckert, and Clarkson (2009) study whereby they identified the need for updated product and upgrades to maintain sustained performance.

4.2.2 Extended Product Support Practices

Microfinance institutions in Nairobi, Kenya use extended product support practices as one of the method of product design-change practice.

The respective respondents were asked to indicate to what extent do they ascertain with the statement in relation to extended product support practices in the institution and they responded to various aspects under the variable on a five-point Likert Scale (5=Very Great Extent, 4=Great Extent, 3=Moderate Extent, 2=Small Extent and 1=Very Small Extent). The research findings are as in the Table 4.2.2 below showing the resultant means and standard deviations of the variables.

Table 4.2.2: Findings of extended product support practices in the DTMFIs

Extended Product Support Practices	N	Mean	Std Deviation
Employees are informed and trained on product information before is launched	10	4.5	0.527
The microfinance has put in place a number of initiatives to provide extended product support and services to customers after the products design life cycle	10	4	0.471
The microfinance has put in place aspects to integrate product design and operation efficiency	10	4	0.667
The microfinance shares information on product knowledge within other departments before it designs the products	10	3.7	0.483
The microfinance derives revenue from innovations such as leased purchasing activities	10	3.6	0.516
The microfinance takes environmental responsibilities after the launch of its products	10	3.5	0.527
The supply chain management influences the microfinance ways to design or revise products	10	3.3	0.483
Overall Mean		**3.77**	

Source: Research data

To a great extent (mean ≤ 3.77 and standard deviation of 0.527) extended product support is practiced by DTMFIs; the respondents agreed to a very great extent that employees are informed and trained on product information before is launched (4.5).

The respondents agreed to a great extent that the DTMFIs have put in place a number of initiatives to provide extended product support and services to customers after the products design life cycle (4.0), the microfinance has put in place aspects to integrate product design and operation efficiency (4.0), that the DTMFIs shares information on product knowledge within other departments before it designs the products (3.7), that the microfinance derives revenue from innovations such as leased purchasing activities and that the DTMFIs takes environmental responsibilities after the launch of its products (3.5).

They further agreed to a moderate extent takes that the supply chain management influences the microfinance ways to design or revise products (3.3).

This means that the DTMFIs use extended product support practices to a great extent with an overall mean of 3.77.

This finding is in line with the ElBaradei (2003) study whereby he found out that it is the responsibility of the producers to adopt practices such as extended leased purchasing and after-sale services to already launched products.

4.2.3 Product Data Integrity Practices

Product data integrity practices as one of the method of product design-change practice used by microfinance institutions in Nairobi, Kenya.

The respective respondents were asked to indicate to what extent do they ascertain with the statement in relation to product data integrity practices in the institution and they responded to various aspects under the variable on a five-point Likert Scale (5=Very Great Extent, 4=Great Extent, 3=Moderate Extent, 2=Small Extent and 1=Very Small Extent). The research findings are as in the Table 4.2.3 below showing the resultant means and standard deviations of the variables.

Table 4.2.3: Findings of product data integrity practices in the DTMFIs

Product Data Integrity Practices	N	Mean	Std Deviation
The microfinance ensures there is close relationship between product strategy and business strategy	10	3.8	0.632
The microfinance banking system is able to take full account of all business processes	10	3.7	0.823

The market demand determines how the system is designed to meet business requirements for certain products designs in the microfinance	10	3.7	0.483
The microfinance ensures that there are efforts to integrate management systems and product design management systems	10	3.3	0.483
The microfinance systems are easily customizable to adopt new or modified product information	10	2.8	0.632
Overall Mean		**3.46**	

To a moderate extent (2.8 ≤ mean ≤ 3.8) Product data integrity is one of the practice used by DTMFIs, the respondents agreed to a great extent that the DTMFIs The microfinance ensures there is close relationship between product strategy and business strategy (3.8) the DTMFIs banking system is able to take full account of all business processes (3.7) and that the market demand determines how the system is designed to meet business requirements for certain products designs in the microfinance (3.7).

The respondents agreed to a moderate extent that the DTMFIs ensure that there are efforts to integrate management systems and product design management systems (3.3) and that the systems are easily customizable to adopt new or modified product information (2.8).

This means that the DTMFIs practices product data integrity to a moderate extent with an overall mean of 3.46.

This finding agrees with the Rangan, Rohde, Peak, Chadha and Bliznakov (2005) research that there is a close working relationship between business strategy and product strategy that is required in management of Product Design Management (PDM) systems.

4.2.4 Embedded Software and Sensors Practices

DTMFIs in Nairobi, Kenya use embedded software and sensors practices as one of the method of product design-change practice.

The respective respondents were asked to indicate to what extent do they ascertain with the statement in relation to embedded software and sensors practices in the institution and they responded to various aspects under the variable on a five-point Likert Scale (5=Very Great Extent, 4=Great Extent, 3=Moderate Extent, 2=Small Extent and 1=Very Small Extent). The research findings are as in the Table 4.2.4 below showing the resultant means and standard deviations of the variables.

Table 4.2.4: Findings of product through-life design-change practices in the DTMFIs

Embedded Software and Sensors Practices	N	Mean	Std Deviation
Innovations on products designs leads to the microfinance acquisition or upgrade of the banking systems	10	3.8	0.632
The emergent of more complex systems necessitates change requests for product designs in the microfinance	10	3.7	0.675
The development and growth of the microfinance banking system continues to evolve without the mixing of ideas from different groups to produce better results	10	3.4	0.516
The microfinance encourages collaboration between different information systems thus leading to standardized information during product design	10	3.3	0.675
The microfinance system growth leads to extra costs and products defects	10	3.2	0.632
The microfinance substantially adjusts the design approaches to fit in the banking system	10	3.1	0.568
Overall Mean		**3.42**	

To a moderate extent ($3.1 \leq \text{mean} \leq 3.8$) embedded software and sensors practices is one of the practice used by DTMFIs, the respondents agreed to a great extent that innovations on products designs leads to the microfinance acquisition or upgrade of the banking systems (3.8), that the emergent of more complex systems necessitates change requests for product designs in the DTMFIs (3.7).

Further, the respondents agreed to a moderate extent that the development and growth of the microfinance banking system continues to evolve without the mixing of ideas from different groups to produce better results (3.4), that the DTMFIs encourages collaboration between different information systems thus leading to standardized information during product design (3.3), the DTMFIs growth leads to extra costs and products defects (3.2) and that the microfinance substantially adjusts the design approaches to fit in the banking system (3.1).

This means that the DTMFIs practices embedded software and sensors to a moderate extent with an overall mean of (3.42).

The research concurs with Giffin, Keller, Eckert, de Weck, Bounova and Clarkson, (2009) who found out that change requests work hand in hand with changes in complex sensor system

4.3 Inferential analysis

This section sought to establish the relationship between product design-change practices variables and operational performance indicators of DTMFIs in Nairobi. The mean scores for product through-life design-change practices, extended product support practices, product data integrity practices and embedded software and sensors practices were 4.225, 3.76, 3.48 and 3.38 respectively. The operational performance index was determined by calculating the weighted average-of-relatives index of the aforementioned indicators calculated by taking arithmetic mean for the indicators. An example of calculated operational performance index for U & I Microfinance bank is as shown below in table 4.3.1: -

Table 4.3.1: Calculated operational performance index for U & I Microfinance Bank

Performance Indicator	**Q1**	**Q2**	**Q3**	**W**	**V1**	**V2**	**V3**	**V1W**	**V2W**	**V3W**
Profit Ksh(M)	4,573.00	6,216.23	9,325.00	20	1	1.36	2.04	20	27.19	40.78
Revenue Ksh(M)	17,709.00	27,855.23	41,083.00	15	1	1.57	2.32	15	23.59	34.80
Operating costs Ksh(M)	10,379.00	16,314.00	24,626.00	10	1	1.57	2.37	10	15.72	23.73
Customer satisfaction (%)	90%	94%	95%	10	1	1.04	1.06	10	10.44	10.56
Service efficiency (%)	95%	95%	95%	15	1	1	1	15	15	15
Employee turnover rate (%)	5%	5%	5%	8	1	1	1	8	8	8
Employee satisfaction (%)	85%	85%	85%	12	1	1	1	12	12	12
Employee productivity (%)	85%	85%	85%	10	1	1	1	10	10	10
				100				100	121.94	154.86
Operational Performance Index								$\frac{(100 + 121.94 + 154.86)}{3}$ **= 125.60% ≅ 1.26**		

Source: Research data

Hence the calculated variables for both product design-change practices and operational performance for all the studied institutions are as shown in the table 4.3.2 below: -

Table 4.3.2: Data table for the determined variables and performance index for respective DTMFIs

Institutions n=11 (no of DTMFIs	Operational performance Index Y	Through-life design-change practices (X_1)	Extended product support practices (X_2)	Product data integrity practices (X_3)	Embedded software and sensors practices (X_4)
Faulu	1.47	4.17	4	3.4	3.5
Kenya Women	1.24	3.92	4	3.8	3
SMEP	1.51	4.33	4	3.6	3.5
Remu	1.02	4.33	3.6	3.2	3.2
Rafiki	1.37	4.33	4	3.2	3.7
Sumac	1.31	4.33	4	3.4	3.3
U & I	1.26	4.42	3.4	3.8	4
Daraja	1.13	4.08	3.7	3.2	3.5
Caritas	0.98	4.17	3.7	3.6	3.2
Uwezo	1.21	4.17	3.6	3.4	3.3

Source: Research data

To conclusively answer the research questions, whether there exists a relationship between product design-change practices and operational performance of DTMFIs in Nairobi inferential statistical analysis was conducted. Correlation analysis was done first.

We start with the correlation analysis with 95% confidence level.

4.3.1 Correlation Analysis

In this analysis Bivariate Pearson correlation was used to test whether there was any correlation between the conceptual model elements and variables. The results showed that there were strong positive correlation coefficients greater than 0.6 between some of the practices between

themselves as well as some practices and the operational performance of the DTMFIs in Nairobi. Table 4.3.3 presents the results.

Table 4.3.3: Table 1: Pearson Correlation Analysis

Dimension	*Operational Performance (Y)*	X_1	X_2	X_3	X_4
Operational Performance (Y)	1				
X_1	0.208	1			
X_2	0.623	-0.247	1		
X_3	0.120	-0.149	-0.049	1	
X_4	0.429	0.624	-0.246	0.028	1

The greatest correlations were between embedded software and sensors practices & product through-life design-change practices and extended product support practices & operational performance which had a correlation coefficient of 0.624 and 0.623 respectively. Further the tests of correlation showed that the use of embedded software and sensors practices will determine the product through-life design-change practices and hence the overall operation performance of the microfinance. Extended product support practices also determine the operational performance of microfinance.

4.3.2 Regression Analysis

Table 4.3.4: Strength of the Model

Model	Multiple R	R Square	Adjusted R Square	Standard Error
Dimension	0.879	0.772	0.590	0.112

Further analysis in table 4.3.4 showed that the determinant coefficient R^2 (the percentage discrepancy of the dependent variable being affected by the changes in the independent variables) was equal to 0.772 or 77.2% that is, product through-life design-change practices, extended product support practices, product data integrity practices and embedded software and sensors practices leaving only 22.8 percent unexplained. This indicates that the model is very strong and reliable to test the concept that is being studied.

4.3.3 ANOVA Analysis

Table 4.3.5: ANOVA Analysis

Model	***df***	***Sum of Squares***	***Mean Squares***	***F***	***Significance F***
Regression	4	0.213	0.053	4.232	0.073
Residual	5	0.063	0.013		
Total	9	0.276			

a. Predictors (Constant): Product through-life design-change practices, Extended product support practices, Product data integrity practices and Embedded software and sensors practices.

b. dependent variable: Operational performance

The P-value (significance level) of 0.073 > 0.05 implies we do not reject the null hypothesis at significance level 0.05. The analysis of variance (ANOVA) indications with significance level of 0.073 in table 4.3.5 above show that there is a relationship between the predictor's variables (Product through-life design-change practices, Extended product support practices, Product data integrity practices and Embedded software and sensors practices) and dependent variable(operational performance). The calculated F ratio of 4.232 is represents the variance between the conceptual practices groups, divided by the variance within the practices groups. If the F ratio is large it shows that there is more spread between the independent variables groups than there is within individual group. This is referred to as the term of error.

Table 4.3.6: Regression Results

Model	*Coefficients*	*Standard Error*	*t Stat*	*P-value*
Intercept	-3.003	1.633	-1.839	0.125
X_1	0.074	0.327	0.227	0.830
X_2	0.613	0.173	3.545	0.016
X_3	0.115	0.166	0.694	0.519
X_4	0.355	0.170	2.080	0.092

a. Dependent Variable: Operational performance

Hence the regression equation is represented as: -

$$\boldsymbol{Y = -3.003 + 0.074X_1 + 0.613X_2 + 0.115X_3 + 0.355X_4}$$

Where:

Y = Operational Performance

The intercept = -3.003, shows that if product through-life design-change practices, extended product support practices, product data integrity practices and embedded software and sensors practices rated at zero the operational performance would be equal to -3.003

X_1 = 0.074, means that one unit of product through-life design-change practices increases operational performance by 0.074 units

X_2 = 0.613, shows that one unit of extended product support practices results in 0.613 units increase in operational performance

X_3 = 0.115, shows that one unit of product data integrity practices results in 0.115 units increase in operational performance

X_4 = 0.355, shows that one unit of embedded software and sensors practices results in 0.355 units increase in operational performance

The adoption of extended product support practices and embedded software and sensors practices are perceived to be playing a major role in increasing operational performance of the DTMFIs as opposed to product data integrity practices and product through-life design-change practices. These results indicates that the success of DTMFIs operational performance relies heavily on adoption of new technologies and extending customer support to already sold products rather than concentrating only on the customary product designs approaches. This is literary because the rapid growth in technology has aided in accessibility of services by customers and the more the microfinance adopts this practice the more it improves its operational performance. Microfinance institutions should invest more in innovations such as mobile technology and internet banking in order to attract more customers in their products and other services. To summarize, this research study wholly fulfilled the two objectives: that it identified the product design-change practices used by DTMFIs and it established the relationship between these practices and operational performance of DTMFIs in Nairobi.

CHAPTER FIVE: SUMMARY OF RESEARCH FINDINGS AND CONCLUSIONS, LIMITATIONS OF THE STUDY, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1. Summary of Research Findings and Conclusions

5.1.1 Summary of Research Findings

The study aimed at determining the product design-change practices used DTMFIs in Nairobi and establishing the relationship between product design-change practices and operational performance of DTMFIs in Nairobi. The study established that DTMFIs use product design-change practices and also found out that there exists a relationship between product design-change practices and operational performance.

The study indicated that to a very great extent majority of DTMFIs in Nairobi use product through-life design-change practices as the most popular practice. This is because DTMFIs are regulated by CBK and their product designs have to go through a thorough approval process by the regulator. Therefore these stringent measures of approvals forces the microfinance to use this practice as they would like to comply with the prudential guidelines set by the regulator. Competition in the industry is also a big factor to the microfinance institution adopting this change practice.

The second most used product design-change practice by DTMFIs was use of extended product support practices. This is due to a number of factors such as after sale service and extending product support to customers. The supply department and operations department have to work closely in order to achieve successful product design-change practices for the organizations performance. Customers who get this service are likely to to be satisfied with the operations of the microfinance institutions hence the reason why most of the institutions also use this design-change practices.

Product data integrity and embedded software and sensors are the moderately used practices hence yet both practices have proved to be hugely influential in determination of the operational performance of DTMFIs. This is due to the advent of technology and this has been driving the economy in recent times. As the microfinance industry grows the customers are becoming more sophisticated and want to access services and products through use of technology as it speeds up

the efficiency. This means that an organization has to embrace innovations in technology such as mobile and internet banking and must be included in the microfinance operational strategy.

The main product design-change practices determinants of operational performance for DTMFIs had a beta coefficient of 0.613 and 0.355 when tested at 99% level of confidence. On the other hand, the other practices studied, product through-life design-change practices and product data integrity practices were found to be less significant in determining the operational performance of DTMFIs. These results are an indication that the organizations operational performance relies heavily on enhancing technology and innovations as well as extending customer support and service satisfaction.

5.1.2 Conclusions

The study found out that most of microfinance institutions in Nairobi have adopted product design-change practices. The regulator plays a big role in creation and implementation of these practices because the institutions have to comply with the rules and procedures that have been set. The practice of extending product support to the customers affects most how these institutions functions as it creates a customer business relationship. Technology is also one of the key drivers of growth of the microfinance industry and should be embraced wholly by the institutions as it has also been indicated by the study as a key practice that determines the operational performance.

The relevant organizations departments should work closely between themselves from the first stage of products design to the last stage of roll-out or launching of products in order for them to succeed. Also product design information should be shared so as to avoid issues such as product propagation. Product design strategy should be aligned with the organization strategy so as to strive to achieve the same goals.

5.2 Limitations of the Study

While conducting the above study, the researcher encountered various limitations. These included the following: -

During the data collection exercise the personnel identified to fill the questionnaire were hesitant and repetitive follow up had to be done. One institution identified did not completely submit the questionnaire hence it was omitted in the study.

Most DTMFIs are very sensitive in releasing or sharing their financial information hence the researcher had to rely on some information obtained from the secondary. Financial information is always regarded as confidential hence accessing it is quite challenging.

Some DTMFIs were reluctant to fill the information since they had the feeling that the researcher was spying for their competitors. The researcher had to convince them that the data was purposely for the study hence they reluctantly filled the questionnaire.

The study concentrated within Nairobi and this may have introduced an element of geographical bias. One DTMFI institution was left out of this study since it was based outside the targeted geographical location. However since this study targeted all the DTMFIs the information obtained covered over 90% of the regulated institutions hence very reliable.

5.3 Recommendations

The study recommends that microfinance institutions should fully adopt all the design-change practices. This relates directly to an organization performance as indicated by the research findings. The DTMFI institutions should mostly concentrate on extended product support practices since it is the practice that hugely affects the performance. Implementation and adoption of technology will also likely influence the organizations performance hence should also be considered in the microfinance operational strategy.

5.4 Suggestions for Further Research

There is need for further study to determine how organizations should sustain the most significance product design-change practices in order to have positive improvement in organization performance. In a fast changing business environment the level of competition is quite high and more study is need on how to sustain these practices with this dynamic business conditions.

There is also need to carry out further research to determine if the existing product design-change practices are for longer-term period or short-term basis. This should be done on how to align the best product design-change practices with an organization strategy in order to achieve the overall strategic goals.

Finally further research should be done to determine the impact of discarding the less significant product design-change practices. This will indicate whether a microfinance business can survive the level of competition as well meet the customer satisfaction by not adopting these insignificant product design-change practices.

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APPENDIX A: LIST OF DEPOSIT TAKING MICRO-FINANCE INSTITUTIONS IN NAIROBI, KENYA

	Name	**Location**
1.	Faulu Microfinance Bank Ltd	Nairobi
2.	Kenya Women Microfinance Bank Ltd	Nairobi
3.	SMEP Microfinance Bank Ltd	Nairobi
4.	Remu Microfinance Bank Ltd	Nairobi
5.	Rafiki Microfinance Bank Ltd	Nairobi
6.	Century Microfinance Bank Ltd	Nairobi
7.	Sumac Microfinance Bank Ltd	Nairobi
8.	U & I Microfinance Bank Ltd	Nairobi
9.	Daraja Microfinance Bank Ltd	Nairobi
10	Caritas Microfinance Bank Ltd	Nairobi
11	Uwezo Microfinance Bank Ltd	Nairobi
12	Choice Microfinance Bank Ltd	Kajiado
13	Maisha Microfinance Bank Ltd	Nairobi

Source: Bank Supervision Department, Central Bank of Kenya 2016

APPENDIX B: RESEARCH QUESTIONNAIRE

Date ……/……../……..

Please take a few minutes to complete this questionnaire. Your honest views and responses will be treated confidential and anonymous as it will be very important in this research study. The questionnaire will last approximately 15 minutes. All the information provided will be only used for the purpose this study.

Kindly tick the most appropriate response

SECTION A: DEMOGRAPHIC INFORMATION

1. What is your position at the microfinance bank?

☐ CEO/Managing Director ☐ Operations/Finance Manager

☐ Operations/Finance officer ☐ Customer care/Service personnel

☐ Others

2. How long have you been in that position?

☐ 0 – 3 years ☐ 4 – 10 years

☐ 11 – 15 years' ☐ Over 15 years

3. How long have you been working in the microfinance industry?

☐ 0 – 3 years ☐ 4 – 10 years

☐ 11 – 15 years' ☐ Over 15 years

4. What is your highest level of education?

☐ Postgraduate ☐ Graduate

☐ Post-secondary ☐ Post-primary

☐ Others

5. What is your level of experience in microfinance operations?

☐ Extremely Good ☐ Good

☐ Fairly Good ☐ Moderate Good

☐ Limited

SECTION B: PRODUCT DESIGN-CHANGE PRACTICES

6. To what extent has your microfinance used the following product through-life design-change practices in an effort to improve its product design-change on a scale of 1-5?

Key:

5=Very Great Extent 4=Great Extent 3=Moderate Extent 2=Small Extent 1=Very Small Extent

Product Through-Life Design-Change Practices	**5**	**4**	**3**	**2**	**1**
The microfinance has mechanisms of changing the product-design after products deployment	☐	☐	☐	☐	☐
The microfinance upgrades its newly deployed products as part of product design-change	☐	☐	☐	☐	☐
The microfinance always is able to meet new customer needs by refreshing existing technology for products	☐	☐	☐	☐	☐
The microfinance maintains performance by modifying or adding new features to existing products already launched	☐	☐	☐	☐	☐
Updated and changed products creates more demands for the microfinance	☐	☐	☐	☐	☐
Changes in the operations and the industry triggers the microfinance to upgrade or design new products	☐	☐	☐	☐	☐
The legislation or customer requests necessitates the microfinance to amend or redesign new products	☐	☐	☐	☐	☐
The microfinance changes the products designs if some problems such as knock-on or proliferation arise from the design phase.	☐	☐	☐	☐	☐
The microfinance manages the products design-change through coordination of activities such as design, procurement, production, marketing sales and support.	☐	☐	☐	☐	☐
Before products design the microfinance has accurate information to assist in improving efficiency	☐	☐	☐	☐	☐

The microfinance follows and is compliant with the rules set down by the regulatory institution during products design or upgrade.	☐	☐	☐	☐	☐
The regulatory authority maintains design integrity by controlling designs in the microfinance industry	☐	☐	☐	☐	☐

7. To what extent has your microfinance used the following extended product support practices in an effort to improve its product design-change on a scale of 1-5?

Key:

5=Very Great Extent 4=Great Extent 3=Moderate Extent 2=Small Extent 1=Very Small Extent

Extended Product Support Practices	**5**	**4**	**3**	**2**	**1**
The microfinance has put in place a number of initiatives to provide extended product support and services to customers after the products design life cycle	☐	☐	☐	☐	☐
The microfinance derives revenue from innovations such as leased purchasing activities	☐	☐	☐	☐	☐
The microfinance takes environmental responsibilities after the launch of its products	☐	☐	☐	☐	☐
The supply chain management influences the microfinance ways to design or revise products	☐	☐	☐	☐	☐
The microfinance shares information on product knowledge within other departments before it designs the products	☐	☐	☐	☐	☐
The microfinance has put in place mechanisms to inform and trained employees on product information before is launched	☐	☐	☐	☐	☐
The microfinance has put in place aspects to integrate product design and operation efficiency	☐	☐	☐	☐	☐

8. To what extent has your microfinance used the following product data integrity practices in an effort to improve its product design-change on a scale of 1-5?

Key:

5=Very Great Extent 4=Great Extent 3=Moderate Extent 2=Small Extent 1=Very Small Extent

Product Data Integrity Practices	**5**	**4**	**3**	**2**	**1**
The microfinance banking system is able to take full account of all business processes	☐	☐	☐	☐	☐
The market demand determines how the system is designed to meet business requirements for certain products designs in the microfinance	☐	☐	☐	☐	☐
The microfinance systems are easily customizable to adopt new or modified product information	☐	☐	☐	☐	☐
The microfinance ensures there is close relationship between product strategy and business strategy	☐	☐	☐	☐	☐
The microfinance ensures that there are efforts to integrate management systems and product design management systems	☐	☐	☐	☐	☐

9. To what extent has your microfinance used the following embedded software and sensors Practices in an effort to improve its product design-change on a scale of 1-5?

Key:

5=Very Great Extent 4=Great Extent 3=Moderate Extent 2=Small Extent 1=Very Small Extent

Embedded Software and Sensors Practices	**5**	**4**	**3**	**2**	**1**
The microfinance substantially adjusts the design approaches to fit in the banking system	☐	☐	☐	☐	☐
Innovations on products designs leads to the microfinance acquisition or upgrade of the banking systems	☐	☐	☐	☐	☐

The microfinance system growth leads to extra costs and products defects	☐	☐	☐	☐	☐
The development and growth of the microfinance banking system continues to evolve without the mixing of ideas from different groups to produce better results	☐	☐	☐	☐	☐
The emergent of more complex systems necessitates change requests for product designs in the microfinance	☐	☐	☐	☐	☐
The microfinance encourages collaboration between different information systems thus leading to standardized information during product design	☐	☐	☐	☐	☐

SECTION C: OPERATIONAL PERFORMANCE

Please provide the requested statistics on the following indicators as far as operational performance of the microfinance is concerned

Performance Indicator	**Unit of measure**	**Q_1 (Apr – Jun 2015)**	**Q_2 (Jul – Sep 2015)**	**Q_3 (Oct – Dec 2015)**
Customer satisfaction	%			
Service efficiency	%			
Employee turnover rate	%			
Employee satisfaction	%			
Employee productivity	%			

THANK YOU

APPENDIX C: TABLE TO BE FILLED FROM SECONDARY DATA FROM CBK

Performance Indicator	**Unit of measure**	**Q_1 (Apr – Jun 2015)**	**Q_2 (Jul – Sep 2015)**	**Q_3 (Oct – Dec 2015)**
Profit	Ksh (million)			
Revenue	Ksh (million)			
Operating costs	Ksh (million)			

APPENDIX D: INTRODUCTION LETTER FOR DATA COLLECTION

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS

Telephone: 020-2059162
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, Kenya

DATE 18/10/2016

TO WHOM IT MAY CONCERN

The bearer of this letter NJIRIH MAGU

Registration No D61/77225/2015

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

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

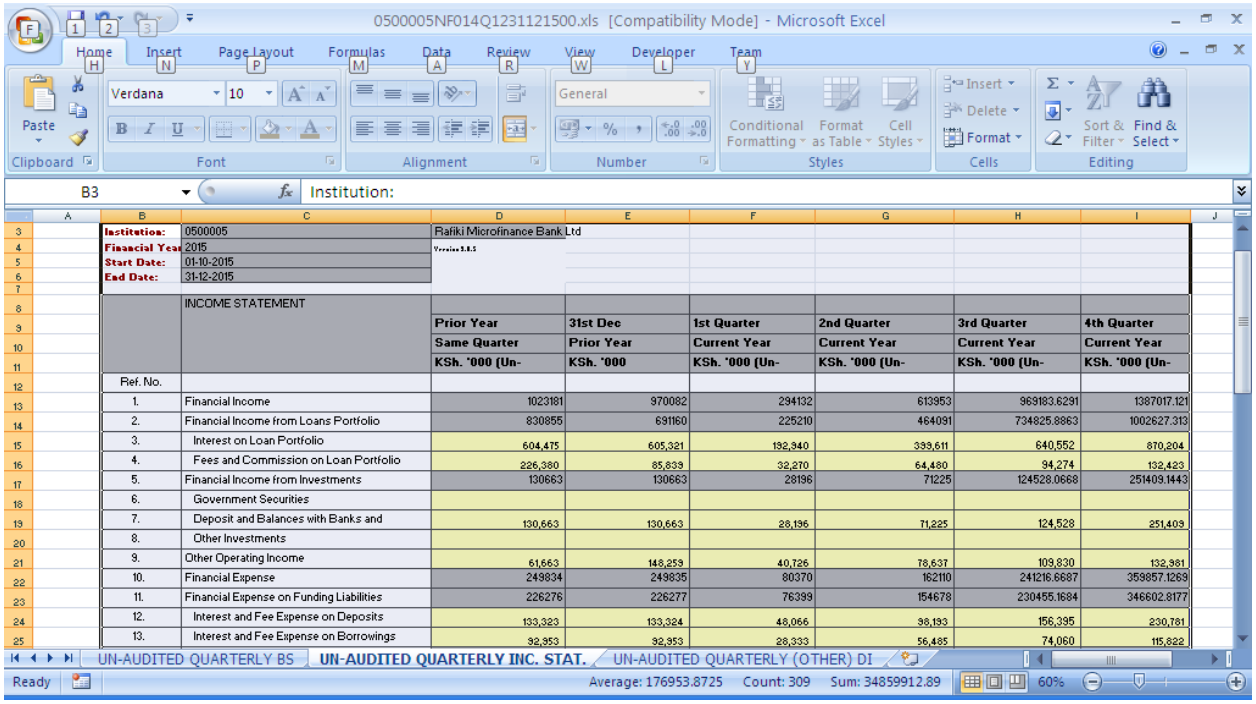
The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
18 OCT 2016
P.O. Box 30197 – 00100, NAIROBI

PATRICK NYABUTO
SENIOR ADMINISTRATIVE ASSISTANT
SCHOOL OF BUSINESS

APPENDIX E: SAMPLE FINANCIAL STATEMENTS RETURN (FOR SECONDARY DATA)



0500005NF014Q1231121500.xls [Compatibility Mode] - Microsoft Excel

Institution:	0500005	Rafiki Microfinance Bank Ltd						
Financial Year	2015							
Start Date:	01-10-2015							
End Date:	31-12-2015							
	INCOME STATEMENT							
		Prior Year	31st Dec	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
		Same Quarter	Prior Year	Current Year	Current Year	Current Year	Current Year	
		KSh. '000 (Un-	KSh. '000	KSh. '000 (Un-	KSh. '000 (Un-	KSh. '000 (Un-	KSh. '000 (Un-	
Ref. No.								
1.	Financial Income	1023181	970082	294132	613953	969183.6291	1387017.121	
2.	Financial Income from Loans Portfolio	830855	691160	225210	464091	734825.8863	1002627.313	
3.	Interest on Loan Portfolio	604,475	605,321	192,340	399,611	640,552	870,204	
4.	Fees and Commission on Loan Portfolio	226,380	85,839	32,270	64,480	94,274	132,423	
5.	Financial Income from Investments	130663	130663	28196	71225	124528.0668	251409.1443	
6.	Government Securities							
7.	Deposit and Balances with Banks and	130,663	130,663	28,196	71,225	124,528	251,409	
8.	Other Investments							
9.	Other Operating Income	61,663	148,259	40,726	78,637	109,830	132,981	
10.	Financial Expense	249834	249835	80370	162110	241216.6687	359857.1269	
11.	Financial Expense on Funding Liabilities	226276	226277	76399	154678	230455.1684	346602.8177	
12.	Interest and Fee Expense on Deposits	133,323	133,324	48,066	98,193	156,395	230,781	
13.	Interest and Fee Expense on Borrowings	92,953	92,953	28,333	56,485	74,060	115,822	

UN-AUDITED QUARTERLY BS | UN-AUDITED QUARTERLY INC. STAT. | UN-AUDITED QUARTERLY (OTHER) DI

Ready | Average: 176953.8725 | Count: 309 | Sum: 34859912.89 | 60%