

**THE EFFECT OF ELECTRONIC BANKING ON FINANCIAL
PERFORMANCE OF SAVINGS AND CREDIT COOPERATIVE
SOCIETIES IN NAIROBI COUNTY**

BY

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**A RESEARCH PROJECT PRESENTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION,
SCHOOL OF BUSINESS UNIVERSITY OF NAIROBI.**

OCTOBER 2015

DECLARATION

STUDENT'S DECLARATION

I declare that this project is my original work and has never been submitted for a degree in any other university or college for examination/academic purposes.

Signature: **Date:**

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This research project has been submitted for examination with our approval as the University Supervisor.

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ACKNOWLEDGEMENT

I would like to thank all those whose assistance proved to be a milestone in the success of my project. Although it is not possible to name all of them, I wish to acknowledge a few people for their professional input, support and encouragement during this research project.

First and foremost, I wish to express my profound gratitude and deep regard to my supervisor, Dr. Duncan Elly, for his exemplary guidance, valuable feedback and constant encouragement throughout the duration of the project. His continued interest, remarkable patience, constructive feedback and critiques of the project in progress have been invaluable.

My sincere gratitude goes to my family and close friends for their moral and emotional support and encouragement throughout this study; mom and dad for always encouraging me to set aside time for this research, my brother Jeff who supported and encouraged me to push on even when my power was scanty and my friend Benedict for the guidance provided.

DEDICATION

I dedicate this research project to my loving parents for always encouraging me to aim higher. I am forever grateful for your love and support shown towards me.

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
ATM	-	Automated Teller Machine
BOSA	-	Back Office Services Activity
CBK	-	Central Bank of Kenya
DOI	-	Diffusion of Innovation
E-banking	-	Electronic banking
EPS	-	Earnings per Share
FOSA	-	Front Office Services Activity
FSD	-	Financial Sector Deepening
ICT	-	Information and Communication Technology
PC	-	Personal Computer
ROA	-	Return on Assets
ROE	-	Return on Equity
ROI	-	Return on Investment
SACCO	-	Savings and Credit Cooperative
SASRA	-	SACCO Societies Regulatory Authority
SMS	-	Short Message Service
S.S.L	-	SACCO Society Limited
TAM	-	Technology Acceptance Model
TOE	-	Technology, Organization and Environment
WOCCU	-	World Council of Credit Unions

ABSTRACT

SACCOs in Kenya have developed rapidly in terms of size, structure and variety of product and services. They have transformed gradually from manual system of operations to a more open, effective and competitive system which has led many SACCOs to automate their services and therefore adopt innovative channels for service delivery. An assumption of research in operations improvement and operations learning is that technological innovation has a direct bearing on organizational performance improvement. Though studies have looked at electronic banking and financial performance of financial institutions in Kenya, Less has been researched on e-banking effect on financial performance of SACCOs. This correlational research study sought to determine the effect of electronic banking on financial performance of SACCOs in Kenya. Secondary data was collected from published financial statements for a five year period (2010 to 2015) on return on assets, capital adequacy, liquidity, size, earnings ability and electronic banking. Regression analysis results establish that 6.2 percent of variations in financial performance are explained by variations in these factors. The study documents statistically significant positive relationships between electronic banking and financial performance of the SACCOs as well as between size and financial performance. It therefore recommends that SACCOs should invest in innovative electronic service provision channels to enhance their competitiveness and subsequently financial performance. Further smaller SACCOs should be encouraged and supported to be competitive in an environment where size influence performance. Further studies should focus on classifying the financial institutions as early or late adopters and investigations should incorporate other variables like costs of electronic banking implementation, training and outreach.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

SACCOs in Kenya have developed rapidly in terms of size, structure and variety of product and services. They have transformed gradually from manual system of operations to a more open, effective and competitive system which is able to offer an extensive range of products and services. The growth in products, services and membership has led many SACCOs to automate their services and therefore improved productivity (Oyugi, 2014). Most SACCOs provide Online Banking, Automated Teller Machine (ATM) Support, Short Message Service (SMS) and Mobile Banking system services.

Even though Kenya did not embrace electronic banking early compared to developed countries, this concept has gained recognition in the microfinance industry and it is considered as a means of gaining competitive advantage (Muriuki, 2009). It is envisaged that a host of benefits ranging from regulation, operational costs and accessibility of services will accrue to the institution and customers that adopt technology which will in turn impact on the firm's financial performance (Atavachi, 2013).

1.1.1 Electronic Banking

Electronic banking is the use of electronic and telecommunication networks to deliver a wide range of value added products and services to customers (Steven, 2002). According to Epstein (2004), the phrase e-banking refers to the process by which a customer may perform banking transactions electronically without visiting a brick and mortar institution and its logistical systems. Several terminologies refer to one or another form of electronic

banking: Personal Computer (PC) banking, online banking, internet or mobile banking (Atavachi, 2013). According to Okiro and Ndung'u (2013), mobile banking is one innovation which has progressively rendered itself in pervasive ways cutting across numerous sectors of the economy. Internet banking refers to the use of the internet as a delivery channel for banking services, which includes all traditional services such as balance enquiry, printing statement, fund transfer to other accounts, bills payments and new banking services such as electronic bill presentment and payment (Frust, Lang, & Nolle, 2000) without visiting a bank (Mukherjee & Nath, 2003).

The need for convenient ways of accessing financial resources beyond the conventional norms has seen steady progress in the scope of innovations emanating from exploitation of these fairly new technologies. From the customer's perspective, internet banking facilitates a convenient and effective approach to manage personal finances, as it is accessible 24 hours a day and 365 days in a year without visiting the bank and from any locations (Rotchanakitumunai & Speece, 2003). Technology enables provision of electronic services. For instance, a website can be viewed locally or internationally, enabling customers to find out more details about the products offered. It therefore reaches a larger target audience. Aduda and Kingoo (2012) concur that with online banking, individuals can check their account balances and make payments without having to go to the banking hall. They do this at their convenience using the ATM cards or over the internet at the comfort of their homes. Venansius (2014) thus notes that this helps reduce operational costs and improve service delivery.

1.1.2 Financial Performance of a SACCO

Van Horne and Wachowicz (2008) define financial performance as a subjective measure of the accountability of an entity for the results of its policies, operations and activities quantified for an identified period in financial terms. Letting (2009) underscore that firm performance relates to the efficiency and effectiveness of the organization. Lusthaus, (2000) prescribe effectiveness, efficiency, relevance and financial viability as the cardinal tenets of performance assessment. To measure the extent of success, Ochieng (2012) note that firms measure among others profitability using traditional performance measures. These measures may either be historical or comparative. Financial performance can be measured through various financial measures such as profit after tax, financial ratios, return on assets (ROA), return on equity (ROE), return on investment (ROI), earnings per share (EPS) and any market value ratio that is generally accepted.

The World Council of Credit Unions, Inc. (WOCCU) developed PEARLS financial performance monitoring system, to provide management guidance for credit unions and other savings institutions. PEARLS is a quantitative tool that attempts to remove the subjective elements of evaluation. It uses a set of financial ratios to measure key areas of credit union operations: Protection, Effective financial structure, Asset quality, Rates of return and costs, Liquidity, and signs of growth. The PEARLS system provides performance standards for the key disciplines of prudent financial management (Branch and Klaehn, 2008). Other monitoring systems, such as the CAMEL model, include qualitative measures of evaluation and indicators that are specific to microfinance institutions. The key indicators of CAMEL are: Capital adequacy, Asset quality, Management, Earnings, and Liquidity management (Cifuentes, 2008).

According to Kariuki (2014), evaluating the financial performance of a business allows decision-makers to judge the results of business strategies and activities in objective monetary terms. It therefore facilitates measurement of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation.

1.1.3 Relationship between E-Banking and Performance of SACCO

In today's intensely competitive economy, providing excellent customer service plays a vital role in a company's success and failure (Mouawad & Kleiner, 1996). Technology has greatly advanced playing a major role in improving the standards of service delivery in the financial institution sector. Customers are conscious of technological advancements and demand higher quality services (Okiro and Ndung'u, 2013). They demand for variety, convenience and new services. They want products that can meet their precise, individual needs. Gitau (2011) noted that technology boom in the past decades has helped financial institutions to respond to this challenge. This is crucial as an organization's ability to perform financially is critical to its survival in the short and in the long run (Aduda and Kingoo, 2012).

Theoretically and empirically, a lot of investigations into the relationship and effects of e-banking on financial performance has been done in the traditional banking service context (Muhammad and Mainudin, 2006). The literature indicates that service quality is a key driver of profit in any profit oriented service organization (Okiro & Ndung'u, 2013). Ombado (2009) noted that having electronic services permits SACCOs to cut cost sharply and in return, the quality of services contributes to the improvement of profitability. It's with this respect that e-banking is positively related to financial performance of SACCOs.

1.1.4 SACCOs in Kenya

The savings and credit cooperative movement in Kenya has had tremendous growth, going by its popularity among the ordinary Kenyans. However, the biggest milestone has been the incorporation of technology in their operations, a move that has seen SACCOs improve efficiency, curb fraud and improve service efficiency to clients (Venansius, 2014). He examined one such SACCO. The Kirinyaga based Bingwa SACCO scooped ten awards in the 2014 national cooperative awards. As of 11 July 2014, the little known SACCO boasted of a 9.4 billion shillings loan portfolio and rapid expansion thanks to the use of technology in its operations.

According to Nyangosi et al. (2009), ATM banking is one of the earliest and widely adopted retail e-banking services in Kenya. However, according to an annual report by Central Bank of Kenya (CBK), its adoption and usage has been surpassed by mobile banking in the last few years (CBK, 2008). The suggested reason for this is that many low income earners now have access to mobile phones. Since the introduction of e-banking in Kenya, SACCOs have witnessed many changes. Customers now have access to fast, efficient and convenient banking services. Okiro and Ndung'u (2013) note that most SACCOs in Kenya are investing large sums of money in information and communication technology (ICT). This offers them a competitive advantage.

1.2 Research Problem

A fundamental assumption of most recent research in operations improvement and operations learning has been that technological innovation has a direct bearing on performance improvement. In the current era, many business entities are embracing technology in order to cope with the global needs of their customers and generation of

accurate and reliable management reports (Oyugi, 2014). Strategic management in financial institutions, demand that they should have effective systems in place to counter unpredictable events that can sustain their operations while minimizing the risks involved through technological innovations. Only institutions that are able to adapt to their changing environment and adopt new ideas and business methods have guaranteed survival. Okiro and Ndung'u (2013) identify some of the forces of change which have impacted the performance of financial institutions to mainly include technological advancements such as use of mobile phones and the internet. The service industry in particular has moved towards the use of automated services mainly internet as an additional option for remote services to their customers instead of only traditional face to face service delivery. This has increased the service quality outreach to many remote parts of the world (Oyugi, 2014). SACCOs in particular are adopting e-banking in order to keep pace with the demands of the world, to counter competition and to improve financial performance.

Many SACCOs in Kenya have adopted the use of automated channels to deliver services. Ukulima SACCO, Mwalimu SACCO, and Stima SACCO are few of the SACCOs which have membership spread all over the nation with members accessing services from anywhere they are with the use of Sacco Link to withdraw money through the ATM; use of M-Sacco to access money through their phones and even accessing statements online (Oyugi, 2014). Customers therefore enjoy efficient, fast and convenient banking services. Whereas this has improved services to members, technology investment takes up larger amounts of the firms' resources. It is therefore important that e-banking innovations are made by sound analysis of risks and costs associated to avoid harm on performance. On

one hand performance is directly related to efficiency and effectiveness of electronic banking, but on the other tight controls and standards are needed to prevent losses associated with e-banking. SACCOs have to balance these two options in order not to impair their overall prosperity. This is only possible if overall effects of e-banking on SACCOs and its customers are well analyzed and understood (Aduda and Kingoo, 2012).

E-banking has made banking transactions easier around the World. Venansius (2014) carried out a study on using technology to enhance service delivery in a SACCO. He concludes that technology is a tool that should be exploited to enhance service delivery in SACCOs. It not only creates competitive advantage but also enhances business growth and stability. DeYoung et al. (2006), carried a study on how the internet affects output and performance at community banks. The study revealed that internet banks became more profitable (ROA and ROE) relative to their brick and mortar rivals between 1999 and 2001. Internet adoption improved bank profitability, particularly through increased revenues from deposit service charges. In the global arena, most materials were on effect of e-banking on commercial banks and community banks. Less has been done on SACCOs.

Previous studies done in Kenya on e-banking include impacts of mobile and internet banking on financial performance in financial institutions (Okiro & Ndung'u, 2013), relationship between e-banking and financial performance in banks (Aduda & Kingoo, 2012), and effect of automated service on financial performance of SACCOs (Oyugi, 2014). Less has been researched on e-banking effect on financial performance of SACCOs. Therefore, this study focused on assessing the effect of e-banking on financial

performance of SACCOs. According to Oyugi (2014), preference of service quality by customers has a significant impact on a SACCO's success and analyzing the markets based on the customers perceptions, designing a service quality system that meets different demands are pertinent objectives for SACCOs to gain and retain competitive advantage. It is with this background that this study sought to address the research question: "What is the effect of electronic banking on financial performance of SACCOs in Kenya?"

1.3 Research Objectives

The objective of the study was to determine the effect of electronic banking on financial performance of SACCOs in Kenya.

1.4 Value of the Study

The rapid development of electronic services in this technology oriented environment necessitates the need for further research in this area. Studies indicate that the quality issues of automated services in the banking context are becoming important because of their potential influence on: attractiveness, customer retention, profitability, positive word-of mouth, and maximum competitive advantages (Santos, 2003).

It is anticipated that the findings of the study are useful to a number of groups among them the SACCO Management who uses the study to have an insight on the benefits of e-banking and what it entails. It also guides them in decision making on operations that need to be automated or enhanced via internet banking. They are thus able to know whether their investments into electronic banking have actually paid off through enhanced financial performance. By so doing, top management can make an informed decision on whether to continue offering such banking services.

The study is also crucial to emerging SACCOs as it provides answers to the factors against the implementation of internet banking in Kenya, prove of the success and growth associated with the implementation of internet banking and highlights the areas of banking operations that can be enhanced via internet banking. Players in the financial institution sector and telecommunications industry also find the study useful as they can use the findings to strategize on how they can mutually benefit from this development.

As both owners and customers, SACCO members also benefit from the study as helps them to understand the different forms of e-banking services adopted by their respective SACCOs. They can thus take full advantage of the services offered. Finally, this study adds to the existing literature, and is valuable to researchers, academicians and individuals who want to learn more about electronic banking. It therefore acts as a reference point for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter seeks to explore in depth the concept of electronic banking through a review of the various theories as well as empirical studies. The review has drawn materials from several sources that are closely related to the theme and objective of the study.

2.2 Theoretical Review

This section reviews the theories that guided the study. In particular, the study looks at the diffusion of innovation theory which explains how over time, an idea or product gains momentum, diffuses and is adopted by a specific population or social system. It then reviews the technology acceptance theory, which holds that perceived usefulness and perceived ease of use of innovation play an important role from the perspective of innovation acceptance behavior. It also reviews the Technology, Organization and Environment framework which identifies three aspects of an enterprise's context that influence the process by which it adopts and implements a technological innovation.

2.2.1 Diffusion of Innovation Theory

Diffusion of Innovation (DOI) Theory, developed by Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system,

adopt a new idea, behavior, or product. Rogers (1995) identified five critical attributes that greatly influence the rate of adoption. He proposed that the rate of adoption of new innovations will depend on how an organization perceives its relative advantage, compatibility, triability, observability and complexity.

With regard to e-banking, this theory cannot be ignored. Innovation is vital in order for a firm to sustain its performance if not increase it. Beaver (2002) noted that innovation is an essential condition to economic progress and a critical element in the competitive struggle of both enterprises and nation states. SACCOs need to adapt to new use of automated services contrary to the traditional way of operations they had long adopted. If they observe the benefits of mobile and internet banking, SACCOs will adopt these innovations over time given other factors such as the availability of the required tools. Since the decision to adopt an innovative idea is critical to an organization, SACCOs do well to assess the following critical factors which determine the adoption of an innovation at the general level: relative advantage (the degree to which it is perceived to be better than what it supersedes); compatibility (consistency with existing values, past experiences and needs); complexity (difficulty of understanding and use); triability (the degree to which it can be experimented with on a limited basis); and observability (the visibility of its results).

2.2.2 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how

and when they will use it, notably: perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness is defined by Davis as the degree to which a person believes that using a particular system would enhance his or her job performance. Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free from effort. These two beliefs, according to TAM, determine one's intention to use technology.

This theory is important when it comes to e-banking as its adoption is dependent on its perceived usefulness and perceived ease of use. It is relevant for this study as it helps decision makers understand the process of user acceptance of innovation. Oyugi (2014) stated that the use of an information system is determined by the behavioral intention, but on the other hand, the behavioral intention is determined by the person's attitude towards the use of the system and also by his perception of its utility. System acceptance will suffer if users do not perceive a system as useful and easy to use (Parisa, 2006). According to Davis (1986), the attitude of an individual is not the only factor that determines his use of a system, but is also based on the impact which it may have on his performance. Therefore, even if an employee does not welcome an information system, the probability that he use it is high if he perceives that the system improve his performance at work. SACCO employees have had no option but to accept process automation so that work is reduced and efficiency achieved (FSD Kenya, 2010). Bertrand and Bouchard (2008) indicate that a number of analyses on the TAM have demonstrated that it is a valid, robust, and powerful model for studying user acceptance of innovation.

2.2.3 Technology, Organization, and Environment Context (TOE)

The TOE framework was developed in 1990 by Tornatzky and Fleischer. It identifies three aspects of an enterprise's context that influence the process by which it adopts and implements a technological innovation: technological context, organizational context, and environmental context. Technological context describes both the internal and external technologies relevant to the firm. Organizational context refers to descriptive measures about the organization such as scope, size, and managerial structure. Environmental context is the arena in which a firm conducts its business—its industry, competitors, and dealings with the government. Thus, these three elements influence the way a firm sees the need for, searches for, and adopts new technology.

This framework is consistent with the DOI theory, in which Rogers (1995) emphasized individual characteristics, and both the internal and external characteristics of the organization, as drivers for organizational innovativeness. These are identical to the technology and organization context of the TOE framework, but the TOE framework also includes a new and important component, environment context. The environment context presents both constraints and opportunities for technological innovation. While looking into whether to adopt e-banking services or not, SACCOs take into account technological, organizational and environmental contexts. This theory is relevant to this study since investing in new technology takes up large sums of the SACCOs resources. It therefore offers a wide context to weigh whether to adopt e-banking or not, looking at the technology relevant to the firm, the scope and managerial structure that will lead to its success and the environment it is operating on, having in mind competitors and other players in the market.

2.3 Determinants of Financial Performance of SACCOs

Financial performance for SACCOs is very important because managers need to know how well the SACCOs are performing. Based on WOCCU's standards of measuring performance, the factors which determine the performance of SACCOs include; asset base, Liabilities, Performance of the loan book, corporate governance and the quality of staff and Regulations in the industry. Additional variables affecting SACCO performance include; investment decisions, loan defaulting, misappropriation of funds and member withdrawal.

The CAMEL framework is often used to assess financial performance. CAMEL is an acronym that stands for Capital adequacy, Asset quality, Management, Earnings ability and Liquidity. These are explained as below:

2.3.1 Capital Adequacy

Njiru (2014) defined Capital adequacy as the level of capital required by firms to enable them withstand the risks such as credit, market and operational risks they are exposed to in order to absorb the potential losses and protect their debtors. Capital provides a cushion to fluctuations in earnings so that firms can continue to operate in periods of loss or negligible earnings. It also provides a measure of reassurance to the members that the organization will continue to provide financial services (Karagu and Okibo, 2014). Maintaining an adequate level of capital is a critical element. Included in the assessment of capital is; Leverage, ability to raise equity, and adequacy of reserves.

2.3.2 Asset Quality

The asset quality rating is a function of present conditions and the likelihood of future deterioration or improvement based on economic conditions, current practices and trends. The quality and trends of all major assets must be considered in the rating. This includes loans, investments, other real estate owned and any other assets that could adversely impact a firm's financial condition (Karagu and Okibo, 2014). Savings-based institutions must generate income to pay returns to savers if they are to continue to attract deposits. When loans become delinquent, when fixed assets are high in relationship to total assets, or when an institution invests savings in non-earning assets, the institution will fail to produce the income necessary to pay financial costs and operating expenses.

2.3.3 Management

The performance of management is often expressed qualitatively through subjective evaluation of management systems, organizational discipline, control systems and quality of staff. Some financial ratios such as total asset growth, loan growth rate and earnings growth rate act as a proxy for management efficiency. One of the major ratios used to measure management quality is operating profit to income ratio. The higher the operating profits to total income (revenue) the more the efficient management is in terms of operational efficiency and income generation. However, it is generally difficult to capture management efficiency with financial ratios (Njiru, 2014). The key indicators to be assessed here include; Governance/management, human resources, processes, controls and audits, information technology, and strategic planning and budgeting.

2.3.4 Earnings

According to Karagu and Okibo (2014), the continued viability of a financial firm depends on its ability to earn an appropriate return on its assets which enables the institution to fund expansion, remain competitive, and replenish and/or increase capital. In evaluating and rating earnings, it is not enough to review past and present performance alone. Future performance is of equal or greater value, including performance under various economic conditions. Examiners evaluate "core" earnings: that is the long-run earnings ability of a firm discounting temporary fluctuations in income and one-time items. A review for the reasonableness of the firms' budget and underlying assumptions is appropriate for this purpose. Examiners also consider the interrelationships with other risk areas such as credit and interest rate. The variables to look for are adjusted return on equity, operational efficiency, adjusted return on assets, and interest rate policy.

2.3.5 Liquidity

Dang (2011) defines liquidity as the ability of a firm to fulfill its current obligations. Examiners review interest rate risk sensitivity and exposure; reliance on short-term, volatile sources of funds, including any undue reliance on borrowings; availability of assets readily convertible into cash; and technical competence relative to Asset Liability Management, including the management of interest rate risk, cash flow, and liquidity, with a particular emphasis on assuring that the potential for loss in the activities is not excessive relative to its capital (Karagu and Okibo, 2014). Key indicators assessed include; Liability structure, availability of funds to meet credit demand, cash flow projections, and productivity of other current assets.

2.4 Empirical Studies

Santomer and Seater (1997) carried out an investigation on the impact of use of internet on financial services in Europe. A cross sectional survey was conducted out in 55 micro finance institutions and the results showed a positive relationship between use of internet and increased accessibility of financial services.

Kegan et al. (2005) examined the impact of online banking applications on community banks performance in America. The study used a structural equation model to create an online banking index and an econometric model to evaluate bank performance. A survey of ten community banks was conducted. The results indicated that banks that provide extensive online banking services tend to perform better than those who lag behind. In addition, online banking helps community banks improve their earnings ability as measured by return on equity and improve asset quality.

Soroor and Toosi (2005) observed that the recognition of mobile banking service in m-commerce depended upon the cost effectiveness introduced to the traditional banking system. Mobile banking offered customers reduced service charges than traditional banking charges. This was an incentive offered by the banks to use the technology and to attract customers, to increase their profit margin. The repercussions of mobile technology were not necessarily transformed into financial profits, but often passed to the customer in the form of reduction in prices. Adoption of mobile banking enhanced the performance of a bank in terms of reduction in costs, such as transaction, administration and promotion costs.

Sumra et al. (2011) examined the impact of e-banking on profitability of Pakistani banks. The study was carried out by assessing the qualitative factors determining the impact of e-banking. The study showed that e-banking has increased the profitability of banks, has enabled banks meet their costs and has enabled them earn profits even in the short span of time.

Ombati et al. (2010), tried to establish the relationship between technology and service quality in the banking industry in Kenya. A cross-sectional survey design was conducted with a sample size of 120 customers. The findings revealed that there is a direct relationship between technology and service quality which can translate to performance of the bank.

Sonja (2010) researched on the effects of computerization on saving and credit cooperatives in Uganda and found out that Technology is likely to increase the efficiency, outreach and sustainability of microfinance institutions. The study found out that technology has positively influenced SACCOs by making daily work easier and quicker and recommended that as technology evolves, more training is required to ensure necessary human resource capacity.

Mutua (2011) studied the impact of mobile banking on financial performance of commercial banks in Kenya. The study concluded that there is a weak but positive relationship between mobile banking and financial performance of commercial banks in Kenya. This could be attributed to the trends which showed that financial performance of commercial banks was affected majorly by macro-economic variables like post-election violence, inflation and foreign exchange rates fluctuations among other macro-economic variables.

Aduda & Kingoo (2012) investigated the relationship between e-banking and performance of Kenyan banking systems. The study revealed that there exist a positive relationship between e-banking and bank performance since e-banking has brought services closer to bank customer's hence improving banking industry performance.

Okiro & Ndung'u (2013) studied the impact of mobile and internet banking on performance of financial institutions in Kenya. This study focused on financial institutions as a whole. They surveyed a representative sample of financial institutions within Nairobi and found that commercial banks had the highest rate of usage of internet banking among the financial institutions sampled. SACCOs are slowly adopting internet banking, while micro finance institutions have not yet adopted internet banking. The study found that mobile banking faces various challenges among them being, system delays by the mobile money transfer service providers, slow processing of transactions, high transactions costs, limit on the amount of money that can be withdrawn in a day and fraud.

Maiyo (2013) conducted a study on the effect of electronic banking on the performance of commercial banks in Kenya. The study found that the adoption of e-banking has enhanced performance of commercial banks due to increased efficiency, effectiveness and productivity. The study revealed that fees and commission from debit cards, credit cards and mobile banking has a significant effect on returns on asset whereas fees and commission from internet banking as well as the amount of money that commercial banks invest in electronic banking to install, train staff and maintain the platforms has no or minimal effect on return on assets.

Oyugi (2014) conducted a study to determine the effect of automated service on financial performance of SACCOs licensed by SASRA in Kenya. A sample of 45 licensed SACCOs based in Nairobi and Kiambu Counties were selected. The study found out that all the SACCOs had undertaken automation of BOSA and FOSA operations in the last 5 years. The study also found out that majority of the SACCOs introduced internet banking services, mobile banking and ATM services. These reduced the dependence on the branch network as a core delivery mechanism. The study deduced that taking into consideration all the five factors (expenditure in internet banking, expenditure in automation, expenditure in mobile banking, number of ATM cards issued and size of the SACCO), there is a positive effect on financial performance of SACCOs licensed by SASRA. The study concluded that generally, automated services have a positive influence on the financial performance of SACCOs in Kenya.

2.5 Summary of the Literature Review

This chapter reviewed literature related to the subject of the effect of electronic banking on the financial performance of financial institutions. Kenyan financial institutions, SACCOs included have embraced the use of ICT in their service provision with the aim of improving the quality of customer service and satisfy their customers' desires to make business processes better. The ability of financial institutions to deliver products and services in the most efficient and effective manner is therefore key to performance and relevance. Research has shown this to have a positive impact on the performance of the SACCOs. According to Williams and Torma (2007), mobile transactions can simultaneously enhance the outreach of financial services, reduce information

asymmetries and provide relatively low cost informational and transactional financial products. It therefore has the potential to transform the access to finance for a significant number of people. It brings closer to reality the aspiration to provide mass access to finance to all countries and income groups.

Studies have been done on the effect of electronic banking on financial performance of commercial banks (Aduda & Kingoo, 2012) and (Njiru, 2014); impact of mobile and internet banking on performance of financial institutions (Okiro & Ndung'u, 2013); effect of electronic banking on financial performance of deposit taking micro finance institutions (Atavachi, 2013). From the studies above, little has been researched on effect of e-banking on financial performance of SACCOs. In the global arena, most materials were on effect of e-banking on commercial banks and community banks. Less has been done on SACCOs. Therefore, there is need to do further research on the effect of electronic banking on financial performance of SACCOs. Since SACCOs operate in this dynamic ever changing environment, this study sought to seek the effect of electronic banking on financial performance of SACCOs in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a detailed discussion of the research methodology applied in carrying out the study. It discusses the research design, the population of study, sample and sampling techniques, data collection methods as well as data analysis and data presentation methods that were employed in the study.

3.2 Research Design

A research design is the plan used to conduct a research and to obtain answers to research questions. Research design refers to the way the study is designed, that is the method used to carry out the research (Mugenda and Mugenda, 2003). A correlational research design was employed in this study. It involved the investigation in which quantity data was collected and analyzed in order to determine if there is a relationship (or co-variation) between two or more variables (a similarity between them, not a difference between their means). The correlation could be positive or negative.

3.3 Population

A population is defined as the total collection of elements about which we wish to make some inferences. According to Cooper and Schindler (2003), a population element is the subject such as a person, an organization, customer database, or the amount of quantitative data on which the measurement is being taken. The population under study was made up of 181 SACCOs. The number was obtained from a list of licensed SACCOs provided by SASRA, as registered under the SACCO Societies Act of Kenya for the financial year ending December 2014 (see attached appendix two).

3.4 Sampling and Sample Size

Owing to the widespread distribution of SACCOs all over the country, the study sampled institutions which are within Nairobi for ease of data collection. The sampling procedure applied was convenience sampling method which involved selection based on availability (ease of access) of the population units. Convenience sampling is a form of non-probability sampling. It involved a deliberate selection of particular units of population to constitute a sample representing the population. It was preferred for this study as it is made up of units which are easy to access and is relatively fast and inexpensive in terms of cost and time required. This technique was applied to select 42 SACCOs which are based within Nairobi and were expected to be able to give response to the study (attached as appendix three).

3.5 Data Collection

The research used secondary data. A secondary data collection template, (attached as appendix one) was developed and shared with Managers and senior staffs of the various SACCOs. This source of data collection was appropriate as it was less costly in terms of time and more flexible for busy respondents. Secondary data was collected from published documents such as annual reports, audited accounts and journals. The study reviewed secondary data for a period of five years (2010-2014) based on availability and accessibility of data. The volume and value of transactions processed through electronic mode were compared against manual transactions processed. Data on total assets owned by the SACCO, profit after tax, expenditure on ICT investments, number of ATMs installed, number of debit cards issued and return on assets were collected from the SACCOs audited records. This aided in measuring the financial performance of the SACCOs. One such measure was calculating the return on assets (ROA).

3.6 Data Analysis

The study intended to use both descriptive and inferential statistics to analyze the data.

3.6.1 Analytical Model

Descriptive statistics such as mean scores and frequencies were calculated and tabulated in frequency tables, pie charts or bar charts for easier understanding and presentation. In order to test the relationship between the variables, inferential tests such as correlation coefficient and regression analysis were employed. The variables considered in this study to measure the effect of electronic banking on financial performance of SACCOs included: investment in electronic banking (both internet and mobile) measured in Kenya Shillings, the number of debit cards issued and the size of the SACCO. Other variables included: the capital adequacy, asset quality, management efficiency, earnings and liquidity levels. The multiple linear regression model was used to establish the effect of e-banking on financial performance of SACCOs. The regression model below was used to establish the relationship:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + \varepsilon$$

Where;

Y – Financial performance measured by Return on Assets

a – Constant; X_1 – Investment in electronic banking measured in Kenya shillings

X_2 – Number of debit cards issued; X_3 – Size of the SACCO

X_4 – Capital adequacy measures; X_5 – Measures on Asset quality

X_6 – Management efficiency measures; X_7 – Earnings ability measures

X_8 – Liquidity measures; ε – Standard error.

Table 3.1 Operationalization of study variables

Variables	Indicators	Measure	Adapted from
Financial Performance	Return on Assets (ROA)	Net income divided by average total assets	Atavachi, 2013
Investment in e-banking	Assets invested in electronic banking	Total assets invested in e-banking	Njiru, 2014
Number of debit cards issued	Measured as log of number of debit cards issued	Formula: $\log e^x$	Atavachi, 2013
Size of the SACCO	Measured as log of total assets	Formula: $\log e^x$ Where x is the power to which e would have to be raised to equal x	Njiru, 2014
Capital adequacy	Total capital	Total Capital to Total Assets	Dang, 2011
Asset quality	Non-Performing Loans	Non-Performing Loans divided by Total Loans	Dang, 2011
Management efficiency	Operating profit margin	Operating profit to income ratio	Njiru, 2014
Earnings ability	Return on Equity (ROE)	Net income over shareholders' equity	Karagu and Okibo, 2014
Liquidity	Customer deposits	Total customer deposits to total assets	Dang, 2011

3.6.2 Tests of Significance

The significance of the model was tested using the F- test at 5% level of significance. Analysis of variance (ANOVA) was applied. The correlation coefficient, R and coefficient of determination, R^2 was used to test the significance of the regression model in explaining the relationship between e-banking and financial performance.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATION

4.1 Introduction

This section contains data analysis that was done in the study. It also gives the findings, discussions and interpretation of the results. The study sought to determine the effect of electronic banking on financial performance of SACCOs in Kenya.

4.2 Descriptive Statistics

Data on E – banking proxied by number of debit and credit cards issued, performance proxied by return on assets, size proxied by total assets, capital adequacy, liquidity and earnings ability of the 42 SACCOs was collected for five years which yielded 210 observations as presented in table 4.1 below.

Table 4.1: Descriptive Statistics

	N	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error
ROA	210	.0578	.19519	4.865	.168
E banking	210	9.0658	1.11581	.566	.168
Size	210	21.4741	1.53357	-.741	.168
Capital adequacy	210	1.8651	10.78593	6.285	.168
Liquidity	210	18.8293	113.36330	6.289	.168
Earnings ability	210	31.5009	170.70302	6.245	.168
Valid N (listwise)	210				

As presented in table 4.1 above, the mean ROA for the SACCOs in the period is 5.78% with a standard deviation of 0.195. The ROA data is positively skewed. The Mean Log of number of debit cards issued by the SACCOs in the period is 9.065 with a standard deviation of 1.115. E banking data is positively skewed. The Mean log of the SACCOs

total assets is 21.474 with a standard deviation of 1.533. SACCO size data is negatively skewed. The average level of capital adequacy is 1.865 for the SACCOs with a standard deviation of 10.785. Capital adequacy data has a positive skew. The average liquidity ratio is 18.829 with a standard deviation of 113.363. The liquidity data is positively skewed. The average earnings ability ratio for the SACCOs in the period is 31.500 with a standard deviation of 170.703. The earnings ability data has a positive skew. These data descriptives shows on average good financial performance, liquidity and capital adequacy of the SACCOs with notable prospects of growth.

4.3 Diagnostic Statistics

To test for serial correlatio of the data set, the Durbin watson test was conducted. The value of Durbin Watson statistic ranges from 0 to 4. As a rule of thumb, The residuals are considered uncorrelated when the Durbin watson statistic is approximately 2. A value close to 0 indicates strong positive correlation, while a value of 4 indicates strong negative correlation. As Presented in table 4.2 a below, the value of Durbin-Watson is 1.345, approximately close to 2, indicating no serial correlation.

Table 4.2 a: Model Summary^b

Model	Durbin-Watson
1	1.345 ^a

a. Predictors: (Constant), EarningsAbility, Liquidity, Ebanking, Size, CapitalAdequacy

b. Dependent Variable: ROA

Multicollinearity in the study is tested using variance inflation factor (VIF) and Tolerance. The reciprocal of tolerance known as the variance inflation factor (VIF) shows how much the variance of the coefficient estimate is being inflated by multicollinearity. A VIF for all the independent and dependent variables less than 3 ($VIF \leq 3$) indicates no multicollinearity while a VIF of ≥ 3 indicates collinearity and more than 10 indicates a problem with multicollinearity as explained by Myers (1990). The Tolerance Statistics values below 0.1 indicate a serious problem while those below 0.2 indicate a potential problem as shown by Menard (1995). As indicated in table 4.2 b, all the variables tolerance levels are greater than 0.2 and all the VIF factors are less than 3 implying that the regression data are not prone to multicollinearity problems.

Table 4.2 b: Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ebanking	.474	2.110
	Size	.369	2.711
	CapitalAdequacy	.536	2.712
	Liquidity	.534	2.731
	EarningsAbility	.941	1.063

a. Dependent Variable: ROA

4.4 Correlation Analysis

Correlation analysis results presented in table 4.3 indicate weak positive relationships between performance and E banking ($r= 0.096$), Size ($r=0.129$), Capital adequacy ($r = 0.026$), Liquidity ($r = 0.026$) and earnings ability ($r=0.039$). These findings suggest that performance associates weakly but positively with the adoption of e- banking, capital adequacy, liquidity and earnings ability though the associations are not statistically significant.

Table 4.3: Correlations

	ROA	E banking	Size	Capital Adequacy	Liquidity	Earnings Ability
ROA	1					
E banking	.096	1				
Size	.129	.262**	1			
Capital Adequacy	.026	.403**	-.563**	1		
Liquidity	.026	.405**	-.559**	1.000**	1	
Earnings Ability	.039	.201**	.182**	-.028	-.027	1

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

As indicated in table 4.3 above, there are statistically significant weak positive associations between E – banking adoption and Earnings ability ($r = 0.201$), Size ($r = 0.262$), Capital adequacy ($r = 0.403$) and Liquidity ($r = 0.405$). The study establishes a statistically significant perfect positive relationship between capital adequacy and liquidity ($r=1.000$) which shows that SACCO liquidity is positively supported by capital from owners contributions. The association between Earnings ability and capital adequacy ($r = -0.028$) and Liquidity ($r = -0.027$) are weak and negative.

4.5 Electronic Banking and Performance

The study sought to determine the relationship between electrobnic banking and financial performance of the SACCOs. As presented in table 4.4 a below, 6.2 percent of variations in financial performance of the SACCOs is explained by variations in the independent variables that consist of Earnings ability, Liquidity, Capital adequacy, E banking and bank size. The adjusted R Square of 0.062 imply that upto 93.8 percent of variations in SACCO financial performance is explained by other factors not included in the current model.

Table 4.4 a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.291 ^a	.085	.062	.1890094

a. Predictors: (Constant), Earnings Ability, Liquidity, E banking, Size, Capital Adequacy

Table 4.4 b below shows that the regression model is significant with F statistic of 3.779 and $P < 0.05$ which indicates that the points lie moderately close to the line of best fit in the scatter diagram. This indicates that the model is relatively suitable in explaining the variance of financial performance of the SACCOs as explained by the variance in earnings ability, Liquidity, E- banking services, capital adequacy and SACCO size.

Table 4.4 b: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.675	5	.135	3.779	.003 ^b
	Residual	7.288	204	.036		
	Total	7.963	209			

a. Dependent Variable: ROA

b. Predictors: (Constant), Earnings Ability, Liquidity, E banking, Size, Capital Adequacy

Table 4.4 c below provides the coefficients from the regression analysis. As presented in the table, there is a statistically significant weak positive relationship between E banking and financial performance of the SACCOs ($\beta=0.347$, $t = 3.569$, $p<0.05$). This suggests that for a unit increase in E banking, there is an increase in financial performance of 0.347. This finding is consistent with earlier findings by Oyugi (2014), Aduda and Kingoo (2012), Okiro and Ndungu (2013) and Maiyo (2013) who established that adoption of electronic banking positively supported financial performance of the respective financial institutions.

Table 4.4 c: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.640	.240		-2.664	.008
	E banking	.061	.017	.347	3.569	.000
	Size	.057	.014	.451	4.086	.000
	Capital Adequacy	.088	.071	4.853	1.234	.218
	Liquidity	.008	.007	4.487	1.147	.253
	Earnings Ability	0.001	.000	.038	548	.584

a. Dependent Variable: ROA

From table 4.4 c, it is imperative that the fitted regression model is:

$$\text{ROA} = -0.064 + 0.347 (\text{E banking}) + 0.451 (\text{Size}) + 4.853 (\text{Capital Adequacy}) + 4.487 (\text{Liquidity}) + 0.038 (\text{Earnings Ability})$$

The study establishes a statistically significant positive relationship between SACCO size and financial performance ($\beta=0.451$, $t=4.086$, $p<0.05$). This finding suggests that for a unit increase in SACCO size, there is a proportionate increase in financial performance to the extent of 0.451. This finding is consistent with Short (2009) and Oyugi (2013) proposals that financial institutions expand at a faster rate with the intention of earning more profits in the future.

The relationship between capital adequacy and financial performance is not statistically significant. As presented in table 4.4 c, there is a positive relationship between capital adequacy ($\beta=4.853$, $t = 1.234$, $p>0.05$) and SACCO financial performance. This finding indicates that for a unit increase in capital adequacy, there is a corresponding increase in SACCO financial performance up to 4.853 times.

The relationship between liquidity and financial performance is not statistically significant. As presented in table 4.4 c, for a unit increase in Liquidity, there is a corresponding increase in SACCO financial performance of up to 4.487 times ($\beta=4.487$, $t=1.147$, $p>0.05$).

Earnings ability also has a positive but not statistically significant effect on financial performance of the SACCOs. The regression estimates in Table 4.4 c infer that for a unit increase in earnings ability (opportunities), there is a corresponding increase in SACCO return on assets by up to 0.038 times ($\beta=0.038$, $t=0.548$, $p>0.05$). This is possible explained by the competition in the financial services industry that limits the existence of earnings opportunities.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the key elements of the study, discussion of major key and interpretation of the results. The chapter further presents the conclusions drawn from the research findings as well as recommendations for improvement and suggestions for further research.

5.2 Summary of Findings

The study sought to determine the effect of electronic banking on financial performance of SACCOs in Kenya. Secondary data was collected from 42 SACCOs for the period 2010 to 2014. The secondary data extracted from the published financial statements were for net income, total assets, number of debit cards issue, total shareholders' equity and total capital. These data sets were useful in deriving annual SACCO performance (return on assets), electronic banking (debit cards), capital adequacy, SACCO size, SACCO liquidity and Earnings ability.

Correlation analysis results suggest weak positive relationships between performance and E banking ($r= 0.096$), Size ($r=0.129$), Capital adequacy ($r = 0.026$), Liquidity ($r = 0.026$) and earnings ability ($r=0.039$) which are however not statistically significant. The association between Earnings ability and capital adequacy ($r = -0.028$) and Liquidity ($r = -0.027$) are weak and negative and are not statistically significant.

The study establishes a statistically significant perfect positive relationship between capital adequacy and liquidity ($r=1.000$) of the SACCOs as well as statistically significant weak positive associations between E – banking adoption and Earnings ability ($r = 0.201$), Size ($r = 0.262$), Capital adequacy ($r = 0.403$) and Liquidity ($r = 0.405$).

The regression analysis results show that 6.2 percent of variations in financial performance of the SACCOs is explained by combined variations in Earnings ability, Liquidity, Capital adequacy, E- banking adoption and bank size. This finding implies that upto 93.8 percent of variations in SACCO financial performance is explained by other variables that are not included in the current study.

Regression analysis establish a statistically significant weak positive relationship between E- banking adoption and financial performance of the SACCOs which suggest that for a unit increase in E- banking adoption, there is an increase in SACCO ROA of 0.347. This finding confirms earlier propositions by Oyugi (2014), Aduda and Kingoo (2012), Okiro and Ndungu (2013) and Maiyo (2013) that adoption of electronic banking positively influences financial performance of the financial institutions.

The study further finds statistically significant positive relationship between SACCO size and financial performance which suggests that for a unit increase in SACCO size, there is a proportionate increase in financial performance of the SACCOs to the extent of 0.451. This finding is also consistent with Short (2009) and Oyugi (2013) arguments that financial institutions expand at a faster rate with the intention of earning more profits in the future.

The study suggests that for a unit increase in capital adequacy, there is a corresponding increase in SACCO financial performance up to 4.853 times. Also, for a unit increase in Liquidity, there is a corresponding increase in SACCO financial performance of up to 4.487 times. For a unit increase in earnings ability (opportunities), there is a corresponding increase in SACCO return on assets by up to 0.038 times. These relationships are however not significant.

5.3 Conclusions

The findings of statistically significant weak positive associations between SACCO electronic banking adoption and SACCO earnings ability, SACCO size, SACCO Capital adequacy and SACCO Liquidity imply that there is a weak positive movement between electronic banking adoption on one hand and these other attributes. The statistically significant perfect positive association between capital adequacy and liquidity shows that SACCO liquidity is positively supported by capital from owners contributions.

The findings of statistically significant positive relationships between adoption of electronic banking and financial performance of the SACCOs leads to the inference that application of innovative approaches enhance financial inclusivity and subsequently financial performance of financial institutions. It therefore supports the financial innovations theory and the Technology acceptance models.

Size also positively has an influence on financial performance which infers that bigger financial institutions perform better than the smaller financial institutions possibly because of stability and trust bestowed on them by the clientele and other stakeholders.

5.4 Recommendations

In view of the research findings, a statistically significant positive relationship is evident between electronic banking and financial performance which imply that there is increased value for electronic banking adoption amongst the SACCOS. There should therefore be harmonization and review of the SACCO electronic banking models and approaches to enhance their financial performance. This should include innovation and introduction of newer approaches.

The study documents a statistically significant positive relationship between size and financial performance of the SACCOs. This is an indication of trust and stability on bigger institutions. Efforts should be directed on supporting the smaller financial institutions to be able to compete adequately with the larger institutions.

5.5 Limitations of the Study

Secondary data was collected from the specific SACCOs financial reports. The study was therefore limited to the degree of precision of the data obtained from the secondary source. While the data was verifiable since it came from the firms publications which are filed with the ministry of trade, it nonetheless could still be prone to these shortcomings.

The study was based on a five year study period from the year 2010 to 2014. A longer duration of the study will have captured periods of various economic significances such as booms and recessions and country political dispensation. This may have probably given a longer time focus hence given a broader dimension to the study.

The study was limited to establishing the relationship between electronic banking and financial performance among SACCOs. For this reason other financial institutions could not be incorporated in the study. The study presumed a linear relationship which could turn out to be other types of relationships

5.6 Suggestions for Further Research

This study has reviewed the effect of electronic banking on financial performance of the SACCOs in Kenya. A similar study should be carried out in other financial institutions and other performance parameters including service quality, efficiency and sustainability could be included.

The study suggests that further studies can be conducted on classifying the financial institutions in categories including early adopters and later adopters of electronic banking channels. Such a study should incorporate the associated costs of implementing electronic banking including training and outreach for the SACCO member users.

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APPENDICES

Appendix I: Secondary Data Collection Template

Year	2010	2011	2012	2013	2014
Net Profit					
Total Assets					
Total Capital					
Expenditure on investment					
Current Assets					
Current Liabilities					

Appendix II: List of Licensed SACCOs as at 31ST Dec 2014

1. Afya Sacco Society Limited	103. Githunguri Dairy & Community Sacco Society Limited
2. Agro-Chem Sacco Society Limited	104. Good Faith Sacco Society Limited
3. All Churches Sacco Society Limited	105. Goodway Sacco Society Limited
4. Ainabkoi Sacco Society Limited	106. Gusii Mwalimu Sacco Society Limited
5. Airports Sacco Society Limited	107. Green Hill Sacco Society Limited
6. Ardhi Sacco Society Limited	108. Harambee Sacco Society Limited
7. Asili Sacco Society Limited	109. Hazina Sacco Society Limited
8. Banana Hill Matatu Sacco Society Limited	110. Ilikisonko Sacco Society Limited
9. Bandari Sacco Society Limited	111. Imarika Sacco Society Limited
10. Baraka Sacco Society Limited	112. Imarisha Sacco Society Limited
11. Baraton Sacco Society Limited	113. Imenti Sacco Society Limited
12. Biashara Sacco Society Limited	114. Koru Sacco Society Limited
13. Bingwa Sacco Society Limited	115. Kwale Sacco Society Limited
14. Boresha Sacco Society Limited	116. Kwetu Sacco Society Limited
15. Capital Sacco Society Limited	117. K-Unity Sacco Society Limited
16. Centenary Sacco Society Limited	118. Lamu Teachers Sacco Society Limited
17. Chai Sacco Society Limited	119. Lainisha Sacco Society Limited
18. Chuna Sacco Society Limited	120. Lengo Sacco Society Limited

19. Comoco Sacco Society Limited	121. Mafanikio Sacco Society Limited
20. Cosmopolitan Sacco Society Limited	122. Magadi Sacco Society Limited
21. County Sacco Society Limited	123. Magereza Sacco Society Limited
22. Daima Sacco Society Limited	124. Maisha Bora Sacco Society Limited
23. Dhabiti Sacco Society Limited	125. Marsabit Teachers Sacco Society Limited
24. Jacaranda Sacco Society Limited	126. Mentor Sacco Society Limited
25. Jamii Sacco Society Limited	127. Metropolitan National Sacco Society Limited
26. Jitegemee Sacco Society Limited	128. Mmh Sacco Society Limited
27. Jumuika Sacco Society Limited	129. Mombasa Port Sacco Society Limited
28. Kaimosi Sacco Society Limited	130. Mudete Tea Growers Sacco Society Limited
29. Kakamega Teachers Sacco Society Limited	131. Muhigia Sacco Society Limited
30. Kathera Rural Sacco Society Limited	132. Murata Sacco Society Limited
31. Keiyo Sacco Society Limited	133. Mwalimu National Sacco Society Limited
32. Kenpipe Sacco Society Limited	134. Mwietheri Sacco Society Limited
33. Kenversity Sacco Society Limited	135. Mwingi Mwalimu Sacco Society Limited
34. Kenya Achivers Sacco Society Limited	136. Muki Sacco Society Limited
35. Kenya Bankers Sacco Society Limited	137. Mwito Sacco Society Limited
36. Kenya Cannery Sacco Society	

Limited	138. 2NK Sacco Society Limited
37. Kenya Highlands Sacco Society Limited	139. Nyabene Arimi Sacco Society Limited
38. Kenya Midland Sacco Society Limited	140. Nyeri Teachers Sacco Society Limited
39. Kenya Police Staff Sacco Society Limited	141. Orient Sacco Society Limited
40. Kiambaa Dairy Rural Sacco Society Limited	142. Patnas Sacco Society Limited
41. Kimbilio Daima Sacco Society Limited	143. Puan Sacco Society Limited
42. Kingdom Sacco Society Limited	144. Qwetu Sacco Society Limited
43. Kipsigis Edis Sacco Society Limited	145. Rachuonyo Teachers Sacco Society Limited
44. Kite Sacco Society Limited	146. Safaricom Sacco Society Limited
45. Kitui Teachers Sacco Society Limited	147. Sheria Sacco Society Limited
46. Kmfri Sacco Society Limited	148. Shirika Sacco Society Limited
47. Kolenge Tea Sacco Society Limited	149. Simba Chai Sacco Society Limited
48. Konoin Sacco Society Limited	150. Siraji Sacco Society Limited
49. Nacico Sacco Society Limited	151. Skyline Sacco Society Limited
50. Nafaka Sacco Society Limited	152. Smart Champions Sacco Society Limited
	153. Smart Life Sacco Society Limited
	154. Solution Sacco Society Limited
	155. Sotico Sacco Society Limited

51. Naku Sacco Society Limited	156. Southern Star Sacco Society Limited
52. Nandi Farmers Sacco Society Limited	157. Stake Kenya Sacco Society Limited
53. Nanyuki Equator Sacco Society Limited	158. Stegro Sacco Society Limited
54. Narok Teachers Sacco Society Limited	159. Ufanisi Sacco Society Limited
55. Nassefu Sacco Society Limited	160. Uchongaji Sacco Society Limited
56. Nation Sacco Society Limited	161. Ufundi Sacco Society Limited
57. Nawiri Sacco Society Limited	162. Ukristo Na Ufanisi Wa Anglicana Sacco Society Limited
58. Ndege Chai Sacco Society Limited	163. Ukulima Sacco Society Limited
59. Nest Sacco Society Limited	164. Unaitas Sacco Society Limited
60. Ndosha Sacco Society Limited	165. Uni-County Sacco Society Limited
61. Ng'arisha Sacco Society Limited	166. United Nations Sacco Society Limited
62. Nitunze Sacco Society Limited	167. Unison Sacco Society Limited
63. Nrs Sacco Society Limited	168. Universal Traders Sacco Society Limited
64. Nufaika Sacco Society Limited	169. Vihiga County Farmers Sacco Society Limited
65. Nyahururu Umoja Sacco Society Limited	170. Vision Point Sacco Society Limited
66. Nyala Vision Sacco Society Limited	171. Vision Africa Sacco Society Limited
67. Stima Sacco Society Limited	172. Wakenya Pamoja Sacco Society Limited
	173. Wakulima Commercial Sacco

68. Sukari Sacco Society Limited	Society Limited
69. Suba Teachers Sacco Society Limited	174. Wanaanga Sacco Society Limited
70. Supa Sacco Society Limited	175. Wananchi Sacco Society Limited
71. Tai Sacco Society Limited	176. Wanandege Sacco Society Limited
72. Taifa Sacco Society Limited	177. Wareng Sacco Society Limited
73. Taraji Sacco Society Limited	178. Washa Sacco Society Limited
74. Telepost Sacco Society Limited	179. Waumini Sacco Society Limited
75. Tembo Sacco Society Limited	180. Maono Daima Sacco Society Limited
76. Tenhos Sacco Society Limited	181. Nandi Hekima Sacco Society Limited
77. Thamani Sacco Society Limited	
78. Transcounties Sacco Society Limited	
79. Trans Nation Sacco Society Limited	
80. Times U Sacco Society Limited	
81. Tower Sacco Society Limited	
82. Transcom Sacco Society Limited	
83. Trans-Elite County Sacco Society Limited	
84. Trans-National Times Sacco Society Limited	

85. Wevarsity Sacco Society Limited	
86. Winas Sacco Society Limited	
87. Yetu Sacco Society Limited	
88. Miliki Sacco Society Limited	
89. Nyamira Sacco Society Limited	
90. Moi University Sacco Society Limited	
91. Dimkes Sacco Society Limited	
92. Dumisha Sacco Society Limited	
93. Eco-Pillar Sacco Society Limited	
94. Egerton Sacco Society Limited	
95. Elgon Sacco Society Limited	
96. Elimu Sacco Society Limited	
97. Enea Sacco Society Limited	
98. Faridi Sacco Society Limited	
99. Fariji Sacco Society Limited	
100. Fortune Sacco Society Limited	
101. Fundilima S.S.L	
102. Gastameco S.S.L.	

Appendix III: List of Sampled SACCOs Based IN Nairobi County

1. Afya Sacco Society Limited	20. Nest Sacco Society Limited
2. Airports Sacco Society Limited	21. Stima Sacco Society Limited
3. Ardhi Sacco Society Limited	22. Telepost Sacco Society Limited
4. Asili Sacco Society Limited	23. Transcom Sacco Society Limited
5. Chai Sacco Society Limited	24. Miliki Sacco Society Limited
6. Chuna Sacco Society Limited	25. Elimu Sacco Society Limited
7. Comoco Sacco Society Limited	26. Fundilima Sacco Society Limited
8. Jamii Sacco Society Limited	27. Harambee Sacco Society Limited
9. Kenpipe Sacco Society Limited	28. Hazina Sacco Society Limited
10. Kenversity Sacco Society Limited	29. Magereza Sacco Society Limited
11. Kenya Bankers Sacco Society Limited	30. Maisha Bora Sacco Society Limited
12. Kenya Police Staff Sacco Society Limited	31. Mwalimu National Sacco Society Limited
13. Kingdom Sacco Society Limited	32. Mwito Sacco Society Limited
14. Nacico Sacco Society Limited	33. Safaricom Sacco Society Limited
15. Nafaka Sacco Society Limited	34. Sheria Sacco Society Limited
16. Naku Sacco Society Limited	35. Shirika Sacco Society Limited
17. Nandi Farmers Sacco Society Limited	36. Ufanisi Sacco Society Limited
18. Nassefu Sacco Society Limited	37. Ufundi Sacco Society Limited
19. Nation Sacco Society Limited	38. Ukristo Na Ufanisi Wa Angalicana Sacco Society Limited
	39. Ukulima Sacco Society Limited
	40. United Nations Sacco Society Limited
	41. Wanaanga Sacco Society Limited
	42. Wanandegge Sacco Society Limited

Appendix IV: Raw Data

ROA	E-Banking	Size	Capital Adequacy	Liquidity	Earnings Ability
0.00464	8.21824793	20.3542	1.0000	0.910763	0.023130443
0.00472	8.30226579	20.6316	0.0275	0.834882	4.361240086
0.00585	8.3553799	20.8272	0.0285	0.831343	3.458285353
0.01131	8.42288251	21.0115	0.0437	0.867165	2.491750645
0.00574	8.45998772	21.1751	0.0436	0.853938	2.431759977
2.6E-05	10.5174562	22.7959	0.1418	0.734424	3.451841729
0.00254	10.5717271	22.9595	0.1184	0.761675	3.690570422
0.00195	10.5814703	23.1073	0.0636	0.763033	2.721257589
0.01392	10.5098506	23.1986	0.0409	0.000121	1119.228967
0.00754	10.4658139	23.2635	0.0643	0.105029	1.161713086
0.01915	9.18368834	22.5612	0.0015	0.744417	79.56814078
0.02302	9.4596194	22.7557	0.0264	0.718215	4.641430023
0.02393	11.9518963	16.0651	70.7403	742.8797	3.352474005
0.02068	10.1836917	23.2411	0.0910	0.724463	2.777844178
0.02254	10.5940815	23.5178	0.0822	0.7719	3.021123614
0.00652	7.59588992	20.2155	0.0357	0.836877	16.64233049
0.00571	7.62461899	20.5158	0.0737	0.845041	4.274004715
0.01385	7.81480343	20.6305	0.0951	0.870624	3.187585527
0.01202	7.93379687	20.7099	0.0834	0.870213	5.036521675
0.01093	8.19257047	20.7994	0.1177	0.086148	3.318400983
0	7.70975686	20.4894	0.0480	0.63816	9.543736667
0.00324	7.79564654	20.674	0.0363	0.637807	7.28442087
0.00304	8.04173471	20.7853	0.0932	0.797634	6.480687736
0.01577	8.56522116	21.1519	0.0542	1.232287	3.00246537
0.0165	8.88377886	21.5151	0.0723	0.614001	2.072779009
0.0017	8.74113642	21.045	0.0285	0.915681	4.718710985
0.12943	8.91193434	18.987	1.0000	7.658217	1.794739398
0.03372	9.00528229	18.7698	1.0000	11.40892	0.447753092
0.13314	9.10875052	19.9695	1.0000	4.478348	3.840456029
0.15291	9.15387583	20.1642	1.0000	4.39316	2.886693913
0.01844	10.4437749	22.5839	0.0578	0.759297	9.153784881
0.02916	10.4510597	22.7674	0.0648	0.772709	1.87151665
0.03744	10.4746648	22.9265	0.0902	0.772973	1.443338219
0.0353	10.5228536	23.1676	0.1436	0.679352	0.66812583
0.02259	10.7559862	23.4764	0.1904	0.598253	1.643903876
0.01743	9.22068666	20.7129	0.0913	0.730094	0.715740432

0.00016	9.24551445	20.9218	0.0741	0.670662	0.605954069
7.2E-05	9.30419495	21.0803	0.0637	0.721308	1.18073772
6.8E-05	9.32447231	21.179	0.1610	0.74523	1.432888693
0.00957	9.14131179	21.2489	0.1633	0.081119	1.303921369
0.00335	7.7935868	20.9931	0.3137	0.52111	0.201817691
0.00491	7.81601384	20.9406	0.4017	0.475397	0.194411269
0.0048	7.65775527	21.0747	0.3626	0.421477	0.242079633
0.04698	7.6989362	20.7152	0.0581	0.667333	3.07059309
0.02725	8.00135503	20.7282	0.0813	0.628104	2.201492944
0.01019	8.28626945	22.4479	0.0456	0.842086	3.368251989
0.00135	8.31996102	24.905	0.0060	0.08208	1.82646385
0.8525	8.3864009	22.9012	0.0544	0.705867	2.200017295
1.16951	8.45744319	22.7437	0.1337	0.949133	1.220670115
0.00464	8.21824793	20.3542	1.0000	0.910763	0.023130443
0.00472	8.30226579	20.6316	0.0275	0.834882	4.361240086
0.00585	8.3553799	20.8272	0.0285	0.831343	3.458285353
0.01131	8.42288251	21.0115	0.0437	0.867165	2.491750645
0.00574	8.45998772	21.1751	0.0436	0.853938	2.431759977
2.6E-05	10.5174562	22.7959	0.1418	0.734424	3.451841729
0.00254	10.5717271	22.9595	0.1184	0.761675	3.690570422
0.00195	10.5814703	23.1073	0.0636	0.763033	2.721257589
0.01392	10.5098506	23.1986	0.0409	0.000121	1119.228967
0.00754	10.4658139	23.2635	0.0643	0.105029	1.161713086
0.01915	9.18368834	22.5612	0.0015	0.744417	79.56814078
0.02302	9.4596194	22.7557	0.0264	0.718215	4.641430023
0.02393	11.9518963	16.0651	70.7403	742.8797	3.352474005
0.02068	10.1836917	23.2411	0.0910	0.724463	2.777844178
0.02254	10.5940815	23.5178	0.0822	0.7719	3.021123614
0.00652	7.59588992	20.2155	0.0357	0.836877	16.64233049
0.00571	7.62461899	20.5158	0.0737	0.845041	4.274004715
0.01385	7.81480343	20.6305	0.0951	0.870624	3.187585527
0.01202	7.93379687	20.7099	0.0834	0.870213	5.036521675
0.01093	8.19257047	20.7994	0.1177	0.086148	3.318400983
0	7.70975686	20.4894	0.0480	0.63816	9.543736667
0.00324	7.79564654	20.674	0.0363	0.637807	7.28442087
0.00304	8.04173471	20.7853	0.0932	0.797634	6.480687736
0.01577	8.56522116	21.1519	0.0542	1.232287	3.00246537
0.0165	8.88377886	21.5151	0.0723	0.614001	2.072779009
0.0017	8.74113642	21.045	0.0285	0.915681	4.718710985

0.12943	8.91193434	18.987	1.0000	7.658217	1.794739398
0.03372	9.00528229	18.7698	1.0000	11.40892	0.447753092
0.13314	9.10875052	19.9695	1.0000	4.478348	3.840456029
0.15291	9.15387583	20.1642	1.0000	4.39316	2.886693913
0.01844	10.4437749	22.5839	0.0578	0.759297	9.153784881
0.02916	10.4510597	22.7674	0.0648	0.772709	1.87151665
0.03744	10.4746648	22.9265	0.0902	0.772973	1.443338219
0.0353	10.5228536	23.1676	0.1436	0.679352	0.66812583
0.02259	10.7559862	23.4764	0.1904	0.598253	1.643903876
0.01743	9.22068666	20.7129	0.0913	0.730094	0.715740432
0.00016	9.24551445	20.9218	0.0741	0.670662	0.605954069
7.2E-05	9.30419495	21.0803	0.0637	0.721308	1.18073772
6.8E-05	9.32447231	21.179	0.1610	0.74523	1.432888693
0.00957	9.14131179	21.2489	0.1633	0.081119	1.303921369
0.00335	7.7935868	20.9931	0.3137	0.52111	0.201817691
0.00491	7.81601384	20.9406	0.4017	0.475397	0.194411269
0.0048	7.65775527	21.0747	0.3626	0.421477	0.242079633
0.04698	7.6989362	20.7152	0.0581	0.667333	3.07059309
0.02725	8.00135503	20.7282	0.0813	0.628104	2.201492944
0.01019	8.28626945	22.4479	0.0456	0.842086	3.368251989
0.00135	8.31996102	24.905	0.0060	0.08208	1.82646385
0.8525	8.3864009	22.9012	0.0544	0.705867	2.200017295
1.16951	8.45744319	22.7437	0.1337	0.949133	1.220670115