

**TECHNOLOGICAL INNOVATION AND COMPETITIVE
ADVANTAGE OF DEPOSIT TAKING SAVINGS AND
CREDIT COOPERATIVE SOCIETIES IN NAIROBI CITY
COUNTY**

BY

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DECLARATION

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

Signed 

Date: 18th May 2021

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

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DEDICATION

This project is dedicated to my father Dismas Onyango Othoth and Brother Mark Ochieng for the moral support and advice they showed me throughout my course work. Thank for so much. This shall be a reminder that united we stand and divided we fall.

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ABBREVIATIONS AND ACRONYMS

ATM	Automated Teller Machine
BOSA	Back Office Service Activity
CBK	Central Bank of Kenya
DT	Deposit Taking
FOSA	Front Office Service Activity
ICT	Information Communication and Technology
MCDM	Multiple Criterial Decision Making
MFI	Micro Finance Institution
RBV	Resource Based View
SACCO	Savings and Credit Cooperative
SASRA	Sacco Society Regulatory Authority
SPSS	Statistical Package for Social Science
SWOT	Strength, Weakness, Opportunity and Threat

ABSTRACT

The objective of the study was to determine the effect of technological innovation on competitive advantage among DT SACCOs in Nairobi City County. The adoption of technological innovation by the deposit-taking Sacco's was proxied by the capacity of the organizations to avail ATM access, mobile banking, member portal, telebanking, and money transfer services. A descriptive research design was used on a population of 41 deposit-taking Sacco organizations. The data collection method used was a questionnaire in which 37 were received back from the sample size of 41. From the analysis of the data collected, the technological innovation adopted by the organizations was manifested by a large extent by agency services, money transfer services access by customers of their funds through the ATM, and to a moderate extent adoption of telebanking services. The results likewise suggested that the adoption of technological innovation had resulted in an improved number of members, faster loan processing, and training of the Sacco products by members. From the part of the influence of the adoption of technological innovation on the competitive position of the company, it was found that the Sacco has had registered reduced operation cost, visibility of the organization products and improved loan application turnover and thus profitability of the organization. Study findings established that the correlation between technological innovation and competitiveness is strong ($r=0.799$) and that one unit change in the Sacco technological innovation resulted in an improved competitiveness level by 0.875. Because of the findings, the researchers concluded that technological innovation had a positive and significant effect on the competitiveness of the Sacco's and therefore the study recommends the adoption of different forms of technological innovation that is tailored to the nature of operations of the organization. DT SACCOs need to re-think beyond dividend and interest on deposit to expand by taking advantage of the opportunities that technological innovation has created to design unique products that can compete and succeed in the market thus increasing the level of member education, member satisfaction, deposit mobilization, increased loan uptake leading to profitability hence more competitive advantage.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Competition can determine a firm's success or failure depending on the competitive strategies, which can vary from defensive to offensive that a firm adopts which can result in a competitive position within a market standing. Porter (1998) notes that competition exists when an organization maintains its unique position in the long term for superior profits. Chartered Institute of Marketing (2014) suggests that a good understanding of core competencies and capabilities can enable organizations to build a long-lasting competitive advantage where management consolidates the organization's resources including technologies, skills, knowledge, and learning into a competitive edge to be able to adapt in the emerging opportunities to realize its mission. Schumpeter (1942) note that economic change revolves around innovation where organizations can develop unique products and processes using the available resources to increase their market position (Tonelli, 2012). Investments in technological innovations can reduce the cost of doing business thus increase efficiency and productivity resulting in competitive advantage (Mang'ana, Nyaboga, Momanyi & Makone, 2015).

The theory of resource-based view (RBV) proposed by Penrose (1959) argues that organizations can develop economic value by appropriately managing their assets as there is a linkage between assets and opportunities where managers can strategically deploy for sustained growth. The theory acknowledges the input of human capital that can be used in innovation to create competitive advantage where it advises management to maintain capabilities and knowledge base to protect competitive advantage (Kor & Mahoney, 2004). RBV aims to analyze the internal resources and

make the resources more difficult to copy by other firms thus providing superior performance.

Organizations that are capable of acquiring valuable assets through increased profitability, rare to be found by competitors, inimitable so that it is not possible to copy and non-substitutable where competitors are not able to find alternative resources and provide the same services that would increase long term competitive advantage (Madhani, 2010). Organizations that focus on devising novel strategies for conducting business and developing new products to address customer needs should achieve a competitive advantage. The scramble for more market share is characterized by competition abated by macro-environmental factors where technological innovations are changing the way the financial industry is interacting with its customers. Banks are adopting technological innovation faster than the DT SACCOs is a factor that increases the switching of SACCO members to the commercial banks leading to competitive challenges (SASRA, 2017).

The financial sector in Kenya comprises commercial banks, microfinance institutions, and DT SACCOs (Central Bank of Kenya, CBK, 2019). A comparison between the commercial banks and DT SACCOs shows that commercial banks are more innovative than DT SACCOs as the banks have more ATM locations, more agency and internet banking, and mobile banking due to the resources that give them economies of scale. Out of 174 DT SACCOs, 120 have mobile service platforms, while 114 have ATM services with none having internet banking even though the regulator acknowledges the improved technological innovation among the DT SACCO organizations (SASRA, 2017). Such organizations are adopting

sustainable and differentiated strategies to overcome pressures from the competitors acquire advantage and maintain their positions while increasing profitability. Tushman and Nadler (1986) noted that organizations that manage their operations effectively would gain competitive advantage by simultaneously creating innovation (Hana, 2013).

1.1.1 Technological Innovation

Blazevic and Lievens (2004) observe an upsurge in technological innovation practices among commercial banks in Kenya. Drucker (2013) defines innovation as the process that involves the development of new ideas, improved and/or increased capability which Schumpeter (1939) further describes as the introduction of novel services, methods of doing things, and sources of discoveries (Ndunga, Nyati & Rukangu, 2016). Technological innovation is the integration of finance and technology while using new technologies to enhance financial services, keeping costs low while controlling risks. Kavanagh (2019) observes that financial institutions are now reducing branch networks because of technological innovation.

The financial industry has seen the need to collaborate with Fintech organizations to explore how they can incorporate emerging technologies; big data, block chain, and cloud computing into traditional financial services to increase customer experience (Zhao, Tsai & Wang, 2019). Technological innovation is a fundamental aspect of industrial and economic development which Porter (1980) supports, noting that nations can attain competitive advantage through innovation as it is a driver to economic growth (Schumpeter, 1934). Organizations have realized the need to take advantage of technological innovation to increase their competitive advantage. DT SACCOs are also increasingly pursuing a similar approach, through M-banking

services, member portal platforms, digital marketing, ATM, and agency banking to take advantage of opportunities while overcoming threats. Financial cooperatives are shifting their business models that are focused more on other aspects of innovation through the creation of new distribution channels and mobile applications.

Frame and White (2004) identified 39 empirical findings that sought to explain innovation within the financial industry where technological advancements were used to reduce bank costs and risks in areas of; new products, ATMs, debit and credit cards, new processes involving payment and record-keeping. Information sourcing and distribution by the use of computers and telecommunication, credit card scoring automation, loan securitization and new forms of organization like internet-only bank and interstate banks that are geared towards improving competitive advantage (Bos, Kolari & Lamoen, 2009). Studies have indicated how technological innovations adopted by financial institutions in Meru County have increased competitive advantage through an improved performance where mobile banking, internet banking, and ATM usage have contributed to enhancing financial access resulting in increased performance thus competitive advantage (Ndunga, Nyati & Rukangu, 2016).

Organizations that focus on technological innovation aim to create an environment that supports and nurtures creative ideas, can think locally while acting global to enable identification of new ideas that are broad and relevant and can give them an edge over their peers. The democratic process of cooperatives allows members to be involved in certain activities which the leadership can take advantage of by adopting technological innovation in their democratic process to improve efficiency,

reduce costs and increase their member trust, loyalty and attain competitive advantage (Brat, Martinez & Ouchene, 2016). Other technological innovation areas that the DT SACCOs can use to increase competitive advantage as provided by Okello (2014); cheque clearance facility, diversification of innovative services, and mobile banking. Other technological innovation platforms include online loan applications, ATM cards, e banking, agency banking, and online portal services. Zhao, Tsai, and Wang (2019) also provide areas where SACCOS can take advantage of to increase competitive advantage which include; Block chain technologies, digital marketing, and new payment methods. Berthier (2019) advises SACCOs to provide customers with the best digital experience and take an innovative stance in their service provision to attain competitive advantage as only the strongest, innovative, and most adaptable financial institution would survive.

1.1.2 Competitive Advantage

The global population reached 6.0 billion by 1998 with predictions of 8.5 billion by 2025 with a growth rate of 1.7% per year. Africa is considered to have the highest growth rate at 3% yearly with a high rate of urbanization, which is also growing at 3.5% (Doyle, 2008). The understanding that population is a macroeconomic element that provides organizations with the information they need to make strategic decisions about their business concerning their mission. Organizations that can remain relevant and profitable despite the competitive pressure within their industry have mastered the art of competitiveness that enables them to attain competitive advantage. According to Puspaningrum (2017), competitive advantages are resources and capabilities that organizations have that they can use to increase customer satisfaction better than the competitors do. If an organization can produce

high-quality and superior products at a lower cost, then they should be able to have a price advantage, gain market share better than the competitors. Supranto (2009) states that competitive advantage can be measured through the uniqueness of product, quality and competitive prices that an organization may have that is preferred by its target customers (Puspaningrum, 2017).

Karago and Okibo (2014) observe that DT SACCOs advance loan to their members three times their savings at 1% interest rates whereas other financial institutions provide loans nine times the savings at the same interest rate conveniently due to their advanced technology thus making DT SACCO products unpopular with the customers as they are not competitive (Kagonia,2017). With increased consumer knowledge brought by advances in technology and the internet, customers can compare prices and check online product reviews to make informed choices.

DT SACCOs need to re-think beyond dividend and interest on deposit to expand by taking advantage of the opportunities that technological innovation has created to design unique products that can compete and succeed in the market thus increasing the level of member education, member satisfaction, deposit mobilization, increased loan uptake leading to profitability hence more competitive advantage (Kagonia, 2017).

1.1.3 Deposit-Taking SACCOs in Nairobi City County

In 1908, the farmers from Europe in Kenya, to purchase farm inputs as well as marketing final products, formed the pioneer cooperative society. The cooperative society was referred to as Lumbwa Cooperative. Kenya Farmers Association (KFA) was later registered in 1930 to replace the Lumbwa cooperative (Patroba, Osoro, Nyago & Odoyo, 2016). SACCOs are owned by the members where they mobilize

savings and then extend credit facilities to the members, which are advanced, based on savings that a member has in the deposits account. The main income for the SACCO industry is the interest received from loans advanced to the members. Sacco Society Regulatory Authority (SASRA) formed under the Sacco Society Act 2008 with a clear mandate to promote, license, regulate and supervise all SACCO activities (Shejero, 2016) supervises the movement. The SACCO movement in Kenya consists of non-financial cooperatives that focus on the marketing of the members' produce and the financial cooperatives.

The financial cooperatives are further divided into two; the Back Office Service Activities (BOSA) that provides only deposits and long-term loans based on the members' savings. DT SACCOs other than long-term loans avail other banking services through their Front Office Service Activities (FOSA), which include ATM, M-banking, agency banking, internet banking, salary channeling, and other short-term savings and loan products. According to SASRA (2017) supervisory report, there were 174 licensed DT SACCOs in Kenya as of December 2017.

The DT SACCO market coverage consists of 638 physical financial delivery channels spread across the entire country with 114 and 120 DT SACCOs having ATM and mobile platforms respectively while 107 DT SACCOs provide agency banking in partnership with commercial banks (SASRA, 2017). Nairobi City County has 42 DT SACCOs with a registered head office in Nairobi. Other financial institutions, digital credit lenders, and MFIs that provide a stiff competitive environment for the DT SACCOs.

1.2 Research Problem

Doyle (2008) observes that increased changes in the global environment accelerate pressure on organizations necessitating greater management effort to establish and maintain a competitive advantage. Competitive strategies can increase competitive position leading to competitive advantage (Porter, 1998). Schumpeter (1942) notes the importance of technological innovation for a competitive edge where organizations can develop unique products and processes to increase their market share (as cited in Tonelli, 2012). Technological innovation can increase efficiency through cost reduction, leading to competitive advantage (Mang'ana, Nyaboga, Momanyi & Makone, 2015).

The deposit-taking financial sub-sector in Kenya comprises commercial banks, MFIs, and SACCOs (CBK, 2019). In the recent past, CBK has deregistered some DT SACCOs for lack of compliance while members have continued to switch to banking products as confirmed by the industry report that there was a decrease in membership by 0.96% in the years 2016 and 2017. Lack of insurance facility for deposits to enhance member confidence and provides compensation should DT SACCO fail, lack of national payment system and a functional central liquidity facility has created barriers to SACCOs efficiency, stability, competitiveness, and growth thus generally reducing the competitiveness of DT SACCOs relative to their commercial bank counterparts. This notwithstanding, such organizations in Nairobi City County are more competitive than others. This paradox raises curiosity as to how technological innovation has an impact competitive edge among the organizations in Nairobi City County.

Zhao, Tsai, and Wang (2019) sought to determine how the competitive advantage of commercial banks in China was affected by adopted financial service innovation strategies, during the changing period encompassing the Fintech revolution with four different categories of state-owned, banks, joint stock, credit cooperatives and city commercial banks. The study used the multiple criteria fuzzy method (MCFM). The study findings suggest that business partners were the most significant factor affecting bank sustainability, then service concepts and organizational innovation. Similarly, the study established that technological innovation and customer interaction, coupled with revenue models had a positive effect on the banks' competitiveness. The study focused on various innovations across the organization where it also separated customer interactions and revenue models from technological innovations. This study incorporated all platforms where technology is applied; service concepts, customer touchpoints, marketing, record keeping, revenue models, and payment systems to determine how they are increasing competitive advantage.

Conto, Antunes, and Vaccaro (2016) did a study to identify how innovation contributed to competitive advantage focusing on a marketing cooperative society that specializes in organic juice and wine in Brazil. The study used an exploratory quantitative study to carry an in-depth interview working with five senior managers. The study examined structure aspects, production processes, market strategies, and firm perspectives. The study established that innovation provided increased financial return and brand image leading to competitive advantage. Having been carried in Brazil as a case study, cannot be generalized within the Kenyan context where the study used financial cooperatives and not marketing

cooperative thus different results. It also had a low sample size of five, which this study sought to achieve above 40 thus results that are more reliable.

Chege (2017) explored the nexus between the strategic innovation practices employed by Kenyan commercial banks and its influence the bank competitiveness. Senior-level managers, middle and supervisors were the targeted respondents. Innovation was measured through service innovation, product innovation, and technological innovation while increased customer connection, performance, and high quality and reduced barriers to operations measured competitive advantage. Content analysis assisted in data analysis. The findings indicated that technological innovation had a significant positive effect on the firm competitiveness. However, the study focused on listed commercial banks with three different innovations. This study focused on technological innovation; therefore, provide a broad outlook for more insight.

Okello (2014) investigated the determinants of sustainable CA among SACCOs based in Nairobi city County where the study focused on all the registered 150 deposits and non-deposit SACCOs in Kenya. The research focused particularly on savings products, internal sources of funds, open membership, technology, SACCO name, capitalization, FOSA, and increased shareholding as determinants of bank competitiveness. The study noted that technological innovations have increased positive speed in service delivery among DT SACCOS seeking competitive advantage. The current study focuses on 41 DT SACCOs located within Nairobi City County since the review of previous studies presents conceptual, contextual, and methodological gaps. The study sought to answer the question: What is the

effect of technological innovation on competitive advantage among Deposit-Taking SACCOs in Nairobi City County?

1.3 Research Objective

This study aimed to determine the effect of Technological Innovation on the Competitive Advantage of Deposit-Taking SACCOs in Nairobi City County.

1.4 Value of the Study

The results of the study provided empirical evidence in support or against the postulations of the theories anchoring the investigation. Resource-Based Theory, for instance, holds that for an entity to gain and sustain competitive advantage, it should amerce unique and highly non- replicable resources. The study empirically tested predictions of RBV on the relationship between technological innovation and competitive advantage. This would lead to the development of the theories.

The study availed insight for policy formulators through an understanding of the overall contribution of technology innovation for the competitiveness of the DT SACCOs. Further, the regulators would use the study to formulate policies regarding technological inclusion within the SACCO industry that would improve their competitiveness. This further enhanced their collective industry competitiveness relative to their banking industry and MFI counterparts.

The management of the various DT SACCOs were able to understand the mix of resources that enabled the achievement of the competitive advantage thus focused on training and maintaining the knowledge base within the organization to protect competitive advantage. The customers benefited from the recommendations as the DT SACCOs adopted thus increased customer satisfaction. This in turn increased customer loyalty thus add value to the DT SACCOs leading to a more CA.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This segment consists of theories that guided the study and provide their relationship to the study. Longman (2003) note that theory helps in explaining something, people, or event about the world. Particularly an idea that has not been proved, as it is a general idea that someone thinks is true but there is no proof (as cited in Benneti, 2009). Grant and Osanioo (2014) add that theories offer a blueprint upon which the study uses to build problem statements, empirical studies, and methodologies. It also provides the relationship in the study that helps in predicting the outcome hence must be appropriate and relevant for the study.

This chapter also discusses diffusion innovation theory as something that is perceived to be new which could be an idea, object, or practice noting that the perception of change in an idea is what makes it innovative as those adopting the idea believe that it is new. Innovation diffusion theory on the other hand tries to understand what might cause the adoption, delay, or non-adoption of the new idea. The theory believes there is some level of uncertainty that surrounds potential adopters of the innovation. Diffusion examines the distribution pattern in the life cycle stage of innovation where it provides the time it takes to diffuse a new technology on the market, where those who want to adopt the innovation go through; information search, persuasion, decision making, implementation, and confirmation. Diffusion is the reaction of people when they learn about a new idea, which tends to bring changes within an industry, which manifests through knowledge and inequality.

The creation of new knowledge within the study objective was realized by use of empirical studies evaluation and thereby the researcher identifying the gaps that the

study would use to seek answers to the research objective. Empirical studies supported the theoretical framework by providing more evidence hence predicted the outcome of the study. International studies and Local studies were reviewed, concepts, context, and methodology used discussed and the gaps in knowledge identified.

2.2 Theoretical Foundation

This investigation is anchored on the resource-based view and innovation diffusion theory. This section analyzed the background of the theories concerning the study variables and explained how the theories were used in the study.

2.2.1 Resource-Based View

This theory was proposed by Penrose (1959), it can be used by organizations to develop economic value by way of effective and efficient asset management (Kor, & Mahoney, 2004). RBV aims to analyze the internal resources for a company or an organization can create a competitive advantage and tries to understand why an organization may fail or succeed based on the available resources. Organizations with a large capital base, market power, and membership do have more resources than they can deploy strategically for a more competitive advantage. Madhani (2010) notes that an organization's resources need to be difficult to be copied by the competitors to qualify for its competitive advantage.

Firms within the same industry may have heterogeneous resources that they control; these resources may last long, as they are not perfectly mobile across industries. The heterogeneity of a resource that would make it provide a competitive advantage. However, Rantakari (2010) notes that resource heterogeneity may not guarantee sustained competitive advantage and therefore firms should focus on four key qualities for a resource to provide a competitive advantage. This can be used by

an organization to tap the opportunities and reduce threats discovered in the SWOT analysis. However, value alone cannot guarantee sustained competitive advantage as the same resource may also provide competitors with the same value thus develop similar products. The resource should be rare to prevent future competitors from accessing it for sustained CA.

The resource should not be copied by other organizations. Technologies can enable organizations to develop service channels and products that are unique hence difficult to copy. The strength of the resource is determined by how hard it is to substitute. The harder it is to get alternatives the better for sustained CA, as competitors would not be able to use alternatives to provide the same value to customers. All these when combine provides a synergy that enabled an organization to acquire sustained competitive advantage. (Mweru & Muya, 2015). The study used the theory to understand how resources affect technological innovation in different DT SACCOs, hence increasing their competitive advantage. Further, it predicted the empirical study findings where organizations with more resources are likely to have a more CA.

2.2.2 Diffusion of Innovation Theory

Rogers (1983) defines innovation as something that is perceived to be new which could be an idea, object, or practice noting that the perception of change in an idea is what makes it innovative as those adopting the idea believe that it is new. Satell (2017) argues that innovation is often incremental, including technological innovation. The author further holds that a properly infused technological innovation can lead to the competitive advantage of a firm. Many approaches are used in innovation depending on the problem at hand where basic research, breakthrough innovation, sustaining and disruptive innovations can be undertaken by an

organization in solving business problems. The approach taken for innovation depends on the organization's capabilities in terms of resources, competencies, and skills needed to undertake a certain innovation.

Rogers (2003) observes how characteristics of the innovation can affect its adoption through its relative advantage to the adopter, its compatibility and whether it can solve the needs of adopters using existing systems without much effort. How complex it is in terms of the difficulties in understanding how it is used, its trial ability before the main use and any observable usage for the people who have adopted the innovation previously. Innovation diffusion on the other hand tries to understand what might cause the adoption, delay, or non-adoption of the new idea. The theory believes that there is some level of uncertainty that surrounds potential adopters of the innovation.

Jdanova and Kaminsky (2013) note that diffusion examines the distribution pattern in the life cycle stage of innovation where it provides the time it takes to diffuse a new technology on the market, where those who want to adopt the innovation go through; information search, persuasion, decision making, implementation, and confirmation.

Dearing and Cox (2018) observe that diffusion is the reaction of people when they learn about a new idea that tends to bring changes within an industry, which manifests through knowledge and inequality where resource-rich organizations adopted innovation faster than small firms did. There are three other stages that diffusion of innovation goes through as provided; the channels of communication, the passage of time, and the system through which innovation is diffused. Communication entails the sharing of information between the adopters and the non-adopters, which can happen through social media, traditional channels,

forums organized by organizations, or face to face. The more the interaction, the more the information is diffused hence increased adoption.

Time is also an element of diffusion where it is analyzed through time taken to share knowledge with one individual or group and the time it is finally adopted by that individual or the society and the rate at which the individuals or groups receive innovation information. Social systems are individuals or groups within an organization with some shared values and other factors that affect the way they view innovation. The structures, systems, processes, roles, and decisions made in an organization can improve or slow down innovation depending on how individuals within an organization form their perceptions of innovation. Sometimes organizations authoritative decisions for the adoption of different innovations whereas, some cases are left optional for adoption, which can also be influenced by opinion leaders, hence increased the chances of adoption (Dearing & Cox, 2018).

2.3 Technology Innovation and Competitive Advantage

Ndunga, Nyati, and Rukangu (2016) studied on how the nexus between technological innovation and the performance of commercial banks in Meru County, Kenya. A descriptive study with a population of 60 management staff. A census study of 20 commercial banks was adopted, as the population was not large. The linkage between technological innovation and bank performance was determined through inferential statistics, with a presentation done in tables. SPSS version 22 was used in the analysis. The study found that bank performance increased due to technological innovations where the banks were able to make extra income away from the conventional sources of loan interest and account maintenance charges. The study suggested that the banks ought to invest a lot more in technology to reduce cost

through the internet and mobile platforms thus more transactions leading to high performance.

John (2017) investigated mobile technology, innovation strategy, and competitiveness of banks in Kenya. Descriptive and inferential analyses were used. Technological variables that were used in data collection were; credit card services, truncation, and cheque imaging, payment settlement, account opening process, loan approval process, sales force automation, and call center services. Likert scale was used in questionnaire development. The study found that respondents followed by truncation of cheque and imaging transmission ranked the account opening process among banks the highest. The study noted that there was an increased geographical reach, increased visibility, and profitability, availability of service 24/7/365, personalization, and de-escalated marketing costs. The investigation also established that banks have invested in technological innovation through mobile banking, the internet, and telebanking.

Wakaba (2017) investigated the impact of technological innovation in the competitive edge of Equity bank, Kenya using a cross-sectional survey study with 80 respondents derived from management staff. Data was collected using primary research. Descriptive and inferential statistics. Technological innovation variable was examined in-terms of; real-time alerts, updates for customers, multiple service transactions, the subsidized rate for service rate, bill payment through the technological platform, virtual banking preference, customer education on technological use, and technical difficulties encountered by customers during product use. Competitive advantage was measured through; market share, increased profitability, reduced teller queues, customer delivery, customer retention, and customer satisfaction improvement. The study found that Equity bank had

embraced technological innovation through increased adoption of debit and credit cards, online banking, mobile banking, agency banking, and social media channels. It had also invested in the internet, technological machines, digital adverts, and new products and services that increased its competitive advantage. Mbai (2007) did a study on competitive strategies used by Mwalimu National SACCO due to external ecosystem changes since 1997 using a case study to narrow down to a specific unit to provide an intensive study. The study used 20 management staff to collect data. The competitive strategy was analyzed using cost leadership, differentiation, and focus strategy. Competitive advantage was analyzed using; loan products, member education, dividend payment, computerized operations, and centralized services. The study found that favorable loan product and monthly savings, large capital base contributed to the competitive advantage of Mwalimu National SACCO.

Zhao, Tsai, and Wang (2019) sought to determine how improving financial service innovation strategies affected the financial performance of commercial banks in China during the Fintech revolution working with four different categories of state-owned, banks, city commercial banks, joint stock, and credit cooperatives. The study used 27 banking experts during the data process that utilized multiple criteria decision-making method (MCDM) to assess the nexus between the variables. The study findings ranked from highest service concepts, organizational innovation, and revenue was the least impactful on financial performance.

2.4 Empirical Studies and Knowledge Gaps

Distanont and Khongmalai (2018) investigated how innovation affects the competitive advantage of frozen food SMEs in Thailand. The study used a quantitative method with purposive sampling to arrive at a sample of 155 from a population of 279. A questionnaire was used in data collection. Cronbach alpha was

used in the reliability test. A pilot study was done to improve validity. The study found that external factors at the micro-level affected SMEs' innovative development more than external factors at the macro level. The study broadly analyzed innovation at the macro and micro levels of an organization. This study examined technological innovation at the firm level.

Noorani (2014) sought to understand how service innovation contributed to competitive advantage using a case study on B2B online business in Pakistan. The study obtained respondents from the IT and R & D departments. Data collection was done through interviews. Descriptive analysis assisted in data analysis. The study found that information technology and IT-enabled innovation was the most important factor that leads to the competitiveness of an organization as it enabled companies to explore the world, adopt and innovate ideas to increase organization's target audience. The study focused on B2B online business.

Hana (2013) did a study on competitive advantage achievements through innovation and knowledge in the Czech Republic using a survey method with 109 organizations. Stratified random and quota sampling was done to group organizations according to their sectors. An email was used to reach the respondents. The study focused on knowledge on innovation contributes to building innovative organizations. Unlike the reviewed study, the present study narrowed down to one type of innovation and its influence on competitive advantage within the Kenyan sector.

Ngure (2017) investigated the nexus between financial innovation and performance of SACCOs in Kirinyaga County, Kenya using a descriptive study with 60 SACCOs. The study used variables such as; product innovation, process, and institutional innovation where process innovation was measured through

automation, cashless, paperless, ATM, and mobile banking; product innovation was measured through new deposit accounts, credit card, debit card, EFT while institutional innovation was measured through management systems and mergers. The research employed stratified sampling to arrive at 52 firms whose data was collected and used for analysis. Data were collected through a self-administered questionnaire. The findings indicated that office automation was important in increasing turnover leading to competitive advantage. The study also found that cashless service and debit card reduced operational costs thus more advantage. The study was done in Kirinyaga County with different characteristics in terms of infrastructure and resources. It also considered three types of innovation whereas the study focused on technological innovation within Nairobi City County.

Kibugo (2016) on his part investigated the influence of financial innovation on the operational performance of MFIs in Nakuru, Kenya working with 187 employees from 11 MFIs to draw a sample size of 70. The pilot study was used to test validity while Cronbach's alpha determined reliability. Inferential statistics and Descriptive and assisted in data analysis. The study found that process innovation significantly increased changes in service provision, reduced costs thus increasing customer satisfaction and market share. The study focused on MFIs in Nakuru County while the current study focused on SACCOs in Nairobi City County.

Maleto (2016) study on the effects of financial innovation on the growth of savings and credit cooperative societies in Kenya adopted a quantitative study and census of 150 SACCOs from 2011 through 2015. Inferential analysis and Descriptive and were used with multiple regression. Financial innovation was measured through the level of, ATM adoption, mobile banking, internet banking EFT, and group lending. The study findings suggest that financial innovation had a positive effect on SACCO

growth leading to competitive advantage. The study concluded that ATM as a technological innovation contributed greatly to SACCO growth. The study examines a period 2011 to 2015 where most SACCOs had not yet adopted technological innovation hence ATM was seen as having a great impact on SACCO growth. Further, not all SACCOs provided reports and there was a lack of standardization of financial statements. The period analyzed was also wide hence huge data from 150 SACCOs. This study provided more insights due to increased advancement in technological innovations hence a different impact. Further, the study used 41 SACCOs within Nairobi thus easy and efficient data analysis for more reliability.

Patroba, Osoro, Nyagol, and Odoyo (2016) investigated the influence of information technology on the sustainable competitiveness of SACCOs in Kisii County through the adoption of a descriptive study with 102 respondents derived from 31 SACCOs. Data collection was achieved through self-administered both closed and open-ended questionnaires. The study noted that information technology-enhanced competitive advantage and business survival of SACCOs in Kisii County. The study was done in Kisii County with 31 SACCOs. This study was done in Nairobi with 41 SACCOs. Mang'ana, Nyaboga, Momanyi, and Makone (2015) determined the extent to which information technology influence the sustainable competitive advantage of SACCOs. The study obtained a sample size of 120 derived from 30 SACCOs through a simple random sampling. Data was collected using a Questionnaire. SPSS and Excel were used in data analysis. The findings indicated that information technology increased service delivery, speed, convenience, and efficiency thus increased competitiveness. The study concluded that IT adoption positively had a

positive relationship with the competitive advantage of SACCOs in Kisii County. The study focused on Kisii County, this study was done in Nairobi City County. Enock, Ignatius, Julius, and Munene (2013) sought to find out how financial innovation affected financial performance focusing on SACCOS in Nairobi City County. The target population was employees, members, and cooperative officers from 1371 SACCOs. The study adopted a descriptive design with stratified random sampling. The study found that institutional innovation of mobile banking, insurance, and investments affected performance. Further, the study found that product innovation including debit and credit cards and money transfer services increased performance leading to competitive advantage. The study noted that SACCOs improved value through; computer use, automation, electronic money transfer, ATM transactions, internet banking, and member data management. The study focused on employees, members, and cooperative officers from 1371 SACCOs, which were both deposit and non-deposit taking. This study worked with management level as respondents and deposit-taking SACCOs within Nairobi hence offers different results.

A study by Shakala (2012) examined also how financial innovation affects the performance of commercial banks in Kenya using a correlational design where a census study with 43 banks was done. Questionnaire assisted in data collection. The findings indicated that financial innovation had positive but insignificant results on the growth of banks. The study recommended more product innovation as opposed to technological innovation.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The study methodology is a theoretical analysis of techniques used in a study, which consists of methods and principles linked to a branch of knowledge that helps in the understanding of best practices used in any inquiry (Iwanaga, 2016). This segment presents the methodology that guided the investigation, to solve systematically the research problem using various steps and processes, which include techniques, assumptions, and the reason why a researcher may prefer a certain technique to the other.

It covered a wide scope with an explanation of the logic behind different techniques adopted and their relevancy (Kothari, 2004). All the methods and techniques to be used in the study are discussed in this chapter systematically. The first sub-section entails the research design, which outlines the road map that the investigation seemed to answer the research objective. The study population was then determined. Since this study adopts a census survey approach, there was no discussion on sampling.

3.2 Research Design

Once a research problem has been identified, organized attempts to increase the authenticity of information that would provide answers to the research problem should be determined hence the research design (Mukherjee, 2017). Researchers have attempted to define research design where all agree that it is a plan aimed to meet certain objectives. Hassan (1995) notes that research design consists of all activities that are involved in an inquiry to attain research objectives, translating research problems into data for analysis to provide answers to the research questions.

Kerlinger (1986) further defines research design as a blueprint, strategy, or structure that guides the investigation with the intent of seeking answers to research problems (as cited in Jongbo, 2014). This can be achieved through survey design, which enables critical analysis of events, ideas, and objects without any attempt to control the environment due to its description of an object at any particular time thereby necessitating direct contact with the object whose behavior is under investigation (Jongbo, 2014).

The study used a descriptive research design. Mugenda and Mugenda (2003) note that descriptive study provides an existing association between variables without altering anything. Blumberg, Cooper, and Schindler (2011) add that descriptive design aims to find out what, how, and where of a given phenomenon (as cited in Njoki, 2018). The design was also used by John (2017), Ndunga, Njati, and Rukangu (2016) hence considered fit for the adoption of the design for the study.

3.3 Population of the Study

Degu and Yigzaw (2006) define the universe as consisting of the whole universe or the aggregate number of items that are to be studied. This should be clearly defined through the indication of place and time to ensure suitability to the study objectives. Cooper and Schindler (2006) note the importance of the proper definition of population that can allow for effective sourcing of data (as cited in (John, 2017)). The investigation targeted the 41 DT SACCOs with registered head office locations in Nairobi City County (SASRA, 2017). Census provides a detailed counting of defined population characteristics in a given point (House, 2001) with the advantage of inclusivity necessitating credible results. Kothari (2011) advises that were economically possible, a census study may be used as it yields accurate findings and reduce errors due to sampling at a minimum level. Census investigation was

adopted given the small number of DT SACCOs in Nairobi at 41. Census investigation also increases more credibility thus making the study valid for decision-making. Purposive sampling was then be used to identify respondents who consisted of senior management from; marketing and information technology were one per DT SACCO were the respondents totaling 41 which is above the recommended threshold of 30 considered fit for analysis by Mugenda and Mugenda (2003) as cited in (Njoki, 2018). This is because management is best placed to provide the needed information under study.

3.4 Data Collection

The investigation collected primary data through the administration of a structured questionnaire. The questionnaire was developed in two sections: section one provided demographic data, section two provided a 5-point Likert scale that incorporated the technological innovation, automation, and competitive advantage among the targeted firms. The respondents were asked to express their opinion on various statements accordingly. The questionnaire was administered to one of the senior managers in each firm to avoid common bias. The targeted respondents were the Chief Executive Officer (CEO), Head of Information Communication Technology (ICT), and Head of Marketing of each firm. The CEO was selected because he represents the entire organization; the Head of ICT was selected because he/she is considered suitable to provide useful information on the state of technological innovation, and the Head of Marketing was selected because he/she is considered suitable to provide meaningful information on the state of competition in the market. The tool was administered through the drop-and-pick technique. A pilot investigation was then adopted where 10% of the study sample size was used to check for correctness of the questionnaire to improve where there is vagueness.

Supervisors were also used to help improve the questionnaire. A research assistant helped in data collection where a drop and pick was done to the management and be picked later. A checklist was maintained to ensure all participating DT SACCOs are met.

3.5 Data Analysis

The data was coded and analyzed using SPSS version 25. Measures of central tendency and dispersion were used to bring out the. Correlation and regression were used to determine the relationship between the study variables. Data was presented using frequency tables, mean, percentages, graphs, standard deviation, and charts to provide a visual view of the results. The study used a simple linear regression model adopted from Kothari (2006) as indicated below:

$$Y = B_0 + B_1X_1 + e$$

Where;

Y = Competitive Advantage

B₀ = Constant

B₁ = Regression coefficient

X₁ = Technological Innovation e= Error term

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

In all research work, data analysis forms an important component of the process through which explanations of theories, concepts, frameworks, and methods are reinforced specific areas of considerations in the chapter are; the response rate, organization, and respondent's demographic information, descriptive statistics concerning the variables of the study, normality tests, and regression analysis and research findings.

Presentation of the results and findings are done based on the objective of the study. Tables are used as a tool for presentation. The chapter also discusses the findings of the study.

4.2 Response Rate

Each of the 41 DT SACCOs was issued with one questionnaire where 37 of the questionnaires were collected. Hence the response rate of 90.2% as shown in Table 4.1.

Table 4. 1: Response Rate

Questionnaires	Number	Percentage
Filled and collected	37	90.2
Non-responded	4	9.8
Total	41	100.00

Source: Research Primary Data 2020

From the results representing the response rate in Table 4.1, it can be concluded that there was an adequate response from the distributed questionnaires since a response rate of over 90% was realized which according to Mugenda and Mugenda (2003)

rated very well. Based on the scholars' recommendation, the over 90% response rate registered in the study was termed as very good for evaluating the study results.

4.3 Demographic Information

The study sought to assess different demographic characteristics of respondents who participated in the study. The variables passed included their gender, age category, and years of working in the DT SACCO, the approximate number of employees, and level of education.

4.3.1 Gender of the respondents

The gender of the respondent was determined with a view to estimating whether the study can be categorized as gender-biased or not. The results concerning the respondent's gender are presented in Table 4.2.

Table 4. 2: Gender of the respondents

		Frequency	Percentage	Cumulative Percentage
Vali	Male	21	58.1	58.1
d	Femal	16	41.9	100.0
	e			
	Total	37	100.0	

Research Primary Data 2020

The findings of the study shows that close to three-fifths of the respondents 43 (58.1%) in the DT SACCOs were male while 31 (41.9%) were female. This suggests both genders were incorporated in the study and thus limited gender biased responses was witnessed.

4.3.2 Age Distribution

The second demographic variable investigated was the age of the respondents. The result on the variable is shown in Table 4.3.

Table 4. 3: Age of the Respondents

Item	Frequency	Percentage	Cumulative Percentage
18-30	4	10.8	10.8
31-40	17	45.9	56.8
41-50	12	32.4	89.2
50& above	4	10.8	100.0
Total	37	100.0	

Source: Research Primary Data 2020

The findings in Table 4.3 suggest that 45.9% of employees were aged between 31-40 years, 32.4% were to be aged 41-50 years, 10.8% were between 18–30 years and 10.8% were 50 and above years. Cumulatively close to the upper percentile (89.2%) of the respondents and this suggests that the DT Saccos have a younger generation heading the respective Sacco's.

4.3.3 Level of Education

The researcher found it necessary to include the education aspect because it helps establish the validity and quality of responses collected. Highly educated respondents are believed to provide a quality response concerning the research problem due to their high understanding ability. The analysis is presented in Table 4.4.

Table 4. 4: Educational Level

Variable	Frequency	Cumulative Percentage
Diploma	12	31.1
Bachelor	16	77.0
Masters	5	90.5
PhD	4	100.0
Total	37	

Research Primary Data 2020

Most of the respondents, close to half of the respondents (45.9%) had the first degree while slightly close to one-third (31.1%) had attained diploma level of education while only 13.5% and 9.5% of the respondents had attained Masters and Ph.D. academic qualification. The results suggest that indicated to have a master’s degree certificate while only seven (9.5%) indicated that they are pursuing their Ph.D. level. The result indicates most employees have the requisite qualification and thereby are well fitted to perform their duties in the DT SACCOs.

4.3.4 Age of the Organizations

The study aimed at establishing the number of years that the DT SACCOs under investigation have been in operation. He helps understand the extent to which an organization has been involved in technological changes subject to the rapidly changing technological environment. The analysis is presented in Table 4.5.

Table 4. 5: Age of the Organization

Variable	Frequency	Percentage	Cumulative Percentage
Less than 10 years	15	20.3	20.3
10-20 Years	30	40.5	60.8
21-30 years	22	29.7	90.5
Over 30 years	7	9.5	100.0
Total	37	100.0	

Research Primary Data 2020

The study found that 40.5% of the respondents indicated that they had worked in the respective DT SACCOs for a period ranging between 10 and 20 years. 29.7% indicated that they are working for a DT SACCOs that have been in operation for 21-30 years, 20.3% said that their employer has been in operation for less than ten years while 9.5% of the respondents opined that the DT SACCOs they work for has been in service for over 30 Years. The findings suggest that over four-fifths of the DT Sacco's had been in operations for over 10 years and this suggests that they have introduced appropriate technological systems in their operations to match the level of competitiveness in the market as well as customer demands.

4.3.5 Approximate Number of Employees

This section assessed the approximate number of employees in their respective DT Sacco's. The findings regarding the number of organizational employees are presented in Table 4.6.

Table 4. 6: Number of Employees

Item	Frequency	Percentage	Cumulative Percentage
Less than 10	-	-	-
10-20	2	5.4	4.1
21-30	8	21.6	24.4
Over 30	37	73	100.0
Total	37	100.0	

Research Primary data 2020

From the study findings, 75.6% indicated that they had worked in the DT SACCOs for over 30 employees and less than 25% of the Sacco has had less than 30 employees. This implies that the majority of the DT Sacco's are not micro enterprises but rather qualify to be in the small and, medium and large enterprises.

4.4 Technological Innovation

The services offered by the DT Sacco's that had been automated was next investigated in the study. The results were presented in a five-point Linkert scale where Very large extent=5, Large extent=4, Moderate extent=3, little extent=2, and Not at all=1. Using descriptive statistics, the study carried out the analysis and estimated the findings using the measure of central tendency. ; The mean, and the measure of dispersion; the standard deviation. The low standard deviation that is less than one implies low response variation. The result is presented in Table 4.7.

Table 4. 7: Technological Innovation

Statement	N	Mean	Std. Deviation
Agency services	37	4.93	.253
Money transfer services	37	4.69	.466
ATM access	37	4.62	.488
Member portal	37	4.57	.499
Mobile banking	37	4.57	.499
Tele banking	37	4.32	.685

Research Primary Data 2020

From the findings, it is established that largely, agency services (M=4.93), money transfer (M=4.69), ATM access (M=4.62), member portal (M=4.57), mobile banking (M=4.57), and telebanking (M=4.32) have been implemented. These dimensions are what the present study believed to be the backbone and evidence of technological innovation practices in DT SACCOs.

4.5 Technological Innovation Automation

Automation of a firm process has gained prominence in the recent past due to the increased servitization of activities. The automation of technological processes may result in activities being undertaken at a lower cost and thus result in improved firm competitiveness. In this regard, the respondents were requested to indicate the extent to which they agree with the following statement concerning technological innovation automation. The results are shown in Table 4.8.

Table 4. 8: Technological Innovation Automation

Statement	N	Mean	Std. Deviation
We have received many new members due to the quick account opening process.	37	4.62	.488
The loan approval process has improved significantly due to automation.	37	4.62	.613
Our DT SACCO members are well trained on the use of technological innovations.	37	4.57	.499
The automation of the sales force has led to increased recruitment and retention of members.	37	4.57	.499
Technological innovation has subsidized rates for services delivered to members.	37	4.50	.503
Our members feel safe when they do transactions through technological innovation channels.	37	4.50	.625
Members can access their accounts conveniently.	37	4.50	.503
There are increased transactions due to technological innovations.	37	4.49	.625
Members can perform multiple transactions easily.	37	4.43	.599
There is a real-time alert on transactions happening in member accounts.	37	4.42	.619
DT SACCO members can make the loan application online conveniently.	37	4.38	.613

Members can deposit their savings through the technological innovation platforms.	37	4.31	.826
Members can pay their loans in time.	37	3.97	1.046
Valid N (listwise)	37		

Research Primary Data 2020

The results show that the respondents agreed to a very large extent, that the DT SACCOs have received many new members due to the quick account opening process (M=4.62) and that the loan approval process has improved significantly due to automation (M=4.62). In addition, largely, the respondent agreed that the DT SACCO members are well trained on the use of technological innovations (M=4.57) whereby in an attempt to increase recruitment and retention of members, the DT SACCOs have an automated sales force (M=4.57). All these automation activities have led to an increased number of transactions due to the resultant convenience of members in the execution of deposit and withdrawal transactions.

4.6 Competitive Advantage

The effect that the technological innovation had on the DT Sacco's was evaluated. The competitive advantage arises through the company performance as measured by operational, market, and financial performance is better than that of competitors. The findings on the measures of performance and how they have been influenced by technological innovation undertaken by the organizations are presented in Table 4.7. The respondents were asked to indicate the extent to which technological innovation has enhanced competitive advantage in the DT SACCOs. The findings on this variable are presented below.

Table 4. 9: Competitive Advantage

Statement	N	Mean	Std. Deviation
The DT SACCO marketing department has recorded reduced costs in marketing and advertising.	37	4.93	.253
There is increased visibility enjoyed by my DT SACCO.	37	4.69	.466
The DT SACCO has recorded increased turnover and profitability due to technological innovation.	37	4.50	.503
Our members are receiving personalized services because of technological innovation.	37	4.50	.503
There is increased revenue due to the automation of services.	37	4.43	.599
The DT SACCO has collected more member data due to technological innovation.	37	4.42	.619
Our DT SACCO has a wide geographic reach due to technological innovation.	37	4.32	.685
Valid N (listwise)	37		

Research Primary Data 2020

The findings suggest that to a very large extent, that the DT SACCO marketing department has recorded reduced cost in marketing and advertising (M=4.93) as a result of technological and innovative marketing strategies. In addition, the DT SACCOs have recently enjoyed the advantage of market visibility due to the extensive technological framework (M=4.69). Further, it was evident that to a very large extent, the DT SACCOs have recorded increased turnover and profitability due

to technological innovation (M=4.50) and that members are receiving personalized services as a result of technological innovation (M=4.50). This implies that technological innovation has played a significant role in enhancing competitive advantage among the DT SACCOs.

4.6 Diagnostic Tests

Diagnostic tests are done to ensure that the data gives suitable regression outcomes without errors relating to correlation. This test involves multicollinearity, normality, serial correlation (autocorrelation), and heteroscedasticity.

4.6.1 Normality Test

The study used the Shapiro-Wilk test to establish the normality of the data. When interpreting the results, a level of significance greater than 0.05 indicates the data value deviates slowly from the normal distribution while a level of significance less than or equal to 0.05 means it is normally distributed.

Table 4.10: Tests for Normality

Variables	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Competitive advantage	.402	37	.000	.615	37	.000
Technological innovation	.375	37	.000	.630	37	.000

Research Primary Data

a. Lilliefors Significance Correction

From the study findings, we can attest that the data points relating to the variables considered in the study are normally distributed since their significance values are

less than 5%. These, therefore, imply that the data comes from a normally distributed population.

4.6.2 Test of Multicollinearity

The results are presented in Table 4.11 shows the results of the multicollinearity test among independent variables. If VIF lies between 1 and 10, then there is no multicollinearity.

Table 4.11: Test for Multicollinearity

Model	Collinearity Statistics	
	Tolerance	VIF
1 (Constant)		
Technological innovation	1.000	1.000

Research Primary Data 2020

As indicated in Table 4.9 of the study findings, the variance inflation factor (VIF) of the variables is 1.00 that lies between 1 and 10. This, therefore, imply that there is no multicollinearity and therefore the explanatory variables in the multiple regression model are not linearly correlated.

4.7 Regression Analysis

The relationship between technological innovation and competitive advantage among deposit-taking SACCOs in Nairobi City County was established by the use of linear regression analysis. Coefficient of determination assesses the extent to which variations in the independent variables explain the changes registered in the dependent variable.

4.7.1 Model Summary

Table 4.12 show the model summary of regression results.

Table 4. 12: Model Summary

Mod	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894 ^a	.799	.796	.220

Research Primary Data 2020

a. Predictors: (Constant), Technological innovation

b. Dependent Variable: Competitive advantage

From Table 4.12 the correlation coefficient (r) represents the strength of association between technological innovation and level of competitive advantage. The correlation of 0.894 indicates a positive and equally strong association between technological innovation and competitive advantage. The R^2 of 0.799 implies that 79.9% of the variance in the outcome variable (competitive advantage) is explained by changes in technological innovation.

4.7.2 ANOVA

This determines the significance of the model. The significance level less than 0.05 imply that the model is significant to predict the outcome variable. The Anova results are presented in Table 13

Table 4.13: Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	13.905	1	13.905	286.054	.000 ^a
Residual	3.500	36	.049		
Total	17.405	37			

Research Primary Data 2020

a. Predictors: (Constant), Technological innovation

b. Dependent Variable: Competitive advantage

The model significance was 0.000 (correct to 3 DP) which is smaller than 0.05. Hence, this shows that it is statistically significant and that competitive advantage is statistically predicted by technological innovation.

4.7.3 Regression Coefficients

Table 4. 14: Coefficients

Model	Unstandardized		Standardized		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	.625	.238			2.629	.010
Technological innovation	.875	.052	.894		16.913	.000

Research Data 2020

Dependent Variable: Competitive advantage

The regression model is presented as,

$$Y = 0.625 + 0.875X_1$$

The regression equation shows that holding technological innovation to a constant zero, competitive advantage would remain at 0.625 units. A unit advancement in technological innovation affects competitive advantage by a significant factor of 0.875. This, therefore, implies that technological innovation positively and significantly influences the competitive advantage of DT SACCOs.

4.8 Discussion of the Findings

Descriptive statistics show that the adoption of technological innovation by the DT Saccos was evident by the capacity of the organizations to avail ATM access, mobile banking, member portal, telebanking, and money transfer services. From the analysis of the data collected, the technological innovation adopted by the organizations was manifested to a large extent by agency services, money transfer services access by customers of their funds through the ATM, and to a moderate extent adoption of the telebanking services. The findings indicated that automation was important in increasing turnover leading to competitive advantage. The study also found that cashless service and debit card reduced operational costs thus more advantage similar to findings of (Ngure 2017).

The results likewise suggest that the adoption of technological innovation had resulted in an improved number of members, faster loan processing, and training of the Sacco products by members. From the part of the influence of the adoption of technological innovation on the competitive position of the company, it was found that the Saccos had registered reduced operation cost, visibility of the organization products and improved loan application turnover and thus profitability of the organization. The findings were similar to Mang'ana, Nyaboga, Momanyi, and Makone (2015) which indicated that information technology increased service delivery, speed, convenience, and efficiency thus increased competitiveness.

The study established that DT Sacco's marketing department had recorded reduced cost in marketing and advertising because of technological innovations that led to digital marketing technique, which is significantly cheaper. In addition, there is increased performance among DT SACCOs and consequently increased revenue due to automation of services. This finding is in tandem with earlier findings by Ndunga, Nyati, and Rukangu (2016) that bank performance increases due to technological innovations where banks were able to make extra income away from the conventional sources of loan interest and account maintenance charges.

This study provided more insights due to increased advancement in technological innovations because of data quality hence a different impact from the study of Maleto (2016) on the effects of financial innovation on the growth of savings and credit cooperative societies in Kenya done to 150 SACCOs within the period of 2011 to 2015 where most SACCOs had not yet adopted technological innovation hence a great impact on SACCO growth. Further, not all SACCOs provided reports and there was a lack of standardization of financial statements.

This study worked with senior management as respondents and deposit-taking SACCOs within Nairobi hence offers different results. The result indicates that the majority of senior managers had the requisite qualification and thereby are well fitted to perform their duties in the DT SACCOs hence implementing some of the technological innovation strategies of the SACCOS. The management of the various DT SACCOs was able to understand the mix of resources that can enable achievement of the competitive advantage thus focused on training and maintaining a knowledge base within the organization to protect competitive advantage. This provided useful information on the study unlike Enock, Ignatius, Julius, and Munene (2013) who sought to find out how financial innovation affected financial

performance focusing on SACCOS in Nairobi City County their target population was employees, members, and cooperative officers from 1371 SACCOs who might not be in a position to know the state of technological innovation in their Saccos.

The study also established that there exists a strong correlation between technological innovation and competitiveness ($r=0.799$) and that one unit change in the Sacco technological innovation resulted in an improved competitiveness level by 0.875. Because of the findings, the researchers concluded that technological innovation had a positive and significant effect on the competitiveness of the Saccos and therefore the study recommends the adoption of different forms of technological innovation that is tailored to the nature of operations of the organization.

Therefore DT SACCOs need to re-think beyond dividend and interest on deposit to expand by taking advantage of the opportunities that technological innovation has created to design unique products that can compete and succeed in the market thus increasing the level of member education, member satisfaction, deposit mobilization, increased loan uptake leading to profitability hence more competitive advantage.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Organizations that focus on devising novel strategies for conducting business and developing new products to address customer needs would achieve a competitive advantage. The scramble for more market share is characterized by competition adapted by macro-environmental factors where technological innovations are changing the way the financial industry is interacting with its customers. Banks are adopting technological innovation faster than the DT Saccos a factor that increases the switching of SACCO members to the commercial banks leading to competitive challenges.

Technological innovation aims to create an environment that supports and nurtures creative ideas, can think local while acting global to enable identification of new ideas that are broad and relevant and can give them an edge over their peers.

The summary, conclusions and recommendations drawn from study findings are presented in this chapter. It summarizes the findings, conclusions and recommendations made after from the study. It also suggest to future researchers areas to study, new knowledge from the research and lastly the limitations the researcher encountered during the research.

5.2 Summary

The objective of the study was to determine the effect of technological innovation on competitive advantage among DT SACCOs in Nairobi City County. The study was done on 41 DT SACCOs located within Nairobi City County using descriptive

research design since the review of previous studies presented conceptual, contextual, and methodological gaps. The data collection method used was a questionnaire in which 37 were received back from the sample size of 41 with a response rate of 90.2% from the questionnaires distributed to the SACCOs. The descriptive statistics obtained have indicated that the majority of DT SACCOs' top management team are well educated given the findings that 68.8% of the top management have attained minimum academic qualifications of the university bachelor degree. In addition, more than 60% of these SACCOs have been in operation for more than 10 years thus implying that they have faced different aspects of technological innovation evolution. The descriptive findings further established that the DT SACCOs studied are small organizations given the small number of employees.

Based on the technological innovation strategies adopted by the DT SACCOs under study, it was established that for these SACCOs to remain competitive, technological innovation dimensions such as mobile money, money transfer services, ATM access, member portal access, and telebanking needs to be effectively implemented. The study found that the DT SACCOs have adopted these technological innovation dimensions to large extent. The study found that with proper implementation of technology innovation there is improved competitive advantage in DT Sacco's. The most important dimensions of innovations include new products and market share. This helps the organization maintain profitability and improve market share.

The study established that with an effective technological innovation system, the DT SACCOs have received many new members due to quick account opening. Technology facilitates an easy and convenient user interface when members log in to their membership portal thus enhancing easy transaction activity using the online

platforms and as a result, there are increased transactions due to technological innovations. In support of this, the study established that members are first trained on the use of technological innovations and therefore they operate the system with ease due to the knowledge gained during the training sessions. The automation of salesforce has led to increased recruitment and retention of members. Additionally, DT SACCO members can make the loan application and payment online conveniently thus enhancing trust in the technology innovations that the SACCOs have implemented.

The findings further revealed that as a result of technology innovation adoptions, the DT SACCOs marketing department has recorded reduced cost in marketing and advertising since marketing is done online thus reducing the cost of sales agent and travel costs. The DT SACCOs have also recorded increased turnover and profitability due to technological innovation. Given the appropriate implementation of technological innovation strategies, the DT SACCOs have collected more member data and effectively managed it in their database. These findings are an indication that technological innovation has enhanced the competitive capacity of DT SACCOs in Nairobi City County. The regression analysis has shown that technology innovation and the competitive advantage of DT SACCOs in Nairobi City County are positively related. The unit advancement in technology innovation significantly enhances the competitive advantage of these organizations.

5.3 Conclusion

From the summary of the research findings, it is therefore concluded that DT SACCOs in Nairobi City County have adopted various technology innovation dimensions including; money transfer services, agency services, ATM access, member portal, mobile banking, and telebanking. Largely, these dimensions of

technology innovation have enhanced the competitive capacity of the DT SACCOs studied.

The technology innovation has improved competitive advantage in various ways like member service delivery, transaction frequency, and cost reduction. The member services offered now are faster and efficient. Through digital platforms, there is less use of papermaking processes more efficient. Members can transact at their homes or offices through using M-banking and Internet Banking hence reducing long lines at banking halls.

The technology innovation has allowed members to interact with their Saccos effectively through Facebook, Twitter, etc. customer service or call centers. The technology innovation adopted has also enabled rolling out innovative and tailor-made products for the DT SACCOs. Consequently, the deposit-taking Saccos should embrace technological innovation in their processes.

5.4 Recommendation and implication of the study

Based on the finding of the study and review of the literature, this study proposes some recommendations. First, Technology is no longer luxury, but a way of life. The rapidly changing trend in technology should be a wake-up call to DT SACCOS that do not embrace technology. This ensured that they provide service to their members effectively and efficiently.

5.5 Limitations of the Study

The study was carried out during the outbreak of the COVID-19 virus. Most of the respondents did not want to touch the hard copies of the questionnaire due to fear of the virus. This was overcome by giving the respondents sanitizers and hand gloves before filling the questionnaires.

The staff of DT SACCOs was working on a rotational basis posing a delayed data collection process. The challenge was overcome by booking appointments with the respondents when they are on duty to fill in the questionnaire.

The research project encountered a concern in the data collection where respondents feared to reveal some information and operation activities by the management for the fear of being leaked to the media or competitors. This challenge was handled by signing a confidentiality and data protection agreement with the DT Sacco's.

5.6 Suggestions for Further Study

Pursuant to the limited context of the current research, it is suggested that future findings should seek to find the impact of technology innovation on the competitiveness of DT SACCOs in Kenya and not in Nairobi only as of the current study. These findings reveal that technological innovation on its own has resulted in improved competitiveness of the Sacco's. Future studies should incorporate other moderating factors such as organizational culture and leadership support to determine what the results will be.

Further research should undertake research engrained into the DT SACCOs corporate culture to ensure the sustainability of the competitive strategy among the Sacco's. Establish the technology innovation strategies implemented by the DT Sacco has to remain competitive and offer services to their members during the crisis brought by the pandemic.

5.7 Contribution to New Knowledge

It was evident that most DT SACCOs have adopted various technology innovation dimensions including; money transfer services, agency services, ATM access, member portal, mobile banking, and telebanking. The research however discovered new trends where most DT Sacco's used data to solve problems and formulate

strategic policies. Through data analytics, DT Sacco's are able to make informed decision, which helps them gain competitive advantage and improve overall performance.

Through the digital information and data analytics, the DT Sacco has analyzed the data to reveal the trends, patterns, automate processes, target marketing, which in turn give them a competitive edge. Real time data information improved customer engagement since customer needs are addressed more quickly thus led to customer retention hence boosting employee productivity and job satisfaction.

Looking ahead, DT Sacco's need to adapt market changes to survive and thrive, they need to create a data driven culture in the organization through investments of the right tool which enable to measure results, gain competitive edge and deliver quality decision making.

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APPENDICES

Appendix I: Research Questionnaire

- i. Please tick where appropriate and make comments as guided accordingly.
- ii. For any clarification, feel free to ask questions and be honest when answering.

SECTION A: PERSONAL DETAILS

1. What is your gender: Male Female
2. What is your age group?
 - a) 18 – 30 () b) 31-40 () c) 41 -50 () d) 50 and above ()
3. What is the level of your education?
 - a) Diploma () b) Bachelor () c) Masters () d) PhD ()
4. What is your career orientation? _____
5. What is the name of your DT SACCO? _____
6. How many years have you served in your DT SACCO? _____
7. How long has the DT SACCO been in operation?
 - (a) Less than 10 years () b) 11-20 years ()
 - c) 21-30 years () d) Over 31 years ()
8. What is the approximate number of employees in your DT SACCO?
 - a) Less than 10 () b) 11-20 () c) 21-30 () d) over 30 ()

SECTION B: TECHNOLOGICAL INNOVATION

Please indicate the extent to which you agree with the adoption of technological innovations in your DT SACCO, where; Very large extent=5, Large extent=4, Moderate extent=3, Little extent=2 and Not at all=1

Indicator	Very Large Extent	Large Extent	Moderate Extent	Little Extent	Not at All
ATM access					
Mobile banking					
Member portal					
Tele banking					
Money transfer services					
Agency services					

SECTION C: TECHNOLOGICAL INNOVATION AUTOMATION

Please indicate the extent to which you agree with automation of technological innovation in your DT SACCO, where; Very large extent=5, Large extent=4, Moderate extent=3, little extent=2 and Not at all=1

Indicator	Very Large	Large Extent	Moderate Extent	Little Extent	Not at All
Members are able to access their Accounts conveniently.					
There is real time alert on Transactions happening in member accounts.					
Members can perform multiple Transactions easily.					
Technological innovation has subsidized rate for services delivered to members.					
Members are able to pay their loans In time.					
Members are able to deposit their Savings through the technological innovation platforms.					
There is increased transactions due to technological innovations.					
Our members feel safe when they do Transactions through technological innovation channels.					
DT SACCO members can make loan Application online conveniently.					
Loan approval process has improved Significantly due to automation.					
We have received many new members due to quick account opening process.					
The automation of sales force has led To increased recruitment and retention of members.					
Our DT SACCO members are well Trained on the use of technological innovations.					

SECTION D: COMPETITIVE ADVANTAGE

Please indicate the extent to which you agree with competitive advantage your DT SACCO Enjoys where; Very large extent=5, Large extent=4, Moderate extent=3, Little extent=2 and Not at all=1

Indicator	Very Large Extent	Large Extent	Moderate Extent	Little Extent	Not at All
Our DT SACCO has a wide Geographic reach due technological innovation.					
There is increased visibility enjoyed By my DT SACCO.					
The DT SACCO marketing Department has recorded reduced cost in marketing and advertising.					
Our members are receiving Personalized services as a result of technological innovation.					
The DT SACCO has collected more Member data due to technological innovation.					
There is increased revenue due to Automation of services.					
The DT SACCO has recorded Increased turnover and profitability due to technological innovation.					

Thank you.

Appendix II: Deposit Taking SACCOs in Nairobi City County

No	DT SACCO
1	Afya
2	Airports
3	Arthi
4	Asili
5	Chai
6	Chuna
7	Comoco
8	Elimu
9	Harambee
10	Hazina
11	Jamii
12	Kenpipe
13	Kevarsity
14	Kenya bankers
15	Kenya police
16	Magereza
17	Maisha bora
18	Metropolitan
19	Miliki
20	Mwalimu national
21	Mwito
22	Nacico
23	Nafaka
24	NSSF
25	Nation
26	Nyati
27	Safaricom
28	Sheria
29	Shirika
30	Shoppers
31	Stima
32	Telepost
33	Tembo
34	Ufanisi
35	Ukristu na ufanisi
36	Ukulima
37	Unaitas
38	UN- Sacco
49	Wanaanga
40	Wanandege
41	Waumini

Source: SASRA (2018)