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Information Communication Technology Adoption and Performance of Deposit Taking Savings and Credit Co-Operative Societies in Kiambu County, Kenya

Wanjohi Julius¹, Tumuti Joshua²

¹Student, Department of Management Science, School of Business, Kenyatta University, P. O. Box 43844-00100, Nairobi, Kenya

Abstract: Information communication Technology (ICT) has been used by organizations to transform their internal processes, data processing and services delivery to consumers. The Savings and credit cooperatives (SACCOs) regulator require them to implement robust ICT platforms as part of the prudential standards it has set. Though there is an observable adoption of ICT by deposit taking SACCOs to provide services to members, there are concerns of how the SACCOS has adopted ICT, similarly there is a noted diminishing rate of growth in assets, loans and total deposits. The general objective of this study was to determine the effect of information communication technology adoption on SACCOs performance in Kiambu County, Kenya. The specific objectives was to determine; the usage of mobile banking on SACCOs' performance in Kiambu County, Kenya, the effect of agency banking on performance of SACCOs in Kiambu County, Kenya, the usage of Automated Teller Machine on performance of SACCOs and to assess SACCOs' data security policies and controls. Technology acceptance Model, Resource based view theory and Diffusion of innovation theories was used in the study. The study used descriptive design on a population of 14 deposit taking SACCOs licensed and operating in Kiambu, Kenya between year 2010 and 2017. The researcher used purposive sampling technique to pick 4 respondents, who were the Branch Manager, ICT, Operations and Finance managers, per SACCO. The researcher used multiple regression analysis technique to analyze data while tables and graphs were used to present the researchers findings. The study found that the respondents considered mobile banking as a tool to enable members access services anywhere-anytime as awell as positively affecting SACCO incomes. It was further found that majority of the respondents felt safe as users while using Networks and internet services as well as affirming that Saccos used stored data to determine the member's financial behavior. Similarly, it was affirmed by the respondents that agency banking positively affected commissions and overall income of the SACCOs. The study concluded that mobile banking has enabled the DT-Saccos to improve their performance by enabling services access through mobile. Additionally, the study concluded that agency banking positively enlarged the income generating channels as the DT Saccos do not need to have physical branches as they can deliver services through virtual operations. Lastly the study concluded that data security is important to business continuity in these Saccos. DT-Saccos can utilize data analytics to customize services and communication to their members. From the analysis, it was found that ICT adoption could explain 56.7 % of the positive variations in performance of DT SACCOS in Kiambu County, Kenya. This study therefore recommends that DT Saccos ought to deepen their investments in ICT innovations as the technology offer effective and efficient channels which in turn positively influence their overall performance. The Saccos further needs to frequently revamp their technological innovations to match market requirements; this should be coupled with training and sensitization to members on these developments.

Keywords: ICT Adoption, SACCOs Performance

1. Introduction

Currently, SACCO industry is faced with diverse challenges such as growth in membership, digital transformation and automation of processes. According to [8], by adopting ICT, SACCOs can recruit members without opening physical branches, offer Sacco products online at the comfort of members as well as simplify services delivery mode.

According to Sasra report 2010, there were over 100 DT-SACCOs connected to Cooperative Bank ATM networks while a few others linked to Pesa point ATM networks. As at year 2017, 114 DT-Saccos had been connected to ATM networks while 60 Saccos were unconnected. Similarly, 120 DT-SACCOs were utilizing Mobile banking applications. As at year 2017 there were 107 DT-SACCOs acting as

Agencies of other financial institutions, however a new trend

is witnessed in which the said SACCOs are rolling out their own Agencies.

SACCO Societies adoption of digital services is hampered by huge capital expenditure investments associated with rolling out ICT infrastructures, cyber-security measures, as well as deploying qualified and competent ICT experts to support the SACCOs' Management Information Systems. This is bound to impact ease of use and accessibility of financial services so as remain competitive as well as growing the non-funded incomes. Therefore, SACCOs have no choice, but to heavily invest in deployment of digital and financial technologies.

For DT Saccos in Kiambu County to compete competitively and positively influence their performance, the use of technology should be enhanced to match up to their competitors who continuously deploy new technologies to

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²Lecturer, Department of Management Science, School of Business, Kenyatta University, P. O. Box 43844-00100, Nairobi, Kenya

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influence their performance. This includes mobile banking, money transfers, online transactions, ATM transactions and online savings and credit channels. These technologies influence the growth in numbers of customers, capital structure as well as the total turnover which results in growth of financial parameters [8].

1.1 Statement of the problem

Financial facilities are increasingly being offered on an Information Technology platform. Organizations have continued to invest in ICT as they are key tools of doing business. Sometimes these necessities are driven by industry standards. While DT SACCOs continues to upgrade their management information systems, the automation levels remain low due to inadequate expertise in the sector. This has squeezed the SACCO's optimum usage of information systems to deliver financial services while as mitigating the operational risks that ride on automation. Similarly, there is a growing concern in regard to sub-optimal deployment of ICT infrastructure and amplified occurrences of fraud among the DT Saccos [14].

[14] Concludes that SACCO's continually to miss business opportunities since some of the Saccos have not adopted IT infrastructure in their operations. The SACCO's have lagged behind in adopting and using the new emergent technologies. The fundamental performance parameters show that DT Saccos grew by 12.4% in total assets in year 2017 from year 2016; however there is a reduced growth rate in assets, loans and to deposits at -2.4%, -4% and -2.8% respectively between the two years [14].

As per the [14], the subsector key indicators, total assets, gross loans and deposits grew by 13.1%, 15.2% and 22.5% respectively between year 2010 and 2011. As per the [9], total incomes of Kenyan DT SACCOs in year 2010 was 22B of which 83.9% was contributed by Credit portfolio, Total turnover for year 2017 was 63B of which 83.51% was contributed by Loan portfolio. Therefore, there are concerns if ICT is enhancing growth and if it has been optimally implemented to support key business growth indicators. Similarly there have been complaints from members on the effectiveness of ICT services. Members complain on the uptime and deficiencies on functionalities of key ICT services.

[5] reviewed the effects of ICT on financial performance of commercial banks and [3] studied the effects of ICT on competitive advantage of multinational banks in Kenya. [6] Studied the effect of ICT adoption on financial performance of SACCOs in Nairobi County and found that, with the introduction of ICT, efficiency can be harnessed and SACCOs would be able to record higher performance and just like other financial institutions, SACCOs have embraced technology so that they are abreast with others. Nevertheless, there is an empirical and contextual existing gap on the study of the impact of technologies on Sacco's performance. Hence, this study will seek to reveal the impact of ICT considering all the variables on Sacco's performance.

1.2 Objectives of the Study

The general objective of the study was to determine the effect of information communication technology adoption on SACCO performance in Kiambu County, Kenya.

1.2.1 Specific Objectives

- 1) To evaluate the effect of Mobile banking on SACCOs' performance in Kiambu County, Kenya.
- 2) To determine the effect Agency banking on performance of SACCOs in Kiambu County, Kenya
- 3) To analyse the effect of data security measures on performance of SACCOs in Kiambu County, Kenya
- 4) To determine the influence of Automated Teller Machine usage on performance of SACCOs in Kiambu County, Kenya

1.3 Significance of the Study

The study sought to provide crucial information on ICT usage on SACCOs at the county level. Thus, the government and regulators was senstized on the need for further controls and support to safeguard members funds. Additionally, the outcome of the study will help cyber security policy makers on specific aspects of information communication technology applied to SACCOs.

An interesting aspect of this study on the application of information communication technology was that due to the frequency of technological changes, frequent studies are necessary to help the organization make updated decisions . The study desired to help understand the combined effect of information communication technology on SACCOs performance.

2. Theoretical Review

The study was anchored on one model and two theories such as Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DIT) and Resource Based View Theory (RBVT). There elaborate discussion are as follows.

TAM was proposed by Davis in his doctoral thesis in 1989. The recognized convenience element and recognized ease of use elements are the main elements in computer application behaviors relying on this model .The need for advancement of the TAM Model was occasioned from IBM Canada joint study with the Massachusetts Institute of Technology, in the 80s to understand the potential of new products to the market and make a justification on what determines the usage of computers [2]

In TAM assumption, there are two aspects; the recognized convenience aspect along with the recognized ease of use aspect is significant in computer use behaviors. According to Davis, the recognized convenience is the potential users' personalized likeliness that applying a certain application framework will improve their work's performance. Recognized ease of use is explained as the level to which the potential user anticipates the target system to not require any

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effort. The purpose of TAM model is to signify the influence of external environment associated to the information system, in relation to the user, such as, intentions and user attitudes.

On the other hand, DIT was initiated by Rogers in the years 2003 and has been applied to explain the innovation decision process. There are five roles. The knowledge role which happens in one is disclosed to an innovations presence and attains some discernment of how it operates. The persuasion role happens when an individual creates a beneficial and adverse attitude towards innovation. The decision role happens when one participates in operations that are a motive to accept or neglect innovation while the implementation role happens when one applies innovation. The confirmation role happens when one pursues augmentation on an innovative decision made to accept or neglect the innovation.

In this study, DIT theory was used to show how different innovations such as Agency banking, Mobile banking and ATM cards are communicated and persuaded to members to initiate patronage. For instance, mobile banking is used by SACCOs to market their new Products and services as well as provide channels for savings and loans disbursements.

There are four main components that influence the scope of a new innovation: the communication channels, innovation itself, time, and the social system. These components rely heavily on the human capital.

RBV theory was established by Penrose in the year 1959. The theory states that businesses are heterogeneous and they possess heterogeneous resources and that the firm's inherent capabilities allow the businesses to add value in the customer value chain improve on services or expand to new markets. Organizations should look inside the firm to find sources of competitive advantage through resources which are rare, valuable and difficult to be intimated by others, furthermore it is possible to explore external prospects using existing resources in a new way rather than acquire new skills for each different prospect that arises [1]

This theory emanates from the field of management research and is viewed as a suitable tool to establish the value provided by the ICT infrastructure. RBV theory assumes that resources, are varied among organization and imperfectly mobile. Organizations which utilizes these resources and capabilities which are finite will attain an advantage over other related industry players [5]

2.1 Conceptual Framework

Figure 1 illustrates a conceptual framework exploring the link between mobile banking, data security, agency banking, automated teller machine and SACCO's performance.

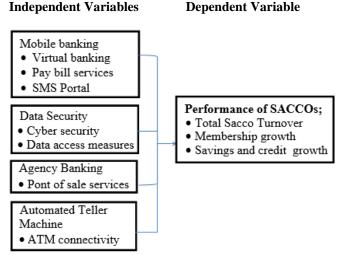


Figure 1: Conceptual Framework Source: Author (2020)

3. Research Methodology

This study used the descriptive research design since it is essential in indicating the flow of approach and attitude as well as aid in the judgment of the outcome of the analysis to be conducted. The use of descriptive research design helped in revealing associations with regards to specific variables without the venture to vary anything in the environment. In accordance to [10], the descriptive research is aimed at identifying the what, how and where of a provided experience. It regards itself with the resolve of what is happening with the mention of specific variables [12]. This technique was significant in the manner that is cost effective and less time consuming. The study population was the 14 deposits taking SACCOs regulated by SASRA in Kiambu County. This research used the purposive sampling technique as the respondents were deemed to be in an advantaged position to know how various ICT innovations impacted the performance of the Sacco. The targeted population was 14 registered deposit taking SACCOs.

3.1 Data Collection Instrument

In this study, primary data was collected using the semistructured questionnaire. The questionnaire had both open and close ended questions. This ensured that the respondents of the semi-structured questionnaire were able to give their opinion .The questionnaire was divided into three parts. Part A applied to collect general information; Part B collected information on aspects influencing the adoption of ICT in the SACCOs and Part C, information on the essence of ICT in SACCOs. Expert opinion was sought from the supervisor on the suitability of the research instrument. Additionally, to achieve consistent outcome, the reliability test was conducted and was estimated using Cronbach's Alpha coefficient of between 0.70 - 0.90.

3.2 Data Analysis

In this research, the descriptive data analysis was used. This was applied to analyze the responses from the questionnaire. The Statistical Package for social Sciences (SPSS) for

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example, the use of Microsoft Excel and statistical data like graphs and pie charts was used to analyze the qualitative data. The multiple regression was used to explain the relationship of the Saccos' performance with the independent variables that is Agency banking, mobile banking, ATM usage and cyber security. The study used a multiple regression formula;

 $Y = \alpha + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_{4+} \epsilon$ Where

Y= Performance of the SACCO

 α = the model intercept

 X_1 = Agency banking

X₂= Mobile banking

 X_3 = Cyber Security

X₄. ATM usage

ε= Error Term

3.3 Ethical Consideration

This study ethics involved the methods used to ensure that the review is done in a way that maintains the rights and privacy of participants in the questionnaire. A research authorization was acquired from the University and letters sent to the 14 SACCOs in Kiambu a week earlier before the start of data collection practice to ensure that the respondents were prepared for the questionnaire. The research permit was also sought from NACOSTI.

4. Research Findings

4.1 Response Rate

The study was done in Kiambu County and all the respondents were drawn from the sixteen (14) Deposit taking SACCOs registered and spread across the Kiambu Sub-Counties which are regulated by SACCO Society Regulatory Authority (SASRA and operate both back office (BOSA) and front office (FOSA) services. Fifty six (56) Questionnaires were distributed in a span of 3 weeks to these Saccos in which we targeted 4 respondents per Sacco. For the data collection, 50 questionnaires were successfully completed and returned. This presented a response rate of 89%. [10] Alludes that a 50% or more response rate is suitable. It's generally acceptable to have higher response rate (80% and above) from a small sample than a low response rate from a larger group of respondents. However, some questionnaires were half way filled while others had incomplete information hence were left out in the study; therefore a 100% response rate was not achievable.

4.2 Reliability of the instrument

Table 1: Reliability analysis per variable

Table 1. Remainity analysis per variable						
Variable	Number of	Cronbach's				
v arrable	items	Alpha				
Mobile Banking	6	0.767				
Data Security	6	0.788				
Agency Banking	4	0.869				
Automated Teller Machine	4	0.822				
SACCOs Performance	12	0.818				

Source: Primary Research Data (2020)

Cronbach's Alpha tests the internal consistency of the data collected, From the Cronbach's Alpha test done, the data returned a coefficient of between 0.767 and 0.869. This was after using test- Retest reliability method in which the questionnaire was given to few and chosen respondents, twice over a period of time and results tallied. [10] Concluded that an average Cronbach's alpha of above 0.77 is considered acceptable.

4.3 Descriptive Analysis

The study assessed the extent to which various factors affected the performance of the SACCOs through descriptive analysis such means and standard deviation. A Likert scale of 5 to 1 where 5 is to a very great extent, 4 is to great extent, 3 is to moderate extent, 2 is to low extent and 1 is to no extent was used.

Table 2: Mobile Banking

	N	Mean	Std. Deviation
Mobile banking has a positive effect on commission based income of the SACCO	50	4.32	.587
Mobile banking has enabled new members to join the SACCO	50	4.74	.527
Mobile banking has enabled the Sacco earn interest income from mobile based loans	50	4.62	.602
Mobile banking has enabled members access Saccos' services anywhere, anytime	50	4.58	.609
Mobile banking require low maintenance costs as compared to their total cost of ownership	50	4.46	.646
Mobile banking enable the Sacco to send custom made Marketing messages to members	50	4.02	.979
Valid N (listwise)	50		
Mean		4.46	0.658

Source: Primary Research Data (2020)

From the research data presented by table 2, mobile banking was found to have an average mean of 4.46. This shows that the aggregate respondents agreed at a very great extent that mobile banking affects positively the performance of SACCOs.

Table 3: Agency Banking

			Deviation
Agency banking has positively influenced the Saccos' commission based incomes		4.32	.935
Agency banking saves the Sacco from opening more brick and mortar branches	50	3.94	1.236
The Sacco has invested in Virtual/branchless operations to reach more members	50	4.34	.917
The Sacco has enlarged the income generating channels by adopting Agency banking	50	4.10	1.233
Valid N (listwise)	50		
Mean		4.18	1.080

Source: Primary Research Data (2020)

On aggregate, the agency banking had an average mean of 4.18. This shows that the respondents agreed at a very great

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SJIF (2020): 7.803

extent that agency banking influence the overall performance of SACCOs

Table 4: Automated Teller Machine

	N	Mean	Std. Deviation
ATM cards positively influence the commission based incomes	50	4.24	1.011
Incomes from ATM usage have a positive effect on income margins of the Sacco	50	4.12	.940
ATMs enhance the mobility of Saccos' products and services	50	4.26	.986
ATMs require low maintenance costs as compared to their total cost of ownership	50	4.40	.904
Valid N (listwise)	50		
Mean		4.26	0.960

Source: Primary Research Data (2020)

On average the ATM usage had a mean of 4.26. This shows that the respondents agreed at a very great extent that ATM enhance mobility of services and income margins to the SACCOs.

Table 5: Data security

	N	Mean	Std. Deviation
We have provided cyber security training, application of cloud and IOT, cyber security			Beviation
management and Increased skills on employees with regards to ICT usage.	50	3.90	1.129
We have setup our Sacco users to feel safe while using Networks and internet services	50	4.22	.932
Our Sacco has elaborate Redundant data storage in data centers	50	3.54	1.129
The Sacco has logical and physical cyber security configurations to mitigate access by attackers in gaining crucial data from the sites.	50	4.08	1.027
The Sacco uses the stored data to determine the members financial behavior	50	4.22	.975
The Sacco has invested in disaster management and recovery		3.80	1.195
Valid N (listwise)	50		
Mean		3.95	1.065

Source: Primary Research Data (2020)

On average the respondents affirmed at a great extent (M=3.95) that Saccos need to use stored data to determine the member's financial behavior, stored data provide business intelligence to the financial institution to determine the creditworthiness of the individual member and evaluate the best fit products and services for various niche of membership.

Table 6: SACCO's performance

	N	Mean	Std. Deviation
The adoption of ICT is key in the improvement of SACCOs earnings	50	4.28	.573
The adoption of ICT has led to an improvement in the liquidity of SACCOs	50	4.40	.808
Internal operations has greatly improved via usage of ICT technologies	50	4.40	.782
The Sacco turnover(Incomes) has been positively impacted by ICT	50	4.32	1.019

ICT adoption has enabled the Sacco grow its membership and common Bond	50	4.26	1.046
Members can easily access SACCOs products and services while using ICT channels	50	4.40	.904
Member savings have grown with implementation of ICT platforms	50	4.50	.863
Members have an efficient medium to save their savings with the Sacco	50	4.40	.808
The sacco is able to electroniclly store member savings and credit data for future access	50	4.34	.895
The Sacco is able to record and disburse credit facilities effectively	50	4.62	.530
ICT enabled savings and credit services has positively impacted the Sacco performance	50	4.66	.519
ICT platforms has enabled the Sacco to monitor and recover credit facilities		4.68	.653
Valid N (listwise)	50		
Mean		4.44	0.783
Source: Primery Passarch Data (2020)			

Source: Primary Research Data (2020)

A composite mean of 4.44 indicated the respondents greatly agreed to the statements on SACCO's performance. This is consistent with the conclusions of [6] who found that adopting ICT led to an improvement of Sacco's performance and embracing of ICT translated to improvement of turnaround time, resulting from new ways of delivering financial services electronically to consumers.

4.4 Correlation Analysis

Table 7: Correlation analysis

	MB	DS	AB	ATM	SP
MB	1				
DS	.272	1			
AB	.314*	.479**	1		
ATM	.352*	.733**	.704**	1	
SP	.612**	.705**	.558**	.534**	1

Key: Mobile Banking (MB), Data Security (DS), Agency Banking (AB), Automated Teller Machine (ATM), SACCOs Performance (SP)

Source: Primary Research Data (2020)

From the table 7, the results shows that the Pearson's r for the correlation between mobile banking and Sacco's performance is 0.612. This shows that there is a positive linear relation between the variables. The Pearson's r for the correlation between the data security practices and Sacco's performance was 0.705. This shows that there is a positive linear relation between the variables. Similarly, the Pearson's r for the correlation between Agency banking and Sacco's performance was found to be 0.558. Lastly, the Pearson's r for the correlation between ATM usage and Sacco's performance was 0.534. This shows that there is a positive linear relation between the variables.

4.5 Multi-regression Analysis

Table 8: Multicollinearity Test

Model		Collinearity Statistic		
		Tolerance	VIF	
	(Constant)			
1	Mobile Banking	.867	1.154	
	Data Security	.459	2.178	

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Agency Banking	.497	2.014
Automated Teller Machine	.296	3.381

a. Dependent Variable: SACCOs Performance Source: Primary Research Data (2020)

The diagnostics test assesses the validity of a model. This study carried out diagnostics tests by examining tolerance and the Variance Inflation Factor (VIF) which are two collinearity diagnostic factors that help identify multicollinearity symptoms. [13] While interpreting the variance inflation factors concluded that it's acceptable to have a VIF of 1-10. From the table 8, the VIF ranged between 1.154 and 3.381 which shows a moderate correlation between the variables.

Table 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753 ^a	.567	.528	.31810

a. Predictors: (Constant), Automated Teller Machine,Mobile Banking, Agency Banking, Data Securityb. Dependent Variable: SACCOs Performance

Source: Primary Research Data (2020)

Table 9 illustrates that holding other factors constant, the coefficient of determination (R Square) indicates that Automated Teller Machine, Mobile Banking, Agency Banking, Data Security in the regression model collectively explain 56.7 % of the variations in performance of DT SACCOS in Kiambu County, Kenya. Other factors not considered in this study could therefore explain the other 43.3% variations on the performance

Table 10: ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	5.958	4	1.489	14.720	.000 ^b
1	Residual	4.553	45	.101		
	Total	10.511	49			

a. Dependent Variable: SACCOs Performance

b. **Predictors**: (Constant), Automated Teller Machine,

Mobile Banking, Agency Banking, Data Security

Source: Primary Research Data (2020)

From table 10, the results indicate that the model was significant since the p-value (0.000) was less than the conventional probability of 0.05 significance level.

Table 11: Regression Coefficients

Model		Unstandardized Coefficients		t	Sig.
		В	Std. Error		
1	(Constant)	1.463	.558	2.620	.012
	Mobile Banking	.288	.131	2.193	.033
	Data Security	.426	.090	4.730	.000
	Agency Banking	.183	.123	1.495	.039
	Automated Teller Machine	.503	.164	3.067	.006

a. Dependent Variable: SACCOs Performance Source: Primary Research Data (2020)

 $Y_L = 1.463 + .183X_1 + .288X_2 + .426X_3 + 0.503X_4$

The regression equation revealed that at 5% significance level and 95% confidence interval, mobile banking had 0.033 level significance, Data security had 0.000 level of significance, agency banking had 0.039 level of significance while ATM usage had 0.006 level of significance. Similarly performance of the Sacco's would rise by 1.463 units.

An increase of agency banking by a unit would enhance performance by factors of 0.183, an increase on mobile banking by a unit would influence performance by factors of 0.288, an increase on data security by a unit would influence performance by 0.426 and an increase of a unit In ATM usage would lead to a increase in performance of the Sacco by a factor of 0.503.

[4] Concluded that various ICT technologies such as usage of ATM systems improved the service delivery to customers and generated incomes for SACCOs and hence the performance. Similarly, [10] concluded that POS terminals has a high income generating potential as it allows customers to complete a broad array of financial transactions thus enabling the financial institutions to earn more and improve their return on assets.

5. Recommendations

From the findings and the conclusions, the study endorses that DT Saccos ought to deepen their investments in mobile banking platforms as it's the next frontier in ICT innovations. This will enable members to access the SACCOs services while not being limited by time or location. The SACCOs ought to revamp their Mobile baking applications so as to present a wide array of features to the members. This study found that the SACCOs are able to deliver services to members using agency banking without a capital outlay in brick and mortar branches. The study therefore recommends that SACCOs ought to carry out frequent and updated trainings to the agents. This will ensure uniform services delivery across different service points. Data security is an essential part within the SACCO information systems. The SACCOs ought to ensure that the networks and data are well secured from unauthorised access through dual authentication, use of password, redundant servers, firewalls or cloud computing. The study further recommends that SACCOs ought to use business analytics tools to understand the consumer behaviour and tailor make products required by the membership. The DT-Saccos regulator (SASRA) ought to develop effective regulatory structures to monitor the adoption of ICT in various SACCOS to boost their efficiency and performance.

6. Areas for Further Studies

This study was dedicated on SACCOs in Kiambu County; the study therefore recommends that future studies need to be done in other rural counties so as to measure the adoption of ICT across the counties. The study further suggests a research on other ICT perspectives, such as impact of ICT adoption as a value addition to the consumer and the quality of ICT innovations being implemented by DT-Saccos. The study further recommends a research on the sustainability of

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ATMs technology in the long term. Lastly the study suggests a research on the relationship between corporate governance practices and digital marketing in Sacco's overall performance.

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