

Assessing the Effectiveness of ICT to Enhance Strategic Management in the Firm: A Case of saving and credit cooperatives in Nyagatare District, Rwanda

Sadate Murekezi

European University of Lefke, TRNC Mersin 10

Turkey

Department of Management Information Systems

sadatemurekezi@gmail.com

Assoc. Prof. Dr. Tahir Yeşilada

European University of Lefke, TRNC Mersin 10

Turkey

Faculty of Economics & Administrative Sciences

tahiryasilada@hotmail.com

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ABSTRACT: *This research examines the effectiveness of information and communication technology (ICT) in enhancing strategic management in saving and credit cooperatives (SACCOs) located in the Nyagatare district of Rwanda. The study aims to achieve three objectives: evaluating the impact of ICT infrastructure on strategic management, identifying how ICT integration contributes to daily operational activities, and determining the influence of ICT skills and training on service delivery and customer satisfaction. The data for this study was collected through surveys, interviews, and document analysis from various SACCOs in the Nyagatare district. The findings reveal that ICT infrastructure has a positive effect on strategic management, data analysis, and decision-making processes. The integration of ICT improves operational activities by automating tasks, streamlining processes, and providing personalized services. Additionally, ICT skills and training play a crucial role in enhancing service delivery and customer satisfaction. However, the study also highlights challenges such as limited infrastructure and the need for training. It emphasizes the importance of addressing infrastructure limitations and investing in staff training to maximize the benefits derived from ICT implementation.*

KEYWORD: Information and communication technologies (ICT), Saving and Credit Cooperative (SACCO), Small and medium Enterprises (SMEs).

INTRODUCTION

ICT has become a driving force in the business world, shaping markets and transforming the way companies operate. The integration of technology has become essential for businesses and the inability to utilize or access ICT tools can have adverse effects on commerce. Therefore, firms strive to comprehend and assess the impact of information technology to make informed decisions about substantial IT investments.

As stated by (Megha & Zaware, 2021), a substantial portion of global organizational investments is allocated to IT and related communication technologies, exceeding fifty percent. These investments are strategically managed by organizations with the aim of enhancing productivity and overall effectiveness. Furthermore, these investments often establish a connection between the company's business model and the critical factors that influence its performance. According to (Dewett & Jones, 2001), information technologies encompass a wide range of communication mediums and devices that facilitate the connection between information systems and individuals. These include various tools such as voice mail, email, voice conferencing, video conferencing, the internet, groupware, corporate intranets, car phones, fax machines, and personal digital assistants.

Information and Communication Technology is a central engine to driving Rwanda's transformation to a knowledge based economy, a fact Rwanda has acknowledged by allocating a budget to ICT – as a percentage of its GDP – that is at par with OECD countries. (RDB, 2023).

ICT continues to support the growth of the Finance Sector while improving the financial-inclusion for all Rwandan. This is evident through improved use of ICT in financial services delivery, increased number of mobile payment subscription and electronic transactions, increased deployment of electronic billing/transaction machines, increased use of online tax payments, and increase of ICT companies with ecommerce platforms.(MINICT, 2012)

The government of Rwanda has invested much effort in promoting integration of technology to speed up its economy; it is encouraging financial institution to digitalize most their services (e-Commerce). Umurenge SACCO, which stands for saving and Credit Cooperative, is a cooperative-based financial institution. Operating as a legal entity, it enables individuals to deposit their savings and obtain loans for investment in diverse ventures. Umurenge SACCOs are a product of the government of Rwanda's

initiative outlined in the Vision 2020 development agenda. The primary objective of this initiative is to enhance access to financial services for citizens, thereby fostering socio-economic development within communities (RCA, 2018)

With a strong emphasis on promoting e-Payment solutions for financial transactions across various levels, Rwanda is actively encouraging their adoption. As part of this initiative, Umurenge SACCOs have proactively embraced information and communication technology (ICT) to digitalize the services given to customers and use it for strategic managements. This adoption of ICT is expected to yield substantial positive outcomes for SACCOs and, in turn, contribute to the economic growth of Rwanda.

1.1 The purpose of the study

This study aims at Assessing the Effectiveness of ICT in Enhancing Strategic Management in the Firm: A Case of saving and credit cooperatives in Nyagatare district, Rwanda.

Objective of the study

To achieve the goal of the study, the study has following objectives;

1. To evaluate the impact of ICT infrastructure to enhance strategic management of a Firm.
2. To identify the contribution of ICT integration to the firm's daily operational activities.
3. To determine the influence of ICT skills and training to service delivery and customer's satisfaction in Saccos.

This study aims to answer the following research questions:

Research questions

1. What is the impact ICT infrastructure to enhance strategic management of a firm?
2. What are the contributions of ICT integration to the firm's daily operational activities?
3. What is the role employee's ICT skills and training to service delivery and customer's satisfaction in Saccos?

Similarly, the study aims to verify the following research hypotheses.

Hypotheses

H1: There is an impact of ICT infrastructure to enhance Sacco's strategic management of a firm

H2: There is a significant contribution of ICT integration in the Sacco's daily operational activities.

H3: There employee ICT skills and training influence positively service delivery and customer's satisfaction in Saccos.

LITERATURE REVIEW

In recent years, there has been an increase in interest in researching how ICT affects strategic management in businesses. With a focus on innovation and production, this article seeks to evaluate how well ICT may improve strategic management within the Firm. In today's global market, organizational survival relies on transformation capabilities and continuous innovative initiatives.(Gorjian Khanzad & Gooyabadi, 2022).

The purpose of this chapter is to review the previous researchers on the Effectiveness of ICT on Strategic Management in the Firm this chapter present the main recent works on Effectiveness of ICT in Enhancing Strategic Management in the Firm.

(Sirirak et al., 2011) to develop a framework that would depict and examine the nature of the relationship between ICT use and organizational performance in the Lebanese market, the results indicate that ICT and innovation are strategic resources.

In the study by (Zahra et al., 2019), to examine the mediating role of knowledge management between information technology capability and Organizational Performance in Pakistan (SMEs).The results of the study highlighted a great deal of agreement with our proposed relation between ITC and OP; Furthermore, it also makes us realized that IT capability provide a foundation of finding a competitive advantage ;

The findings of the study also shed a light that Pakistani SMEs increasingly realizing the role of IT capabilities in increasing the OP.

In the research carried out by (Yunis et al., 2017),to investigate the influence of information and communication technology (ICT) adoption on hotel performance in Thailand. The findings indicate that ICT adoption has a significant positive relationship with hotel performance. However, ICT adoption influences operational productivity more than customer satisfaction.

ICT makes a business more efficient, effective and promptly respond to customers' needs. ICT can assist business activities including design, manufacturing, R&D, distribution and sales and feedback. Through a proper digital transformation, businesses have the ability and capacity to exceptionally improve their productivity and competitiveness (Agarwal & Brem, 2015)

To generate value and obtain competitive advantages. Studies have revealed that digital transformation facilitates business innovation improves performance, enhances consumer experiences (Zaki, 2019) and boosts the development of value activities (Martínez-Caro et al., 2020).

(Hulland & Wade, 2016), asserted the impact of ICT in three different competitive levels: Industry, competitive environment and Organization (Strategy). He noted that the industry level, ICT can change the product life cycle, change its mode of distribution, change barriers geographic market and affect the economic bases of production. At the competitive environment, ICT can change the balance of forces the company with its competitors, customers and suppliers. At the organizational level, He denoted that the use of ICT can contribute to improved implementation of activities of the value chain (e.g. design, production, marketing, etc..) and thus contribute to the success of generic strategies minimize costs and/or differentiation.

The role of ICT in business is seen in however it will facilitate your company become a lot of productive, increase performance ,save money, improve the client expertise ,streamline communications and enhance social control decision- creating .It additionally play a task in serving to corporations expand globally and in providing workers access to company data where and whenever they have.(Com, 2020).

According to (Wachira et al., 2014) in his research “The researcher sought to evaluate the perceived effect of ICT on performance of SACCOs in Kenya”; The study found that the SACCOs survival will depend on what kind of ICT’s they are using and how well the employees and the members are conversant with the technology.

In the research by (Moturi & Mbiwa, 2015) to evaluate Management Information Systems (MISs) to run their business, serve their clients and provide differentiated products and services to gain competitive advantage in Sacco. Using the ISO/IEC 25010 Software Product Quality Model. The results indicated that the MISs currently in use by the SACCOs serve them well in terms of functionality, efficiency, reliability, ease of use and portability.

In recent years Rwanda has embarked on Economic liberation policies which pave a way to growth of cooperative societies specifically SACCOs in many areas of the country including Kigali City. According to (Mulyungi, 2018 as cited in Tumwine et al,2015).Cooperative policy encourage gender equity in formation and management/leadership of SACCOs.

Nyagatare SACCOs have incorporated ICT into their operations to enhance performance and service delivery. This includes utilizing ICT for tasks such as security, workers management, system monitoring and control, data analysis, and decision making. This adoption of ICT is in response to customer needs and aims to facilitate prompt service delivery. The introduction of ICT in firms brings numerous advantages. According to (Ion & Andreea, 2010), they have identified and analyzed the key factors associated with implementing information and communication technologies in small and medium businesses operating in the service sector. These factors are as follows: (1) ICT has the potential to enhance managerial practices in SMEs within the service sector; (2) ICT offers multiple benefits to SMEs in the service sector; (3) SMEs can leverage ICT to foster growth and encourage

innovation.

In considering the various results obtained from a variety of studies, it can be concluded that ICT play a tremendous role in improving the performance of a firm. However, managers should be aware of the limitations of IT competencies when dealing with dynamic environments. This suggests that while IT can provide benefits in certain situations, it may not always be effective in highly dynamic environments, and other strategies may need to be employed (Chakravarty et al., 2013).

Conceptual framework

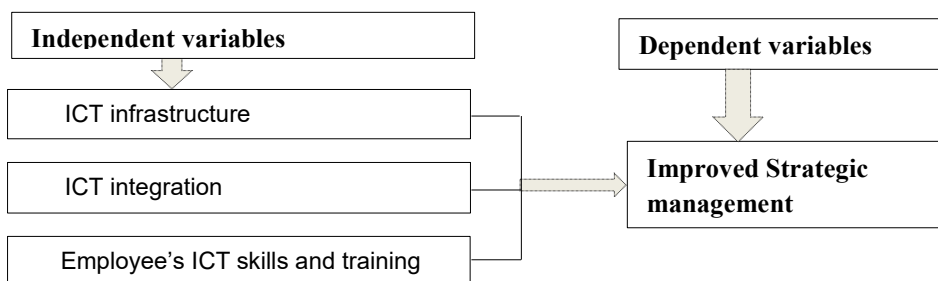


Figure 1: Conceptual framework

RESEARCH DESIGN AND METHODOLOGY

This section shed light on the methodology followed in the current study. First, the approach will be discussed. The research questions and hypotheses were restated. Third, the sampling procedures will be described. Fourth, the data collection and procedures will be explained detailed. The reliability of the scales will be reported.

Research approach

The current study departs from a pragmatic sentence to knowledge. Therefore, the approach is a mixed approach that uses both quantitative and qualitative data. (Creswell and Creswell, 2017). In this regard methodological triangulation will be adopted. It means that more than one research instruments is more likely to increase the reliability and validity of the findings to answer the research questions and hypotheses.

Population and Sampling procedure

Non- probability sampling will be used to gather the sample for this research. Non-probability sampling means that not all individuals have an equal chance to be included in the sample,(Etikan, 2016) The research was conducted by focusing on specific firms/SACCOs that have implemented ICT as solutions for strategic management purposes in Nyagatare district.

In this study was used Convenience sampling where by participant are individuals who are workers accessible or available at a certain time in selected SACCOs.

Table1: Target population

District	Sacco	Population	Census
Nyagatare	Sacco Turwanye Ubukene Rwimiyaga	11	11
	Matimba Vision Sacco	10	10
	Karangazi Sacco	8	8
	Museri Sacco	8	8
	Total	37	37

Source: Sacco, 2023

Data for this study were obtained from 37 participants through an online survey questionnaire, which served as the research instrument ($N = 37, n = 37$). Four specific SACCOs were purposively selected, considering two criteria: (1) having a significant number of employees and (2) being situated in areas with essential infrastructure such as electricity and network connectivity. The questionnaire was initially distributed to 37 staff members, and all 37 respondents provided feedback, resulting in a response rate of 100 percent.

Data collection instruments

The item statements in the questionnaire were designed to address four research questions pertaining to the effectiveness of ICT in enhancing strategic management within the firm. Closed-ended items were utilized, and participants were instructed to respond using a five-point Likert scale. A rating of one indicated strong negative feedback (strongly disagree), while a rating of five represented strong positive feedback (strongly agree).

To gain insights on ICT infrastructure, specific items were explored using a scale ranging from "No" (indicating a negative assertion) to "Yes" (indicating a very positive assertion). Additionally, an item related to ICT integration and utilization in strategic management within the firm was included in the questionnaire. This item employed a five-point Likert scale encompassing options such as "Strongly agree," "Agree," "Neutral," "Disagree," and "Strongly disagree."

Validity and reliability

A questionnaire was used as the research instrument in this study to collect data from participants. The instrument was designed using Google form and comprised 25 item statements from which 21 were found reliable. Validity is the assurance that the research instrument measures what it intends to measure. To ensure the validity of the instrument used in this study, a preliminary test of the item statements of the questionnaire was conducted by seeking expert views on the coherence and trustworthiness of the instrument in relation to the objectives of the study. As the study considered SACCOS' employees in Nyagatare district as the sole participants, the researcher shared the instrument to three works in the different district.

The reliability of the questionnaire was evaluated through Cronbach's Alpha which measures the internal consistency. The Alpha measures internal consistency by establishing if certain item measures the same construct. Cronbach's Alpha was established for every objective in order to determine if each scale (objective) would produce consistent results should the research be done later on. The findings of the pilot study shows that all the four scales were reliable as their reliability values exceeded the prescribed threshold of 0.7

Table 2: Cronbach's alpha obtained from reliability test

Coefficients Scale	Cronbach's Alpha	N of Items
ICT Infrastructure	.898	5
ICT Integration	.736	5
Employee ICT skills and Training	.446	4

Source: Primary data, 2023

DATA ANALYSIS AND PRESENTATION

Upon data collection, the researcher undertook various operations to analyze the data and derive meaningful insights. These operations encompassed editing the data to eliminate inconsistencies,

categorizing the data based on similarities, and arranging it into tables to ascertain relationships between variables. Descriptive statistics were employed to depict the characteristics of the collected data. To establish relationships among the variables under study, Pearson's Correlation, Analysis of Variance (ANOVA), and Multiple Regression Analysis using a Logic model were utilized. The complete set of hypotheses was tested at a 95% confidence level. Numerical values consistent with numerical codes were assigned to the responses.

Quantitative Analysis

For the analysis of quantitative data, the statistical package for social sciences (SPSS) version 20 was utilized. The quantitative items were subjected to data analysis using this software. On the other hand, qualitative data was examined through the correlation coefficient to establish initial relationships between variables. To compare the observed data with the researcher's hypothesized data, Karl Pearson's Zero Order coefficient of correlation test was employed (Kothari, 2012).

Multiple regression analysis was the chosen model for this analysis, which can be represented as follows:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \varepsilon$$

In this equation:

- y represents the dependent variable (Sacco Strategic Management)
- β_0 denotes the constant term
- x_1 corresponds to the first independent variable (ICT Infrastructure)
- x_2 refers to the second independent variable (ICT Integration)
- x_3 stands for the third independent variable (Employee ICT Skills and Training)
- β_1 to β_3 represent the regression coefficients for each independent variable
- ε represents the random or stochastic term

The hypotheses were tested at a 95% confidence level ($\alpha = .05$), using a two-tailed test approach.

RESULTS AND DISCUSSION

This section presents results that examine the effect of ICT in enhancing strategic management of SACCO. The presentation is accompanied with interpretation and discussion in the scope of the research questions and objectives of the study.

Table 3: Description of participants' demographic information

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Female	20	54.1	54.1	54.1
Male	17	45.9	45.9	100.0
Total	37	100.0	100.0	
Age				
18-24	8	21.6	21.6	21.6
25-29	21	56.8	56.8	78.4
30-Above	8	21.6	21.6	100.0
Total	37	100.0	100.0	
Level				
High School	14	37.8	37.8	37.8
Graduate	18	48.6	48.6	86.5
Post graduate	5	13.5	13.5	100.0
Total	37	100.0	100.0	

Source: Primary data, 2023

Understanding the demographic characteristics of the study participants is crucial in the academic and scientific investigation, and could not be underestimated throughout the research process (Galea & Tracy, 2007). We herein present description participants' demography by using frequencies and percentages of characteristics, which deemed necessary for this study (Table 2). Gender was considered where 20 (54.1) and 17 (54.9) corresponding to Female and Male respectively participated in the study. Younger participants were the 18-24 years of age category while older ones were in the age category was above 30 years. Education level indicates that 14 (37.8) were holders of Advanced level certificate (A2), 18 (48.6) are bachelor's degree holders (A0) while 5 (13.5) had post graduate degree.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.873 ^a	.762	.741	.46567

a. Predictors: (Constant), Employee Skills, ICT Infrastructure, ICT Integration

A table 4 presents the regression results. From the model summary the R² was .762 indicating that Predictors (Employee Skills, ICT Infrastructure, and ICT Integration) explained 76.2% of the variation in the enhancing strategic management of Sacco in Nyagatare District.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.952	3	7.651	35.280	.000 ^b
	Residual	7.156	33	.217		
	Total	30.108	36			

a. Dependent Variable: Effective Strategic Management

b. Predictors: (Constant), Employee Skills, ICT Infrastructure, ICT Integration

Table 4 displays the coefficient of the regression model of Sacco performance on ICT infrastructure, Innovations, ICT awareness and ICT policies. From the table all the coefficients of the model were significant at 5% level of significance. This means that all the hypotheses were accepted at 95% confidence level. The regression model achieves a degree of fit as reflected by (F = 35.280; P = .000 < .05) Hence the results is meaning full.

Therefore, Sacco performance can be predicted using the following equation:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \varepsilon$$

$$y = -6.44 + 0.749x_1 + 0.086x_2 + 0.248x_3 + \varepsilon$$

Where;

Y is Sacco performance

X₁ is the ICT infrastructure

X_2 is the ICT Integration

X_3 is the ICT Employee ICT Skills and Training

Table 6: Coefficients^a Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.644	.429		-1.502	.143
1 ICT Infrastructure	.749	.150	.437	4.981	.000
ICT Integration	.086	.034	.255	2.539	.016
Employee Skills	.248	.053	.481	4.705	.000

a. Dependent Variable: Effective Strategic Management

Based on the information provided in the table 6, the independent variable "ICT Infrastructure" has a positive unstandardized coefficient of 0.749, indicating that a one-unit increase in ICT infrastructure is associated with an increase in the dependent variable.

It is statistically significant ($p < 0.001$) with a relatively large standardized coefficient (Beta = 0.437), suggesting a moderate impact on the dependent variable.

The independent variable "ICT Integration" has a positive unstandardized coefficient of 0.086, indicating a positive relationship with the dependent variable. It is statistically significant ($p = 0.016$), but its impact is relatively smaller compared to the other variables (Beta = 0.255).

The independent variable "Employee Skills" has a positive unstandardized coefficient of 0.248, suggesting a positive relationship with the dependent variable. It is statistically significant ($p < 0.001$) and has a relatively large standardized coefficient (Beta = 0.481), indicating a substantial impact on the dependent variable.

Based on the given results, ICT Infrastructure ($\beta=.749$) and Employee Skills ($\beta=.248$) appear to be significant predictors of the dependent variable, while ICT Integration ($\beta=.086$) is also statistically significant but with a smaller effect.

In summary, the utilization of ICT tools, such as RFID and checking points, within Sacco operations has been shown to have a noteworthy positive influence on security. This, in turn, enhances customer satisfaction and instills trust by ensuring the safety of their financial assets. Additionally, providing training to employees on ICT, particularly regarding Financial Management Software and database usage, enhances their proficiency and reduces operational costs. For instance, previously, Sacco may have needed to hire temporary workers to assist with inventory management, but with ICT implementation, they can efficiently monitor inventory status and generate prompt reports.

Moreover, the introduction of electronic attendance systems enables managers to effectively monitor employee attendance. Consequently, the utilization of ICT has been found to have a significant positive correlation with customer satisfaction.

SUMMARY AND CONCLUSIONS

The study aimed to assess the perceived effects of ICT on strategic management in SACCOs in Nyagatare District. Specifically, it focused on the impact of ICT infrastructure on SACCO performance. The findings indicated that ICT infrastructure, ICT integration, and employees' skills and training have a significant positive influence on strategic management.

The study revealed that ICT has brought several benefits to SACCOs, such as improved database management and information sharing. Real-time data availability has enhanced service delivery accuracy and planning capabilities. Additionally, the adoption of ICT has enabled SACCOs to streamline internal processes, reducing redundancies and increasing operational efficiency. Automation of tasks like loan application processing and account management has reduced administrative burdens and boosted overall productivity. The use of digital platforms has also facilitated better communication and collaboration among staff members and stakeholders, leading to more coordinated strategic decision-making.

Furthermore, ICT implementation has expanded SACCOs' access to a wider range of financial services. This includes digital attendance systems, mobile banking (though not available to all customers), tax calculations, and collaboration with other financial institutions like Umwalimu Sacco. These advancements have contributed to improved financial inclusion and accessibility for SACCO members.

In conclusion, the study highlights the positive impact of ICT on strategic management in SACCOs. Through enhanced decision-making, operational efficiency, and customer satisfaction, ICT has played a crucial role in driving sustainable growth and development in these financial cooperatives.

Research implication and Limitations

This study is exploratory research intended to assess the effectiveness of ICT in enhancing strategic management in firms has certain limitations that should be acknowledged. Despite the contribution and the significance of this study, it has several limitations. One key limitation is the potential impact of sample size and representativeness. If the sample size is small or not representative of all saving and credit cooperatives (SACCOs) in Nyagatare district, it may not provide an accurate reflection of the diverse characteristics present in the broader population of SACCOs in Rwanda or other regions. Consequently, the findings may not be generalizable beyond the specific sample utilized in this study.

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