ADOPTION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND DETERMINANTS OF PERFORMANCE OF SACCOs' IN UGANDA

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A DISSERTATION SUBMITTED TO DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF ARTS IN ECONOMICS OF KYAMBOGO UNIVERSITY

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DECLARATION

I, **KABUGO ROBERT** hereby declare that this dissertation report titled ***"ADOPTION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND DETERMINANTS OF SACCOs' PERFOMANCE IN UGANDA"*** is my original work and has never been presented for a degree in another University.

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APPROVAL

We as University Supervisors confirm that the dissertation entitled ***"ADOPTION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND DETERMINANTS OF SACCOs' PERFOMANCE IN UGANDA"*** has been done by the candidate under our supervision.

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DEDICATION

This dissertation is dedicated to my cherished parents and wife for overwhelmingly and endlessly supporting me towards the entire academic journey.

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ABBREVIATIONS

SACCOs	Savings and Credit Cooperative Societies
ICT	Information and Communication Technology
WOCCU	World Council of Credit Unions
MTICs	Ministry of Trade Industries and Cooperatives
TAT	Technology Acceptance Theory
MFIs	Microfinance Institutions
OECD	Organization for Economic Co-Operation and Development
AMFIU	Alliance of Microfinance Foundation and Institution of Uganda
UCA	Uganda Cooperative Alliance
UCSCU	Uganda Cooperative Society and Credit Union
NPA	National Planning Authority

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ABSTRACT

The study focused on adoption of ICT and determinants of performance of SACCOs' in Uganda. The three specific objectives included: to investigate the effects of ICT on SACCOs' performance, to determine other factors that determine SACCOs' performance in Uganda. Further, the study investigated the determinants of ICT adoption among SACCOs in Uganda. The study used primary data collected from different SACCOs that had embraced the use of ICT in their operations in Uganda. A population of 420 reflecting sample size of 201 SACCOs was interviewed. The study employed a multiple logistic regression model to analyze the effect of ICT on SACCOs' performance and other factors that determined SACCOs' performance in Uganda. The study also used an ordered logistic regression model to explore the different factors that determine SACCOs' ICT adoption levels in Uganda based on three levels that is low, medium and high.

The study results revealed that ICT expenditure and number of functional computers were positive and statistically significant at 0.04 percent with ICT adoption and 7.6 percent respectively holding other factors in the model constant in influencing profitability.

The study further found out that total accumulated savings and total loan portfolio amount of the SACCO were positive and statistically significant at 0.256 percent and approximately 0.2 percent respectively holding other factors constant in the model and membership size was positive though non-significant in influencing the performance of the SACCO.

The ordered logistic model results revealed that number of ICT trained staff, internet access, number of ICT training and age of the SACCO were factors that positively and significantly determines the probability of SACCO ICT adoption levels at 1% and 10% respectively.

The study therefore, recommended that SACCOs should earmark more funds for ICT adoption and use, increase the availability of functional computers since they had significant effect, encourage and motivate members to save more and also continuously train their staff in ICT related tools among others to improve SACCOs performance and also adopt ICT in their operations.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

With globalization coupled with information revolution, institutional performance measured in different dimensions is increasingly becoming a global concern for both multinational corporations and domestic business enterprises. Performance of these institutions world-wide is based on the nature of competition existent in the market in order to determine whether the organization is performing well or otherwise. For institutions to achieve their objective function of improved performance and remaining competitive amidst the market dynamics, it calls for competitive strategies internally to tap into the existing and emerging opportunities influenced by external variables over time (Manochehri et al., 2012)

Ollo-Lopez & Aramendia-Muneta (2012) pointed out that Communication and information technology (ICT) acts as a stimulus for the flexibility of Savings and Credit Cooperative societies (SACCOs) because those that adopt and use it are likely to perform better in the market and enables them to differentiate their products and services in the same market. ICT adoption and usage appear to have direct effect on productivity depending on the sector and also support sustainable development. In the cooperatives sector, the use of e-platforms, for example, e-mails, social media networks, e-ecommerce among others, have not only substantially reduced on the cost of physical transportation and transactions, but also improved efficiency in operation. Therefore, their study revealed that it is significant, for organizations to enjoy the benefits of long-term investment in ICT since positive effects are only realized upon adoption (Manochehri et al., 2012). Consistently, organizations, for example, SACCOs should put in mind that ICT adoption requires structural adjustments and internal changes, for instance, staff training, and reorganization among others (Consoli (2012) and Bayo-Morines et al., (2013)).

According to Steinfield et al. (2012) the fast growth and advancements in ICT have directly affected the management and functioning of SACCOs. ICT adoption, usage and exploitation improve performance and competitiveness which eventually result into long run SACCO growth. ICT provides SACCOs a competitive advantage in the emerging business enterprises because most business leaders depend on ICT to share information, store data and also make informed decisions.

ICT has the prospect to enable and support effective and efficient operations vital to the performance of SACCO business activities, and in the end, it enhances both innovativeness and competitiveness which are central in SACCO performance. Most Importantly, the United Nations sustainable development goals, particularly SDG 9 and the national development plan (NDPIII) of Uganda underscore the importance of ICT infrastructure and digital transformation in a bid to increase ICT penetration and usage for socio-economic development (NPA, 2020).

George et al. (2017) pointed out that performance in business seems to change and improve equally when SACCOs adopt ICT to ease the communication, exposure and work in the market environment. In addition, regardless of the level of interaction in the market, high ICT usage improves performance of any business. ICT use increases the level of expectations for SACCOs to improve effectiveness and efficiency of the prevailing internal processes. This adds value by exploiting the new available opportunities and also enhances SACCO performance. It is also argued that adopting ICT in SACCO operations and management tends to support SACCOs in costs reduction, effectiveness, market information and provision of services to their clients (Ghobakhloo et al., 2011). Franco et al. (2014) indicates that the increasing pace of technological development and innovation in most developing countries is stimulating the performance of multiple SACCO functions. The study revealed that the planned orientation of SACCOs is significant simply because it determines the level by which SACCOs would forecast its demand in the competitive environment. Relatedly, it is noted that SACCOs are motivated to adopt ICT mechanisms in order to improve their internal practices, speed up product information via faster communication, and also enhances promotion and distribution of their services through the online platforms. Therefore, whatever the case maybe ICT stands as a key pillar for the contemporary business innovation and transformation for improved performance.

Many developing countries, for instance, Uganda, most organizations find it difficult to adopt and implement ICT resources and also network systems because of high costs associated with ICT adoption (OECD, 2017). The study by Ghobakhloo and Tang (2013) agree that high cost of ICT tools and infrastructures make it hard for SACCOs to adopt modern information and communication technologies.

However, Nkonge (2018) found out that SACCOs are challenged by the sluggish adoption of ICT in their business processes. This is partly due to the range of issues including: strict legislations

and regulations, limited research and development, inadequate ICT knowledge and skills, high cost of ICT services among others. In Uganda, Morris (2014) and Ssewanyana (2010) pointed out that statistical evidence shows that more than 50 percent of the SACCOs had only one computer. In addition, individual computer usage stands at 33 percent, local area network use at only 17 percent and internet use for communication and searching information at 40 percent. Due to the delayed introduction of ICT and use, Low levels of technological innovation, productivity, and development are a problem for SACCOs which tend to be the key indicators of performance. Since most research studies in Uganda concentrated more on factors determining SACCO performance specifically focusing on how ICT affects performance of SACCOs as well as the adoption of ICT among SACCOs. Therefore, it was against this backdrop that the study sought to examine the adoption of ICT and its usage affects SACCOs' performance in Uganda.

1.2 Statement of the Problem

In the contemporary times, technological change is a key driver of performance in the financial sector in both developed and developing countries (Bloom et al., 2012; World Bank, 2016). With digital revolutions world -wide, the performance of any business is dependent on ICT adoption and proxies of ICT which include; number of functional computers, ICT expenditure and internet use among others. The levels of transactions using electronic means like cellular phone through the mobile and agency banking system have increased globally. Despite the vast benefits of ICT, its adoption and use among SACCOs have remained low (Sempala and Mukoki, 2018) in Uganda which is consistent with the study findings by Cirera et al. (2016) which pointed out that, on average, ICT adoption and usage among SACCOs stands as; internet connection (20.3%), computer use (47.65%) and software (14.1%) thus, little is known about how ICT affects performance; and the determinants of ICT adoption among SACCOs in Uganda. Therefore, it was against this background that the study sought to investigate the impact of ICT on SACCOs' performance in Uganda.

1.3 Study Objectives

The objectives of the study are composed of the general and specific objectives

1.3.1 General Objective

The general objective of the study was to examine Adoption of Information and Communication Technology (ICT) and determinant of performance of SACCOs' in Uganda.

1.3.2 Specific Objectives

The study sought to address the following specific objectives;

i) To examine the effect of the ICT use on SACCOs' expected profits in Uganda.
ii) To identify other determinants of performance among SACCOs' in Uganda.
iii) To investigate the determinants of ICT adoption among SACCOs in Uganda.

1.4 Research Questions

The study sought to answer the following research questions;

i) What is the effect of ICT use proxies; functional computers, ICT expenditure and internet use have on SACCOs' performance in Uganda?
ii) What is the effect of accumulated savings, loan portfolio, membership size, age of the SACCO and number of ICT trained staff on SACCOs' performance in Uganda?
iii) What are the determinants of ICT adoption among SACCOs in Uganda?

1.5 Significance of the Study

The significance of the study to different stakeholders includes;

i) The study findings contribute knowledge to different SACCOs regarding the utilization of the digital platform and maximization of profits. The ultimate existence of every financial organization is to grow the shareholder's wealth and maximize their profits. It is an opportunity for the SACCOs to embrace technology and increase interaction with their customers.
ii) The study assists the information technological companies that deal with the creation and formation of the different applications that are used in the financial sector to come up with innovations that are reliable and affordable.
iii) Researchers who wish to uptake additional research in the area will base on this study to extend the stock of knowledge in the digital arena.

1.6 Limitations of the Study

Unwillingness of the respondents, for instance SACCOs' managers to give detailed information about key critical drivers that influence ICT adoption and usage on SACCOs' performance. However, the researcher overcame this by explaining to them that their identity will not be revealed and the information collected was purely for academic purposes.

1.7 Organization of Study

This research report is made up of five chapters where chapter one presents the introduction of the study which includes; background of the study, problem statement, objective of the study, hypotheses, significance of the study, limitation and organization of the study. The second chapter covers the literature review comprising of the theoretical framework and empirical studies. Chapter three focuses on the research methodology which was used, chapter four presents and discusses the empirical findings. Chapter five include the summary, conclusions and recommendations of the study.

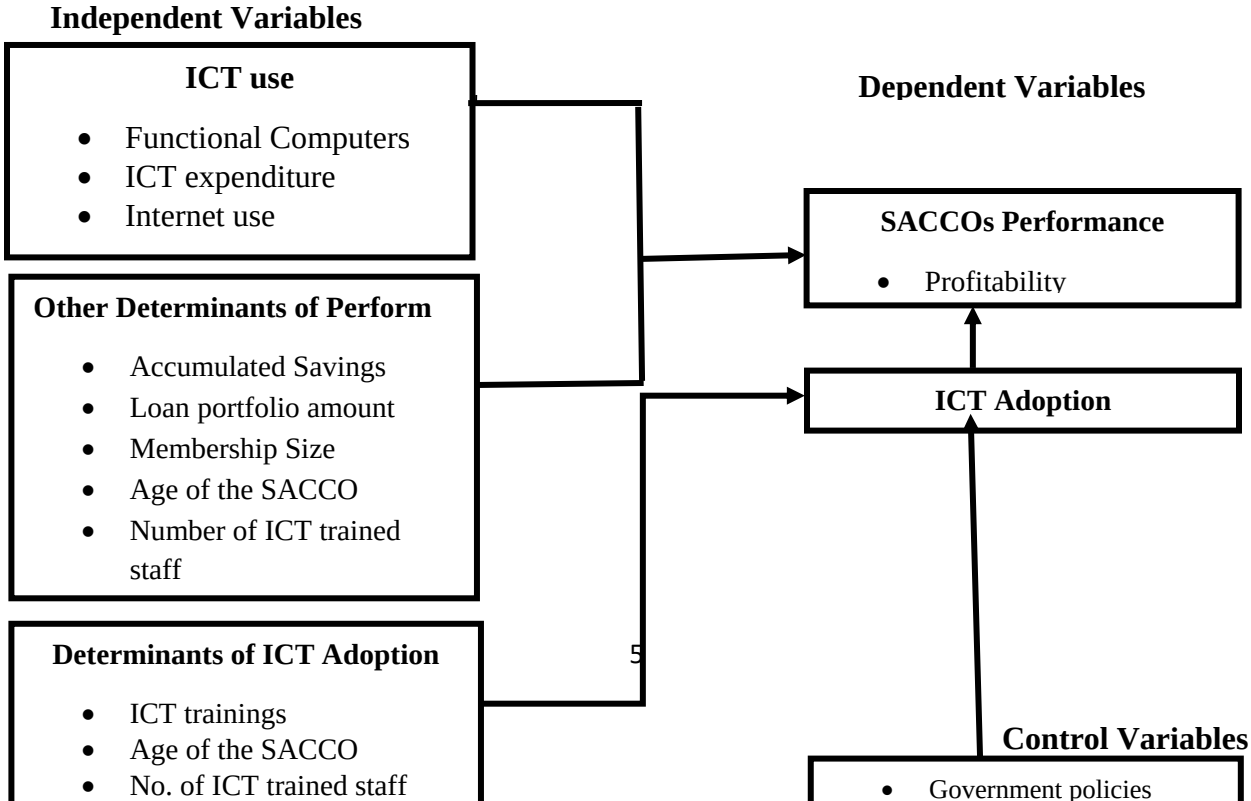
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews the available literature by different scholars which is related to adoption of ICT; and the effect of use of ICT on SACCOs' performance. Specifically, the theoretical and empirical literature is reviewed within this section. The conceptual structure and literature review is presented in this chapter too.

2.1 Conceptual Framework



Source: (Author 's own Conceptualization)

According to Mugenda & Mugenda (2003) conceptual framework entails generating an idea about the relationship that exists between variables in the study and also displaying the relationship diagrammatically. Since the study used two models, the dependent variables of the study are SACCO's performance measured in terms of profitability and ICT adoption measured on three scales of high, medium and low. On the other hand, independent variables are made up of ICT proxies: functional computers, ICT expenditure and internet use, other determinants of performance among SACCOs in Uganda such as accumulated savings, loan portfolio, membership size, age of the SACCO and while the determinants of ICT adoption are measured in terms of SACCO age, internet access, number of ICT trainings, location of the SACCO and number of ICT trained staff in Uganda. Furthermore, it was also argued that SACCOs that have responded positively to ICT adoption tend to register better performance compared to those that are adamant towards ICT adoption in Uganda (Cirera et al., 2016; Stork et al., 2013 and Maldonado et al., 2012).

2.2 Theoretical Framework

According to Freeman et al. (2010), the term ICT is a field of work which entails technologies, for example, computers, software, and inter connectivity which are all directed towards fulfilling information processing and communications purposes. Similarly, ICT can also be the scientific, technological and management practices that aid in handling, processing and distributing information through their application such as computers, internet use, and website among others.

2.2.1 Technology Acceptance Theory (TAT)

This theory checks the generation reputation concept phenomenon in describing the user's reputation and the goal accrued to the use of the generation. In this case the TAT version stresses

the perceived generation case of use and usability (Davis et al., 1989). According to Gefen et al. (2003), the notion by consumer of a particular generation is derived from the usefulness perceived at that time in improving his or her activity performance. Therefore, the perceived attitude views how difficult the activity will be without the user learning the new available set of innovation or system in executing the different organizational activities in the present time. This theory posits that the use in that era is only possible when there is a positive usefulness perceived by the consumers.

It is assumed that there are always external dimensions that play an influential role on the effect of perceived usefulness and its value got from the external environment. This theory is built on two core facets which are basically used to gain knowledge of statistics and technologies but putting much emphasis on perceptive issues. It is important to understand the key critical elements that have direct effects on the growth of an internet site totally based on this theory (Liu and Arnett, 2000). Understanding the net behaviors of the consumers motivated some scholars to use each technology acceptance theory and develop a greater modified version to best explain the behavior of clients (Gefen et al., 2003). This theory is built in such a way that the usage of the model on online customers makes use of survey and test techniques important.

2.2.2 Rogers Innovation Diffusion Theory

According to Rogers (2003), ICT Adoption is viewed as a decision undertaken by the organization to make full use of the available innovations as their best course of action. Innovation is a practice, idea and or object which is presumed as new by the different individuals in the organization, however, it is argued that not all ideas are worth adopting even when they are deemed good and, in the event, organizations can take long to adopt an innovation or idea. Rogers further highlighted five key attributes that have direct bearing in influencing the rate of adoption in the organization, for example relative advantage, compatibility, complexity, observability and triability. Rogers also theorized that innovations always grouped in the Complexity-Simplicity range because of the conditions that may exist that innovation may not be directly understood by the potential adopters and assumed that innovation diffusion of the latest technology has either situational or environmental issues that drive adoption (Rogers, 2003). In the end, when the organization or user finds the innovation simple to comprehend, the innovation will simply be adopted (Greenhalgh et al., 2004)

2.3 Empirical Literature Review

According to Zikmund (2013); Carr and Griffin (2010) empirical literature review is widespread survey of the past inquiries related to the designed research questions. It can also be a straight search of published work that involves journal articles and periodicals.

2.3.1 Effect of Information and Communication Technology (ICT) use on SACCOs' Performance

The study by Aregbeshola (2014) pointed out that ICT use not only rises returns on the working capital of the SACCO but also the return on assets of the SACCO, thus, the study revealed that performance outcomes result from ICT cost efficiency than ICT investment by SACCOs. According to Aquilera et al. (2015), performance of SACCOs is enhanced when they use appropriate technological tools such as computers, websites among others which have systems that enable to correctly monitor their financial resources and administrative processes hence improving on their competitive levels and performance. In the same way, Eton et al. (2017) argued that SACCOs should diversify their business activities through ICT use to increase on their profit levels and eventually performance. While the study by Lee et al. (2010) pointed out that ICT provides new business model that enables SACCOs to directly have access to new markets and sources for their competitive advantage. A corresponding study by Maldonado et al. (2012) found out that SACCOs that widely make use of ICT register greater performance levels. However, these studies have not been in position to study in depth how the routine use of ICT among SACCOs increase performance. The study also intends to use profitability as a measure of SACCO performance unlike the above studies that used the traditional measures of performance like Return on assets and return on equity.

Adekunle et al. (2014) pointed out that computers and performance is becoming an important component in the operation of financial institutions. The number of computers contributes directly and significantly to performance of most financial institutions (SACCOs) in the financial sector because of it increases the efficiency of the workers, financial management systems, swiftly enhances information sharing within and outside the institution, minimizes on the cost of labor among others. Therefore, performance in financial institutions is as a result of computers used by an organization because of its vast benefits thus, there is a positive effect of number of computer's use on performance. However, the studies above do not clearly show which kind of computers

because an organization may have computers which are not functional to meet the present market demands in terms of software, updated computer system among others. Hence, this study focusses on the number of functional computers in influencing performance among SACCOs.

ICT expenditure is critical for ICT implementation among firms. ICT is a continuous, dynamic and management process which is not straight forward and direct in any organization because it calls for adequate resources for its sustainability. In Sweden, about 99.4% of the firms are small and medium enterprises though the level of ICT expenditure/ amount allocated to ICT is limited as compared to larger enterprises. The findings between 2009 and 2013 indicated that ICT expenditure among firms positively and directly improves performance because it enhances on the labor productivity overtime. Similar studies also pointed out that ICT use and expenditure move in the same direction and significant as far as performance of any business enterprise is concerned (Chowdhury et al., 2003 and Eze et al., 2014).

The studies by Canzian et al. (2019); Yang and Liu (2018) about the impact of ICT in terms of internet use on traditional enterprise performance in China and Italy respectively, found out that internet use improves performance of firms and SACCOs with an average of around 31 percent in returns per share and also 24 percent in asset returns. Therefore, the studies emphasize that internet use improves performance. On the other hand, empirical literature revealed that ICT use in terms of internet does not matter much in increasing performance, for example, Bertschek et al.'s (2013) study investigated the links to causality that exist between company efficiency and internet use in German but the study results showed that internet use does not increase firms' performance in its primary stages rather it has got a positive effect on the process of the firm. As far as the above studies are concerned, the most important question remains that how does ICT use and related tools trigger SACCO performance and also do not clearly show how internet use as a proxy for ICT directly affects performance in terms of information dissemination to the members and other clients in the financial market, so this study interests itself in understanding the effect of internet use on SACCO performance.

The study by Harelimana (2017) on microfinance institutions in Rwanda about the impact of information and communication technology use in SACCOs employed a descriptive research design using both quantitative and qualitative methods of analysis supported by a simple random

sampling. The study revealed that information technology use had positive effect on performance in terms of profitability, however; the extent of the effect was discovered to be low due to limited levels of investments in information and communication technology among SACCOs. Therefore, level of investment in ICT infrastructures like internet, computer use among others directly enhances on the performance of microfinance institutions particularly SACCOs. Though the study does not address the extent to which ICT investment affects use and later performance among SACCOs. In the same way, the study by Maleto (2012) about the effect of information and communication technology in financial institutions on their growth in Kenya revealed that the use of ICT methods in terms of electronic record keeping through the use of electronic gadgets helped in increasing performance of over 150 SACCOs. The study used the data between 2011 and 2015 from the financial statements and articles about the effect of ICT innovations in microfinance institutions.

Kamau (2014), in his study about the effect of ICT use on the performance of micro finance institutions (MFIs) in Kenya. The study used a descriptive survey and found out the main factors that determine ICT adoption on performance in SACCOs between 2008 and 2012; he performed tests on the effect of ICT using primary data collected through the use of questionnaire and set pace for analytical model to ascertain how strong the association is between variables. In the end, the study findings after analysis indicated that there was a positive correlation between the level of ICT use and performance in Microfinance institution during that time periods. Relatedly, Keah (2014) explored the effect of ICT use on the financial performance of SACCOs in Kenya where he employed both a descriptive research design and cross-sectional design in his study; the target population was 45 SACCOs that were involved, aided by a purposive sampling technique where 40 SACCOs were selected considering secondary data sources in gathering information from financial records and statements. Eventually, the study findings revealed that increase in ICT use by Sacco's results into a corresponding increase in SACCO's performance. However, since the study used a small sample size of 40 SACCOs which was not significant to reflect the exact position of how ICT use impacts performance among SACCOs in the whole country and also did not clearly indicate how they arrived at the defined sample size of the study. Therefore, this study covered the whole country with sample size of 201 SACCOs that had embraced ICT in execution of their operations, which is a significant and large sample compared to the above study in question to find out how ICT use affects SACCOs performance.

2.3.2 The Other Determinants of Performance among SACCOs

The study by Koskei & Naibei (2017), in Kenya about the determinants of Member loyalty among SACCOs in Kericho County found that there are wide ranges of activities necessary to ensure membership retention among SACCOs in the region for example providing a competitive interest rate, mode of disbursement of the financial products among others. The greater the membership size, the greater the business performance. The study further revealed that client loyalty is pivotal in ensuring membership size among SACCOs. Similar studies about the factors affecting SACCOs' performance in Meru South District by Muriuki (2010), Makena (2014) and Onsase et al. (2013) pointed out that the size of the SACCO is mainly in terms of number of members and hence argued that membership size influenced the performance of SACCOs in the region. Therefore, study findings pointed out that SACCOs with larger number of members have higher chances of having more funds that can be used to give out more loans which is not the case with those SACCOs with few members simply because membership promises sustained flow of revenue to the SACCOs and eventually improves performance of the SACCO. However, the study relied mainly on the postulation that membership size is the main source of revenue among SACCOs based on the assumption that the more members subscribed to the SACCOs the more revenue that accrues to the SACCO which varies when members decide not to contribute or save like for the case of dormant SACCOs. The study also found out that membership of the SACCOs as a way of measuring performance has received limited attention and also fewer studies have been conducted about the same. Therefore, this study intends to fill the research gap by using profitability as a proxy for performance.

Studies by Kiaritha (2021) and Costa-Font et al. (2018) in Kenya and United Kingdom respectively pointed out that accumulated savings of the forms an integral component and act as a key driver in influencing the level of economic activities that is to say growth and performance among most enterprises. It is argued that saving is determined by the saving culture of members in the SACCO and that accumulated savings increases the liquidity of the SACCO which enables them to extend credit whereby the study found out that credit had a significant direct positive influence on performance of the SACCO. In addition, the study by Kahuthu et al. (2015) studied the influence of savings on the performance SACCOs. This study examined the impact of saving on SACCO performance using a linear regression model and a census survey design. The study's findings showed that SACCOs' performance is positively impacted by accumulated funds. However, the

findings of the study were arrived at by measuring share capital in terms of total assets possessed among SACCOs which lacked the empirical evidence to justify the key assets of interests for the study. Therefore, this study adds to the stock of knowledge by measuring accumulated savings of SACCOs in terms of total savings contributed by members that subscribe to the SACCOs that have got a direct bearing on the SACCOs performance.

According to Hamisu (2011), loan portfolio amount is an important ingredient in the performance of any financial institutions including SACCOs where by loans are among those important features in financial institutions because loans are among the main yielding assets of a SACCO in the balance sheet which tend to give the biggest portion of the working revenue. Thus, SACCOs are always affected by liquidity issues because loans are proportional to amount of funds placed by members. In addition, a SACCO with high credit issues has high liquidation risk which puts members in danger and in a way of ensuring enough profit levels in a highly competitive financial sector, SACCOs tend to assume excessive risks. On the other hand, SACCOs with higher volumes of loans extended tend to get higher interest income and, in the end, this results into increased profit potentials for SACCOs hence, its performance. Gongera et al. (2013) in their study about the effect of loan portfolio in commercial banks in Kenya revealed that loan portfolio is a significant measure of liquidity which tends to enhance performance of SACCOs. Whereas the study investigated about effect of loan portfolio as a proxy of performance among SACCOs, most studies concentrated mainly on determinants of loan portfolio as a key driver for the liquidity of the SACCOs, however, this study measured SACCO performance by concentrating on the total loan portfolio amount available for the SACCOs for its operations and in the end contributed to the existing body of knowledge.

Noordin (2014) in his study, “Does age matter for SACCO to perform?” points out that age of the SACCO is an interesting variable in measuring performance because literature has showed that different scholars have defined age of the SACCO and performance using different dimensions for example in terms of young, intermediate and old SACCO (Ayyagari et al., 2011) and others in terms of new and old SACCOs (LiPuma et al., 2013). Therefore, existing literature has revealed that age of the SACCO and performance has got conflicting attention where some scholars point out that age of the SACCO significantly and positively increases performance (Gaur & Gupta, 2011 and Fort et al., 2012). On the other hand, some literature has indicated that SACCO age has

no significant impact on performance (Khalifa, 2014 and Reiss, 2011). Hence, this study wishes to investigate the exact relationship and or effect of age of the SACCO and performance.

The number of ICT trained staff is vital in executing the routine activities of the business enterprise as it enhances the proper functionality of the business, productivity and later performance. The studies by Nyangarika et al. (2020); USAID (2013); Ofafa et al. (2013) and Mwakaje (2010) pointed out that employees (staff) with computer skills backed with regular trainings tend to perform better in the business thus, the higher the number of ICT trained staff, the better the business perform because of their efficiency levels that increase the profit margins, reduce the cost of doing business through fast information dissemination among others. Therefore, ICT trained staff positively affects the profitability of the business among business enterprises. However, Msabila (2012) argued that businesses find it difficult to sustain highly trained ICT staff, limited with resources and management support in term of budget among others which in turn affects performance of the enterprise in one way or the other.

2.3.3 Determinants of ICT Adoption among Savings and Credit Cooperative Societies

The study by Ollo-Lopez and Aramendia-Muneta (2012) pointed out that in most cases, the ICT adoption determinants among SACCOs are categorized according to factors concerning SACCO staff using ICT, factors related to characteristics of the SACCOs among others which affect the SACCOs' operation.

Kotla et al. (2012) posited that ICT training programs among employees of the organization accelerate the rate of adoption because training results into a wide range of benefits in terms of decision making, reduction in human errors, reduction in transaction costs, information processing and dissemination, efficiency among others. Staff ICT training among SACCOs in particular is important as its adoption and use increases the income gains of the SACCO and extension of financial and other services. ICT training among SACCOs helps the employees to build or acquire skills and later develop self-confidence such that they remain competitive in the changing market environment while pursuing objective of satisfying their clients' needs. Therefore, ICT training has got a positive relationship with ICT adoption and use on the basis that the more training in ICT among staffs results into greater efficiency and ICT usage in execution of their activities or otherwise. The study by Jung (2013) points out that ICT training among employees of SACCOs acts as a motivating factor which fosters provision of quality services in the shortest time possible

because achieving such requires experienced, skilled and professional employees, hence, continuous ICT staff training interventions and investment are important for SACCOs. However, most available literature looked at financial banking institutions and little on SACCOs. Therefore, this study seeks to improve on the existing stock of knowledge by exploring how ICT staff training affects ICT adoption among SACCOs measured in terms of number of times employees are trained in ICT.

A study by Gnansounou (2010) in Benin using 440 firms employed an ordered probit revealed that the age of the SACCO and its size were found to be positively associated with ICT adoption whereby big firms or SACCOs were found to have higher and more chances to adopt ICT because of the resources owned by these big firms to easily invest in the new knowledge and technology. On the other hand, the study of Olise et al. (2014) employed a simple probit to analyze data in over 40 Nigerian firms where the study findings found out that there was a significant positive relationship between the age of the firm and the ICT adoption in term of internet.

The size of ICT trained staff measured in terms of proportion of staff with computer knowledge. The study by Khalifa (2014), about the determinant of ICT adoption among Tunisian firms pointed out that 26% of the employees in most Tunisian firms have the ICT capacity traced in terms of share of computer users. The study findings also revealed that the number of ICT trained staff positively and significantly determine ICT adoption. Therefore, this study explores the effect of number of ICT trained staff in terms of computer knowledge by employees in influencing the level of ICT adoption among SACCOs.

Internet access is increasingly becoming critical ingredient as far as ICT revolution and adoption is concerned among firms, individuals and companies' overtime. The study by Moghaddam et al. (2013) about the factors affecting ICT adoption among rural users in Iran pointed out that internet access is important in narrowing the gap between the rural and urban areas as far as ICT related software and hardware are concerned. The study findings indicated that internet access both at individual and firm levels has direct impact in harnessing the level of efficiency and performance respectively thus, internet access swiftly affects ICT adoption and later performance of any business. Similar studies have pointed out that internet access provide firms with the opportunity of extending and passing on communication and information through website, emails, internet use among others which act as impetus for ICT adoption (Mariana, 2018; and Stork et al., 2013).

A study by Wei and Cao (2018) explored the impact of location on ICT adoption in terms of internet penetration in seven Asian countries. The study results pointed out that location of the SACCO positively influences ICT adoption. While McCoy et al. (2018) in their studies about the relationship between the impact of location of the SACCO and ICT adoption in terms of broad band infrastructures in Ireland found out that location positively affect ICT adoption among SACCOs in terms of broad band facilities. In the same way, the study by Wang et al. (2018) investigated about the effect of location among different internet industries in Yangzhou City for the periods 2006, 2012 and 2016. The findings indicated that the majority of the companies that used internet were located in the city which enables SACCOs in the city and around the city to easily adapt to ICT compared to others in the rural areas. However, the above studies confined their investigations about the how the location of the SACCO affects its ICT adoption in the urban city centers yet most SACCOs are located in the rural areas of most countries where the average income earners are found. Therefore, this study points out the fact that its investigation is comprehensive in nature covering the urban, and rural areas of the country to clearly find out how location of the SACCOs affects ICT adoption.

In conclusion, in the contemporary world, ICT adoption and use among SACCOs acts a path for the flow of information which has got a direct bearing towards the behavior of customers and or members of the SACCOs in making proper choices in the shortest time possible hence, and hence streamlining ICT yields better performance. Most empirical studies did not focus on how ICT adoption and use can efficiently be used as an incentive for improved performance among SACCOs. Due to the fast and dynamic trends in ICT, its use and adoption requires SACCOs and or firms to always restructure their internal management practices to achieve its usefulness in their operations. Most studies reviewed mainly concentrated on the effect of information technology on SACCOs' performance but did delve into the determinants of ICT adoption among SACCOs. Therefore, this study intends to close the gap in the above reviewed literature by investigating in depth the effect of ICT on performance, and determinants of ICT adoption among SACCOS.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter draws its concentration on research design that was used, target population of the study, sampling procedure and sample size, data reliability and validity, data analysis, presentation and ethical consideration in the study.

3.1 Research Design

The study aimed at investigating the effect of ICT on SACCOs' performance in Uganda. Basing on the nature of the study, a cross-sectional research design was adopted because it provides the opportunity to collect both quantitative and qualitative data in the analysis of the problem through administering questionnaires and or interviewing the pre-determined sample of the study population (Murphy, 2013). Cross sectional design enabled the study to determine the prevalence of ICT among SACCOs, using multiple regression and ordered logistic models in analysis. Therefore, once a SACCO has been selected for the study the researcher assessed ICT adoption and effect of ICT on SACCOs' performance.

3.2 Scope of the Study

The scope of the study was composed of the content, geographical and time scope in guiding the whole study. The study confined its investigation on evaluating ICT adoption on performance of SACCOs in Uganda putting emphasis on the four core regions of the country, namely; Western, Central, Northern and Eastern. The study mainly focused on those SACCOs that have at least appreciated the role of digitalization and have adapted to ICT in all the four regions

3.3 Sampling Procedure

The purpose of sampling was to confidently determine a representative group that would enable the study to collect and get meaningful information about the population (Mugenda & Mugenda, 2003). The study's SACCO selection process was facilitated by the use of stratified and purposive

sampling techniques. Because ICT use differs by region, the stratification was based on the SACCOs' locations. Due to their administrative and governance duties within SACCOs, the managers were contacted once the SACCOs were chosen by purposive sampling.

3.4 Population and Sample Size

Population should have observable characteristics that the researcher employs to generalize the results of the study (Mugenda & Mugenda, 2003). Uganda has 1261 active registered SACCOs, according to data from the World Council of Credit Unions (2018). Nonetheless, the study by Ssewanyana and Busler (2019) found out that about 420 actives registered SACCOs adopted and use ICT and related devices in their operations in terms of computer use, internet and or website. Therefore, in relation to their study findings, this study used a population of 420 SACCOs that have embraced ICT in their line of duties to determine the sample size following the Morgan and Krejcie (1970) formula below;

$$s = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P(1-P)}$$

Where; s = Required Sample Size; $X^2 =$ Table value of Chi-square for 1 degree of freedom (assumed to be 1.96); $N =$ Population Size; $(N-1) =$ Small Sample Technique; $P =$ Population Proportion (Estimated as 0.50) and $d^2 =$ Degree of accuracy expressed as a proportion (0.05). Calculating the sample size

$$s = \frac{1.96^2(420)(0.50)(1-0.5)}{0.05^2(420-1)+1.96^2(0.50)(1-0.50)} = \frac{403.37}{1.0475 + 0.9604} = \frac{403.37}{2.007};$$ s = 201 SACCOs.

3.5 Data Collection and Procedure

Primary data source was used in the study through administering a semi-structured questionnaire to the respondents. The available literature by Hesse-Biber et al. (2015) shows that questionnaires are the most preferred tool of collecting data because they are easy to analyze and more specific compared to telephone and face to face surveys, cost effective, more consistent and objective among others. Therefore, only one simplified and organized questionnaire was used to cater for all the possible respondents.

3.6 Model Specifications

3.6.1 Model for the First and Second Objectives

To address first and second objectives about SACCOs' performance, the study employed a multiple linear regression model (MLRM). Theoretically, the model was given as;

$y = \text{f}(I, S)$ ……..... (1)

Where; y= Dependent variable; performance,

I = ICT use (Functional computers, ICT expenditure & internet use)

S = SACCO's characteristics (proxied by Membership size, Loan portfolio amount, Accumulated savings, Age of the SACCO and Number of ICT trained staff) which are control variables in the model

3. 6.2 Study Variables used in the Analysis

Dependent Variable: SACCO performance measured proxied by average annual profits.

The independent variables as used in this study were grouped in two classifications. The first classifications involved ICT use (functional computers, ICT expenditure and internet use). The second classification involved SACCO characteristics measured in terms of membership size, total accumulated savings, total loan portfolio amount and age of the SACCOs and number of ICT trained staff.

Table 1: Summary of Variable Description and Expected signs

Variable	Description	Expected Signs	Literature Source
y_i	Performance measured in terms of average profitability	Dependent variable	Aregbeshola (2014) Aquilera et al. (2015)
x_1	Computers measured in terms of number of functional computers in the SACCO	+	Adekunle et al. (2014)
x_2	ICT expenditure; continuous variable measured in terms of amount of spent on ICT related tools	+	Eze et al. (2014); Chowdhury et al. (2003)
x_3	Internet use; Dummy which takes on value "1" if SACCO has website/internet, 0 otherwise	+	Eton et al. (2017) Maldonado et al. (2012)
x_4	Age of the SACCO; measured in terms of number of years in existence	+/-	Jarmin and Miranda (2012), Reiss (2011)
x_5	Membership size of the SACCO; continuous variable measured in terms of number of SACCO members	+	Koskei & Naibei (2017); Makena (2014)
x_6	Loan portfolio amount of the SACCO; continuous variable measured in terms of total loan portfolio of the SACCO	+	Hamisu (2011) Gongera et al. (2013)
x_7	Accumulated savings of the SACCO; continuous variable measured in terms of SACCO's total accumulated savings.	+	Kiaritha (2021), Costa-Font et al.(2018)
x_8	Number of ICT trained staff; continuous variables proxied by the proportion of staff with computer skills and knowledge	+	Nyangarika et al. (2020); USAID (2013)

Source: Empirical and Theoretical Literature

The econometric model is specified as;

$$lny_i = \alpha_0 + \alpha_1 x_{1_i} + \alpha_2 lnx_{2_i} + \alpha_3 x_{3_i} + \alpha_4 lnx_{4_i} + \alpha_5 lnx_{5_i} + \alpha_6 lnx_{6_i} + \alpha_7 lnx_{7_i} + \alpha_8 x_{8_i} + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (2)$$

Where; $\alpha_0 =$ Constant term, $\alpha_1 \ldots.., \alpha_8 =$ Coefficients of the independent variables and $\varepsilon_i =$ Error term and is assumed to follow a normal distribution with zero mean and constant variance

In this econometric model, the variables that were extremely large, were expressed in logarithmic form such as; ICT expenditure, age of the SACCO, membership size, loan portfolio amount and accumulated savings. On the other hand, variables that had small values such as; functional

computers and number of ICT trained staff were not expressed in logarithmic form and internet use was taken as a dummy variable.

3.6.3 Model for the Determinants of ICT Adoption: Ordered Logit Model

Ordered logit model was used because the dependent variable (ICT adoption) had a natural ordering information that is to say low, medium and high. The dependent variable was categorical, so an ordinary linear regression was not suitable since the variable had non-interval nature and the non-uniformity of the outcome choices (Long and Freese, 2014). Therefore, an ordered logistic model was employed to explore the determinants of ICT adoption among SACCOs following the three discrete outcome choices or categories, namely; low, medium and high.

3.6.3.1 Model Specification

Let Y be an observed ordinal variable, then Y is a function of Y^* that is not observed. The continuous latent variable Y^* (ICT adoption) has different magnitudes of μ whereby μ caters for the three adoption outcome choices (low, medium and high). Thus, the theoretical model was stated as

$Y^* = \sum_{\mu=1}^{\mu} \beta_\mu X_\mu + \varepsilon_i$ ……………………………………………………… (3)

Y^* is unobserved/ latent variable and ε_i is assumed to follow a standard logistic distribution

Y_i = 1, if $Y_i^* \leq \mu_1$

Y_i = 2, if $\mu_1 < Y_i^* \leq \mu_2$

Y_i = 3, if $Y_i^* > \mu_2$

$Y = j, if\ \mu_{j-1} < Y^*;\ j = 1, 2, 3$ ……………………………………… (4)

Where; Y_i is observed in j number of ordered categories, μ_s are unknown parameters separating adjacent categories predicted with β_s.

Therefore, the probability that Y_i falls into $j\ category$, μ_s and β_s are estimated with an ordered logistic model below

$P_i(Y_i > j) = \frac{\exp(X_i\beta - \mu_j)}{1+[\exp(X_i\beta - \mu_j)]}$ ……………………………..………………… (5)

$P_i(Y_i > j) = \frac{1}{1+[\exp(X_i\beta - \mu_j)]}$ ……………………………..………………… (6)

Where; subscript j is ICT adoption choices, and subscript i represents i^{th} SACCO and P_i is the probability of observing the SACCO i making the choice j.

Therefore, the econometric model specified below lists some factors (x_i) that determine ICT adoption among SACCOs;

$$y_i = \beta_0 + \beta_1 x_{1_i} + \beta_2 x_{2_i} + \beta_3 x_{3_i} + \beta_4 x_{4_i} + \beta_5 x_5 + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where; $\beta_0 =$ Constant term, $\beta_1 \ldots, \beta_5 =$ Coefficients of the independent variables and $\varepsilon_i =$ Error term and the error term is assumed to have a standard logistic distribution.

3.6.4 Variable Descriptions in the Analysis

The dependent variable, ICT adoption choices among SACCOs measured in three adoption levels, namely; low, medium and high.

The independent variables used in this study were SACCOs' age, internet access, number of ICT staff trainings, SACCO location and number of ICT trained staff.

Table 2: Summary of Variable Description and Expected signs

Variable	Description	Expected Signs	Literature Source
y_i	ICT adoption measured on three scales (1 = Low, 2 = Medium, 3 = High),	Dependent variable	Maddala (1990)
x_1	Staff ICT training; binary variable that takes value "1" if the SACCO has ICT trainings in the last one year, 0 otherwise	+	Kotla et al. (2012); Jung (2013)
x_2	Age of the SACCO; measured in terms of years the SACCO has been in existence	+	Khalifa (2014); Gnansounou (2010)
x_3	ICT trained staff; Continuous variable measured in terms of number of employees who knows computer.	+	Khalifa (2014)
x_4	Internet access; dummy variable that takes on values "1" if the SACCO has internet access, 0 otherwise	+	Moghaddam et al. (2013); Viollaz (2018) and Stork et al., 2013
x_5	SACCO location; binary variable that takes value "1" if the SACCO is Urban, 0 otherwise.	+	Wei and Cao (2018), McCoy et al. (2018),

Source: Empirical and Theoretical Literature

3.7 Data Analysis and Presentation

According to Mugenda & Mugenda (2003), before actual data analysis, data obtained through the use of questionnaire was coded, validated and edited. These research instruments returned was scrutinized to determine the correctness and accuracy following the structure of operations that include editing, coding, and organization. Therefore, the collected data for this study was analyzed with the aid of a descriptive and inferential statistics using statistical software STATA version15 and also correlational analysis was employed to establish the relationship between study variables. Eventually, the analyzed data was presented in terms of tables, percentage and or proportions.

3.8 Outliers Management

According to Robert Dawson (2011), in model analysis, it was argued that outliers are always present in almost every dataset and should be properly managed. Outliers were identified and visualized in the continuous variables using a visual box plot approach, then replaced with median. This approach is the most effective in visualizing outliers given the use of inter quartile range (IQR) with a formula given as;

I. Q. R = $Lower\ boundary\ Q_1 - 1.5 * IQR (Upper\ boundary\ Q_3 + 1.5 * IQR)$…… (8)

3.9 Data Reliability and Validity

The questionnaire was pre-tested among SACCOs in Uganda by conducting a pilot study to attest whether they are valid or not. In ensuring that these research instruments were reliable and valid for the study, the researcher ensured that they were error free and or clear. Reliability of the research instruments was computed using Cronbach's Coefficient Alpha for both even and uneven items grounded in the order of numbers arranged in the questionnaire. Reliability should always at least be 0.60 and or higher. Therefore, if the Coefficient Alpha of 0.60 is gotten, then the research instrument is accepted (Wallen & Fraenkel, 2013) given by the formula;

$$\alpha = \frac{N.\bar{C}}{\bar{V} + [N-1].\bar{C}}$$

Where; N equal to the number of items of the instrument $\bar{C}$ is the average inter-item covariance among the items and $\bar{V}$ is the average variance. The instruments were subjected to the Cronbach's Coefficient Alpha to test whether it was easy to administer. The results indicate that instruments were reliable with Cronbach coefficient Alpha of approximately 0.60.

3.10 Ethical Considerations

The researchers made an effort to follow research values and best practices. Prior to being used in the field, the study instruments were pre-tested. In order to perform the study, the researcher requested permission from the line Ministry of Trade Industries and Cooperatives, the graduate school, and the general management of SACCOs. In order to enhance the body of knowledge regarding the performance of SACCOs in Uganda, the management of SACCOs and the corresponding respondents were assured that the study's findings would be used exclusively for academic purposes.

CHAPTER FOUR

EMPIRICAL RESULTS AND DISCUSSION

4.0 Introduction

This chapter provides the descriptive statistics of the variables under study. Analysis of data, presentation, interpretation, and results discussion are also covered in this chapter. Descriptive Statistics of Socio-Economic Characteristics of the SACCOs

The socio-economic characteristics of SACCOs considered were location of the SACCO, region, registration, affiliation and ICT adoption levels.

Table.3: Descriptive Statistics of Socio-Economic Characteristics of the SACCOs

SACCO Characteristics	Variable	Freq.	%.age
Location of the SACCO	Urban	56	27.86
	Rural	145	72.14
	Total	201	100
Region	Central	111	55.22
	Eastern	21	10.45
	Western	55	27.36
	Northern	14	6.97
	Total	201	100
Registration	Fully Registered	170	84.58
	Probationary Registration	28	13.93
	Unregistered	3	1.49
	Total	201	100
Affiliation to apex bodies	AMFIU	8	3.98
	UCA	60	29.85
	UCSCU	41	20.40
	Affiliated to more than one	29	14.43
	No affiliation	63	31.34
	Total	201	100
ICT adoption Level	Low	49	24.38
	Medium	94	46.77
	High	58	28.86
	Total	201	100

Source: Field Survey, 2022

The descriptive results in Table 1 indicates that the majority of the SACCOs are found in rural areas reflecting 72.14% of the surveyed SACCOs. According to the region, the study revealed that central region had the highest number of SACCOs in the country equivalent to 55.22%

followed by western region with 27.36%, eastern region with 10.45% and Northern region with 6.97% of the SACCOs.

The study also found out that 85.00% of the SACCOs were fully registered, 13.00% of the SACCOs were probationary registered and 1.50% of the SACCOs were not registered. Hence, the findings imply that with the majority of the SACCOs registered, supervision and regulations by the line ministry becomes very easy which fosters the cooperative sector growth and enhances performance.

As far as affiliation to apex bodies among SACCOs is concerned, 31.34% of the SACCOs were not affiliated to any apex body governing SACCOs in the country, 29.85% of the SACCOs are affiliated to Uganda Cooperative Alliance (UCA), 20.40% of the SACCOs are affiliated to Uganda Cooperative Society and Credit Union (UCSCU), 14.43% of the SACCOs were affiliated to more than one apex bodies and 3.98% of the SACCOs were affiliated to Alliance of Microfinance Foundation and Institutions of Uganda (AMFIU). Therefore, the majority of the SACCOs are not in any way affected by policy issues of these apex bodies in executing their operations.

For ICT adoption levels among SACCOs in Uganda, the study findings revealed that the 46.77% were at medium level, 28.86% at high level, while 24.38% of the SACCOs were at the low level of ICT adoption as far as ICT adoption and use is concerned in executing their operations.

Table 4: Summary of Descriptive Statistics of the Study Variables

Variable	Units	Mean	Std.	Min	Max
Age of the SACCO	Years	13.04	7.27	1	58
Membership size	No. of members	6179.4	2,917.20	5	578691.51
Total accumulated saving	Shillings	625,600,000	67,249,647.39	601,000	4,000,000,000
Internet use	Dummy	0.40	0.49	0	1
Loan portfolio amount	Shillings	690,400,000	66,121,297.60	500000	4,000,000,000
Location of the SACCO	Dummy	0.28	0.45	0	1
No of functional computers		6.148	0.1	1	120
No of ICT trained staff		8.351	1.04	1	160
Expected Profits	Shillings	196,900,000	47,700,987.31	200000	7,500,000,000
Internet access	Dummy	1.76	0.43	1	2
ICT staff training	Dummy	1.343	0.14	0	20
ICT Expenditure	Shillings	247,200,000	38,554,301.83	0	5,000,000,000

Source: Field Survey, 2022

Based on study results, on average most of the employees in the SACCOs have worked for the period of 5 and half years with standard error of 0.25 which justifies that they have enough experience to run SACCO activities and also provide relevant information for the study as far as ICT adoption and use is concerned. For the year of operation of the SACCOs, on average most SACCOs have existed for the period over 13 years with standard deviation of 0.66, which is a period long enough for the SACCOs innovate and extensively adopt to the use of ICT related devices in the day to day running of the business activities with a view of improving performance.

For SACCO membership, on average 0ver 6,179 SACCOs' members are actively involved in the routine contributions and operations of their SACCOs which guarantees continuity and efficient liquidity to the SACCOs, and hence, increase the ability to extend credit and other financial services to not only their members but also the general public.

Total accumulated savings, on average was UGX. 625.6 million With a standard deviation of over UG.X. 67 million. Therefore, most SACCOs had enough working capital derived from members' savings sufficient enough to extend different financial services to members and beyond. Basing on the study results about the loan portfolio of the SACCOs, on average most SACCOs have loan portfolio amount of UGX. 690.4 million With standard deviation of over UGX. 66 million which shows that some SACCOs have got strong liquidity base to lend to their members according to Annual General Meeting's (AGM) decision and eventually make some profits as study proxy for performance. Therefore, the higher the loan portfolio amount the higher the performance among SACCOs.

The study results about the number of functional computers owned by the SACCOs indicate that on average, most SACCOs have over 6 functional computers with standard deviation of 0.1. The availability of functional computers in the SACCOs motivate managers to make recommendations to AGM to invest sufficiently in ICT infrastructures in terms of internet, software, website and computer-related tools that accelerate use of ICT. Therefore, the more functional computers possessed by the SACCOs increase the ease to use ICT which eventually improves performance among SACCOs in Uganda.

In the same development, the study also investigated on the number of ICT trained staff and found out that on average, over 8 employees had training in ICT and hence got the required knowledge to use computer related equipment among SACCOs. Therefore, SACCOs that have equipped their

staff with the necessary knowledge as far as ICT trained staff is concerned tend to perform well compared to those SACCOs whose employees that had no ICT trained staff.

The results of the study about expected profit of the SACCOs discovered that on average, most SACCOs earn UGX. 196.9 million Annually with the standard deviation of approximately UGX. 77 million. Since profitability is a proxy of performance among SACCOs in the study, it is argued that the higher the profit levels registered by the SACCO, the better the performance.

Concerning the number of staff ICT training among SACCOs, the study results indicates that on average, most SACCOs train their staff in ICT once in the year with standard dev 0.14. This revealed that the study can make inference on the results because of the minimal variation from the mean for the sample and population. Therefore, the number of trainings of staff in ICT equips them with the required ICT knowledge and skills that increases the performance of staffs in the SACCO hence, improved performance among SACCOs in Uganda.

4.3. Correlation Matrix

Table 5 below presents a pair wise correlation matrix that was used to establish the relationship that exists between the dependent variable and the independent variables. The correlation matrix results indicate that the number of functional computers owned by the SACCO, ICT expenditures, accumulated savings, membership size of the SACCO, loan portfolio amount, age of the SACCO and the number of ICT trained staff of the SACCO were positively related to profitability. On the other hand, internet use was negatively related to profitability and the direction of correlation was in contradiction to the theoretical underpinnings. Hence, apart from internet use, the rest of the explanatory exhibited a positive relationship with the dependent variable and rhymed with the theory. Basing on the pair-wise correlation results presented in Table 5, we note that explanatory variables were not perfectly correlated as indicated in Table 5 below.

Table.5: Correlations Matrix

Variables	Expected profit	Computers	ICT Exp.	Internet Use	Accum. Savings	Mem. size	Portfoli Amount	Age SACC	ICT trained staff
Expected profits	1.000								
Functional computers	0.382	1.000							
ICT Expenditure	0.204	0.215	1.000						
Internet Use	-0.075	-0.148	-0.208	1.000					
Accumulated savings	0.542	0.460	0.141	-0.081	1.000				
Membership size	0.429	0.494	0.081	-0.130	0.663	1.000			
Loan portfolio amount	0.535	0.502	0.165	-0.121	0.859	0.667	1.000		
Age of the SACCO	0.211	0.257	0.033	0.007	0.534	0.519	0.548	1.000	
No. of ICT trained staff	0.334	0.948	0.211	-0.157	0.455	0.499	0.489	0.275	1.000

Source: Field Survey 2022

4.4 Multiple Regression Results

The dependent variable performance proxied by profitability was regressed on the independent variables, namely; number of functional computers, ICT expenditure, internet use, total accumulated savings, total loan portfolio amount, membership size, age of the SACCO and the number of ICT trained staff and regression results are presented in Table 6. The model regression results cover both objectives one and two.

Table. 6: Showing Multiple Regression Results

The table 6 below shows multiple regression results of the effect of ICT and other factors that influence of SACCOs performance in Uganda.

Variables	**Profitability**
Functional Computers	0.076***
	(0.026)
ICT Expenditure	0.040**
	(0.019)
Internet Use	0.091
	(0.246)
Accumulated Saving	0.256***
	(0.088)
Loan Portfolio	0.205*
	(0.121)
Membership Size	0.142
	(0.087)
SACCO Age	-0.370**
	(0.182)
Number of ICT trained staff	-0.049**
	(0.019)
Cons_	7.622***
	(1.403)
R-squared = 0.368	**Observations = 201**
Root MSE = 1.642	**Prob>F (8,192) = 0.000**

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Field Survey 2022

Profitability, ICT expenditure, accumulated savings, loan portfolio, membership size, SACCO age are in logarithmic form and functional computers is a linear variable while internet use is a dummy. The explanatory power of the model as indicated by the R-squared is 0.368. This indicates that the approximately 37 percent of the variations in profitability are due to variations in the explanatory variables. Although this R-squared is low, it is highly consistent with most studies that employ cross-sectional data (see Haddad et al., 2003; Nakabo-Ssewanyana, 2003; Zebeli et al., 2006; Kabubo-Mariara et al., 2008 and Omeke et al., 2019).

Functional computers, internet use, and ICT expenditure served as proxies for the study's first goal, which was to determine how ICT affected Sacco's performance. The model's regression results show that, of the three variables, internet use had no significant impact on performance, but

functional computers and ICT spending did. For instance, at the one percent significance level, functional computers had a positive and statistically significant effect. When all other variables are held equal, the average improvement in SACCO performance from additional functioning computers is 7.6%, and the effect was significant at the one percent significance level. It makes sense that the more operational computers the SACCO has, the more effectively its personnel carry out their jobs, which boosts SACCO earnings and, ultimately, improves SACCO performance. The study's findings are consistent with those of Adekunle et al. (2014), who found comparable correlations between ICT and performance.

The study results also point out that ICT expenditure has a positive and significant effect on SACCO performance at five percent level of significance. A one percent increase in ICT expenditure, on average, improves performance by 0.04 percent, keeping other factors constant. ICT expenditure results into an increase in the level of profits realized by the SACCOs since ICT enhances efficiency of the employees. Hence, the study findings are in line with the study findings of Chowdhury et al. (2003) and Eze et al. (2014) that argued that ICT expenditure increases performance in terms of profitability. On the other hand, internet use though the coefficient shows positive relationship, it had no significant effect on SACCO's performance.

Further, the regression results presented in Table 6 indicate other factors that affect SACCO performance and the findings address the second objective of the study. The following model variables were used to ascertain their level of significance as far as performance is concerned; total accumulated saving, membership size, total loan portfolio amount, age of the SACCO and the number of ICT trained staff. Variables such as total accumulated savings, total loan portfolio and age of the SACCO had significant effect on SACCOs' performance.

The study results point out that total accumulated saving is statistically significant and positively influence performance among SACCOs at one percent level of significance. For a one percent unit increase in total saving results into a corresponding increase in the level of average profits earned by SACCOs by 0.256 percent which shows improved performance. Intuitively, as members of these SACCOs continuously save, it increases availability of funds for both investments and lending options and ultimately yielding more profits, and hence SACCO performance. Eventually, the study findings about total accumulated savings concur with the research findings of Costa-Font et al. (2018) and Kiaritha (2021) that support the argument that accumulated savings significantly improves performance in terms of profitability.

The study results also point outs that membership size of the SACCO positively influences performance among SACCOs though statistically not significant. For a one-unit increase in the number of active members of the SACCOs, directly results into an increase in the average profit levels to be realized overtime. Eventually, it implies that SACCOs that have got many active members in their operations tend to perform well compared to SACCOs with few and many dormant members; hence, membership base of the SACCO accelerates its performance. The study findings align with the empirical studies of Muriuki (2010), Onsase et al. (2013) and Makena (2014) which argued that an increase in the number of active SACCO members' results into a corresponding increase in profit levels thus, improved performance.

The model results also revealed that total loan portfolio positively and significantly influences performance of the SACCO and this was found to be significant at ten percent level of significance. For a one percent unit increase in the loan portfolio amount increases profitability of the SACCO by approximately 0.2 percent. Intuitively, the amount of funds available to be accessed by SACCO members greatly enables the SACCO to realize income in terms of interest, which later spurs its performance measured in profit terms. The study findings are in total agreement with the findings of Hamisu (2011) and Gongera et al. (2013) that argued that loan portfolio amount improves performance of the financial institution in the financial sector.

The multiple regression results also revealed that age of the SACCO is statistically significant and negative at five percent level of significance. For additional year of SACCO's existence, SACCO's performance was found to decline on average by 0.37 percent. The model results rhyme with the previous findings that argued that age of the firm directly or indirectly affects the performance of the firm and in this case, the findings point to the negative direction of age in measuring performance. Eventually, age of the SACCO remains a contentious concern among scholars that it increases performance and others argues otherwise as evidenced in the studies of; Ayyagari et al. (2011); Reiss, (2011); Gaur & Gupta (2011); Fort et al. (2012); LiPuma et al. (2013) and Khalifa (2014) who argued in the same way as far as performance and age of the SACCO is concerned.

The model results also found out that the number of ICT trained staff among SACCO is negative and significant at 5% which is in disagreement with the study findings of Mwakaje (2010); Ofafa et al. (2013) and Nyangarika et al. (2020). The negative sign of this explanatory variable is unexpected because it does not conform to theory. However, this study observed that the use of

ICT in most SACCO is still relative and expensive to manage, this could have contributed to the unexpected sign of the number of ICT trained staff in the model.

4.5 Multicollinearity Test

Multicollinearity test was performed using the Variance Inflation Factor (VIF) in the study and if the mean VIF is less than 10, it indicates absence of perfect Multicollinearity as seen in Table 7.

Table 7: Multicollinearity Test Results

Variables	VIF	1/VIF
Functional Computers	10.089	.099
Number of ICT trained staff	9.995	.1
Total Loan Portfolio amount	4.37	.229
Total Accumulated savings	4.092	.244
Membership Size	2.179	.459
Age of the SACCO	1.573	.636
ICT Expenditure	1.099	.91
Internet Use	1.079	.927
Mean VIF	**4.309**	**.**

Source: Author's computation, 2022

The study finding from table 7 of Multicollinearity test results showed that the VIF is less than 10 which indicates that there is no problem of perfect Multicollinearity among the explanatory variables of the model.

4.6 Skewness/Kurtosis tests for Normality

				------ joint ------	
Variable	**Obs**	**Pr (Skewness)**	**Pr (Kurtosis)**	**adj_chi2(2)**	**Prob>chi2**
Resid	201	0.000	0.000	25.990	0.000

Using the Skewness/kurtosis test for normality results, indicate that residuals are not normally distributed as indicated by chi (2) being 0.000. However, there is nothing more inherently wrong having non- normal data since some characteristics of the study does not follow bell curve distribution (Kristin, 2012).

4.7 Ordered Logistic Regression Model

The study employs an ordered logit model to assess the determinants of ICT adoption among SACCOs. Ordered logistic regression model indicates the independent variables that are

statistically significant to predict whether odds ratio of a SACCOs' ICT adoption level falls into the Low, Medium and High category. Therefore, Table 6 below displays the relative adoption levels between the explanatory variables and its outcome variables.

Table 8: Ordered Logistic Regression Results of the Model Variables

****** p<.01, ** p<.05, * p<.1 and Z-values are in parentheses***

Source: Field Survey, 2022

ICT Adoption level	**Odds Ratio**
ICT Staff Trainings	1.639***
	(3.580)
Age of the SACCO	1.029*
	(1.660)
No. ICT trained staff	1.216***
	(4.720)
Internet Access	4.789***
	(4.240)
Location	0.909
	(-0.290)
/cut1	3.196
	(0.676)
/cut2	6.319
	(0.806)

Mean dependent var	2.045	SD dependent var	0.730
Pseudo R-squared	0.270	Number of Obs	201
Chi-square	114.685	Prob>chi2	0.000
Akaike crit. (AIC)	324.694	Bayesian crit. (BIC)	347.818

/Cut 1 = Estimated cut point on the latent variable (Y^*) important in differentiating low ICT adoption category form the medium and high ICT adoption categories once values of the predictor variables are estimated at zero. The SACCOs that had a value of 3.2 or less on the underlying latent variable that gave rise to ICT adoption variable would be classified as low ICT adoption given that all predictors had zero.

/Cut 2 = Estimated cut point on the latent variable (Y^*) important in differentiating low and medium ICT adoption categories form the high ICT adoption category once values of the predictor variables are estimated at zero. The SACCOs that had a value of 6.3 or greater on the underlying latent variable that gave rise to ICT adoption variable would be termed as high ICT adoption given that all other predictors had zero. While SACCOs that had a value ranging from 3.2 and 6.3 on the underlying latent variable could be classified as middle ICT adopters.

The probability of Chi Square is significant at 5 percent level of significance meaning that all the regression coefficients are statistically jointly significant and the Pseudo-R squared is 0.27 and is always low with the limited dependent variables model (Gujarati, 2004).

From the ordered logistic regression results, of the binary coefficient of ICT staff training is positive and statistically significant at one percent level of significance. The odds ratio of comparing SACCOs that had no ICT trainings to SACCOs that had ICT trainings on ICT adoption levels, other model variables held constant. For SACCOs that had ICT trainings, the odds of high ICT adoption category against the combined medium and low ICT adoption categories are 1.639 times greater than for SACCOs that had no ICT training. Intuitively, training staff in ICT enhances their efficiency, cost reduction in terms of information sharing among others and in the end, acts as an incentive to ICT adoption. Eventually, the model results are in agreement with the study findings of Kotla et al. (2012) and Jung (2013) that found out ICT training directly and positively impacts its adoption.

The model results revealed that the odds ratio for a one unit increases in the age of the SACCO on ICT adoption level holding other model variables constant is statistically significant and positive at 10 percent level of significance Therefore, for a unit increase in the age of the SACCO, the odds of high ICT adoption category compared to the combined medium and low ICT adoption categories are 1.029 times greater, holding other model variables constant. In the same vein, for a unit change in the number of years the SACCO has been in existence, the odds of the combined high and medium ICT adoption categories compared to the low ICT adoption category are 1.029 times greater, other variables held constant. Intuitively, the number of years the SACCO has been in operation or existence directly determines ICT adoption level because of the market share acquired, the increasing number of membership size among others. Thus, the study findings extend the body of knowledge as found out by the studies of Gnansounou (2010) and Olise et al. (2014) that age of the SACCO directly determines the adoption of ICT among firms.

The study findings also point out the number of ICT trained staff is positive and statistically significant at one percent level of significance. For a unit increase in the number of ICT trained staff, the odds of high ICT adoption versus the combined middle and low ICT adoption categories are 1.216 times greater, given other variables held constant in the model. Intuitively, the more the number of ICT trained staff the higher the chances of the organization adopting ICT in their

operations because the capacity and potentials of staff in the use of ICT related tools may be viable. Thus, the ordered logistic results concur with the study findings of Khalifa (2014) that revealed that the number of ICT trained staff in the organisation significantly determines ICT adoption.

The study empirical findings also indicate that internet access is positive and statistically significant at one percent level of significance. The odds ratio of comparing SACCOs that had no internet access to ones that had internet access in their operations on ICT adoption level given other model variables constant. SACCOs which had internet access, the odds of high ICT adoption level against the combined medium and low ICT adoption levels are 4.789 times greater higher for SACCOs that had internet access than those that did not have internet access, holding other model variables constant. Therefore, the study results about internet access are in agreement with the study findings of Viollaz & Mariana (2018) and Stork et al. (2013) that internet access determines ICT adoption among firms.

The model results about location of the SACCO revealed that location was positive and statistically not significant in determining ICT adoption. The odds ratio of comparing urban to rural location on ICT adoption of the SACCO holding other model variables constant. For the SACCOs located in the urban areas, the odds of high ICT adoption level against the middle and low ICT adoption levels are 0.909 times lower than those ones in the rural areas, keeping other variables constant. Hence, the ordered logistic model results about location of the SACCO were in agreement with the empirical findings of Wei and Cao (2018) and McCoy et al. (2018) that SACCO location increases its probability of ICT adoption.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary, conclusions of the study findings and possible recommendations in relation to Information Communication and Technology (ICT) adoption and use among SACCOs in Uganda.

5.1 Summary of the Study Findings

The regression results of the model indicate that out of the three variables, functional computers and ICT expenditure had significant effect on performance while internet use had no significant effect, for example, functional computers had a positive and statistically significant effect at one percent level of significance. For additional functional computer acquired by the SACCO, on average, leads to an increase in SACCOs' performance by 7.6 percent keeping other factors constant and the effect was significant at one percent level of significance. ICT expenditure has a positive and significant effect on SACCO performance at five percent level of significance. A one percent increase in ICT expenditure, on average, improves performance by 0.04 percent, keeping other factors constant.

For the second study objective, the following model variables were used to ascertain their level of significance as far as performance is concerned; total accumulated saving, membership size, total loan portfolio amount, Age of the SACCO and the number of ICT trained staff. Variables such as total accumulated savings, total loan portfolio and age of the SACCO had significant effect on SACCOs' performance. The regression results showed that total accumulated saving is statistically significant and positively influence performance among SACCOs at one percent level of significance. For a one percent unit increase in total saving results into a corresponding increase in the level of average profits earned by SACCOs by 0.256 percent which shows improved performance. Relatedly, total loan portfolio positively and significantly influences performance of the SACCO and this was found to be significant at ten percent level of significance. For a one percent unit increase in the loan portfolio amount increases profitability of the SACCO by approximately 0.2 percent

From the ordered logistic regression results, study results revealed that internet access, ICT staff trainings, ICT trained staff and Age of the SACCO are factors that positively and significantly determines the probability of SACCO ICT adoption levels. ICT staff training is positive and statistically significant at one percent level of significance. The odds ratio of comparing SACCOs that had no ICT trainings to SACCOs that had ICT trainings on ICT adoption levels, other model variables held constant. For SACCOs that had ICT trainings, the odds of high ICT adoption category against the combined medium and low ICT adoption categories are 1.639 times greater than for SACCOs that had no ICT training. In the same way, the number of ICT trained staff is positive and statistically significant at one percent level of significance. For a unit increase in the number of ICT trained staff, the odds of high ICT adoption versus the combined middle and low ICT adoption categories are 1.216 times greater, given other variables held constant in the model.

5.2 Conclusion of the Study

The main objective of the study was impact of ICT and SACCOs' performance in Uganda with specific objectives as; effect of ICT on SACCOs' performance, identifying other determinants of SACCO performance and investigating the determinants of ICT adoption among SACCOs in Uganda. Therefore, study draws the following conclusions as far as the study objectives are concerned;

The study used primary data for SACCOs that use ICT in their operation with a population of 420 SACCOs reflecting a sample size of 201 in Uganda. The study used multiple regression to analyze the effect of ICT on SACCOs' performance. The study concluded that ICT proxies of functional computers and ICT expenditure had significant effect on SACCOs' performance.

In addition to ICT, other factors that had significant effect on SACCOs' performance were total accumulated saving of the SACCO and total loan portfolio amount of the SACCO using a multiple regression model.

The ordered logit model was used to assess the determinants of ICT adoption among SACCOs in Uganda. The key determinants that had significant effect on ICT adoption were ICT trainings, age of the SACCO, internet access of the SACCO and the number of ICT trained staff in the SACCO.

5.3 Recommendation of the Study

Basing on the study findings and conclusions, the study recommends that SACCOs should earmark more funds to increase ICT adoption and use in their operations since ICT funding was found to have a direct and significant impact on performance of SACCOs. In the same way, SACCOs should increase on the availability of functional computers since functional computers serve as an impetus for ICT adoption and use, exposes the employees of the SACCOs to ICT related facilities among others.

The study also recommends that SACCO should encourage and at the same time motivate their members to continuously save more because total accumulated savings of the SACCO was found to have a significant effect on performance in terms of profitability.

As far as ICT adoption is concerned, the study finding confirms that ICT trainings, number of ICT trained staff and internet access significantly determines SACCOs' decision to adopt ICT. Therefore, the study recommends that SACCOs should conduct more ICT trainings so as to effectively equip their staff with the latest ICT knowledge that is critical in the financial sector. The government should also reduce the tax imposed on ICT related devices such that SACCOs in all corners can easily have access to internet and other meaningful ICT tools important in their operations.

5.4 Areas for Further Studies

With reference to the study findings, the study deems it fit that the following areas of interest are important for further research.

- The effect of electricity distribution on ICT adoption among SACCOs.
- Does reduction of Tax rates on ICT related gadgets Increase ICT adoption among SACCOs

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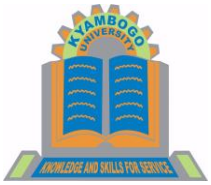
APPENDIX ONE: STUDY QUESTIONNAIRE

KYAMBOGO  **UNIVERSITY**

P. O. BOX 1 KYAMBOGO

ECONOMICS AND STATISTICS DEPARTMENT

STUDY QUESTIONNAIRE

Dear Respondent

I am Kabugo Robert, a student of Kyambogo University pursuing master's degree of Arts in Economics, under-taking a study titled ***"Information Communication Technology (ICT) and SACCOs' Performance in Uganda***". The data and findings from the study will be used purely for academic purposes. The researcher pledges to ensure utmost professionalism, ethical consideration, and confidentiality during the study discourse. Therefore, I request you to kindly complete this questionnaire.

At the end of the study, I shall be happy to share with you the findings of the study. I highly appreciate your positive participation in the study. For further information or clarity contact the researcher on 0783964855/0706399055 or rkabugo90@gmail.com

SECTION A: BACKGROUND INFORMATION

Name of SACCO ……..…...

Please fill in or tick the appropriate response

a) **Position in the SACCO.**

Manager	Credit officer /Cashier
1	2

b) Age Bracket of the Manager.

18-30 yrs	30-39 yrs	40-49yrs	50-59 yrs	More than 60 yrs
1	2	3	4	5

c) Gender of the Manager.

Male	Female
1	2

d) Education Level of the Manager.

Certificate	Diploma	Bachelor's Degree	Postgraduate Diploma	Master's Degree
1	2	3	4	5

e) (i) Location of SACCO

Region				District
1	Western	3. Eastern		
2	Central	4. Northen		

(ii)

Urban	Rural
1	2

f) Registration of SACCO

Fully Registered	Probationary Registration	Unregistered
1	2	3

g) Affiliation to Apex bodies

AMFIU	UCA	UCSCU	Affiliated to more than one body	No Affiliation
1	2	3	4	5

SECTION B: INFORMATION COMMUNICATION TECHNOLOGY (ICT) USE AND SACCOs PERFORMANCE

1. Profitability: Can you attribute your profit level to ICT use?

Yes	No
1	2

2. What is the average annual profit of the SACCO in (Ug.shs)?

……

3. Is your SACCO connected to internet?

Yes	No
1	2

4. How many functional computers does this SACCO have that help in performing its work?

……..……

5. Does this SACCO have a website?

Yes	No
1	2

SECTION C: OTHER FACTORS THAT DETERMINE SACCOS' PERFORMANCE

1. How many active members do you have in this SACCO?

……..……

2. What is the total loan portfolio amount of this SACCO in (Ug.shs)?

……..……..

3. What is the total accumulated share capital of this SACCO in (Ug.shs)?

……

SECTION D: DETERMINANTS OF ICT ADOPTION AMONG SACCOS

1. For how long has this SACCO been in existence (in years)?

……

2. How long have you worked with this SACCO (in years)?

1-5yrs	6-10yrs	>10yrs
1	2	3

3. Does this SACCO train its staff/employees in ICT?

Yes	No
1	2

4. If yes, how many times in a year?

……

5 Internet access: Do this SACCO have access to internet?

Yes	No
1	2

6 How do you rate the level of ICT adoption in this SACCO?

Low	Medium	High
1	2	3

7 How many employees do you employ in this SACCO?

……

8 How many employees of your SACCO know how to use a computer?

……

9 How often do you use a computer to do your work?

Never use	1 hr a day	1-3hrs a day	More than 3hrs
1	2	3	4

Thank you for your cooperation