MAKERERE UNIVERSITY

MAKERERE UNIVERSITY BUSINESS SCHOOL

TECHNOLOGY INNOVATION, RISK MANAGEMENT PRACTICES AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN UGANDA

BY

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A DISSERTATION SUBMITTED TO THE DEPARTMENT OF MAKERERE UNIVERSITY BUSINESS SCHOOL (FACULTY OF GRADUATE STUDIES AND RESEARCH) IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF BUSINESS ADMINISTRATION OF MAKERERE UNIVERSITY

PLAN A

MARCH, 2022

DECLARATION

This dissertation is original and has not been submitted for any other degree or award to any other University/academic institution before.

Signature..... Date 11/03/2022.

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APPROVAL

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DEDICATION

I dedicate this dissertation to my family, employer, supervisors, colleagues, friends and everybody who has worked tirelessly to ensure that I complete it.

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LIST OF ABBREVIATIONS

BOU- Bank of Uganda

CB - Commercial Banks

GDP- Gross Domestic Product

CR- Credit Risk

CRM - Credit Risk Management

CVI- Content Validity Index

FI - Financial Institution

MSEs - Micro and Small Enterprises

SD - Standard Deviation

SPSS-Statistical Package for Social scientist

LIST OF TABLES AND FIGURES

ABSTRACT

The study sought to examine the relationship between technology innovations, risk management practice and financial performance of commercial banks in Uganda. The study focused on commercial banks located in Kampala Central region. A cross sectional survey design was adopted using a quantitative approach.

The study used convenience sampling technique to select bank staff from 24 commercials banks located in Kampala. Data was analyzed with the help of Statistical package for social scientists (SPSS) v 20. Inferential statistics, correlation, regression and mediation analysis were carried-out to achieve the objectives of the study.

The study findings indicated a significant positive relationship between study variables. The regression findings indicate that technology innovation and risk management practices predict financial performance by 11.3%. The findings indicated that risk management practices had a significant effect on the relationship between technology innovation and financial performance. The study suggests a number of recommendations among which is the need for carrying out a qualitative study.

CHAPTER ONE

1.0 Introduction

This chapter covers the background of the study, statement of the problem, significance of the study, purpose of the study, research objectives and the conceptual framework.

1.1 Background of the study

Commercial banks operate in a dynamic and competitive environment as their performance keep on fluctuating. Many banks have been established and thereby giving grounds to the competitive banking services that may bring about satisfactions to their customers (Ong and Teh, 2013). Without exception of Uganda's banking sector that is comprised of 24 commercial banks as of the 2018. According to Bank of Uganda supervisory report of (2017), in 2016 the competitive edge of commercial banks increased as per the government securities by 15.9 percent up from 6.1 percent while lending grew by 3.7 percent compared to 19.7 percent, reflecting a shift from riskier assets to safer assets driven by the decline in asset quality.

According to Bank of Uganda Annual Report (2018), in 2017 there was a good year for Uganda's commercial banks, with some posting encouraging results and others, swimming in losses according to their financial statements for the year 2016/17. With the economy being unsteady and some banks closing up in 2017, the poor state of the economy was reflected in the performance of some commercial banks. GDP growth for 2016 has been revised downwards from the initial projection of 5% to 4.5% largely due to a sluggish economy. This year saw Crane Bank, one of the then leading banks in Uganda collapse after it became 'significantly undercapitalized'. The bank collapsed after recording a

whooping Shs3.1bn loss in 2015, down from a net profit of Shs50.6bn in 2014. This was a result of high non-performing loans that increased by 122.9% to Shs142.3bn in 2015, up from Shs19.36bn in 2014. Many banks reported a dip in their profits while two banks, Cairo International Bank (CIB) and Commercial Bank of Africa (CBA) out rightly reported losses. Cairo International Bank reported a loss of Shs 1.45 billion, which is marginally lower than the Shs 1.46 billion reported in 2016.

Technological innovation is used to refer to the process through which technological advances are produced (Goh, 2012). The innovation process includes a set of activities that contribute to increase in the capacity to produce new goods and services (product innovations) or to implement new forms of production (process innovations). Therefore, the concept of technological innovation is associated with the idea of a flow generation, application and dissemination of technologies (Roehm and Sternthal, 2011). The use of technology innovation has been high recognized as an engine that has helped in reduction the risks in commercial banks and increase on the financial performance.

Risk Management practices is the identification, assessment and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events (Njogo, 2012). It is neither a concept for complete risk avoidance nor its elimination. Managing risk is nothing but managing the change before the risk manages (Raghavan, 2013). Schroeck (2002) and Nocco and Stulz (2006) in Ariffin and Kassim (2009) stress the importance of good risks management practices to maximize firms' value. While the former proposes that ensuring best practices by instituting effective and prudent risk management practices to increase earnings, the latter specifically posits that effective enterprise risk management have a

long-run competitive advantage to the firm compared to those that manage and monitor risks individually (Ariffin and Kassim ,2009). In the light of this and as a follow-up, a holistic approach is suggested in managing risk (Adebisi and Oladunjoye (2013). Risk management is at the core of survival for the big majority of commercial banks. Kithinji (2010) said that risk management practices encourage the implementation of policies to limit insider lending and large exposures to related parties this is in addition to controlling risks stemming out of chances that a client may not repay the loan (Tefera, 2011). Hence the need to carry out a research study on the effect of Technology Innovation, risk management practices and performance of commercial banks in Uganda.

1.2 Problem Statement

According to the Annual Police Report, (2019), Bank fraud accounts for $1-10million annually, cyber-attacks amounting to 207 million shillings lost due to mobile banking and mobile money transactions, ATMs have accounted for the loss of almost 1.2billion shillings. According to Ahimbisibwe, (2017), unreliable internet banking systems have customers loss money during deposits, customers complain of high transaction costs during issuing of ATM (15-20k), in 2018 banks faced fraud and forgeries accounting for 60% loss in mobile banking. Banks have registered a decline in financial performance for example, a whopping drop of 51.6% profits after tax by DFCU in 2018, which fell to UGX 61.7bn from UGX 127bn, (Muhwezi, 2019). The above decline in the financial performance of commercial banks might be attributed to innovative technologies and risk management practices.

1.3 Overall objective of the study.

The purpose of the study was to examine the relationship between technology innovations, risk management practice and financial performance of commercial banks in Uganda.

1.4 Research objectives

i. To analyze the relationship between technology innovations and financial performance of commercial banks in Uganda.

ii. To examine the relationship between technology innovations and risk management practices of commercial banks in Uganda.

iii. To establish the relationship between risk management practices and financial performance of commercial banks in Uganda.

iv. To determine mediating role of risk management practices on the relationship between technology innovations and performance of commercial banks in Uganda.

1.5 Research Questions

i. What is the relationship between technology innovations and financial performance of commercial banks in Uganda?

ii. What is the relationship between technology innovations and risk management practices of commercial banks in Uganda?

iii. What is the relationship between risk management practices and financial performance of commercial banks in Uganda?

iv. What is the mediating effect of risk management practices on the relationship between technology innovations and performance of commercial banks in Uganda?

1.6 Scope of the Study

The scope of this study is broken down into; geographical scope, subject scope.

1.6.1 Geographical scope

The study focused on commercial banks located in Kampala Central region. The study will be limited to the above-mentioned commercial banks since they are supervised by Bank of Uganda which is a source of reliable information regarding financial performance of commercial banks in Uganda.

1.6.2 Subject scope

The study focused on establishing the relationship between technology innovations, risk management practices and financial performance of commercial banks in Uganda.

1.7 Significance of the study

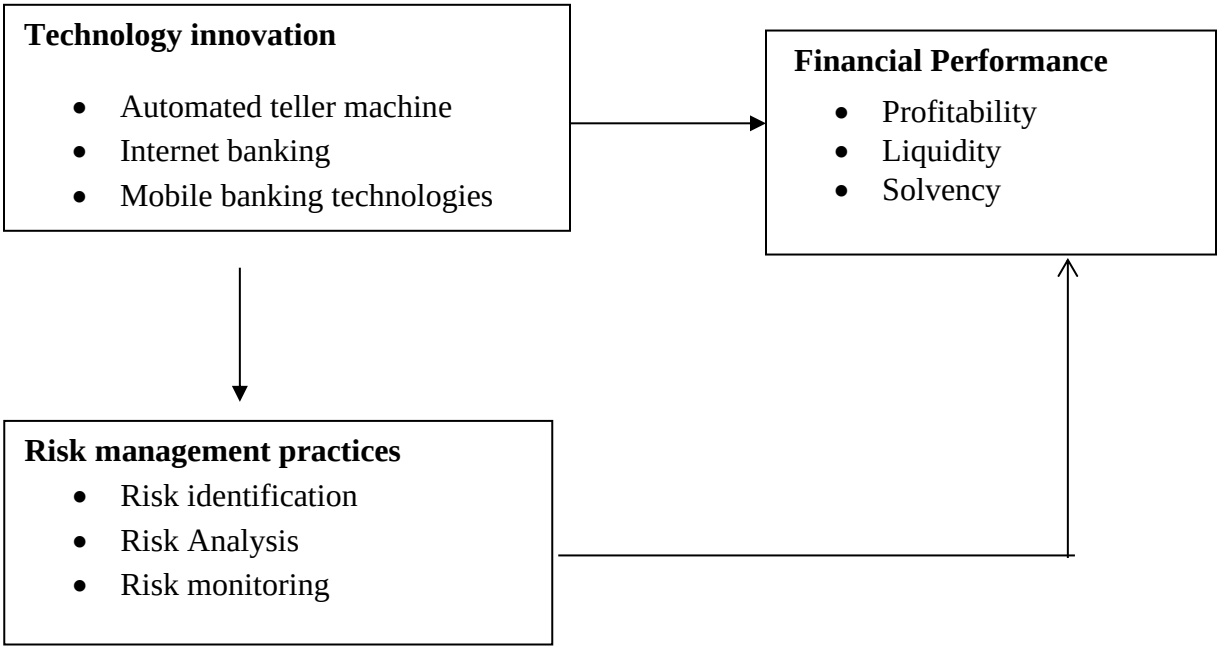
This research paper may help financial institutions to come up with better ways managing risks in order to improve financial performance of commercial banks.

This research may enable managers of commercial banks who are concerned with the overall financial performance of commercial banks in Uganda.

The research will enable Bank of Uganda in making informed decisions aimed at supporting commercial banks in Uganda improve on the financial performance.

The study findings may be a basis upon which key stakeholders and policy makers such as Bank of Uganda to formulate and implement policies related with risk assessments aimed at enabling commercial banks improve on financial performance of commercial banks.

1.8 Conceptual framework



Source: Adopted and modified by the researcher from literature of (Gonzalez-Vega 2003; Kropp & Katchova, 2011; Qinlan & Izumida, 2013); Sigalas, 2013)

Description of the Conceptual Framework.

The model above shows that technology innovation influences financial performance. It also shows that technology innovation influences risk management practices. Risk management practices influence on financial performance.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This section presents a review of related literature of the study in the research area. This section also seeks to identify the research gap that existed between what other researchers have done and what this study aims to tackle as well as capture the relationship of the research variables.

2.1 Conceptual Review

2.1.1 Technological Innovation

Technological innovation is used to refer to the process through which technological advances are produced (Goh, 2012). The innovation process includes a set of activities that contribute to increase in the capacity to produce new goods and services (product innovations) or to implement new forms of production (process innovations). Therefore, the concept of technological innovation is associated with the idea of a flow generation, application, and dissemination of technologies. Innovation is an essential component of competitiveness. Drucker (2013) defined innovation as a process involving equipping in new, improved capabilities or increased utility. Schumpeter (2014) described the different types of innovations as the introduction of new products, development of new methods of production, discovery of new sources of supply, discovery of new markets and new ways to organize organizations. Drucker (2013) noted that innovations provide firms with a strategic orientation to overcome the problems they encounter while they strive to attain sustainable competitive advantage. Innovation involves acting on the creative ideas to

make some specific and tangible difference in the domain in which the innovation occurs (Davila, 2010).

Technological innovation is made up of systems innovation, processes innovation, and innovation of equipment employed in an organization. Cumming, (2012) defined process innovation as the process of reengineering and improving internal operation of business process. According to Oke *et al*. (2011), process innovation involves the development of or enhancement in techniques and the evolution in process or system (Lawson & Samson, 2011). For example, innovation in skill, techniques, technology, system and procedure, which is used in the transformation process of input into output (Letangule and Letting, 2012). In an activity production, process innovation can be referred to as new and improved techniques, tools, devices, and knowledge in making a product (Langley *et al.*, 2011). It has a distinctive competence for competitive advantage, particularly in financial industries. In the banking industry, technological innovation has enabled the banks to launch a number of products in their banking platforms courtesy of superior core banking systems out sourced from systems development companies (Letangule and Letting, 2012)

2.2.1 Risk Management Practices

Risk management according to Stanton (2012) refers to the process by which an organization identifies and analyses threats, examines alternatives, and accepts or mitigates those threats even before they begin to impede the activities of the organization. Similarly, Culp (2013) opined that risk management is viewed today as one of the key characteristics of successful companies which enable firms to view all risks facing them through some form of pre-planned activities. Also, risk management can be perceived as a management process that requires a firm's management to identify and assess the collective risks that

affect firm value and apply an organizational wide strategy to manage those risks in order to attain higher level of efficiency (Meulbroek, 2012).

The primary goal of risk management is to maximize shareholder value (Beasley *et al.*, 2013; Hoyt & Liebenberg, 2011; Pagach & Warr, 2011). Banner *et al.* (2014) asserted that risk management is a value adding technique that is aimed at generating additional profit for a company by giving an overview of all risky activities, constructing recovery plans and constant monitoring of day-to-day operations. Thus, Hoyt and Liebenberg (2011) suggested that profit maximizing firms should consider implementing only an aspect of risk management that increases expected shareholder wealth. According to Vieira (2010), increase in risk complemented by risk concentration may confer vulnerability to corporate segment. Therefore, risk management strategies contribute in an essential manner to value creation of a business organization.

2.2.2 Financial Performance

Performance is the competency of an organization to transform the resources within the firm in an efficient and effective manner to achieve organizational goals (Daft, 2017). Organizational goals vary depending on the purpose for which they are established. Business organizations have profit, growth and survival as the main goals. According to Dyer and Reeves' (2015) definition, financial performance consists of financial outcomes (return on invested capital or return on asset and stock value or shareholder return). Financial performance can be measured through evaluating a firm's profitability, solvency and liquidity (Mutuku, 2011). A firm's profitability indicates the extent to which a firm generates profit from its factors of production. Financial performance can be measured by monitoring the firm's profitability levels. Zenios et al. (2011) states that profitability analysis focuses on the relationship between revenues and expenses and on the level of profits relative to the size of investment in the business through the use of profitability ratios.

Performance encompasses three specific areas of firm outcomes namely financial performance (profits, return on assets, return on investment); market performance (sales, market share); and shareholder return (total shareholder return, economic value added) (Divenney et al., 2011). Performance is the ultimate dependent variable of interest for those concerned with just about any area of management: accounting is concerned with measuring performance; marketing with customer satisfaction and market share; operations management with productivity and cost of operations organizational behavior with employee satisfaction and structural efficiency; and finance with capital market (Odundo, 2013).

2.3 The Relationship Between Technology Innovation and Financial Performance

Bharawaj (2015) empirically tested that Technology innovation has advantages compared to the Information Technology in encouraging better corporate performance. Technology innovation has the ability to create a new resource, either by spreading or incorporating some other resources, in other words by using Technology innovation the company has strategies to gain a variety of benefits and advantages to its investment in information technology (Ross, Westerfield,. Jordan, 2015). By developing Technology innovation, the company can create competitive advantage, and essentially it can improve financial Performance (Lawrence, J.W, 2010).

Electronic integration has been treated as a crucial technology innovation resource in the B2B context. According to Wang et al. (2016), electronic integration refers to the extent to which supply chain relevant activities between and within channel members are carried out by interorganizational IS. Electronic integration can cover a wide range of inter firm channel activities from loose transaction activities to tightly coupled ERP-to-ERP connections to facilitate collaborative demand planning and fulfillment (Chatterjee et al., 2016) and thus can demonstrate varying results on business process and structures in the international supply chain exchange relationship. This perspective is also mirrored by Overby and Min (2011), who contend that depending on the levels and patterns of electronic integration, we will witness more or less significant impacts on business process and structures in the international supply chain relationship. They point at an array of I-commerce models which may range from the simplest information, interaction, and transaction, to the most sophisticated integration level (Wilkinson, 2013).

With the rapid technological developments which also affects the condition of the company to be more competitive in every way, and with the view that the company is currently oriented on knowledge also spur the organization to be more creative and produce continuous innovation (Wilkinson, 2013). A banking company is a service company which is highly dependent on the use of information technology, and has a very tight competition. Capabilities of information technology combined with organizational learning and knowledge management capabilities to organizational performance.

Resource-based view of technology innovation suggests that firms can and do differentiate themselves from competitors by means of their IT resources (Chen & Tsou, 2012). On the other hand, while it is difficult to acquire or imitate each distinct technology innovation resources, firms can achieve competitive advantage through learning to combine their existing IT resources effectively (Bharadwaj, 2010). While the customer-employee interaction is one dimension of service work, technology innovation usage is a second factor affecting performance (Batt, 2010). Some studies (e.g., Mithas*et al*., 2005; Mithas*et al*., 2011) suggest that technology innovation capability more affects the performance indirectly by mediation of other organizational capabilities like customer and market focus, performance management, and information management capability, although a direct relationship between technology innovation capability and performance has been verified too. Technology innovation resources in combination create a firm-wide technology innovation capability (Bharadwaj, 2015) that leads to competitive advantage and better firm performance by increasing its revenue and decreasing its costs.

In the context of reengineering, technology innovation allows for innovative business processes, new skills and new organizational structures (Brynjolfsson and Hitt, 2013). Hence, Barua and Whinston (2008) and Barua et al. (2016) argue that technology innovation is complementary to organizational characteristics and processes, and that investments in technology innovation are less likely to succeed if done in isolation. Devaraj and Kohli (2010) showed in 2000 that technology innovation investments contribute to a higher level of revenue when combined with BPR initiatives. However, Loveman (1990) found no relationship between various technology innovation ratios and performance measures for return on investment. Likewise, Sager (2008) and Venkatraman and Zaheer (1990) reveal that technology innovation has no impact on performance. Brynjolfsson (2013) has suggested that researchers should look beyond conventional productivity.

Competency in technology innovation function and effective use of software tools have been proposed as some of the most important factors that contribute to the success of commercial banks. They include: building of effective technology innovation infrastructure, adequate investment in technology innovation infrastructure, adequate measurement of effectiveness of the infrastructure, and proper integration of the infrastructure to the existing business processes and systems. Kettinger, Teng, and Guha (2017) went on to state that technology innovation infrastructure strategies and BPR strategies which should both be derived from organizational strategy, need to be in effective alignment to ensure the success.

While the rapid development of information technology has made some banking tasks more efficient and cheaper, technological investments are taking a larger share of bank's resources Gardashew, D., Sadgina, & Zumwalt, (2012). Currently, apart from personnel costs, technology is usually the biggest item in the budget of a bank, and the fastest growing one. Another problem associated with this financial innovation is plastic card fraud, particularly on lost and stolen cards and counterfeit card fraud. Banks need to manage costs and risks associated with electronic banking (Hamilton, R., Jenkinson, & Penalver, 2017). It is therefore important that e-banking innovations are made by sound analysis of risks and costs associated so that to avoid harms on the bank performance. On one hand the bank performance is directly related to efficiency and effectiveness of electronic banking, but on the other hand tight controls and standards are needed to prevent losses associated with electronic banking. The banks have to balance these two options in order not to impair its overall prosperity (Ivatury, & Ignacio M., 2008). This is only possible if overall effects of electronic banking on the banks and its customers are understood. Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance (Kagan, Acharya, Rao, & Kodepaka, 2015). Use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs as well as bringing potential benefits. The impact of ICTs and e-business strategies on bank performance are positive overall, but that ICTs are not a panacea in themselves (Kombo, & Tromp, 2015). .

2.4 The relationship between technology innovations and risk management practices

Successful risk management puts into consideration various factors that should be coordinated systematically to give a firm the desired objective. Risk management can lead

to less cost and improved returns (Hasanali, 2012). Information technology is changing the way we communicate and hence reporting of risk analysis and finding is made easy. Monitoring of risk is simplified by a well-informed organization (Beroggi and Wallace, 2012). Communication of risk management practices to all the employees ensures a culture that is aware of the risk procedures within the firm. This is echoed by Ranong and Wariya (2016) in their study that recognized communication has one of the factors affecting risk management practice. Communication has a positive impact on time taken in risk management process.

Over the years, technology has been growing all over the world and hence need to understand its impact to the society (Novick, 2014). Some of these factors affecting risk management have been identified as Communication, Culture, Information technology, Training, Organization structure, Commitment from Management and Trust (Wariya and Ranoggi, 2009). However, the studies fail to highlight on how technology is playing a role in determining risk management practices. More so technology will lead to increased competition, higher performance levels, globalization and effective data management (Stoneburner & Feringa, 2012).

Earlier, studies established positive relationship between technology and risk management. But we need to identify to what extent will change in technology impact on risk management practices (Tuckett and Taffler, 2012*)*. Risk management can be determined by various factors and technology plays a key role (Wanjohi & Ombui, 2012). Among the factors that are influenced by the information technology comprise of risk associated with technology and internet penetration. This is one of the major risks that are changing the face of risk management practices. Technological risk will have an adverse effect on risk management by increasing the cost of carrying out risk management process (Ziemba &

Ziemba, 2008). Technological risk takes different forms from simple malfunction of computer, phis, to complex malicious act such as cybercrime. Organizations are losing billions of dollars through cyber-attacks especially financial institutions. Fund managers are prone to these attacks. Risk management practices are being streamlined to take in consideration the increased use of technology (IBM, 2011). Technology risk management programs are applied to control and minimize the risk environment.

Fund managers face various risks in their endeavor to meet the clients' target. Recently, technology advancement has led to change of the risk environment in the daily operations. The traditional risk management strategies have changed. Previously risk factors such as inflation, business risk, and financial risk were common (Tuckett & Taffler, 2012*).* But today technological risk is one of the major risks facing asset managers. Among these changes, cybercrime is the most common. Use of internet for malicious or exploitative purpose can be classified as cybercrimes (Chorafas, 2011). Normally computer crimes are very catastrophic and costly to the entity. The dynamics of risk management have changed to keep vigil of this criminal acts carried out by hackers. Some of the common changes are use of cyber security to curb this technological risk (Chorafas, 2011).

The nature of business managers requires the need to hold and manage rapidly increasing volumes of data. This data comprises clients' information, the market data, the asset portfolio and numerous bank account transactions (Nocco & Stulz, 2010). These require a complex data management strategy that may be outsourced or at times managed by the firm. This has in turn increased the risk management spectrum to the asset managers. Though cloud computing has made it easy to access data from the server with much ease (Novick, 2014). Risk management is highly boosted by the ability to identify this risk due

to availability of data (Chorafas, 2011). More so, monitoring of these data is becoming more efficient hence much more informed decisions are made. Thus, the process of risk management has lowered the time schedule and cost.

Communication is too enhancing risk management by reducing the information asymmetry. All fund managers are able to access the vital information for their daily transactions (Ziemba and Ziemba,2008). These new technologies also present huge risks, however, when these benefits are offset by data management hurdles and customers expressing dissatisfaction online for all to see. The responses on social sites can lead to negative publicity which may increase to reputation risk. Communication is too enhancing risk management by reducing the information asymmetry. All fund managers are able to access the vital information for their daily transactions. These new technologies also present huge risks, however, when these benefits are offset by data management hurdles and customers expressing dissatisfaction online for all to see. The responses on social sites can lead to negative publicity which may increase to reputation risk (Ziemba & Ziemba, 2008).

The counterpoint of risk is opportunity and technology innovation functions which can effectively manage their risks will enable their businesses to radically outperform those companies which are put off by or simply not up to the challenge (Tuckett & Taffler, 2012*)*. Companies where technology innovation feels empowered to influence commercial decision-making by demonstrating how business enablement can be driven by effective management of technology risks, will prosper greatly at the expense of those companies where ignorance or fear of new or changing technology risk areas either prevents them

from moving into new areas, or results in failures when they attempt to (Ziemba & Ziemba, 2008). This is the time for technology innovation leaders to step up and put themselves and their function at the center of driving their business forward (Kouns and Minoli, 2011). The computing and telecommunications industry had made some strides in development of personal computers that could process at a higher speed and memory. This was a boost to the financial sector. The processing of complex numerical solution and multivariate differential equations were made possible (Bodie, 2009).

2.5 The Relationship Between Risk Management Practices and Financial Performance

In today's fast-moving business environment, banks are exposed to a large number of risks: credit risk, liquidity risk, market risk, operational risk, interest rate exchange risk, etc. Due to such exposure to various risks, efficient risk management is required. Managing risk is one of the basic tasks to be done, once it has been identified and known. Shafiq and Nasr (2010), argue that managing a risk in advance is far better than waiting for its occurrence. The focus of good risk management is the identification and treatment of risks. Its objective is to add maximum sustainable value to all the activities of the organization IRM (2002). Risk management in the financial sector is very critical that all sectors of the economy. As the main objective of the institution is to maximize revenues and offer the maximum value to the shareholder. Therefore, risk management is essential to achieve the goal of wealth maximization (Al-Tamimi and Al-Mazrooei, 2017).

Empirical studies show differences in approaches to credit risk management when different contexts are considered (Kim & Ahn, , 2012). Nzuve, (2013), studied the relationship between credit risk management practices and financial performance of commercial banks

in Liberia and found out that market fundamentals and institutional factors such as lack of capacity for credit risk managers which results in the use of consultants by banks in formulating credit risk policies influence financial performance. The study concludes that variations in the credit policies are attributable to bank efforts to maintain threatened profit margins. Jordan Darell, (2012), examined the effect of credit risk management on financial performance found out that in spite of a large number of unpaid loans.

However, the number of the empirical studies on risk management practices in financial institutions was found to be relatively small. Linbo (2004) examined efficiency versus risk in large domestic USA banks. He found that profit efficiency is sensitive to credit risk and insolvency risk but not to liquidity risk or to the mix of loan products (Hahm (2004). Niinimaki (2004) found that the magnitude of risk taking depends on the structure and size of banks' risk Management in the market competition. Banks in this situation tend to take risks, although extreme risk taking is avoided. In contrast, introducing deposit insurance increases risk taking if banks are competing for deposits. In this case, deposit rates become excessively high, thereby forcing banks to take extreme risks. Wetmore (2004) examined the relationship between liquidity risk and loanstocore deposit ratio.

The main techniques used in risk management according to Al-Tamimi (2002) were establishing standards, credit score, credit worthiness analysis, risk rating and collateral. He also highlighted the willingness of commercial banks to use the most sophisticated risk management techniques in the study and recommended the adoption of a conservative credit policy. Oldfield and Santomero (2007) investigated risk management in financial institutions and suggested four steps for active risk management techniques.

It has become critical for bank managers and other stakeholders to understand the current determinants of financial performance towards attaining high profitability and good performance which ensures survival in business. Poor bank performance may lead to banking failure and crisis, which have negative consequence on the economic growth (Ongore and Kusa, 2013). Research was done by Maina and Muturi (2013) studied on financial structure, banks liquidity and operational efficiency on financial performance of commercial banks in Kenya and the moderating influence of ownership structure (foreign or local) on which a significant effect was established on financial structure and operational efficiency while an insignificant relationship on ownership structure and banks liquidity.

Schroeck (2002) and Nocco and Stulz (2006) stress the importance of good risks Management practices to maximize firms' value. In particular, Nocco and Stulz (2006) suggest that effective enterprise risk management (ERM) have a long-run competitive advantage to the firm (or banks) compared to those that manage and monitor risks individually. It is, therefore suggested that firms should manage risks strategically by viewing all the risks together within a coordinated manner. This is the view shared by this study. In relation to this, Stulz (1996) associates good risk management practices with the elimination of costly lower tail outcomes by proposing full-cover risk management as compared to selective risk management.

Ben-Naceur and Omran (2008) examine the influence of bank regulations, concentration, financial and institutional development on commercial banks' margin and profitability of commercial banks and was found that bank capitalization and credit risk have positive and significant impact on banks' net interest margin, cost efficiency and profitability. Felix and Claudine (2008) investigate the relationship between bank performance and credit risk management. It could be inferred from their findings that return on equity (ROE) and return

on assets (ROA) both measuring profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability. Kithinji (2010) assesses the effect of credit risk management on the profitability of commercial banks.

Company motives for managing financial risks are the same as those for employing a risk management, as financial risks are a subgroup of the company's risks. One of the main motives is to reduce the instability of earnings or cash flow due to financial risk exposure (Dhanini, 2007). The reduction enables the firm to perform better forecasts (Drogt & Goldberg, 2008). This will help to guarantee that sufficient funds are available for the company for investment and dividends (Ammon, 2018). Another reason for management of financial risks is to avoid financial distress and the costs connected with it (Triantis, 2010; Drogt & Goldberg, 2008). Lastly also management own-interest of stabilizing earnings or the objective to keep a constant tax level can be motives for financial risk management (Dhanini, 2017). Depending on which of the arguments is in the focus of the company, the risk management can be structured. The focus is either on minimizing volatility or avoiding large losses (Ammon, 2008).

2.6 The mediating role of risk management practices on the relationship between technology innovations and performance

Ashoori and Teymouri (2010) in their study on the technology innovation impacts on risk management with an aim of improving the performance of commercial. Valid information is an important factor that leads to business success (Wondimu, 2013). The study further emphasizes the importance of risk management in strategic management of the organization by controlling the threads (Sarji, 2017. Information technology impact on risk management was summarized into three components mainly cost, time, and performance. It concluded that there is a positive impact of information technology on risk management especially in optimizing time of process rather than cost and performance (Rono and Bittok, 2010).

Banking institutions must play a catalytic function to develop technological innovation-driven economy. The experience of developed countries has evidently demonstrated that a shift of government's industrial policy-making towards a technological innovation-driven economic strategy is absolutely critical. Allegedly successful industrial policy performs an important function in fostering firms to inculcate a culture-based spirit of innovation and addresses firms' concerns in the realm of innovation pursuits (Goh, 2002).

Stoneburner and Feringa (2012), risk management as the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level. To identify the risk in organizations, risk assessment is used to determine the extent of the potential threat, vulnerabilities, and the risk associated with an information technology system (Maingi and Wanjiru, 2013). Firms that offer products that are adapted to the needs and want of target customers and that market them faster and more efficiently than their competitors are in a

better position to create a sustainable competitive advantage (Wang et al, 2003). Competitive advantage is increasingly derived from knowledge and technological skills and experience in the creation of new products (Yasuharu, 2003; Tidd, 2001

Today's business environment is extremely vigorous and encounters quick changes as a consequence of creativity, universal competition, rapid disseminating of knowledge, continual technology advancement, innovation, increased consciousness and demands from customers (Agbolade, 2011; Talegeta, 2014). Thus, business firms, specifically the banking industry, are required to react rapidly to the dynamics of quick changing customers' anticipations (Nigussie, 2015; Grima *et al.,* 2016; Grima and Caruana, 2017). Hence, to be able to remain alive and surpass in this fierce universally competitive market, every bank must embrace ICT in its business operations to enhance the efficiency and effectiveness of services provided to customers, ameliorate business processes, as well as to improve managerial decision making and working group cooperation's (Luka and Frank, 2012; Adesola *et al.,* 2013; Thalassinos *et al.,* 2012).

Various studies have revealed converting the banking system from traditional to automated based have promote support in business operations and aid as competitive advantage for realizing higher efficiency; branch productivity; control of operations; customer service; accurate fund transfer; risk management; maintaining customer; real time information system; diminishing human errors; diminution of branch offices; lessening the number of branch staff, enhancement in service delivery; and minimizing of cost by substituting paper based and labor intensive methods with computerized processes (Aliyu *et al.,* 2012). This will enhance the performance of banks, reducing the costs, and rising profits (Sumra *et al.,* 2011; Kosinova *et al.,* 2016; Japparova and Rupeika-Apoga, 2017).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the research design, study population, sampling techniques and procedures, data collection methods, data collection instruments, validity and reliability, procedures of data collection, data analysis and measurement of variables and the ethical considerations.

3.1 Research Design

A cross sectional survey design adopted which was utilized a quantitative approach. This was used largely because it helps to collect data to make inferences about the population of interest at one point in time. In addition, the time horizon with in which the study was conducted necessitated the adoption of the cross-sectional design. The quantitative research approach enhances a statistical illustration of the relationship between the variables of technology innovations, risk management practice and financial performance of commercial banks.

3.2 Study Population

The collection of all elements of interest to the researcher to enable her carry out an investigation refers to study population. The population study composed of 24 Commercial banks; these banks are selected because of their declining financial performance (Bank of Uganda annual report, 2016).

3.3 Sampling size and technique

A sample is the element within the study population that takes part in the study. Therefore, the sample size of 24 commercial banks was considered according to Yamane's sample calculation (Yamane, 1967). This is because the population under the study is finite. The researcher used a convenience sampling technique to choose respondents. Convenience sampling is adopted so as to collect data from conveniently available pool of respondents. The unit of analysis was a commercial bank, the unit of inquiry was bank staff excluding support staff. This was because these respondents were expected to be having enough experience and important knowledge about the concepts under the study and being the staff in the actual bank activities.

3.4 Data Collection tools

According to Creswell (1994) data collection methods and instruments help researchers in taking large amounts of data, reducing it to significant classes, forms, subjects and interpreting the information. The researcher used a self-administered questionnaire in order to collect data about the concepts under the study. According to Abawi (2013) questionnaires contain a chain of questions and prompts for purpose of obtaining data from research participants. According to Sakaran (2003) a self-administered questionnaire method is not costly, permits anonymity, may result in more honest answers and that issues can be clarified in the process of collecting data.

3.5 Data processing and Analysis

Data was collected from the field using questionnaires, edited, sorted and coded to develop feel for the data. Statistical package for social scientists (SPSS) v 20 was used to analyze the data from the field, this used to derive descriptive and inferential statistics on the data.

For inferential statistics, correlation was be applied to determine the relationships between the study variables. Other statistical tools such as regression was be used to examine the predictive power of independent variables on the dependent variable.

3.6 Validity and Reliability

3.6.1 Validity

Mugenda and Mugenda (2003) cited by Obbuyi (2011), validity is the meaningfulness and accuracy of information, based on the research results. He further says that validity is the degree or extent of accuracy of results obtained from analysis of data which represent the actual situation under study. Amin (2005) defines validity as appropriateness of data collection instruments to measure whatever it is supposed to measure. To attain validity, the researcher subjected the data collection instrument to scrutiny from practitioners, experts and supervisors.

3.6.2 Reliability

According to Mugenda and Mugenda (2003) reliability is a measure of the degree to which a research instrument yields or gives consistent results or data after repeated trials. Gay (1996) the Cronbach's Alpha coefficient should be 0.7 or above for the instrument to be used.

Table 3.0: Measurement of variables

Reliability

Variable	No of items	Cronbach's Alpha
Technology Innovation	16	0.845
Risk Management Practices	15	0.756
Financial Performance	18	0.897

Source: Primary Data

3.8 Measurement and operationalization of Variables

The items in the questionnaires were linked to a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). This helped the respondents to rate their responses against given items on the various measures. The measures included the following:

Technology innovation was measured by Automated teller machine, Telephone banking, Internet banking and Mobile banking technologies as developed by Mengesha, and Common (2007). The items on the constructs were linked to a five-point Likert scales to evaluate the respondent's views where 1 is strongly disagree response and 5 is strongly agree.

Risk management practices was measured by risk identification, risk measurement and risk monitoring as developed by Jones, McCarthy, & Hawali, L. (2010) and Leung, (2012). The items on the constructs were linked to a five-point Likert scales to evaluate the respondent's views where 1 is strongly disagree response and 5 is strongly agree.

3.9 Financial Performance was measured in terms of profitability, liquidity and solvency as developed by James Neelankavil, Debra. Comer, (2007). The items on the constructs were linked to a five-point Likert scales to evaluate the respondents' views where 1 is strongly disagree response and 5 is strongly agree.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF FINDINGS

4.0 Introduction

This chapter presents the results/findings of the study, their analysis and interpretation. The presentation of findings focuses on descriptive statistics of the demographic characteristics of the respondents, correlation analysis that focused on establishing the relationship between study variables, and regression analysis to establish the predictability of one variable over the other variable. These were reported based on the study objectives;

4.1 Demographic characteristics of the Respondents

The researcher established the demographic characteristics of respondents such as respondents' gender; age; marital status; level of education and experience. These were presented in the table below;

Table 4.1: Demographic Characteristics of Respondents

Variable/Item	Frequency	Percentage
Gender: Male	102	51.7
Female	97	48.3
Age: 20-25 Years	87	44.3
25-30 Years	72	35.8
30-35 Years	25	12.4
35-40 Years	8	4.0
40 Years Above	7	3.5
Marital Status: Single	106	53.7
Married	77	38.3
Divorced	16	8.0
Education: Diploma	17	8.5
Degree	145	73.1
Postgraduate	17	8.5
Masters	20	10.0
Experience: 1-2 Years	59	29.4
2-4 Years	65	33.3
4-6 Years	46	22.9
Above 6 Years	29	14.5
Total	**199**	**100**

Source: Primary Data

According to the findings in the table above, majority respondents were men which implies that the banking sector in Uganda is still dominated by men which gives them an upper hand to be exposed to technology and risk management abilities than women. The table indicates that majority of respondents are between the age of 20-35 years which shows that more innovations and risk abilities based on current banking problems can be exploited by a young and energetic workforce. The marital status of the respondents shows that majority staffs in the banking sector are single people with little or no stressors that may divert their innovative abilities to other responsibilities. Of the 201 respondents, the table shows that at least more than 145 staff had attained their bachelor's degree which implies that the workforce is able to adopt new technological innovations and can be trained to manage risks. Lastly, at least more than 65 staff had 2 years' experience working in the same bank.

4.3 Correlation Analysis

The researcher conducted a Pearson's correlation coefficient analysis to establish the relationship between the study variables (Independent and dependent variables). The purpose for carrying-out this analysis was to evaluate where there existed a relationship between independent variable and dependent variable.

Table 4.2. Correlation Analysis

Correlations

	1	2	3	TI	4	5	6	RMP	7	8	9	FP
Automated Teller Machine (1)	1											
Internet Banking (2)	.728**	1										
Mobile Banking Technologies (3)	.549**	.561**	1									
Technology Innovation (TI)	.864**	.854**	.858**	1								
Risk Identification (4)	.497**	.500**	.341**	.506**	1							
Risk Analysis (5)	.530**	.529**	.418**	.563**	.407**	1						
Risk Management (6)	.595**	.600**	.490**	.644**	.494**	.605**	1					
Risk Management Practices (RMP)	.656**	.659**	.501**	.692**	.795**	.831**	.821**	1				
Profitability (7)	.312**	.293**	.233**	.320**	.270**	.251**	.207**	.302**	1			
Liquidity (8)	.246**	.222**	.241**	.277**	.222**	.289**	.248**	.311**	.767**	1		
Solvency (9)	.299**	.275**	.218**	.302**	.205**	.284**	.214**	.290**	.800**	.834**	1	
Financial Performance (FP)	.305**	.281**	.248**	.320**	.247**	.296**	.240**	.323**	.910**	.936**	.947**	1

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

Source: Primary Data

4.3.1 Relationship between technology innovation and financial performance

The correlation results in table above shows that there is a significant positive relationship between technology innovation and financial performance (r= .320**, P<.01). This suggests that when there is an increase in technological innovation then the financial performance of the bank will also increase and vice versa. This implies that a significant increase in automated teller machines; internet banking and mobile banking technologies, positively correlates with a significant increase in financial performance (bank profitability, liquidity and solvency).

4.3.2 Relationship between technological innovation and risk management

The correlation results in table above shows that there is a significant positive relationship between technological innovation and risk management (r= .692**, P<.01). This suggests that when there is an increase in technological innovation then the risk management of the bank will also be improved and vice versa. This implies that a significant decrease in

automated teller machines; internet banking and mobile banking technologies, positively correlates with a significant increase in risk identification, risk analysis and risk monitoring.

4.3.3 Relationship between risk management practices and financial performance

The correlation results in table above shows that there is a significant positive relationship between risk management practices and financial performance (r= .323**, P<.01). This suggests that when there is a positive increase in risk management practices then the financial performance of the bank will also increase and vice versa. This implies that a significant increase in risk identification, risk analysis and risk monitoring positively correlates with a significant increase in bank profitability, liquidity and solvency.

4.4 Regression analysis

The researcher carried-out a regression analysis to establish the predictability of technological innovation and risk management practices over financial performance of the bank.

Table 4.3. Showing Regression Analysis of technological innovation, risk management practices and financial performance.

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.716	.323		5.305	.000
	Technology Innovation	.224	.111	.186	2.008	.046
	Risk Management Practices	.208	.099	.194	2.097	.037
R		.350				
R Squared		.122				
Adjusted R Square		.133				
F		13.653				
Sig.		0.000				

Dependent Variable: FinancialPerformance1

The results in the above table indicate that risk management practices are a significant predictor of financial performance of the bank. This implies that an increase in increase in risk identification, risk analysis and risk monitoring affects bank performance by an increase. The table indicates that the two predictor variables (technology innovation and risk management practices) predict 11.3% of the bank financial performance (Adjusted R Square = .113). However, risk management practices are a stronger predictor with a beta value of .194 which implies that one unit increase in risk management practices increases bank financial performance by .194.

4.5 Mediation effect of risk management practices on the relationship between technology innovation and financial performance

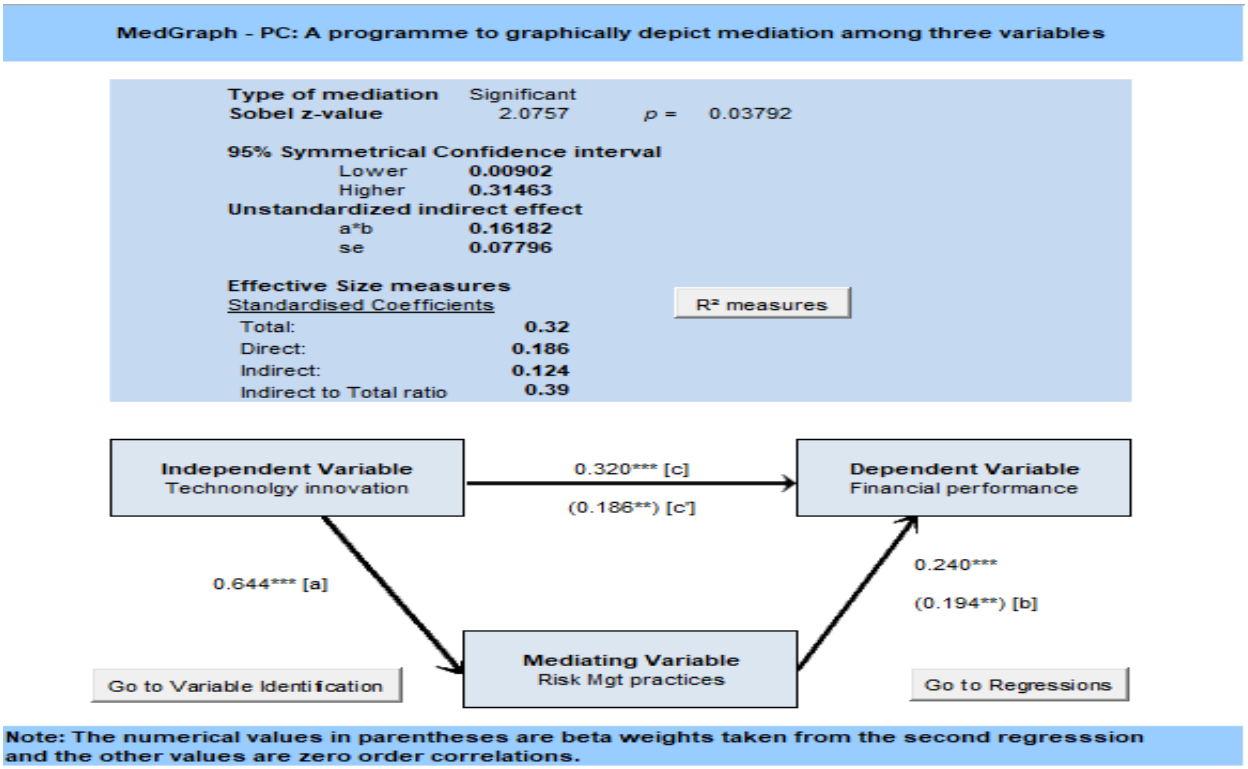
The results in Table 4.8 and Figure 4.1 shows that the Baron criteria for establishing mediation effects have been met. First, technology innovation accounts for a significant proportion of variance in financial performance ($\beta = 0.320$, $p < 0.01$). Second, technology innovation accounts for a significant proportion of variance in risk management practices ($\beta = 0.644$, $p < 0.01$). Third, risk management practices accounts for a significant proportion of variance in financial performance ($\beta = 0.240$, $p < 0.01$). Last, the absolute effect of technology innovation on financial performance reduced from $\beta = 0.320$ to $\beta = 0.186$. Thus, all conditions have been met, thereby establishing risk management practices as a true mediator in the relationship between technology innovation and financial performance. A further step was taken to test the significance of the mediation effect. In order to do this, a Sobel z-value was generated through a MedGraph. The results in Figure 4.1 (MedGraph) indicates a significant Sobel z-value 2.0757 ($p < 0.05$). The Figure 4.1 further shows that when risk management practices is introduced, the standardized beta (β) for the relationship between technology innovation and financial performance reduces from $\beta = 0.320$ to $\beta =$

0.186. This confirms that risk management practices partially mediate the relationship between technology innovation and financial performance. A ratio index (i.e., indirect effect/total effect) of 39%. This indicates that 39% of the effect of technology innovation on financial performance via risk management practices, while the 61% is a direct effect.

Table 4.4. Mediation test results

Predictor	**Model 1: Risk management practices**			**Model 2: Financial performance**		
	B	**SE**	**Beta**	**B**	**SE**	**Beta**
Constant	0.898	0.224		1.716	0.323	
Technology Innovation	0.778	0.052	0.644**	0.224	0.111	0.186**
Risk management practices				0.208	0.099	0.194**

Figure 4.1: MedGraph-PC: Mediation effect of risk management practices on the relationship between technology innovation and financial performance



CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents a discussion, conclusions, recommendations based on the findings in relation to the objectives of the study which were to examine: To analyze the relationship between technology innovations and financial performance of commercial banks in Uganda. To examine the relationship between technology innovations and risk management practices of commercial banks in Uganda. To establish the relationship between risk management practices and financial performance of commercial banks in Uganda. To determine mediating role of risk management practices on the relationship between technology innovations and performance of commercial banks in Uganda. The chapter also highlights specific recommendations in line with the research objectives, methodological limitations of the study and areas for further research.

5.1 Discussion

5.1.1 Technology Innovations and Financial Performance

The finding found is significant negative relationship between technology innovation and financial performance. This postulated that when there is a decrease in technological innovation then the financial performance of the bank will also decrease and vice versa. This implies that a significant decrease in automated teller machines; internet banking and mobile banking technologies, negatively correlates with a significant increase in financial performance (bank profitability, liquidity and solvency). These findings are consistent with numerous earlier studies such as; Hence, Barua and Whinston (2008) and Barua et al. (2016) argue that technology innovation is complementary to organizational characteristics and processes, and that investments in technology innovation are less likely to succeed if

done in isolation. Devaraj and Kohli (2010) showed in 2000 that technology innovation investments contribute to a higher level of revenue when combined with BPR initiatives. Similarly, Akujinma (2017), asserts the banking sector in the developing economy like Uganda is strengthened due to financial technological innovations in various payment methods/systems, such as the use of automated teller machines, mobile banking, and electronic banking. This technological progress can increase competition in the banking sector as the numbers of institutions can also increase. Many studies have found a positive relationship between financial innovation products and enhanced bank efficiency, as well as profitability. Agboola, (2006) adds that, technology innovations directly affect how managers decide, how they plan and what products and services are offered in the banking industry. It has continued to change the way banks and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery in commercial banks.

5.1.2 Risk Management Practices and Financial Performance

The findings obtained that a significant negative relationship between risk management practices and financial performance. This suggested that when there is a decrease in risk management practices then the financial performance of the bank will also decrease and vice versa. This implies that a significant decrease in risk identification, risk analysis and risk monitoring negatively correlate with a significant increase in bank profitability, liquidity and solvency. Our research findings are in line with those of Mwiya (2010), who argue that, without proper risk management framework in the commercial banks' profitability is unthinkable. Also, these findings are also consistent with the corporate risk management theory developed by David Pyle in 1975. He lauded that to ensure survival of

a financial institution there should be a proper risk management framework. Arunkumar and Kotreshwar (2005) lauded that bank which engages in proper risk management practices survived financial crisis and had competitive edge in the market in the long run. The findings were further supported by Shafiq and Nasr (2010) who postulated that managing a risk in advance is far better than waiting for its occurrence: prevention is better than cure. This follows that the financial institutions should proactively identify the risks, assess them, mitigate, communicate and monitor risk management practices. From the aforementioned, there is contradictory evidence to explain how risk management practices influence financial performance. It is therefore likely that the findings herein are bound to raise more empirical studies about the same.

5.1.3 Technology Innovations and Risk Management Practices

This study obtained a significant positive relationship between technological innovation and risk management. The findings postulate that when there is an increase in technological innovation then the risk management of the bank will also be improved and vice versa. This implies that a significant decrease in automated teller machines; internet banking and mobile banking technologies, positively correlates with a significant increase in risk identification, risk analysis and risk monitoring. According to the researcher, technological innovations Innovation must be part of any bank's DNA if it is to survive and thrive in a fast-moving business environment. The relationship between technology innovation and financial performance by this study, further highlights the importance of integrating technology innovation efforts with risk management, understanding that setting strategic objectives without thinking through the business risks could curtail such objectives. Instead of performing risk management in a vacuum, leading companies embed risk management

into technological innovation process. These findings are in line with the empirical studies of Davis et al. (2002) which postulated that technology innovation decreases time of processes in risk management by helping to follow the matters systematically. Worth to note, the potential impact of technology innovation on risk management can be demonstrated by how technology innovation can streamline risk-management compliance. In the past, most risk regulators in commercials relied on paper-based or semi-electronic report submissions to manage banks' risk appetite.

To sum up, this study provides contextual evidence in support of technological innovations as far as enhancing risk management is concerned. As such, it provides important policy and managerial implications by providing a justification for integrating technology innovations in to risk management practices in commercial banks.

5.1.4 Mediation Effect of Risk Management Practices on The Relationship Between Technology Innovations and FINANCIAL Performance of Commercial Banks in Uganda

It was established in this study that; risk management practices mediate the relationship between Technology Innovations and financial Performance of commercial banks. This meant that that risk management practices facilitates the relationship between technology innovations and financial Performance in commercial banks. In the same context, the study shows that, considering the use of risk management practices (risk identification, risk analysis and risk monitoring) that come with technology innovation will increase on the financial performance of the bank. This is in agreement with the studies of Ashoori and Teymouri (2010) who asserts that, technology innovation impacts on risk management with an aim of improving the performance of commercial. Valid information is an important factor that leads to business success (Wondimu, 2013). The study further

emphasizes the importance of risk management in strategic management of the organization by controlling the threads (Sarji, 2017. Information technology impact on risk management was summarized into three components mainly cost, time, and performance. It concluded that there is a positive impact of information technology on risk management especially in optimizing time of process rather than cost and performance (Rono and Bittok, 2010).

5.2 Conclusion

Herein, it has been clarified that technology innovations influence risk management practices in commercial banks. This confirms to us that technology innovations are profoundly altering internal operations and delivery of financial services in commercial banks to impact their financial performance. Our research also unearths those technological innovations impacts risk management. The research findings tell that the integration of technology innovations in Risk management practices is paramount in commercial banks because it helps them address the unknowns and position themselves to mitigate them more efficiently.

Risk management practices and financial performance were found to be interlinked. This suggested that when there is a decrease in risk management practices then the financial performance of the bank will also decrease and vice versa. This implies that a significant decrease in risk identification, risk analysis and risk monitoring negatively correlate with a significant increase in bank profitability, liquidity and solvency.

This research revealed a mediation effect of risk management on the relationship between Technology Innovations and Financial Performance. this implies that considering the use of risk management practices (risk identification, risk analysis and risk monitoring) that come with technology innovation will increase on the financial performance of the bank.

5.3 Recommendations

Owing to the positive relationship between technology innovations and financial performance of Commercial Banks. It is recommended to the bank management to regularly conduct system checks to avoid breakdown of the ATM machines which helps decongest the banking halls. It is recommended that the management conducts a market survey to ensure that the credit card services being offered are acceptable in major shops and organizations are also embracing the use of new technological innovations. It is also recommended that the bank management ensures that internet banking is fully secured with encrypted passwords to avoid hacking of important information for the clients.

The findings revealed that technology innovation and affect risk management in commercial banks. Another action is the implementation of strategies to improve the institutions' financial performance measured by ROA. These strategies include obtaining higher margins from non-interest related activities, acquiring profits from assets.

The banks must be focused in terms of their needs and using the right technology to achieve goals, rather, than acquiring technology because other banks have it. Government participation in ensuring focused telecommunication industry must be visible to reduce or remove avoidable costs of implementing e-commerce and internet banking. Regulatory authorities like the banks of Uganda must stipulate standards for the banks to follow to avoid making Uganda's Banking Sector a dumping ground for the outdated technological infrastructure as this will encourage more technological innovations.

Training and Manpower development is another major problem militating against the growth of technology innovation in the country. Government must make right IT policy by ensuring that Computer, Communication equipment and other IT infrastructures to a large extent are manufactures in the country so that our people can acquire first hand necessary

skills. Government Policy that will guide against Money laundering, fraud and Security risks posed by technology innovation are inevitable.

To counter the legal threat and security posed to net banking and e-commerce, the necessary legal codes backing the industry must be established; this will enhance the growth of the industry.

5.4 Limitations of The Study

This study was only conducted within commercial banks in Kampala -Central Region. Even then, this study focused on specific branches where respondents were selected. As such, the findings obtained in this study cannot inform how the studied variables from the perspective of banks or financial institutions in rural Uganda.

Some of the targeted study participants declined to divulge information by not responding to the questionnaires sent to them. There is a possibility that some crucial information may have been missed from the non-respondents thus introducing a response bias in the current study.

This study was a cross-sectional research design, which meant that the results upon which interpretation was based was obtained just once or in a snapshot. Therefore, the relevance of the study findings over a long period cannot be guaranteed because the changes overtime regarding the studied variables were not captured herein.

The other limitation was that some respondents gave biased responses considering the fact that the study was targeting individual who are busy with their work. The researcher counteracted this limitation by designing anonymous and neutrally worded questions where the Likert scale was limited to only four choices from which a respondent would

choose. This ensured that the respondents take a stand and eliminate unbiased responses related to their indecisiveness

5.5 Areas for Further Study

Following the findings from this research study, the researcher proposes the following as areas for further research: -

The study was cross sectional so we should see how to take a longitudinal to establish trends over a long period of time.

There is need to look at a qualitative study on financial performance of commercial banks in Uganda.

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APPENDICES

APPENDIX 1: APPENDIX 1: QUESTIONNAIRE

MAKERERE UNIVERSITY

MAKERERE UNIVERSITY BUSINESS SCHOOL

QUESTIONNAIRE ON TECHNOLOGY INNOVATION, RISK MANAGEMENT PRACTICES AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN UGANDA

Dear Respondent,

I am a student of Makerere University Business School Pursuing Master of Business administration. I am collecting data for my dissertation. The main objective of the study is to investigate the relationship between **Technology innovation, risk management practices and financial performance of commercial banks in Uganda**. I assure you that the data will be strictly kept confidential and only used for academic purposes. To ensure anonymity, you are not supposed to write your name in the questionnaire.

Kindly spare **15-30** minutes to answer the questions and provide the valuable information following the directions in the questionnaire.

SECTION A: BACKGROUND INFORMATION

1) Gender: Male ☐ Female ☐

2) Age

20-25 years ☐ 25-30 Years ☐ 30-35 Years ☐ 35-40 years ☐

40 years and above ☐

3. Marital Status

Single ☐ Married ☐ Divorced ☐

4) Level of education

Diploma ☐ Degree ☐ Post Graduate ☐ Masters ☐

5) How long have you been working in the bank

1-2 year ☐ 2-4 Years ☐ 4-6 Years ☐ Above 6 Years ☐

SECTION B: TECHNOLOGY INNOVATION

Strongly Disagree (S.D)	Disagree (D)	Not Sure (N.S)	Agree (A)	Strongly Agree(S.A)
1	**2**	**3**	**4**	**5**

ITEM		SCORES				
	Automated Teller Machine	SD	D	NS	A	SA
1	ATMs influence reduction of operational costs and hence better return on assets for the bank	1	2	3	4	5
2	ATMs investment have payback period of less than 3 years and hence good return on assets	1	2	3	4	5
3	Incomes from ATMs have had positive impact on bank income margins	1	2	3	4	5
4	Investment in ATMs in mostly motivated by profits to the bank	1	2	3	4	5
5	ATMs have low maintenance costs lading to high levels of profitability over their economic lifetime	1	2	4	4	5
6	The use of ATM encourages balance enquiry	1	2	3	4	5
	Internet Banking					
1	Internet banking influence reduction on costs	1	2	3	4	5
2	The internet banking encourages better return on assets for the bank	1	2	3	4	5
3	Internet banking investment have payback period of less than 3 years and hence good return on assets	1	2	3	4	5
4	Income from internet banking have had positive impact on bank	1	2	4	4	5
5	Internet banking encourages balance enquiry to customers	1	2	3	4	5
	Mobile Banking Technologies					
1	Mobile banking influence reduction of operation costs and hence better return on assets for the bank	1	2	3	4	5
2	Mobile banking investment have payback period of less than 3 year and hence good return on assets	1	2	3	4	5
3	Income from mobile banking have had positive impact on bank in come margins	1	2	3	4	5

4	The use of mobile banking has increased customer access to bank services.	1	2	3	4	5
5	The use of mobile banking has led to more bank innovations	1	2	4	4	5

SECTION C: RISK MANAGEMENT PRACTICES

Strongly Disagree (S.D)	**Disagree (D)**	**Not Sure (N.S)**	**Agree (A)**	**Strongly Agree (S.A)**
1	**2**	**3**	**4**	**5**

ITEM		**SCORES**				
	Risk identification	SD	D	NS	A	SA
1	Risks and other threats can be hard to eliminate but when they have been identified, it is easier to take actions and have control over them.	1	2	3	4	5
2	The bank management team organizes brainstorming meetings for the staff to generate ideas about risks.	1	2	3	4	5
3	The bank managers use questionnaires to solicit ideas about important banks risks	1	2	3	4	5
4	Risks are identified by interviews with experienced bank managers and experts in the field of risk management	1	2	4	4	5
5	This bank has a risk register which contains all the risks, potential responses and the root cause of the bank risks.	1	2	3	4	5
	Risk analysis					
1	Effort is undertaken to assess the impact of the identified risks in the bank	1	2	3	4	5
2	The organization's effort is undertaken to adequately establish the consequences of identified risks to achieve the bank objectives	1	2	3	4	5
3	Effort is undertaken to collect data about the potential risks which are analyzed	1	2	3	4	5
4	My organization prioritizes risks according to how quick response they require	1	2	4	4	5
5	Risks have bank supervisors to monitor the development of responses	1	2	3	4	5

	Risk Monitoring					
1	External audits are conducted to ascertain if the risk management process in the organization fulfills the banks risk management objectives.	1	2	3	4	5
2	Risk responses are promptly implemented in this bank	1	2	3	4	5
3	Management of this bank regularly institutes special investigations to ascertain if the risk management processes are observed.	1	2	3	4	5
4	The bank supervisors always discover new risks, keep track of identified risks and eliminate past risks from risk assessment	1	2	3	4	5
5	The bank manager regularly updates the risk register	1	2	3	4	5

SECTION D: FINANCIAL PERFORMANCE

	ITEM	**SCORE**				
No.	**PROFITABILITY**	**SA**	**A**	**D**	**SD**	
1	Overall, business gross profit has grown in the past two years.	1	2	3	4	5
2	The gross profit margin has been stable since the last 6 months	1	2	3	4	5
3	We are able to fund business growth from retained profits of last year	1	2	3	4	5
4	We budget to forecast costs and revenues to meet monthly operations	1	2	3	4	5
5	Maximum profits rather than maximum sales is our key objective	1	2	3	4	5
6	Overall financial performance and future outlook is encouraging	1	2	3	4	5
7	Maximum sales rather than maximum profits is our main objective	1	2	3	4	5
	LIQUIDITY					
1	We have been meeting sales targets or expectations since last year	1	2	3	4	5
2	Customer base has steadily been increasing since last year	1	2	3	4	5
3	Overall financial performance and future outlook is encouraging	1	2	3	4	5
4	We are able to fund business growth from retained profits	1	2	3	4	5
5	We budget to forecast costs and revenues to meet monthly operations	1	2	3	4	
	SOLVENCY					
1	Good financial management and sound financial decisions	1	2	3	4	5
2	Generates enough cash over thirty or sixty days to pay bills time period	1	2	3	4	5

3	Generate enough resources to cover expenditures over a normal budget cycle	1	2	3	4	5
4	Provides adequate services to meet welfare needs	1	2	3	4	5
5	Balance revenues and spending, meet future obligations, and handle unknown financial challenges in the long run	1	2	3	4	5
6	Fiscal crises is expected	1	2	3	4	5

THANK YOU

APPENDIX II: KREJCIE & MORGAN TABLE FOR SAMPLE SIZE SELECTION

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.