# MEDIATING EFFECT OF FINANCIAL INNOVATION ON THE RELATIONSHIP BETWEEN ORGANIZATIONAL CAPITAL AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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**A Thesis Submitted to the Institute of Postgraduate Studies of Kabarak University in Partial Fulfillment of the Requirements for the Award of Doctor of Philosophy in Business Administration (Finance).**

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This thesis entitled Mediating Effect of Financial Innovation on the Relationship Between Organizational Capital and Financial Performance of Commercial Banks in Kenya" by Virginia Kirigo Wachira is presented to the Institute of Postgraduate studies of Kabarak University. We have reviewed this thesis and recommend that it be accepted in the fulfilment of the requirement for the award of Doctor of Philosophy in Business Administration (Finance).


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## DEDICATION

This thesis is dedicated to God almighty for His faithfulness upon my life. To my husband Stephen, who has been an inspiration throughout the hard period of putting together this piece of work. Thank you very much for your encouragement, prayers, and support. God bless you. To my wonderful daughters, Esther, Joyce and Carol, thanks for being there for me. You are amazing.

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# ABSTRACT

The purpose of the study was to investigate the mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. Purposely the study sought to examine the relationship between financial knowledge and expertise and financial performance of commercial banks in Kenya. It also evaluated the relationship between financial business process and practice and financial performance. Assessment of the relationship between human capital and financial performance and assess the mediating effect of financial innovation on the relationship between organizational capital and financial performance of commercial banks was done. A census survey was carried out on all the 41 licensed commercial banks in Kenya. Out of the 123 respondents that were targeted, all responded constituting a response rate of 100%. Hypotheses were tested using a combination of multivariate techniques, including regression analysis, chi-Square, RMSEA, GFI and NFI to address the mediating effect as well as model complexity, estimating constructs and latent variable scores. The findings found that financial knowledge and expertise had a positive relationship with the financial performance of commercial banks There was a strong positive relationship between the financial business process and financial performance of commercial banks. This implies that organizational capital leads to enhanced financial performance. The results also revealed that there was a significant positive relationship between human capital and financial performance of commercial banks. The study confirmed that the combined effect of financial innovation (ATMs, internet banking, Mobile banking and Debit cards) mediated the relationship between organizational capital and financial performance of commercial banks. This study contributes to understanding the mediating effect of financial innovation and financial performance as well as confirming the finding of previous studies that have found a significant link of mediating effect of financial innovation and financial performance of commercial banks. The study used T statistical tests which indicated that financial innovation had a mediating effects effect on organizational capital and financial performance ($\beta$=0.378, $p<0.05$). The study also brings out that increased understanding of financial knowledge and expertise can enhance financial performance of Commercial Banks. Firms should strengthen their financial business process and practice since it plays a significant role in channeling funds to the industries as well as contributing towards economic, financial growth and stability. Financial institutions like banks can also enhance financial performance by building on their human capital through customer relations, employee relations and increased customer loyalty. Several financial performance parameters such as Return on Assets (ROA) and Earnings Before Interest and Tax (EBIT) were used to measure the financial position for the commercial banks. Liquidity preference Theory, Diffusion of Innovation Theory and Transaction Cost Theory guided this study. The study was carried out in Nairobi's since over all of the Commercial Banks head offices are based in Nairobi. The study respondents were the bank operation managers, credit managers and transactional banking manager. A self-administered and open-ended questionnaire was used to collect primary data while secondary data was obtained through documentary analysis of audited published financial statements.

**Keywords:** *Organizational capital, Financial innovation, Financial performance Mediating Effects and financial Performance.*

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# OPERATIONAL DEFINITION OF TERMS

**Commercial Bank Performance:**  Commercial bank performance was taken as an indicator that plays the key role in the economy of the world and provides services that need to be understood as the increased mobilization of deposits (Njigo, Oluoch & Ndambiri. 2018). This definition was adopted for this study. The commercial banks performance was assessed based on the Banking Sector Quarterly Report Ended 31$^{st}$ March, 2018 which is the largest of the Kenyan financial sector.

**Commercial Banks:** Commercial banks are defined as financial institutions which provide banking services, such as accepting the deposits, lending loans and offering basic investment products. They also offer a range of banking products and services which include transfer of funds, collection of funds and payments of various items including insurance premium bills as per the direction of the customers (Musau, Muathe & Mwangi, 2018). In order to carry out this study in the Kenyan context Commercial Banks was banks regulated by the Central Bank of Kenya (CBK, 2018).

**Financial Business Process:** refers to a sequential set of tasks that takes a set of information to a finish state. It is the degree to which organizational capital enable current companies to protect their business models from disorderly technologies. This study refers financial business processes as one of the organizational capital components that are not easily mimicked by competitors such as financial knowledge of information system, experience in financial system and financial information.

**Financial innovation:** is defined as a collective, open-ended activity aimed at the creation and implementation of new appropriate products or processes in order to generate significant economic benefits and other values. Financial innovation refers to new applications of reduced costs, reduced risks, and provides ideas, methods, and skills which can generate unique products, services and instruments that influence an organization's competitiveness and improved financial performance (Hu &Xie, 2016). This study adopted this definition with ATMs, Internet Banking, Mobile Banking and Debit Cards as the innovations on focus.

**Financial Knowledge:** can be defined as the ability to understand effectively and use of various financial skills, including financial management generated with the firm through formal processes of knowledge integration, and can be used by the employees in the organization (Sott, 2010). This study refers financial knowledge as the knowledge generated within the company through formal process to understand the relationship between knowledge of organizational financial issues and equivalent financial behavior that is increasingly recognized as an area of critical financial importance.

**Financial Performance of Banks:** Refers to the act of performing financial activity. It is the degree to which financial objectives have been accomplished hence the process of measuring the result of banks operations and monetary terms (CBK, 2017). This study referred financial performance of the banks as one of the economic performance that is measured by financial indicators such as return on assets (ROA), earnings before interest and tax (EBIT).

**Human Capital:** refers to the stock of knowledge, habits, social and personality attributes including creativity embodied in the ability to perform labor so as to produce economic value. This study defined Human capital as the value created by the customer in the banking sector and was measured by the following indicators: customer relations, employee relations and customer loyalty.

**Organizational Capital:** refers to the intangible resources such as information, structural capital and social capital that provide the firm with a competitive advantage. It is defined as the collection of all informational resources firms have at their disposal that can be used to drive profits, gain new customers, and create new products as well as improve firm's performance (Onyekwelu, et al., 2017). Under this study organizational capital referred to the intangible resources that include financial knowledge and expertise, human capital, and financial business process and practice.

**Innovation:** can be defined as new applications of knowledge, ideas, methods and skills that can generate unique capabilities and leverage an organization's competitiveness(Kim et al., 2012). Innovation can be identified into product, process, organizational (Stanislawski & Olczak, 2010) and financial innovations.

# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **ATM** | Automated Teller Machines |
| **c.d.f** | Cumulative distribution function |
| **CBD** | Central Business District |
| **CBK** | Central Bank of Kenya |
| **CFA** | Confirmatory Factor Analysis |
| **CFI** | Comparative Fit Index |
| **e.d.f** | empirical distribution function |
| **EFA** | Exploratory Factor Analysis |
| **FSB** | Financial Stability Board |
| **FSMP** | Financial Sector Master Plan |
| **ICT** | Information Communication Technology |
| **OLS** | Ordinary Least Squares |
| **POLS** | Pooled Ordinary Least Square |
| **R&D** | Research and Development |
| **RMSEA** | Root Mean Square Error of the Approximation |
| **ROA** | Return on Assets |
| **ROE** | Return on Equity |
| **SEM** | Structural Equation Modeling |
| **SIFIs** | Systematically Important Financial Institutions |
| **SPSS** | Statistical Package of Social Sciences |
| **VAIC$^{TM}$** | Value Added Intellectual Coefficient |

**CHAPTER ONE**

**INTRODUCTION**

**1.1 Background of the Study**

Globally there have been substantial changes in the banking sector over the last years. According to Idowu, Ngumi and Muturi (2016), the financial innovations are important alternative channels that allows cost reduction for banks. It is defined as new processes in the financial services sector as well as new financial technologies. Financial innovation therefore comprises both technical, technological changes and new financial instruments. Earlier scholars defined financial innovation as the financial performance of creating new financial instruments, markets. Financial innovations involve adapting and improving on the existing products and concepts (Baldwin, 2016). The process of financial innovation has been evolving at a high speed over time as explained by Nobel laureate Robert Merton. Financial innovation unlike the traditional methods of financing has broadened the availability of resource by creating new ideas, solutions, and financial instruments.

As an integrated part of global economic system, financial innovation is recognized as a driver for banking sector improving their liquidity and increasing the number of their potential clients. It is doubtless that new development in financial innovation has made the banking sector advance in financial instruments and payment systems that are used in the lending and borrowing of funds. Better financial innovations encourage more savings, investments, improves productivity and investment decisions.

In today's fast-changing world, financial innovation has become a global phenomenon as more and more financial institutions try to attract technological innovations and enhance the associated technology spillovers. Successful financial innovations cannot be easily imitated by competitors and appears to strengthen the explosion of global trade in the

twenty first century. The speed of financial innovation diffusion in the global financial system is enhanced in the developed countries like the Dutch, British and French which were the first to create financial innovation in terms of money markets and information networks for private credit and public finance (Oloo, 2011). Sustainable financial innovation helps to stimulate economic growth and industry expansion by fulfilling a core function of lower costs and higher efficiency. The importance of financial innovations derives from its impact on competitive advantage. In the banking sector financial innovation is a prerequisite for financial performance based on the availability of funds to deficit unit as well as access to new investment opportunities.

A recent World Bank (2016) publication on financial innovation asserts that the volume of cashless transaction in African banks grew by 13% per annum between 2014 and 2016 due to improved availability, reliability, and security of financial innovation. It stated that 40% of the African banking customers prefer to use financial innovations for transactions. A number of exciting financial innovations are emerging making some central banks to tap the opportunities inherent in these financial innovations. Driven by financial innovation, Nigeria-based fintech Paga allows their bank customers to make money transfers through their mobile phones since its launch in 2009 and has nearly six million active users. Tanzania allowed financial innovation payment between different telecom operations three years ago. In Kenya, penetration of mobile banking through M-Pesa that was launched by Kenya mobile operators Safaricom in 2007 has over 26 million customers that is 90 per cent. In South Africa launched FNBs Geo payment application in 2012. This payment application has gained over 1.5 million.

This has made many financial service companies including mobile-banking and micro-loan companies in Africa to become fast growing service industry making most central banks and telecoms struggle to regulate them. World Bank (2016) report acknowledges

that African central banks have made progress in reducing their cost-to-income ratio in the recent years. Financial innovation is embraced as a market context that is developing extremely fast. This has led the African banks to encapsulate new technologies, new products and services, new markets and institutions and new business models. Through investing in organizational capital that connects with banks knowledge and capabilities financial innovation leads to poverty reduction and mitigation of competition problems.

In Kenya, the banking sector financial technology penetration is designed to operate with high levels of mobile banking and other financial innovations. Financial innovation is used to cover a range of activities including reducing costs, risks and providing improved services which may in turn contribute to improved financial performance and competitive advantage in the banking sector. Likewise, financial innovation helps the Kenyan banks to communicate with their customers frequently and generate revenue as a result of increased customer's transactions (Nekesa & Olweny, 2018). It is against this backdrop that banks are now faced with the challenges of how the customers accept the financial innovation as it is one thing for banks to innovate and another for the innovation to be received by the customers. Also is the fact that customers are the sole targets of the banks and are more educated on competitive environment, technology, customer preferences and markets.

Financial innovation and organization capital intersect most profoundly around the issues of improving and monitoring financial performance as well as strengthening of portfolio mixes in the banking sector. Organizational capital has recently gained momentum as the accumulation of information to enhance production efficiency within a firm (Prescott & Visscher, 1980). An important asset has progressively provided all-encompassing ways cutting across most financial institutions and other sector of the economy. Organizational capital is dynamic and enables tangible and intangible resources of the organization such

as financial knowledge, human capital, knowledge and expertise as well as business processes and practices to be productive.

Organizational capital is the key intangible asset of the businesses. Several studies have focused on defining Organizational capital and proposing models for their measurements. Medina (2010) posits that organizational capital is of the elements of intellectual capital separate from social and human capital. In the banking sector organization capital can be considered as the organized knowledge generated within the firm through formal processes of knowledge integration, which can be used by other employees in the organization. Similarly earlier studies define organizational capital as knowledge institutionalized within organization processes and databases, documents, patents and manuals that organizations use to store and retain knowledge (Oloo, 2011). Organizational capital is therefore, the tangible and intangible resources that preserve knowledge of the company even when the key employees leave it.

Analysis of public listed banks in the U.S.A indicates that organizational capital investments are gaining importance in the global and dynamic business landscape (World Bank, 2018). In today's digital age organizational capital is becoming increasingly more important to firms as well as global economy. The analysis of publicly listed companies in a variety of international setting that include the United Kingdom, Scandinavia, Australia and U.S. macro-economic data shows that investment in intangible assets has become more influential over the years (World Bank, 2015). In addition, the global perspective economy states that the income that arises from the organizational capital is more than one- third the size of income generated by tangible assets. This represents more than 40% of the cash flows generated by all intangible assets.

This phenomenon has remarkably grown global demand as evidenced in studies done within Mexico, Portugal, Ireland, Germany, Australia, Jordan and others. In today's economy China is seen to become the world's largest buyer and importer of knowledge at all levels, while Taiwan on the other hand is noted to be moving in that direction by establishing Taiwan intellectual research center. The center was meant to create international authoritative knowledge repository for organizational capital. Organizational capital therefore develops a framework for analyzing intangible assets in the firms. In today's environment, firm performance is linked with Organizational capital. However, firms that operate in a competitive environment like banks need to engage in constant financial innovation in order to remain competitive.

In Africa, measuring organizational capital is embedded with a range of strategic decisions relating to internal operations of the bank's technology. Most notably organizational capital has technological development in the financial knowledge and expertise, financial business process and practice and human capital that have altered financial performance. Additionally, due to tremendous growth of organizational capital, most African commercial banks have ventured into financial innovation to offer banking services to their clients. Globalization process has encouraged managers in the banking sector to take a fresh look of how this important asset can be better measured and managed in their industry.

In recent years there is a growing realization that financial performance is an accumulated end result of the organization capital, processes and activities. Financial performance of a bank measures the successful performance with a limited relevance in forecasting future performance. According to World Bank (2017), banks and financial institutions are special components of healthy and wealthy financial systems of an economy. In the developed countries, financial performance measures are seen as the

only way of assessing effectiveness and efficiency in the banking sector. Globally, indicators of financial performance ratios include return on assets and earnings before interest and taxes in comparison with competing banks. In continents like Asia (Hong Kong, Japan, South Korea, Singapore and Taiwan) financial performance in the banking sector has been as a result of financial innovation due to the high penetration of internet banking from 58 per cent in 2014 to 92 per cent in 2016 (World Bank, 2017). Financial performance measures is a common practice in developed countries like UK, US and some European countries and it is analyzed using the ratios based on the accounting profits.

Africa being the second profitable region in the global banking industry as of World Bank (2017) report, has exhibited high variation in growth and profitability. Despite a challenging competitive landscape some commercial banks in Africa have proved to shoulder above the rest in terms of profitability, revenue growth, efficiently and credit control. African banks analyze the financial performance using profitability ROA, EBIT, ROE and market share growth. The top-quintile banks in term of ROE grew in revenues at 23 percent per annum over a 5-year period from 2011 to 2016 (World Bank, 2017).

In Kenya the commercial banks control the financial sector and any failure in the sector indicates implication on the economic growth of the country (Oloo, 2011). The Kenyan banking sector has set ambitious goals for both profitability and market share growth measuring financial performance. The profitability ratios (ROA and EBIT) have been used to evaluate the financial performance. Measures of financial performance in commercial banks display the winning practices that are direct to specific challenges that all Kenya commercial banks face. In Kenya a high number of individuals have low income making the banking revenue pools to concentrate in the middle- and higher-income segments. In addition, high- cost models make Kenya commercial banks to have

more manual processes, more tellers, and more cash related costs compared to international peers. More than 90% of all the transactions are carried out in cash.

Equity bank remains a good example in financial performance having achieved high share of 66 percent transactions and loan sales of 85 percent through the mobile channel. In addition, the Equity bank collaborated with Telco and Airtel to deliver Equitel, a mobile virtual network that gained two million customers within 18 months of launch. At the same time the bank increased the ATMs and branch infrastructure and network of 30,000 agents. Equity banks customers can pay bills, open accounts and make deposits using the financial innovations. Kenya commercial banks of Africa also collaborated with Telco and Safaricom to deliver M-shwari services to offers loans through the mobile channels. M-shwari process 80,000 loans applications per day (CBK, 2017).

### 1.1.1 Financial Innovation in the Kenyan Banking Sector

In the Kenyan context, great changes have taken place in commercial banks due to Information and communication technologies (ICTs) changing the way financial products are accessed by customers. The influence of these new technologies have provided a powerful delivery channel to access and control their finances as well as converting the old ideas into new ones (Ahmed, 2014). The banking sector has created internal and external factors to adopt the financial innovation. The external factors include technologies which enable them to serve their customers, suppliers, competitors and government more cost-effectively (Hsueh, Lin& Li, 2010). With the tremendous use of financial innovation, the Kenyan banking sector taken lead in the innovation processes particularly in the use of technology in money transfers (CBK, 2017). Strengthening technology systems in the Kenyan banks have brought increased technological innovation which rests on the revolutionary electronics. A report on Training by Kenya Industrial Property Institute (KIPI) enforced the Industrial Act of 2001 to train on

Information technology and has emphasized that financial innovation can improve financial performance, processes and promote service delivery (CBK, 2014). In the Commercial banks, financial innovativeness puts more emphasis on the ATMs services, internet and mobile banking services and has networked their machines to increase financial inclusion to their customers (CBK, 2017).

The success of financial innovation in Kenyan banks has made the financial systems and financial performance to reduce regulatory costs required by the employees and the customers. There seems to be a general agreement among the scholars and practitioners that financial innovation is a key factor in the commercial banks financial performance. Since financial innovation is closely related to the concept of cost reduction, ATMs technology has become a fundamental financial innovation which has been used to reduce the long queues in the banking halls. It has also been stated that ATMs have generated greater efficiency by increasing the links between Commercial Banks and their clients (Gakure & Ngumi, 2012). Financial innovations have proven to be particularly effective in supporting ATMs, in cutting costs and improving efficiency to expand banks products and services with the view of financial information management and advance in technology given an upper hand (CBK, 2015).

Additionally, the present economy has witnessed internet and mobile banking receiving massive acceptance in the banking industry. The very existence of internet and mobile banking gives emphasizes to the creation and popularizing importance of new financial technologies and financial instruments (Kashmari, et al., 2016). In the twenty first century the commercial banks have collaborated with the telecommunication firms to offer services that lead to electronic and internet-based banking (Nsambu, 2014). Internet and mobile proves how financial innovation technologies enable customers and banking employees to perform financial activities. Given that all banks struggle with financial

performance, internet and mobile banking enhance the increased collection of deposits as well as disbursement of loans with less operating costs (Gakure & Ngumi, 2012).

Commercial banks have therefore embarked on the internet and mobile phones as well as activities that improve and increase the efficiency of financial systems in the banking sector. Issahaku, et al. (2013) examined the financial characteristics and innovation in microfinance institutions in Ghana and revealed that the idea of internet banking is to give the customers access to their banks through the web site and enable them to transact their account. They also found that the commercial banks have introduced internet in their operations as a source of banking funding and equity of ownership that encourage financial innovations. According to Matevu and Kerongo (2015) internet banking offers the customers of the bank's greater convenience, flexibility and control over their bank accounts. They recommended that for banks to be highly competitive, they need to employ modern technological innovations such as internet and mobile based banking services. Sujud and Hashem (2017) revealed a positive and significant impact of innovations in the banking sector on profitability and return on assets.

In the last couple of years' internet and mobile banking has flourished in Kenya due to the constant integrated systems that have enabled the customers to check because balances and perform transaction history, pay bills and transfer funds (Issahaku, et al., 2016). Studies have linked organizational capital with the financial innovations with the view that they enhance financial returns by humanizing banks services, assist risk sharing and improve the quality (Thorsten, et al., 2017). However, the dynamics influencing the mediating effect of financial innovation in a competitive environment like banks have not been examined empirically in the context of Kenyan commercial banks and this gap largely influenced this study.

## 1.1.2. Financial Performance in Kenyan Banking Sector

In measuring the banking sector performance, the managers use financial performance to assess their ability as well as that of the whole organization in moving the business towards financial performance. The purpose of financial performance measurement is to obtain helpful information that relates to flow of funds, the use of funds efficiently, effectiveness of funds as well as motivating the managers to make the right decisions (Majali et al., 2012). Aduda and Kingoo (2012) argued that the relationship between financial innovation and financial performance among commercial banks in Kenya can be measured by ROE and ROA and they form a major part of banks decisions. Today financial performance is an important element in the banking sector to determine the relevant indicators of financial sustainability, how they relate to the formulated bank objectives and how they depend on the financial performance activities.

Several studies tested financial performance using performance measures such as ROA, ROE, market share, sales, profitability and other financial ratios and provided mixed reactions. Zawadi (2013) conducted a study on the financial performance of commercial banks in Tanzania over a period of 7 years   using ROA. The study revealed that there is no significant difference between profitability among peer bank groups in terms of ROA, although there is a significant difference among the groups in terms of ROE and NIM and revenue ratios that influenced financial performance. Adams (2014) used ROA, ROE and NPM as dependent variable to evaluate the financial performance of banks using financial ratios- a case study of Erbil banks for investment and finance. The study concluded that the general financial performance of Erbil bank had continuous improvement in terms of liquidity ratios, profitability ratios and asset quality ratios. In addition, Socol and Dănuleţiu (2013) also used ROA and ROE to measure the financial performance as a determinant of financial performance of the Romanian banks

performance and found that ROA and ROE vary because of credit risk ratios. They concluded that debt to equity ratio has a positive impact on financial performance.

At present the Kenyan banking sector financial performance can be measured in 41 commercial banks, a reduction from 44 as Giro commercial bank has been acquired by I&M Holding and Diamond Trust Bank Kenya has acquired Habib Bank limited Kenya, while the Chase bank and Imperial Bank are under receivership (CBK, 2015). In addition, there is 1 mortgage finance company, 12 microfinance banks, 8 representative offices of foreign banks, 14 money remittance providers, 86 foreign exchange bureaus and 3 credit reference bureaus (CBK, 2017). The present Kenyan banking system has experienced several acquisitions over the last four years as shown in the table below.

**Table 1: Local Banks Acquisitions**

| Acquirer | Bank Acquired | Book value at acquisition (Kshbn) | Transaction state | Transaction Value (Kshsbns) | P / Bv Multiple | Date |
|---|---|---|---|---|---|---|
| Diamond Trust Kenya Bank | Habib Bank limited Kenya | 2.38 | 100% | 1.82 | 0.8x | Mar-17 |
| SBM Holding | Fedelity commercial Bank | 1.75 | 100% | 2.75 | 1.6x | Nov-16 |
| M Bank | Oriental commercial Banks | 1.80 | 51% | 1.30 | 1.4x | Jun-16 |
| I & M Holding | Giro commercial Bank | 2.95 | 100% | 5.00 | 1.7x | Jun-16 |
| Mwalimu SACCO | Equatorial Commercial Bank | 1.15 | 75% | 2.60 | 2.3x | Mar-15 |
| Centum | K-Rep Bank | 2.08 | 66% | 2.50 | 1.8x | Jul-14 |
| GT Bank | Fina Bank Group | 3.86 | 70% | 8.60 | 3.2x | Nov-13 |
| **Average** | | | **80.3%** | | **1.8x** | |

Source; Cytonn (2017)

According to the CBK annual report (2017) the acquisitions are happening at much cheaper valuation ranging from 0.8% to 2.3%. This has allowed more foreign bank entries into Kenyan banking sector where in the year 2017. Mayfair bank and Dubai Islamic Bank were licensed by the Central Bank of Kenya to start their operations. ROE was used to measure the financial performance and recorded a negative EPS growth of 13.8% in 2017 compared 15.5% in 2017 (Cytonn, 2017).

Despite all the headlines on the commercial banks' profitability, they still have challenges which require further intensive study on the part of financial innovations. Customer expectations have made the commercial banking sector to feel pressure because they have a strong preference of demand deposits and other short-term funds. These days it's all about the customer experience and adoption of technology where the customers can initiate transaction from diverse channels including mobile phones, internet banking, ATMs and credit cards.

## 1.2 Statement of the Problem

The development of financial innovation especially the Kenyan commercial banks have led to the development of new payment systems and asset alternatives to holding assets with the ability to tailor their products that meet Kenyans' needs. This has helped Kenya commercial banks achieve the highest financial inclusion rates in the developing world, at 75% (OBG, 2018). However, whether the financial innovation in banking sector remains the main determinants of financial performance is a challenge. Despite the importance of financial innovation its effect is still misunderstood for the three main reasons, first increasing risks associated with ICT frauds, including identity thefts. The effect of these crimes has detailed losses by the commercial banks and individuals. Secondly rebranding, competition from mobile money transfer services, and ATM card skimming (CBK, 2017) in the banking sector exposes it to operational challenges. To

curb these challenges there is increased operational costs that affect banks financial performance.  For instance, there are a couple of commercial banks reporting declaring losses (CBK, 2017). The banking sector registered a decline in performance in the year ended December 2017, of 9.6% and 14% drop of pre-tax profit form85.35 billion in 2016 to Ksh 73.39 billion in 2017.Total risk-weighted assets ratio also decreased from 17.97 % in June 2018 to 17.45 %September 2018 (CBK Commercial Banks credit officer survey July-September 2018).

Additionally mediating effect of financial innovation remains lowly untested (Mabrouk & Mamoghli, 2010). Empirical studies scrutiny of previous studies on the direct effect of financial innovation on financial performance has produced mixed results regarding the financial innovations on the banks financial performance. Financial innovation has been found to have a significant contribution to financial performance (Adhiambo 2014; & Mwania and Muganda 2011). However, these findings contradicted the findings of Franscesa and Claeys (2010) and Pooja & Singh (2010) that financial innovations had least impact on banks financial performance. Additionally other  researchers such as Muthinja  and Chipeta, (2018); Mbiti and Weil (2015); Ngari and Muiruri (2014); Aduda and  Kingoo, (2012), concluded that there is a direct effect of financial innovation on financial performance of banks and many financial innovation such as ATMs, mobile banking, and internet banking influence the performance.

It is in this background of such mixed conclusions that motivated and necessitated the need to carry out a study on mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya.

**1.3 General Objective of the Study**

The general objective of this study was to investigate the mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya.

**1.3.1 Specific Objectives of the Study**

i. To examine the relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya.

ii. To evaluate the relationship between financial business process and practice, and financial performance of Commercial Banks in Kenya.

iii. To assess the relationship between human capital and financial performance of Commercial Banks in Kenya.

iv. To assess the mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya.

**1.4 Research Hypothesis**

$H_{01:}$ There is no statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya.

$H_{02:}$ There is no statistically significant relationship between financial business process and practice and financial performance of Commercial Banks in Kenya.

$H_{03:}$ There is no statistically significant relationship between human capital and financial performance of Commercial Banks in Kenya.

$H_{04:}$ There is no statistically significant mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya.

**1.5 Significance of the Study**

The motivation behind this study was related to uncover the benefits of mediating effect of financial innovation on organizational capital in the banking sector financial performance in the world and in particular Kenya commercial banks. In addition to financial innovation, managers in the banking sector will realize the relationship between organizational capital components and financial innovation. In a bid to enhance cost reduction, they will also realize that it is their responsibility to take lead in driving effective financial innovation and ensuring increased financial performance in the Commercial Banking sector of Kenya. It is therefore, their responsibility to identify the areas where improvements can be done. Management will also be able to plan for the development and implementation of organizational capital and financial innovation. Customers will acquire efficient, effective and dependable services from the results of banking innovations so that they can lead their own quality life in particular saving time and minimizing cost. This will bring about economic growth and stability of the country.

Academic researchers who may require reference to the data used in the study may benefit from the findings, owing to the fact that mediating effect of financial innovation and banks performance, rich literature is limited in Kenya. The study findings will provide the insights to the Commercial Bank's management as they are able to evaluate the previous approach used to resolve management challenges and improve their research on financial innovation and organizational capital. Lastly, the investors and Governments may also use its findings to make relative investment and policy decisions.

**1.6 Scope of the Study**

The study focused on the commercial banks in Kenya that were in operation for the last three years. The focus scope was centered on 41Commercial Banks headquarters in Kenya. They have a workforce of 18,625 despite recent technical advancement in the

sector (CBK, 2017). The study was precisely limited to financial managers (operations managers, credit manager and transactional managers) within commercial banks. The study was guided by three independent constructs that characterize organizational capital. These include financial knowledge and expertise, financial business process and human capital. Nairobi being the Kenya's capital city has all the 41 commercial banks headquarters. The study investigated the mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. However, the study did not include the effect of financial innovation on the performance of other sectors of the economy. The study covered the 41 commercial banks which were in operations since year 2015-2017.

## 1.7 Limitations of the Study

The idea of bank performance is sensitive and most commercial branch managers were not willing to provide information related to their financial performance. However, this was alleviated by the use of the secondary data in terms of financial statements.

Some of the respondents were not willing to cooperate which threatened to reduce the response rate. However, the introduction letter from the university restored the required confidence to the respondents to volunteer required information for the study. The study reduced the non-response cases by physically dropping and collecting the questionnaires from each respondent.

## 1.8 Assumption of the Study

Commercial Banks are increasingly considered as the key part of the modern economy that leads to the financial sector performance in the developing countries. This is because the Commercial Banks are considered as the main drivers and participants of financial innovative activities. In Kenya, the Commercial Banks are fast growing with prudential

standards set by the Central bank establishing the margin of the Banking operations. If the financial activities are well natured in the commercial banks they create jobs, source of competition, and human resource flexibility (Mustafa, 2014). In addition, financial knowledge has become a key production factor creating the speedy emergence of financial innovation and organizational capital.

This study developed a model of assessment of organizational capital and financial innovation that will enable the Commercial Bank's management, policymakers, practitioners and students to evaluating their contributions in terms of financial performance. Nowadays, there has been an increased challenge such as strong competition and ever-changing financial knowledge management systems that create differential advantages in term of organizational capital. This study explored the mediating effect of financial innovation on organizational capital in the Commercial Banks.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter reviewed the literature on organizational capital concepts and banks financial innovation. It discussed the key theories underlying banks financial innovations, developed a conceptual framework and expounded on the research gap of mediating effects on financial innovation and the Commercial Banks financial performance.

## 2.2 Empirical Literature Review

This section analyzed the previous studies that have been conducted on financial innovation and financial performance. Empirical studies that have examined the relationship between organizational capital and financial performance in the banking sector presents opposing findings. The key argument in this study was to reveal the mediating effects of financial innovation on financial performance, the direct and indirect effect through the components of organizational capital (Financial knowledge and expertise, financial business process and practice and Human capital) on financial performance and finally tested the study hypothesis with a view of agreeing or disagreeing with them.

## 2.2.1 Financial Knowledge, Expertise and Financial Performance

Given the essential role of information technology in today's banking sector, organizational capital facilitates tangible and intangible property to be productive (Zin & Ahmad, 2014). Organizational capital is an important asset that cannot be easily reproduced by competitors and hence conferring sustained competitive advantages on the banking sector. There are multiple approaches to the definition of organizational capital, in terms of employees, process and structure, organization knowledge, values and norms

(Ahamad, 2017). An all-inclusive measurement of organizational capital will enable the commercial banks to invest in financial innovation to ensure productive operations as well as adapt to new ways of doing business (Tomasz, 2012). Regrettably, there are no useful guidelines for managers on how organizational capital is used to enhance the commercial banks profitability, growth and performance (Mustafa, 2014). The organizational capital literature is important in informing the managers that financial innovation is important since what is not measured cannot be managed and that measurement of organizational capital will help them plan and monitor the performance of this important intangible asset (Mustafa, 2014).

Rahim et al. (2017) study on the human capital efficiency and firm Performance: an empirical study on Malaysian technology industry. The study used data from all the technology companies listed under the main markets and Ace markets in Malaysia in the year 2009. Their study applied Value Added Intellectual Coefficient (VAIC$^{TM}$) methodology to measure human capital efficiency. Their study concluded that there was no difference in terms of human capital efficiency between Main Market and Ace Market. Given the importance of the industry in creating and sustaining an organization competitive advantage and capabilities which in turn influence its performance, financial innovation should be measured. This study also used the sample size of specific industry in the technology industry where financial innovation is a key factor and has been left out. Furthermore, the study used only the utilization of human capital which is only a component of organizational capital. Even though human capital is key to future success of the organizations, it is important to analyze the mediating effect of financial innovation and the relationship between the relevant measures of organizational capital and financial performance.

Hideavah and Adivawarman (2017) examined the determinant of intellectual capital in Indonesia's Syariah banks over the period 2010-2015. The study used multiple regression analysis to measure the relationship between the independent variables and dependent variable. The value added intellectual capital (VAIC) was used to measure financial performance. Their results indicated that independent variables, bank risks and bank profitability have a negative influence on the banks financial performance. The study lacked to measure the financial understanding between the banks and the customers in terms of mediation services. The study also lacked the suitable financial innovation products that form financial services that provide for the needs of customers. This makes the study to be too general in terms of the relationship between financial knowledge and expert and financial performance of banking sector.

A study by Meressa (2016) on the determinant of organizational capital (intellectual capital) performance; empirical evidence of Ethiopian Banks investigated the impact of investments in information and technology, profitability, banks risks staff ratio to total income. The study used Econometric model estimation procedures and specification tests of panel data linear regression models and revealed that investment on financial information and technology have statistically significant positive effect on organizational performance. However, the organizational performance was treated in an aggregate form and the effect of financial innovations which could have been used as a way of balancing each element of organizational capital was statistically left out. The isolation of mediation services from the study means lack of an opportunity to understand how the commercial banks operate. This in turn leads to the misunderstanding of financial innovations and their mediation services in the banking sector. The study is therefore limited in formal financial service information, hence creating a gap.

Zin, Hassan and Ahmad (2014) evaluated the intellectual capital (organizational capital) efficiency and examined the relationship between intellectual capital components and financial performance. They used 21 commercial banks in Malaysia in years 2008 to 2012. The study employed the Value Added Intellectual Coefficient (VAIC^TM) model and the Pooled Ordinary Least Square (POLS) estimation method. The study found that AmBank (M) and Berhadbank are the most efficient in utilizing their intellectual capital. Further, it found that the intellectual capital components are positively associated with the financial performance. Their study contributed towards the execution of Malaysia's Financial Sector Master plan (FSMP) in enhancing banks financial innovation and operating efficiency as well as competition. Despite the literature on relationship between the financial knowledge, expert and financial performance of commercial banks the study failed to discuss the capable services provided by financial innovation and their mediation services hence creating a gap.

Dauda and Akingbade (2011) analyzed the responses of customers and employees to technology innovation, and their effects on the performance of the Nigerian banks. Fifteen (15) main banks were selected for the research. Their study concluded that technological innovation brings effective management and improves employee's performance, customer's satisfaction, sustainable profit and increased return on equity. However, the study failed to discuss the financial innovations mediating services in the context of electronic and internet although they extend the services of the existing systems and operate as mediators between customers and banks systems. This makes the study too general in terms of financial knowledge and expert and financial performance in the banking sector.

Research conducted by Mondal and Ghosh, (2012) investigating empirically the relationship between organizational capital and financial performance of 65 Indian banks

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for a period of ten years from 1999 to 2008.Their study used VAIC$^{TM}$ methodology to conduct their analysis on data of 65 Indian banks only making it general proposal. Their analysis indicated that the relationships between the performance of a bank's organizational capital and financial performance indicators, namely profitability and productivity are varied. The study results suggested that banks' organizational capital is vital and corresponded positively with high financial performance. Their finding indicated that the major competitive advantage on the organizational capital and financial performance of Indian banks are financial innovations. They also advocated that there is a strong relation between organizational corporate success and organizational capital. The study concluded that banks should manage their organizational capital in order to increase financial performance. However, more current measures that include the effect of financial innovations and different types of variables can be used to evaluate the financial performance of the banks. In addition, the studies should consider using other measures of organizational capital efficiency as well as comparing them with VAIC$^{TM}$ model.

Lipunga (2014), measured the organizational capital performance of the commercial banking sector of Malawi. The study used the value-added organizational capital coefficient (VAIC$^{TM}$) to measure performance. It measured the organizational capital efficiency of the commercial banking sector of Malawi from 2010 to 2013. The findings indicated that the sampled commercial banks achieved on average, common performance in all the years under study, except in 2011 when they achieved good performance. Furthermore, the trend analysis suggested an upward trend in terms of the level of efficiency, though at a very low rate. Therefore the commercial banks have to add more effort in order to improve their organizational capital efficiency. However, the study lacked to measure the streams relating to the need of payment mediation services to

develop information on the existing infrastructure from many payment providers in order to overcome shortcoming of the available payment systems.

Similarly Carlin et al. (2012) examined the organizational capital performance of the Australian Financial Sector for the period 2006-2008. The study used the ROA and ROE as measure of financial performance. Their conclusion was that financial knowledge and expertise influences the value creation capability of financial sector. The study posits that financial knowledge and expertise holds an organization together among the financial industry sub-sector. In the direction of measuring performance by way of organizational capital allows a detailed understanding of how financial innovation contributes to the financial sector. The study revealed a positive impact of financial knowledge and expertise of Australian financial sector performance. However, the impact of financial knowledge and expertise and financial performance should cut across different countries and industries. The study had no statistically significant difference in the financial performance of the organizational capital and financial innovation in the value creation.

Hassan et al. (2013) investigated innovation capital and bank's performance in their study. The study was on 'Effects of Innovation Types on Firm Performance on Pakistan's Manufacturing Sector'. They revealed that innovation capital influences firm performance and collective implementation of innovation types over time has a positive effect. They found that although commercial banks lead to higher profitability there is direct and significant relationship between innovation and future performance of the firm. The study's main short coming is that it lacked a financial innovation mediating service provider that intercepts customer's service, process and credits their accounts to complete the transactions.

**2.2.2 Financial Business Process and Practice and Financial Performance**

Dzombo et al. (2017) on their study on the effect of branchless banking strategy on the financial performance used ROA as the key gauge of commercial banks financial performance. They concluded that ROA takes into account all the assets that used to support financial business process activities hence a better measure of financial performance. To further focus on this study both agency and electronic banking channels had a significant negative effect on the financial performance of commercial banks. Other measures of financial performance that makes sense in the framework of payment mediating services such as electronic, internet payment mechanisms, credit cards have been limited. The study was therefore too general hence did not shed light on the specific factor that influence the relationship between financial business process and practice and financial performance in the commercial banks.

Trautman (2016) evaluated the e-commerce, cyber and electronic payment system from Paypal. The study revealed that internet, e-commerce and mobile platforms have major impact in the financial business process reducing the operating costs. This evidence stated that there is a strong relationship between the dimensions of financial innovation and the banking sector financial performance. The study revealed that the customers accepted the financial innovation as payment systems which include ATMs, internet, mobile banking and cards. This study fails to describe the relationship between payment mediation services and financial innovation measures that should be employed to measure the financial business process.

Lin et al. (2015) evaluated the Harnessing Internet finance with innovative cyber. Their study revealed that business of internet finance covers almost every sector of finance. They point out that internet finance is multifaceted and profound and cover not only e-payment and e-banking that promote financial businesses but also credit, guarantee

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collateralization and assurance of financial services. They used traditional credit assessment to evaluate individual's credit scores and person's credit scores to illustrate creditworthiness and time series modeling and multi-agent modeling and SOM/K means clustering. These kinds of methodologies are mostly challenged by the nature of data used in terms of authorization where the study should form a method to manage the validity of transactions. The authorization system in terms of exchange of money while not connected to a network and with a third party mediating for transaction is not taken into account. This makes the study too general and did not measure the influence of mediating effect of financial innovation.

Rosemann and Brocke (2015), examined the financial business process management. Their study revealed that financial business process is a complex dynamic system and an interacting feedback hoops that builds social constructs. Business Process Modeling Notation was used to measure the financial business process and financial performance. Descriptive and inferential statistics was used in collecting and analyzing data. Their findings revealed that there exists a strong relationship between financial business process and banks performance. However, the reliable money exchange between transacting parties is essential and the study has not addressed this critical aspect. In addition, the study did not holistically cover mediation services of financial innovation such as mobile banking, internet banking and ATMs on the financial business process that could affect the operating systems and financial innovation behind the system. This makes the study to be general in the examination of financial process management.

Getembe et al. (2013), examined the money transfer system and business management process among the commercial banks in Kenya. They revealed that costs, long queues and foreign exchange dealing with the technological money transfer systems affect the value of financial business process management. The study also revealed that very often

banks use financial innovation to perform transactions. Despite the study covering the automatization of the area of financial business process management the impact of adopting the payment mediation services is ignored. In addition, the study has a weakness in highlighting existing payment system as a mediator that provide extra services in financial performance of commercial banks and the benefits associated with financial innovation. The study therefore is limited and making it too general in the study of money transfer system to maximize financial performance.

Okiro and Ndungu, (2013), further examined the impact of mobile banking and internet-banking on performance of financial institutions in Kenya. Their study evaluated 30 financial institutions to identify the extent of mobile banking and internet usage and used a descriptive research design with the questionnaire as the main tool for data collection. They concluded that commercial banks have the highest use of mobile banking and internet banking compared with other sampled financial institutions. Some of the gaps in this study are that it examined mobile banking and internet-banking in segregation, yet financial innovations complement each other. The study was also carried out on 30 financial institutions hence limiting the scope of the study and simplification of its findings. The study also failed to relate the mediating service of mobile banking and internet banking making the study too general.

Muenstermann et al. (2010) evaluated the relationship between the performance of financial business process standardization and financial performance of 156 organizations. They pointed out that financial business process is positively affected by standardization process. However, the study indicated that the impact is stronger in-service organizations and is the most used single method to assess the bank's financial performance registered in the stock market for 2004 to 2008. The results indicated a significant relationship between organizational capital and market value and financial

performance of nonfinancial organizations. The research recommended that banks should continue to invest in financial innovative channels to improve their cost control hence improved financial performance. The main gap in this study is that it used an evaluation of the recruitment process of specific organizations where financial innovation should be used as key factor to evaluate performance.

El-Bannany (2013), investigated the impact of intellectual capital disclosure on the cost of equity. The study found that organizational capital is closely related to internal process, financial knowledge and skills. They considered financial business process and practices to consist the structures, process and employees to help expand and organize in order to be productive, effective and innovative. The ability to increase competition intensifies the need for rapid change in the internal organization and adopts new financial knowledge that presents financial innovation. In this era of financial knowledge economy, the concept of financial business process and practices introduces the relationships with financial knowledge management and financial performance. As a result, the study has failed to focus on the mediating effect of financial innovations that tend to outsource activities that do hold the possibility of differentiating the firm from its competitors.

Quinn and Cleary (2016) investigated the three components of intellectual capital and business performance. The study examined the impact of the management accounting on organizational capital and business performance. Although the study indicated a significant correlation between organizational capital and business performance, the precise nature of the linkage between the organizational capital and the business performance remains ambiguous. Financial business process and practice differs and has different needs across and within the sectors concerning learning, innovation, adopting financial knowledge and developing a technology. Consequently, valuing organizational

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capital is often characterized by the acquisition stage as well as post-acquisition strategy planning. Although the fact that business performance have not properly measured their organizational capital, it is important for organizations to know which position they are towards the financial business process and practice as well as know how to use the financial innovation to increase its profitability.

### 2.2.3 Human Capital and Financial Performance

Ismaila (2013) study on The Relationship between Human Capital Efficiency and Financial Performance: An Empirical Investigation of Quoted Nigerian Banks showed that well-organized utilization of human capital does not have any major impact on the return of equity of banks. The study also revealed that banks that maintained utilization of human capital resources have a very insignificant impact on the return on equity of banks. Their evidence shows that bank performance cannot be predicted by human capital efficiency and size of the banks. Apart from the limiting generalizability of the results by the small sample size, it can be noted that the study failed to relate the special class of mediation services that has emerged to provide convenience services to banks business services and their customers and the financial performance.

Worluand and Omodero, (2016) focused on the effect of human capital development and financial performance of banks in Nigeria. The study primarily sampled Commercial Banks in Nigeria and gave more attention to human capital development by way of training and adequate welfare to enhance their productivity. Their results revealed that banks employees have not been intellectually well developed so as to make a significant impact on the financial performance of banks. Although their study generally accepted that banks have not invested adequately on human capital, the effect on financial performance could be drawn from customer relations as well as structural capital to make effect on the profitability of banks. However, the study ignored technological platforms

associated with the mediating services of financial innovation transactions and performance of the banking sector. This makes the review of their study regarding the key components of organizational capital too general. The result of this study opens an innovative avenue for research and may serve as source of hypothesis for further quantitative research on financial innovation effect as a mediating factor on organizational capital and human capital and financial performance.

Ozkan et al. (2017), studied the relationship between the intellectual capital and financial performance of 44 banks operating in Turkey between 2005 and 2014. The results suggested that human capital generally affected the performance of Turkish banking sector. However, the study ignored technological platforms associated with the financial innovation transactions and financial performance of the banking sector. The review of their study regarding the key mediation services provided by financial innovation in terms of payments has not been included in the study. This makes the study to be too general.

Gunu et al. (2013), evaluated training and development as a tool for organizational performance: case study of selected banks in Nigeria. According to the study training and development have significant impact on financial performance; employees need to be motivated during training programs. The study concluded that without financial innovation, banks will not be attractive to the staff to maintain them after training and development. An important factor that underlies the acceptance of this view is the dominance of mediating services provided by the financial innovation within the banking sector. Assuming that financial innovation has a mediating service that is key to financial performance, it is not adequately reflected in study. The study therefore lacked to determine the extent to which financial innovation such as ATMs, mobile banking and

internet banking may intrinsically offer mediating services. The study therefore gives a general view on human capital and financial performance of commercial banks.

Oyinlola et al. (2014), study on an empirical analysis of human capital development and organizational performance in banking sector: A Nigerian experience showed that there was a significant relationship existing between human capital development and financial performance in the banking sector. The study concluded that efforts should be geared towards improving human capital development and that banks' managements should embrace effective leadership style to enable the expenditure incurred on human capital development impact effectively on banks' performance. Although the focus of their study was on human capital development and firm performance mediating factors of financial innovations that contribute to financial performance in the banking sector have been left out. A firm's financial performance is not a direct result of human capital only; financial innovation provides mediating services should therefore be differentiated as factors that contribute to a company's performance.

## 2.2.4 Financial Innovation and Firm Performance

Financial innovation can be examined as a key contribution of effective and efficient delivery commercial banks services and eventually customer satisfaction and loyalty. Success in financial innovation allows cost reduction and risk control as well as providing improved services to the users of financial services in the banking sector (KPMG, 2015). Financial innovations are expected to progressively reshape the financial performance in the financial sector, measure the extent to which new financial products, services and procedures can explain competitive advantage in commercial banks. It reduces cost and aids in terms of products and services as well as the way the banks deliver the financial products to increased output. Additionally, financial innovation increases the bank's technical ideas, technology or technology-based ideas.

Saksonova and Merlino (2017), conducted a study on Fintech or financial technology as financial innovations the possibilities and problems of implementations. They examined the growing competition between not only in the growing economies but also in the emerging markets. The customer survey used to verify their hypotheses and working on the peer-to-peer (P2P) model was used to provide a platform for corresponding borrowers with lenders. They revealed that successful financial technology companies that are banks competitors have much lower transaction costs compared with the large volumes of transactions in the banking sector. However, the study employed the direct effects of financial innovations to examine the effect of financial innovation at the firm level. The technological effect on the financial service as a mediating factor that may have implication for financial performance and stability is not measured. In addition, the survey did not measure the alternative channels like internet banking and mobile banking as substitution of the technological change. This study showed that there is need for a better understanding on mediating effects in today's financial performance of commercial banks.

Mabrouk and Mamoghli (2010), investigated the Dynamics of financial innovation and bank's performance Context of an Emerging Bank. They revealed that financial innovation influences financial performance and collective implementation of innovation types over time has a positive effect. They found that Commercial Banks adopted two types of financial innovation namely service innovation (Automatic teller machines, credit cards and Electronic payments) and product innovation that lead to higher profitability. Financial innovation has a direct and significant relationship between innovation and future performance of the banking sector. However, despite the increased attention paid to the activities of financial innovation the study does not give a strict and clear definition of mediating effects of financial innovation thus making it difficult to

compare the results of different studies in the banking sector. This study provided an overview of the financial innovation processes including similarities, differences, and mediating effects.

Muiruri and Ngari (2014), in their study of the consequences of financial innovation demonstrated that although the banks have a huge number of investments, its management on technological competence is consequently important due to cost reduction in raising funds. The study points out that the banking sector is faced with the challenge of making some previously unattainable funds to become active. They revealed that the operational approach of Commercial Banks was problematic due to the fact that National banks generally counted on their reputations and relations with the government, hence neglecting the customer's reliability and employee's satisfaction. In the absence of the mediating services offered by financial innovation it becomes impossible to understand the procedures through which the organizations expand their distinct financial knowledge that would largely grow financial performance. In spite of the attention given to financial innovation in the study it failed to exploit mediating effects which could be employed for the purposes of its financial performance. The study also did not measure mediating of financial innovation to monitor whether it has been used as an organizational control system. This in turn, raised concern that inspires the current research.

A study by Cherotich, et al. (2015), evaluated financial innovations and performance in commercial banks in Kenya. The study noted that there was no significant relationship between financial innovation and financial performance in the commercial bank. Their study suggested that an innovative organization requires a financial innovative process and outcome. They measured financial innovation process by focusing on the drivers, sources and locus of financial innovation while financial innovation outcome relates to

the type of financial innovation such as ATMs, internet banking, mobile banking and funds transfers. Their finding revealed that organizational capital has a positive relationship with financial performance. However, the power of information technology in terms of financial performance was not directly linked with organizational capital.

Wachira (2017), analyzed the effect of financial innovation on credit risk management of commercial banks evidence from Kenya Commercial Bank. The study found a strong relationship between financial innovation and risk management of banks. The study analyzed data for the period of 10 years, 2003-2013 and noted that banks are open to new financial innovation to reduce the transaction cost. Moreover, it was also revealed that customers are open to financial innovation hence positive growth and financial performance. Although there is a relationship between financial innovation and financial performance, the study fails to discover any link between organizational capital components and financial innovation. The study did not confirm that financial innovations are directly linked to financial performance. In addition, the study failed to include the mediating effect of financial innovation. This therefore makes the study to be general.

Gichungu and Oloko (2015) investigated the relationship between bank innovation and financial performance in Kenya commercial banks over the period 2009-2013. Their study stated that there is need to investigate whether financial innovation contributes to financial performance and profitability in commercial banks. However, according to their findings, investment in online banking systems has no statistically significant impact on financial performance. The study revealed that enhanced ATM banking as a bank innovation had a positive impact on the commercial banks performance since it helps to reduce information asymmetry between the banks and their loan candidates. The study stated that financial innovation reduces a bank's business risk, as well as its risk

management costs. In addition, the study showed that important elements were customer service satisfaction and bank image recognition. Despite the study recognizing the presence of direct effect of financial innovation and financial performance the mediating effect was not taken into account. However, although network transactions in terms of internet banking, use of ATMs and mobile banking are more common, the mediating effect of financial innovation on banking financial performance was not confirmed. This increased the anxiety that inspired the current study.

Mediation refers to sequence of fundamental relationship where independent variable is influenced by a third variable (Hayes, 2013) and helps to understand how one variable affects the other variable. Mediation effect has an indirect effect where the effect of independent variable goes through a mediator. This study will use the Baron and Kenny (1986) to explain the mediating process. The mediation function of financial innovation links the organizational capital and financial performance. According to Adams (2014), the link between independent variables and dependent variables must be significant. In this study mediating variable was satisfied as the significant relationship of organizational capital and financial performance.

**2.2.5 Financial Performance**

Understanding of the financial performance is essential for every banking sector since most of the banks crucial decision- making process depends on the financial outcomes. According to Kithinji et al. (2017), financial performance can be construed in several ways. Mostly financial performance indicates the effectiveness of the primary goal of the banks as it shows the level of success in its operations (Wang, 2008). In the banking sector decent financial performance boosts its capacity to support its expansion, and increase earning and maintain its competitiveness in the marketplace.

Banking financial performance heavily relies on the outcome achieved in meeting internal and external goals (Lin et al., 2008). It also relies on the comparison of main profitability measures like return on assets and earnings before interest and taxes. It is therefore the core of all activities in any commercial bank. Financial performance is also used as a measure of a banks overall financial health over a given period of time To asses financial performance in the banking sector a number of different measures have been employed in previous studies. These includes accounting-based ratios from income statements and financial positions such as Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE) Earnings Before Interest and Tax (EBIT) (Madsen, 2007). To capture these different aspects of financial performance, multiple measures, financial and non-financial aspects should be employed.

In this study financial performance has been measured by the Return on Assets (ROA) and Earnings before Interest and Tax (EBIT) to indicate accounting measure of the bank's assets for financial analysis. ROA indicates the percentage of net earnings relative to the banks total assets. ROA also reveals how much after-tax profit the banks generate for every shilling worth of assets the banks. Earnings before interest and taxes (EBIT) indicated the banking profitability. It measured the banks profit that includes all incomes and expenses (operating and non-operating) except interest expenses and income tax expenses. EBIT was also referred to as operating earnings, operating profits and profits before interest and taxes.

## 2.3 Theoretical Literature Review

A theory can be defined as a reasoned statement, or a group of statements supported by evidence to clarify some phenomena. It is, therefore, a systematic explanation of the relationship between phenomenon's and provides an extensive explanation to an occurrence. It is therefore important for a study to be conversant with those theories

applicable to the area of study (Smyth, 2004: Kombo & Tromp, 2009). Theoretical framework acts as guide research determining what variable to measure and the statistical relationship to look at in the context of the problem under study (Trochim, 2006). Theoretical literature, therefore, helps the study to clearly see the variables of the study, general framework for data analysis and helps in the selection of applicable research design. The relationship between organizational capital and financial performance is rooted on liquidity preference theory, diffusion of innovation theory and transactional cost innovation theory. These theories provide a detailed account of financial performance using organizational capital in spite of their merits and demerits (Kamukama, 2013).

## 2.3.1 Liquidity Preference Theory

The theory was developed by Keynes (1936) and was based on several assumptions that seek to explain the level of interest rates in regard to the supply of money and the desire of savers to hold their savings in cash or near cash. Keynes (1936) defines this theory as the theory of employment, interest and money and identifies three motives of holding money as speculative, precaution and transaction. According to this theory Speculative motive is the individuals need to hold cash and take advantages of changes in interest rates fluctuations. Most banks have opted to holding their marketable securities so as to meet these motives. In addition, precautionary motives are used to hold cash so as to meet some unforeseen disasters, possibilities and coincidences. In the Banking sector precautionary motives is influenced by the level of interest rate, liquidity preferences anticipated expenditure changes in income as well as the availability of money substitutes. On the other hand, transaction motive is the demand for money for day-to-day activities.

The liquidity theory recognizes that banks liquidity could be used to enhance the activities involved in obtaining funds from depositors and other creditors (Emery & Purser 2006). According to Keynes commercial banks are strictly regulated and thus faced with ever-ceasing problem of weighing financial performance against financial innovation. The presence of these regulations determines the liquidity of the commercial banks (LIyer, 2016). It is for this reason that the commercial banks try to venture into new financial innovations. This theory thus is important in that it helps to shed light on the reasons to determine the future financial performance of the banks. More so it recognizes that bankers feel a speculative movement may be representing good liquidity and better access to financial knowledge, financial business and human capital. In addition, liquidity preference can be used to create value in pursuit of the firm's objectives. Financial innovations have been noted as per the theory to be a move to increase liquidity of a bank and as powerful resources to influence banks decisions (Dohmen, 2016). The theory frequently acknowledges the organizational capital that is likely to increase the degree of confidence on one's expectations that was biased towards more liquidity (Nielsen, 2002).

### 2.3.2. Diffusion of Innovation Theory

Diffusion of innovation theory was developed by Roger in 1962 and has been employed in adopting technology. This theory explains the two stages of technology adoption including innovation and diffusion through the social systems, time and consequences. The theory is therefore centered on the increase or decrease of new ideas, products and adoptability of a given culture. According to this theory, the flow of information is through networks. Financial innovation and organizational capital provide information which influence financial performance. According to this theory there are five main factors that influence performance which include; Relative advantage that measures the

degree to which an innovation is seen better than a program, product or clue, it interchanges, compatibility that measures the reliability of the innovation with the standards, experiences and needs of the probable adopters, complication that deals with the complications of innovation. The theory states that innovation can be tested or experimented before a obligation to adopt is made. On the other hand, observer ability is the extent to which the innovation provides tangible results (Rogers, 1995). According to Uzkurt, et al. (2013), diffusion theory is important to organizations that seek to have competitive advantages and responsiveness to environmental changes especially with the introduction of financial innovations.

This theory, therefore, was important in this study because it explains the diffusion research on the characteristics of financial innovation that influence the adoption of new innovations and new information technology which is tailored with the opinion of management. The theory also focuses on the characteristics and consequences of the banking sector for adopting financial innovation as well as the communication used in the adoption process. The theory emphasizes on mechanisms that should be sought to encourage and foster an innovative culture in organizations since these are likely to facilitate the performance with the introduction, adoption and diffusion of new innovations which, in turn, is likely to result in financial performance.

### 2.3.3 Transactional Cost Innovation Theory

The theory of transactional cost innovation can trace its origin from way back in the year 1983 when Hicks and Niehans (1983) placed a value on the reduction of transaction cost. The theory further proposed that the financial innovation is the answer in advanced technology which reduced the transaction cost. According to transactional cost innovation theory, reductions of transaction costs are the key resources that add value to an organization and have been applied to address many issues. This theory therefore is

the most powerful theory in the modern economy and has been used in the setting of the government policies since the early 1983.It is recognized as the key determinant of firm's performance and it continues to evolve (Achieng, et al., 2015).

It observes financial innovation as assets and stresses that investments by organizations in financial innovation will generate worthwhile returns. The theory proposes that investment in innovation results to stock of financial knowledge that contributes to productivity in economic reimbursement for individuals and society as a whole (Sweetland, 1996). It states that investment in financial innovation helps in understanding the financial dynamics that results in long-term benefits. According to this theory, financial innovation is associated with lessening the financial transaction cost and is positively linked to the firm's performance. The concept of transactional theory provides an insight into the relationship between organizational capital and the financial performance. In the twenty first century, financial innovation is directly useful in bank performance process which is shifting towards the enhancement of internet connected information technology as a priority and is believed to promote economic growth. The provision of information technology is seen to enable efficiency coordination, management as well as use of information to reduce the transaction cost. The theory also suggests that ATMs, Debit/Credit Card, Mobile banking/Internet banking, electronic funds is necessary to lower the transaction cost of an organization (Brennan & Connell, 2000).

In this study, this theory was important in many ways as it shows that modern economy seems to agree that in the new global economy, information technology and financial innovation is the key to improving transaction cost and eventually increases the firm's performance. It also suggests that performance is supported by increased information asymmetries between the banking sector and financial intermediaries that fully conform

to the operations of the firm. Today the expansion of the branch network within the commercial banks is derived from transactional costs which are critical inputs in the bank's performance since they are high-tech business industry and service oriented that provide intelligence integrated products and services developed by human capital.

## 2.4 Conceptual Framework

This conceptual framework shows the mediator or the mediating variables effects as an integral part of cause-effect relationship. A mediator variable comes between the dependent and independent variables of the study in a cause-effect relationship and allows the relationship to be better explained. The independent variable intended for this study indicated organizational capital (Financial knowledge and expertise, financial business process and practice and human capital). The dependent variable was the Commercial Banks financial performance, which is indicated by, Return on Assets (ROA), and Earnings before Interest and Tax (EBIT). The mediating variables such as financial innovation included ATMs, Internet banking, Mobile banking and Debit cards.

**Independent Variable**　　　　　**Mediating Variable**　　　**Dependent Variable**

**Organizational Capital**

| Financial Knowledge and Expertise | | |
|---|---|---|

Structure of diagram:

**Financial Knowledge and Expertise**

Financial knowledge of information system experience in financial information system

Financial information

$H_{01}$

**Financial innovation**
- ATMs
- Internet banking
- Mobile banking
- Debit cards

$H_{04}$

**Financial Performance**
- ROA
- EBIT

**Financial Business process and practice**
- Internal business process measures
- financial Innovation network
- cash flows

$H_{02}$

**Human capital**
- Customer relations
- Employee relations
- Customer loyalty

$H_{03}$

**Figure 1:** Conceptual Framework

Source, Author (2021)

### 2.4.1. Hypothesis Testing

### 2.4.1.1 The Direct Effect of Financial Knowledge and Expertise

Financial knowledge and expertise is important because it is the main tool in an organization that supports the employees in doing their work to create value and is everything that supports employees' productivity (Edvinsson & Malone, 1997). Financial knowledge and expertise encourage the human resource to create compliance, competitiveness and collaboration that influence its value drivers. Kamukama (2012),

states that financial knowledge is owned by the organization and therefore remains in the firm even when the employees leave. It means knowledge of financial information, experience and financial information Systems management procedures are embedded in the organizational capital. Financial knowledge and Expertise is therefore seen as the backbone of the firm since it represents the firm's memory, facilities coordination and support efficiency.

Unlike the human capital, financial knowledge and expertise provides the framework to guide and interpret actions in the firm by embracing high technology that is used to guide and interpret actions in the organization. According to Wang and Noe (2010), financial knowledge and expertise depends on financial knowledge sharing and can include financial information system such as software and databases through which employees contribute to financial knowledge exchange and application. It also encloses organizational financial knowledge and financial innovations required by the organization to achieve competitive advantages (Mention & Bontis, 2013). From this discussion, the following hypotheses were tested:

$H_{01}$ There is no statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya.

### 2.4.1.2 The Direct Effect of Business Process

Financial business process is embedded as a key determinant of processes and financial performance at organization level. Financial business process and practice focus on the business environment resulting from competitive pressure that is growing at a speed owing to rising customer expectation, globalization and technological development. Overall financial business process enables the firms to excel in terms of possessions, documented information and codified financial knowledge, information systems,

financial knowledge management, organizational structure as well as its culture (Ahmed, 2013). In addition, financial business process and practice builds the links between organizational capital and financial performance (Trautman, 2016). The importance of financial business process and practice in the organization goes beyond ensuring an efficient combination of information and financial knowledge that directly affects the performance of organizations.

Commercial banks have a set of unique financial business process and practices encourage the human resource to capitalize on financial innovation to improve performance. This demonstrates that financial business process is a component of organizational capital that banks to combine resources more efficiently than other financial instructions to generate finance (Trautman, 2016). Given the fundamental changes in financial performance, the idea of business process is gaining strong momentum to provide measures of performance such as cost, superiority, service, flexibility speed that brings assurance of financial performance of the banking sector. Financial business process and practice therefore represents the understanding of the business flow and has a positive influence on financial performance. According to Hedley et al. (2010), about 70% of UK banking sector failure rate was due to lack of financial business process and practice. This study therefore suggested that managing organizational capital need to evolve and change with the changing ways of doing businesses. Therefore, the following hypotheses were tested;

$H_{02}$ There is no statistically significant relationship between financial business process and practice and financial performance of Commercial Banks in Kenya.

### 2.4.1.3 Human Capital and Financial Performance

Understanding the impact of human capital, organizational capital, and financial performance is important for commercial banks in order to sustain competitive advantage. Emphasize the importance of human capital commitment to discovering mystical financial performance in the banking industry. Human capital is the only generative intangible asset as it provides the organizations with the capability of employee's engagement in customer relations and is the source of intellectual possessions (Tarus & Sitieni, 2015). Moreover, human capital relates to the competence of employees that incorporate the customer relations, employee relations and customer loyalty that gives the firm a distinguishing character and has a direct effect on banks financial performance. In addition, human capital is mostly accumulated through human being efforts and is highly manageable across the firm. It therefore, refers to unique creative thrust, capable of leaning and skills that employees develop in the framework of their specialized activities (Kamukama, 2012).

Human capital has competitive characteristics which considerably affect the relation between organizational capital and financial performance. There is a strong relationship between the dimensions of human capital construct referred to as individual financial knowledge, training, creativity, expertise, experience, skills, attitudes, abilities, and personal networks of individuals in the commercial bank financial performance (Odinioha, 2013). Furthermore, human capital enables the commercial banks to add more value and to improve its competitive advantages since it utilizes financial knowledge efficiency and enhances their innovation potential in order to increase the financial performance (Kamukama, et al., 2010). The relationship between human capital and financial performance in Commercial Banks in Kenya was examined in this study. Therefore, the following hypotheses were tested.

H$_{03}$; There is no statistically significant relationship between human capital and financial performance of Commercial Banks in Kenya.

**2.4.3 The Mediation Effect of Financial Innovation**

Mediation effect is series of fundamental relationship in which the independent variable relates its effect on the dependent variable through an influencing third variable (Hayes, 2013). According to Baron and Kenny (1986), the mediating analysis helps to understand the significant relationship of one variable and its effect on the other variable. In this study the relation between the independent variable and dependent variable was satisfied by the relationship between the organizational capital and financial performance. The link between the independent variable and the mediating variable was significant to satisfy the relationship between the organizational capital and financial innovation. In addition, the link between the dependent variable and mediating variable must be significant to satisfy the relationship between financial innovation and financial performance (Huang et al., 2011).

This study suggests that a vibrant and global competitive environment affects financial innovation and financial performance of the commercial banks. Financial innovation has three key trends that include concentrated international competition, incoherent and challenging markets and ability of resolving the sustainability dilemmas that bring improved financial returns. Scholars have urged that financial innovation reduces the agency costs, facilitate risk sharing, helps to compete in the market and improve locative efficiency (Thorsten et al., 2013). Financial information system management is a sound solution to the manager's ability to execute some specific managerial activities or responsibilities. A study done by Rosni and Rosli (2013) argues that financial information system management is the engine driving financial innovation system towards the goal of improving the organization financial performance.

The relationship of financial information system management has been established as a key enabler of change with new products such as mobile banking, ATMs as well as electronic banking that leads to improved financial performance dimensions (Odinioha & Gbaraka, 2016). The banks in Malaysia revealed that there is significant relationship between financial information system management and banks financial performance (Zin et al., 2014). In addition, financial business process and practice support employees and improves the relationship between organizational capital and financial performance. However, financial business process and practice in the banking sector are designed to capture and distribute business financial knowledge that directly affects the financial performance (Mohammed, 2012).

It therefore encourages the banking sector to capitalize on financial innovation to improve financial performance. Financial innovation, therefore, has a positive influence on financial business process and practice and financial performance. Therefore, good management skills require human or interpersonal managerial skills that present the manager's financial knowledge and ability to work with employees and are important for all hierarchical levels for managers in the firm. Better human capital in the organizations increases performance Bontis (2006). The value and unique competencies of employees are associated positively with financial innovation in the banking industry (Schneider et al., 2010). In the present literature there are very few studies that have discussed on the mediating effect of financial information system management on financial innovation and financial performance in the commercial banks. Therefore, the following hypotheses were tested;

$H_{04}$There is no statistically significant mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya.

**2.5 Research Gaps**

Several studies have tested the role of financial knowledge, expertise and financial performance. These includes Saksonova and Merino (2017) in their study on Fintech or financial technology as financial innovations the possibilities and problems of implementations. Mabrouk and Mamoghli (2010) in their study on dynamics of financial innovations and banks performance. Trautman (2016) in the study on the e-commerce, cyber and electronic payment system from paypal, Lin, et al. (2015) in their study on the Harnessing Internet finance with innovation cyber, Rosemann and Broke (2015) in their study on financial business process. Regrettably, there are no useful guidelines for managers on how organizational capital is used to enhance the commercial banks profitability, growth and financial performance. Additionally, most studies used the sample size of specific industry in the technology industry where financial knowledge and expertise are key factors and have been left out the study is therefore limited in formal financial service information hence creating a gap.

Moreover, the few studies that have been done on financial business process and practice included financial innovation. Dzombo, et al. (2017), assessed the effect of branchless banking strategy on the financial performance of commercial banks in Kenya. They concluded that ROA takes into account all the assets that used to support financial business process activities hence a better measure of financial performance. Trautman, (2016) evaluated the e-commerce, cyber and electronic payment system from Paypal and revealed that internet; e-commerce and mobile platforms have major impact in the financial business process reducing the operating costs. Lin et al., (2015) evaluated the Harnessing Internet finance with innovative cyber and they revealed that business of internet finance covers almost every sector of finance. Rosemann and Brocke, (2015) examined the financial business process management. Their study revealed that financial

business process creates social constructs hence it is a deterministic machine and a multifaceted dynamic system with an interacting feedback loops. These studies failed to describe the relationship between payment mediation services and financial innovation measures that should be employed to measure the financial business process, hence creating a gap.

Most of the literature review on human capital indicated that the researchers concentrated on a few variables on financial innovations. Ismaila, (2013) study on The Relationship between Human Capital Efficiency and Financial Performance and revealed that banks that maintained utilization of human capital resources have a very insignificant impact on the return on equity of banks. Worluand and Omodero, (2016) examined the effect of human capital development on financial performance of banks and the results revealed that banks employees have not been intellectually well developed so as to make a significant impact on the financial performance of banks. Ozkan et al. (2017), analyzed the relationship between the intellectual capital performance and financial performance of 44 banks. Oyinlola et al. (2014), study on an empirical analysis of human capital development and organizational performance in banking sector. The studies ignored technological platforms associated with the financial innovation transactions and financial performance of the banking sector. Most of focused on human capital development and firm performance and mediating factors of financial innovations that contribute to financial performance in the banking sector have been left out. These studies therefore give a general view on human capital and financial performance of commercial banks hence creating gap.

In respect to financial innovation, Muiruri and Ngari (2014) investigated the consequences of financial innovation in the commercial banks. Cherotich, et al. (2015) based their study on financial innovation and performance in commercial banks in

Kenya. Wachira (2017) analyzed the impact of financial innovation on credit risk management of commercial banks. Gichungu and Oloko (2015) in their study on the relationship between bank innovation and financial performance in Kenya commercial banks. Their finding indicated that the commercial banks had adopted financial innovations. Additionally, most of financial innovation literature review was mostly in the developed countries like Canada, Hong Kong and US. Sharf (2016), studied on the users of financial innovation in Canada. Thorsten et al. (2017) investigated the financial innovation in the fast growing sector. Uzkurt et al. (2013) studied on the role of innovation in the relationship between organization culture and firm performance. Shert (2015) studied on technological innovations in banking sector. Beshati et al. (2012) in their study on relationship between Intellectual capital and financial innovation with financial performance. Abir and Chokri (2010), in their study on financial innovation and performance of banks; Elsetouhi et al. (2011) in their study on the relationship between intellectual capital and process and product innovation in banks. Despite the literature on financial performance of commercial banks the studies failed to discuss the capable services provided by financial innovation and their mediation services, hence creating a gap. In addition, these studies indicated that limited attention has been paid to the mediating effect of financial innovation on organizational capital and financial performance in the Kenyan commercial banks. This study therefore will fill the existing knowledge gap.

# CHAPTER THREE

# RESEARCH DESIGN AND METHODOLOGY

## 3.1 Introduction

This chapter explains the research design and the methodology in a systematic order to achieve the research objectives or solve the research problems and to show how the research was analyzed scientifically. Research methods are therefore defined as the procedures and techniques for conducting research. This chapter consists of research philosophy, design, location of the study, population of the study, sampling procedures and sample size, instrumentation measurement, pilot study, validity and reliability. This is followed by data collection procedure, lastly, data analysis and presentation and confirmatory model and hypotheses testing.

## 3.2 Research Philosophy

Research philosophy refers to the nature and development of knowledge and is an important part of research methodology. Research philosophy is grounded on the methodological criteria for a research study. According to Sudeshna and Datt (2016), research philosophy is the understanding and knowledge gained by conducting the research. Johnson and Christesen (2008), posits that research philosophy is an independent approach that is undertaken by individual researcher in cognizance of the underlying principles of design, implementation and evaluation of a particular problem that motivate the researcher to investigate and develop a temporary or permanent solution. Research philosophy is based on three branches that the researcher needs to take into account. These include ontology, epistemology and positivism approaches that are based on certain paradigms.

In research methodology there are various philosophical paradigms that include realism, positivist and phenomenological paradigms. However, social sciences are guided by the

two main paradigms, positivist and phenomenological paradigms. Positivist paradigm adopts a clear quantitative approach to examining phenomena and is an objective- based method and could be used to test hypothesis from existing theories. The research adopted positivism that states that reality is stable and can be described from an objective point of view without bias. Additionally, positivism is based on reason, truth, validity and focus purely on evidence gathered through observations and experience. It is measured empirically measured using the survey, quantitative methods, experience, and statistical analysis (Saunders et al., 2009).

This study used multiple regressions to measure and analyzes collected data in order to determine the various effects in the study (direct and mediated) to make conclusions and generalizations. The general objective of the study was to evaluate the mediating effect of financial innovation on organization capital and financial performance of commercial banks in Kenya. The study also entailed on interpreting the research findings in the context of the relevant theoretical and empirical literature described in chapter two.

### 3.3 Research Design

Yin, (1994), defined research design as the plan or framework for conducting the research. Research design is hence considered as an important part of a reliable and valid research since it explains the preparation of data collections and analysis so as to solve the research problem or achieve the research purposes (Kothari, 2009). In addition, the research design is used to explain the purpose of the study, the type of the questions being addressed, the techniques used for data collections, and approaches to select samples and how the data was analyzed (Gray, 2007). Research design will, therefore, be the procedure to help in decisions regarding what, where, when, how much, by what ways in relation to an investigation or research (Cooper & Schindler 2011). Additionally, Cooper and Schindler (2011) states that it constitutes the outline of the data collection, measurement, and analysis.

This study adopted descriptive research design. Descriptive research design involves gathering of quantitative data that describe events and allows a researcher to get information regarding the status of the occurrences as well as to describe what remains with respect to variables in a situation. The use of descriptive research design in this study was to point out the variables that are worth testing quantitatively. Descriptive research was chosen as it allowed the researcher to gather data that define events, organizes, tabulates and depicts the data collection (Glass & Hopkins, 1984).

Quantitative methods on the other hand were used to examine the relationship between variables to analyze and represent relationships mathematically through statistical analysis. Therefore, this design was appropriate for this study to address extensively quantitative methods to analyze the relationship between variables. The main aim of this study was to investigate the mediating effect of financial innovation on the relationship between organizational capital and financial performance in commercial banks in Kenya. The descriptive research helped to organize the findings in order to fit them with explanations and test or validate those explanations (Salkind, 2010).

### 3.4 Location of the Study

In line with the subject matter of the study, the study was carried out on all the Commercial banks in Kenya. These commercial banks were 41 by the end of 31[st]March 2018 (CBK, 2018). The accessible population included all the commercial banks as of 31st December 2018 and was in continual operations period of not less than 3 years. The location of the study was Nairobi since all commercial banks have headquarters in Nairobi. In addition, new financial innovation is better provided in headquarters where operational, credit and transactional managers are acquainted. It is also essential to note that there is relative accessibility in the network of main roads within Nairobi. The target population or the unit of observation therefore was the commercial banks within Nairobi.

While the unit of analysis or the respondents were the commercial bank's operational, credit and transactional managers of the 41 commercial Banks.

## 3.5 Population of the Study

According to Zikmund et al. (2012), population is referred to a collection of all items in any field of inquiry where a sample is drawn and is known as the universe. Hyndman (2008) refers to population as the aggregate or totality of those conforming to a set of specifications. Mugenda (2003) defines target population as the entire group of individuals, items, objects or things with common observable attributes that specifically fit for being sources of data required to address the research problem. The target population of this study was the 41 licensed commercial banks in Nairobi. The study respondents were the operational, credit and transactional managers of the 41 commercial banks in Nairobi that were in operations as at 31[st]March, 2018. The reason for choosing these managers as respondents was because they are responsible for financial performance and have high level of appreciation on financial innovation, organizational capital and the financial knowledge of their respective banks. They are also responsible for supervision of financial performance in their banks through the departmental budget and action strategies. According to the CBK annual supervision report of the year 2017 as at 31[st]March 2018 the Kenyan Commercial Banks had a network of about 41 banks spread throughout Kenya.

## 3.6 Sampling Procedures and Sample Size

### 3.6.1 Sampling Procedures

Sampling procedure is a technique or a process of selecting sample that is representative of the population. Lavrakas (2008), describes a sample in a survey research context as a subset of subjects drawn from a larger population. Mugenda (2010), describes it as a part of the total population and points that a sample is a number of individuals or items

selected from a population for a study preferably selected to represent the larger group from which it was selected. Kothari (2008), refers to a sample as a collection of units chosen from the universe to represent it. Therefore, a sample is a representative of the population and suitable for research in terms of cost, convenience, and time.

This study employed survey of the entire banking industry in Kenya. This meant that all the registered commercial banks in Kenya were subjected to the study. Census was employed due to the fact that the study aimed to investigate the mediating effect of financial innovation and financial performance of commercial banks in the entire banking industry in Kenya. The sample of this study was therefore 41 commercial banks in Kenya as at $31^{st}$March 2018. Since the entire population from which the sample is taken is homogeneous, census sampling was done. Census sampling is a sampling tool where every element in the population has an equal chance of existence in the sample. The accessible population was operational managers, credit managers and transactional managers of the 41 Commercial Banks. The period of study was three years 2015 and 2017.

### 3.6.2 Sampling Frame

Sampling frame is physical presentation of all units in the population from which the sample was selected. According to Turner and Swart (2011), sampling frame includes all individuals in the target population and includes accurate information that can be used to contact the selected individuals (Sekaran, 2010). It enables the researcher to have a unique identifier for each member, choose a logical organization to the list and use of up-to-date information from the target population. This study used census for the commercial banks as listed in the Central banks of Kenya database which were last updated as of March 2018 as presented in Appendix II.

## 3.7 Data Collection Instrumentation

Data collection instruments are methodologies used to identify information source and collect information during a study or means by which primary data are collected in social research (Kothari, 2009). Accurate and systematic data collection is critical when conducting scientific research (Orodho, 2009). The process of developing data collection can be done in a number of ways cognizant of the costs involved, time and other resources at the disposal of the study. Data collection includes self-administered questionnaires, mailed questionnaires, observations, personal interviews, and telephone interviews. However, in this study the respondents were approached with close ended self-administered questionnaire using drop and pick later method to obtain primary data. Cooper and Schindler (2011), explain that the questions in a study are directly related to the research questions. Bryman (2011) alleged that the questionnaires consist of a series of specific, short questions that are asked by the researcher or answered by the respondents on their own. Bryman (2011), also states that the number of closed-ended questions in any survey should exceed the number of open-ended questions.

Secondary data is the data readily available from other sources. This study used the statements of comprehensive income, statements of financial positions and statements of cash flows of the respective commercial banks for five years to calculate and analyze the return on assets (ROA) and earnings before interest and tax (EBIT) from the published financial statement.

**Table 2: Goodness of Fit Statistics in SEM**

| Fit Indexes | Acceptable values |
| --- | --- |
| Chi-Square ($X^2$) | P value greater than 0.05 ($< 0.05$) |
| Root Mean Square Error of Approximation (RMSEA) | Value$< .05$ indicates good model fit;<br>Value$<.08$ indicate reasonable fit<br>Value $< .10$ indicates poor fit |
| Goodness-of-Fit Index (GFI), | Value $\geq 0.90$ |
| Normed Fit Index (NFI). | Value $\geq 0.90$ |

### 3.8 Pilot Study

A questionnaire is a common tool used to collect data in business research. The questionnaire should be piloted to refine it to ensure that the respondents have no problems in answering the questions. A pilot study is therefore undertaken for pre-testing the questionnaire. However, based on the results of the pilot study the questionnaire can be edited (Kothari, 2009).

A pre-test study was carried out prior to the beginning of the full study to establish the respondents understanding of the questions and to solicit feedback for improvement of the instruments. Cooper and Schindler (2011), defines pilot test as a test to detect weaknesses in design, instrumentation and hence provide an alternate data for collection of probability sample.

According to Sekaran, (2010): Mugenda, (2008): Cooper and Schindler (2011), a pilot test is essential for testing the reliability of instruments and the validity of a study. The procedure that was used in pre-testing the questionnaire was identical to those that were used during the actual study or data collection. The study used Cronbach's alpha to test the reliability of the instruments. The rule of thumb for interpreting alpha for Likert scale question of more than 0.7 was acceptable (Mugenda & Mugenda, 2003).

In this study, a pilot test was conducted using questionnaires administered to commercial banks branches outside the Nairobi CBD. According to Cronbach's alpha eight commercial banks were taken for pilot-testing, each sampling one branch manager was sampled. The questionnaire was coded and input into statistical package for social sciences (SPSS) Version20 to run the cronbach reliability test. The result of the reliability test was used to produce the overall Cronbach Alpha correlation coefficient. Higher internal consistence close to 1 and a coefficient of 0.7 is recommended for newly developed questionnaires.

## 3.9 Validity and Reliability

### 3.9.1 Validity of Data Collection Instrumentation

Validity comprises the usefulness of inferences; meaningfulness as well as the appropriateness made by the study on the base of the data collected and can be thought to be judgmental (Wallen & Fraenkel, 2001). To measure the validity of the instruments and to address the operational constructs and their respective indicators as they are extracted on the basis of extensive literature review, content validity was adopted. Validity was used to check whether questionnaires are measuring what they purport to measure (Mugenda, 2008; Bryman, 2011). According to Drost (2011) validity has a number of different aspects and assessment approaches which include statistical conclusion validity, internal validity, construct validity, and external validity.

This study adopted content validity where the domain of the concept was made clear. Validity is therefore the power of conclusions, inferences or propositions used to validate hypothetical constructs by clustering those indicators or characteristics that appear to correlate highly with each other (Kane, 2006). Drost (2011), posits two ways of assessing content validity especially if the study is using several survey items to measure a more universal construct that there are basically of questions about the techniques or

test and/or ask their opinions of expert judges in the field. In order to increase the content validity of the research instrument EFA was used to summarize the information of a large group of variables into a smaller one by allocating them into distinct factors without significant loss of information.

### 3.9.2 Reliability of Data Collection Instrumentation

Abbott and McKinney (2013), explain that reliability is the extent to which a given measuring instrument produces same result under the same condition and with the same subjects each time it is used. According to Drost (2011) the methods used to estimate test reliability in behavioral research include, test-retest reliability, alternative forms, split-halves, inter-rater reliability, and internal consistency. The internal consistency method was adopted because it is more stable than the other methods (Bryman, 2012; Cooper & Schindler, 2011). The study used the Cronbach's alpha (α) which is the most common. Cronbach's alpha was popularized by Cronbach (2004) to measure consistency within the instrument and points out the extent to which a set of test assesses how well a set of items measure a particular behavior or characteristic within the test. Each item was treated as measuring a single latent variable (Cronbach, 2004). Pallant (2010) recommends a value above 0.7 to be used as cut-off. In support of internally consistent, Drost (2011) proposes that estimates of reliability should be based on the average inter-correlations among all the single items within a test. The equation of Cronbach's alpha (α) was as follows:

$$\alpha = K / (K - 1) (1 - (\Sigma\sigma k^2 / \sigma total^2)) \text{-----------------------------------------Equation (1)}$$

Where; α is Cronbach's alpha, K is the number of items, $\Sigma\sigma k2$ is the variance $\sigma total2$) is the scores on the total measurement (Cronbach, 2004).

Bollen et al. (2005), in their study on the Linking intellectual capital and intellectual property to company performance, used Cronbach's alpha to ensure the reliability of the data collection instrument in their study. Same case with Anuonye (2015), in the study of Intellectual Capital Measurement: Using the Earnings Per Share Model of Quoted Insurance Companies in Nigeria.

**3.10 Data Collection Procedure**

Kombo and Tromp (2009), explain that data collection is the process of gathering information to provide or verify some facts. Cooper and Schindler (2006), propose the use of the questionnaire in descriptive studies since self-administered surveys characteristically cost less than personal interviews and there is also sample accessibility. The researcher in this study obtained an introductory letter from Kabarak University in order to apply for a research permit from National Commission of Science and Technology (NACOST). An introduction letter and the NACOST permit were presented to the respondents. Questionnaires were appropriate for this study since they collect information that is not directly observable but entails the feelings, motivations attitudes as well as experiences of individuals.

Primary data is data collected afresh for the first time hence being original in character (Kothari, 2008). Primary data are the original items to the problem under study and can be openly used for comparative study. In this study primary data was collected through the administration of questionnaires to operation managers, credit managers and transactional managers. Paxson, (1992) states that a drop and pick later method can reduce nonresponse bias through reduction of non-coverage, noncontact or refusal to participate. This study preferred the drop-and pick method in order to give the respondent sufficient time to respond to the questionnaires as well as to reduce bias and once they were entirely answered the researcher collected them. Since the questionnaires

were designed based on the five likert-types scale the respondents were required to rate by scoring the extent to which they perceived a particular statement as a descriptive of the effect in the industry. Five research assistants were engaged to follow up the administered questionnaires. The finance department was used as an entry point to the commercial banks.

Ghauri and Gronhaugh (2002), defines secondary data as the already available data that have been collected and analyzed from relevant documentaries as well as company publications. Secondary data saves cost and time in the implementation of the study. Secondary data was collected through documentary analysis of financial statements and financial reports of different commercial banks and central banks of Kenya annual reports. Melissa (2014), states that secondary data involves the use of data congregated from a previous study. Secondary data is a systematic method with procedural and evaluative steps and is an empirical exercise which can be utilized in several ways.

## 3.11 Data Analysis

Data analysis involves the reduction of collected data to adaptable size, developing summaries, observing for patterns, and applying statistical techniques. Data preparation enables editing, coding, and data entry. In addition, data presentation is the activity that ensures the correctness of the data as well as their conversion from primary data to reduced and classified forms that are more appropriate for analysis. Editing detects errors and omissions, correct them where possible, and certify that maximum data quality standards are achieved. Coding is the assigning of numbers and symbols to answers so as to group the collected data into either secondary or primary techniques to a medium for viewing and manipulation.

Descriptive statistics enables the researcher to successfully describe the distribution of the items in the study. This study used descriptive statistics in the form of percentages, means and measures of dispersion, which allows for the presentation of data in a more meaningful way and thus simpler interpretation of data. The use of percentages is important as they simplify data by reducing all the numbers to a range between 0 and 100 and help translate the data into standard form with a base of 100 for relative comparisons and easier interpretations (Cooper & Schindler, 2011). Descriptive statistics analyze data in the form of frequency tables, bar charts, graphs and pie charts from close ended questions in the questionnaire.

To test the quantitative data statistical procedures were used. Statistical analyses covered a broad range of techniques from simple to complex methods. According to Faraway (2000) in a situation where the number of independent variables is more than one multiple linear regression are used. Cooper and Schindler (2006), states that correlation coefficients reveal the magnitude and direction of the relationships. Correlation and regression analysis were used to test the relationship between financial knowledge and expertise, financial business process and practice and human capital and financial performance. Hypothesis on the individual relationships were tested using t-statistics at $p<0.05$. To test the hypotheses on the combined relationship, $R^2$ and ANOVA were analyzed at $p<0.05$. Inferential data analysis was used to establish the significance of the individual hypothesis and to ensure that all conditions for correlation coefficients and regression analysis were met. To test for the relationship between organizational capital and financial performance Pearson correlation coefficient was applied.

Data on financial performance was analyzed using trend analysis and was presented using tables. The study used linear multiple regression analysis to test the statistical significance of the various independent variables (financial knowledge and expertise,

financial business process and practice and human capital) on the dependent variables (Return on Assets, Earning Before Interest and Tax and profitability).

Data were analyzed using multiple linear regressions to measure the degree of relationship of the independent variable under study against the dependent variable. Analysis of Moment Structural (AMOS) and Statistical Package for Social Sciences (SPSS) version 20 was used in this research to analyses the data. Multiple regression analysis involves combining several predictors in a single regression equation. A null hypothesis fail to be accepted if the probability value is less than the significance level (0.05) and the alternative hypothesis would be accepted (Johnson & Christensen, 2012). The degree of Coefficient of determination ($R^2$) would be used to determine the degree of association.

### 3.11.1 Financial Knowledge and Expertise

The regression models that were used to establish the relationship between the financial performance Dependent variable and the Financial Knowledge and Expertise independent variables is provided below.

$Y = \beta i + \beta 1\ X1 + \varepsilon$ ……………………………………………Equation 3.2

Where.

Y is the Financial Performance of commercial banks,

$\beta i$ is the constant or Beta Coefficient of intercept,

X1 is Financial Knowledge and Expertise,

$\varepsilon$ is Error Term (Disturbance factors) which represents residual or values that are not within the regression model.

### 3.11.2 Financial Business Process and Practice

The reduced model for direct relationship between hypothesized financial business process and practice, and financial performance was based on simple regression equation.

Hence the regression equation for testing hypothesis 2 was as follows.

$Y = \beta i + \beta_1 X_1 + \varepsilon$ …………………………………………………Equation 3.3

Where;

Y is the dependent variable Financial Performance

$\beta i$ is the Beta Coefficient,

$X_1$ is the independent variable, financial business process and practice and

$\varepsilon$ is the error term.

### 3.11.3 Human Capital

The direct hypothesized relationship between human capital and financial performance was based on regression equation

Hence the regression equation for testing hypothesis 3 was as follows;

$Y = \beta i + \beta_1 X_1 + \varepsilon$ …………………………………….........………………Equation 3.4

Where;

Y is the dependent variable Financial Performance,

$\beta i$ is the Beta Coefficient,

$X_1$ is independent variable Human Capital,

$\varepsilon$ is Error Term.

### 3.11.4 Mediating Effect of Financial Innovation

The most common way to obtain estimates of the path coeffients is to run a series of regression analyses. This is similar to Baron and Kenny (1986) steps on path analysis except that a statistically significance outcome on the first step is not considered a

requirement before the subsequent steps. There are several methods used to test statistical significance of mediated models. However, the four most widely used procedures include causal –step approach, (Baron & Kenny, 1986), joint significance tests for a and b path coefficients, the Sobel test (Sobel, 1982) for null hypothesis ($H_0$) *ab*=0, and the use of bootstrapping to obtain confidence intervals for the *ab* product that represents the mediated or indirect effect.

The reduced model of the indirect relationship between the hypothesized organizational capital and mediating variable financial innovation was based on the Sobel test

Model 1

$$Y = \beta 0 + \beta 1 X + \beta 2 M + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \text{Equation 3.4}$$

Where;

Y is the dependent variable Financial Performance,

$\beta_1$, $\beta_2$ and $\beta_3$ is Beta Coefficient,

$X_1$, $X_2$ and $X_3$ is the independent variables, (Financial Knowledge and Expertise, financial business process and practice and Human Capital).

M is the mediating variable financial innovation, (ATMs, Internet banking, Mobile banking and Debit cards).

The second model was used to establish the relationship between the mediating variable (financial innovation and financial performance)

$$M = \beta 0 + \beta 1 X + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \text{Equation 3.5}$$

Model 2

A second model was used to establish the relationship between the mediating variable (financial innovation) variable and dependent variable (financial performance).

This study focuses on the following path equation models.

$$\begin{array}{c} \text{c} \\ X \xrightarrow{\ a\ } M \xrightarrow{\ b\ } Y \end{array}$$
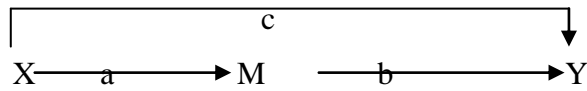
Table 3 below shows the steps that were used;

**Table 3: Steps Used**

| Steps | Analysis | Visual Depiction |
|-------|----------|------------------|
| Step1 | $Y = B_0 + B_1X + e$ <br> Simple regression to test path c alone with X predicting Y <br> Where Y= financial performance <br> $B_0$ = constant <br> $X_1 =$ <br> e =error term | C <br> X          Y |
| Step 2 | $M = B_0 + B_1X + e$ <br> Simple regression analysis to test for path a with X predicting M <br> Where M = financial innovation <br> $B_0$ = constant variable <br> X <br> e= error term | X $\xrightarrow{\ a\ }$ M |
| Step 3 | $Y = B_0 + B_1M + e.$ <br> Simple regression analysis to test for significant path of b alone with M predicting Y. <br> Y = financial performance <br> $B_0$ = constant <br> M =financial innovation <br> e= error term | b <br> M $\longrightarrow$ Y |
| Step 4 | $Y = B_0 + B_1X + B_2 M + e$ <br> Multiple regression analysis with X and M predicting Y. <br> Y = financial performance <br> $B_0$ = constant <br> M =financial innovation <br> e= error term | C <br> b <br> X $\longrightarrow$ M $\longrightarrow$ Y |

## 3.12 Hypothesis Testing

Structural equation modeling (SEM) is explained as a statistical process that allows multiple relationships between one or more independent variable as well as multiple relationships between one or more dependent variables. SEM model allows the researcher to perform multilevel regression or ANOVA on factors. In this study, univariate and multivariate regression/ ANOVA and factor analysis was used to implement the data.

Multiple indices measures the overall model fit. Absolute fit indices combined with relative fit indices are included. In this study the indices consist of the Chi-square test of model fit ($X^2$), the Root Mean Square Error of Approximation (RMSEA), the Goodness-of-Fit Index (GFI), and Normed Fit Index (NFI).

**Table 4: Research Design Matrix for Research Hypothesis**

| Research Hypothesis | Analysis Technique | Interpretation |
|---|---|---|
| $H_{01}$ There is no statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya. | $Y = \beta i + \beta_1 X_1 + \varepsilon$ Statistical Analysis; Pearson Correlation coefficient and Regression Coefficient. | Where, Y is the Financial Performance of commercial banks, $\beta i$ is the constant or Beta Coefficient of intercept, $\beta_1$ denotes change in financial knowledge and expertise and financial, $X_1$ is Financial Knowledge and Expertise, $\varepsilon$ is Error Term which represents residual or values that are not within the regression model. The closer R approaches $\pm 1$, shows a relationship exists. It is interpreted that $X_1$ has a significant effect on Y. Reject $H_{01}$ if P-value $\leq 0.05$ however fail to reject if P-value is $> 0.05$. |
| $H_{02}$ There is no statistically significant relationship between financial business process and practice and financial performance of Commercial Banks in Kenya. | $Y = \beta i + \beta_1 X_2 + \varepsilon$ Statistical Analysis; Pearson Correlation coefficient and Regression Coefficient | Y is the dependent variable Financial Performance Coefficient $\beta_2$ denotes the change in financial performance from a unit increase in financial performance. $\beta i$ is the Beta Coefficient, $X_1$ is the independent variable, financial business process and practice The closer R approaches $\pm 1$, then a relationship exists. This is interpreted as evidence of $X_2$ having a significant effect on Y $H_{02}$ is rejected if P-value $\leq 0.05$ and fail to reject if P-value is $>0.05$. |
| $H_{03}$ There is no statistically significant relationship between human capital and financial performance of Commercial Banks in Kenya. | $Y = \beta i + \beta_1 X_3 + \varepsilon$ Statistical Analysis; Pearson Correlation coefficient and Regression Coefficient. | Where; Y is the dependent variable Financial Performance, $\beta_3$ denotes the change in human capital, $\beta i$ is the Beta Coefficient, $X_3$ is Human Capital, $\varepsilon$ is Error Term. $H_{03}$ is rejected if P-value $\leq 0.05$ and fail to reject if P-value is $>0.05$. |
| $H_{04}$ There is no statistically significant mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. | $Y = \beta_0 + \beta_1 X + \beta_2 M + \varepsilon$ Statistical Analysis; Pearson Correlation coefficient and Regression Coefficient. | Multiple regression analysis with X and M predicting Y. Y is financial performance $\beta_0$ is the constant, $\beta_1$ and $\beta_2$ are coefficient. M is the financial innovation $\varepsilon$ is the error term $H_{04}$ is rejected if P-value $\leq 0.05$ and fail to reject if P-value is $>0.05$. This is interpreted as a significant mediating effect between X and Z as a mediator. |

International Business Machines (IBM) (2010) states that the assumptions of linear regression must be achieved by the data analyzed and coefficients must be linear in nature, followed by the response errors that should follow a normal distribution with a common distribution. The model presents a simplified linkage between hypothesized financial performances as mediated by financial innovation for commercial banks in Kenya.

## 3.13 Measurement and Scaling Technique

Measurement involves the assignment of a number to an object which reflects the degree of possession of a characteristic by that object (Panneerselvam, 2006). This study used a 5-point Likert scale, to measure the objectives. The Likert scale, which is interval scale, is designed to examine how strongly subjects agree or disagree with a statement (Sekaran & Bougie, 2010). The 5-point Likert scale stating "Strongly disagree" and "Strongly agree" was used. Trochim (2006) defines Likert Scaling as one-dimensional scaling method whose concepts are generally easier to understand because you have either more or less of it, and that's all. On the other hand, Kothari (2009) explains that 5-point Likert scales are used because they are more reliable and can provide more information. Wahid and Mahmood (2013) in their study on Relationship of Intellectual Capital Dimensions and Performance of Banks in Malaysia: An Exploratory Study used a 5-point Likert scale. Additionally Kemboi et al. (2014) in their study on Intellectual Capital as an Antecedent to Employee Performance in Commercial Banks in Eldoret.

## 3.13.1 Measurement of Independent Variables

This study used the dichotomous scale to elicit a Yes or No answer. Rensis Likert, developed Likert scale, to examine how strongly subjects agree or disagree with a statement (Cooper & Schindler, 2011). This study used a Likert scale which was dominant in the questionnaire. Chimi and Russel (2009), explain that Likert scale is used

in nearly all fields of scholarly and business research that it is used in a wide diversity of circumstances. Likert scale therefore, sought a belief, opinion or effect when the value sought cannot be asked or answered definitely. It is also used when the value sought is considered to be of a sensitive nature. The independent variables were evaluated easily through standard techniques like factor analysis.

The study also used the Analysis of Moment Structures (AMOS) component to construct a conceptual model linking the variables under study. SEM was used to confirm and explain conceptual models that involve attitude and perceptions (Argyrous, 2005). Mokhtar et al. (2012) in their study on the determinants of customer behavioral responses in Nigerian retail banks used AMOS 16 to test whether perceived financial innovation mediates the relationship between organizational capital and commercial banks financial performance. Baron and Kenny (1986) a four step approach in which simple and multiple linear regressions was conducted and significance of the coefficients was examined in each step to analyze the effect of financial innovation on the performance of the commercial banks.

### 3.13.2 Measurement of Dependent Variable

Measurement of financial performance was by financial ratios that were analyzed from data obtained from financial statements. The financial ratios were important in this study because they provided a pattern or trend over the five years from 2015-2017. In addition, the purpose of financial ratios in this study was to establish the financial strength of the commercial banks. This is because the financial ratios are historical in nature (figures are historical in nature) and therefore can reflect on the financial performance of what has happened and not what will take place in future. Return on asset (ROA) measured the returns by using assets used to generate income. ROA was also used to assess the operating performance relative to outlay, considering whether the banks used debts or

equity capital to finance the outlay. The ratio measured the relationship between the profit before interest and tax (EBIT) as well as the total asset expressed in number and in percentage since it showed Commercial Banks efficiency in utilizing total assets. The following formula was used to measure the ROA

ROA = (Net profit before Interest and Tax / Total Assets) x 100

EBIT=Operating profit+ Non-recurring +Non-core +Non –controlled

## 3.14 Diagnostic Tests

The main aim of this process was to assemble or construct data in a meaningful or compressive way. Data analysis entails examining, categorizing and tabulating the evidence to address the initial propositions of the study. Analysis and diagnostic test are tightly related to each other since without analysis diagnostic does not exist. This study uses diagnostic test to predict the consequences, both positive and negative and tabulating the evidence to address the various forms of bias that may occur in research. The study used a number of diagnostic processes to identify the favorable and unfavorable factors.

### 3.14.1 Tested for Outliers

An outlier is an extreme event that alters the true relationship between variables, either by creating a correlation that should not exist or suppressing a correlation that should exist (Abbott & McKinney, 2013). In multivariate data, outliers for ordinal variables are those units representing an unusual combination of the categories or of the ranks of the variables (Riani, et al., 2012). This study was tested for outliers through computing Mahalanobis distance for each sample, with outliers being identified as those samples yielding large values of Mahalanobis distance (Webb & Copsey, 2011).

### 3.14.2 Normality Test

Normality is important in determining the shape of distribution and helps to predict dependent variables scores (Fitrianto & Chin, 2016). To test the normality of the data, the study used Kolmogorov-Smirnov (K-S) test. The K-S statistic was based on the maximum absolute difference between the empirical distribution function (e.d.f) and specified cumulative distribution function (c.d.f) (Sukkasem, 2010).This was used to test the nature of statistical population's relative frequency distribution. The theoretical distribution of population is the calculated cumulative frequency distribution that represents null hypothesis ($H_0$). The sample is run to test significance that is commonly used to test the randomness in a sample. This is done because a non-random sample may be a biased representation of the data (Bhattacharya, 2013). Lilliefors (2012) used Kolmogorov-Smirnov test to test for normality with mean and variance unknown. The normality of the data distribution also was assessed by examining its skewness and kurtosis. The absolute values of consistent skew or kurtosis indices were used to assess the linearity of the variables (Kline, 2005).

### 3.14.3 Multicollinearity Test

This study checked for the problem of multicollinearity, which is present if there are high correlations between some of the independent variables (Burns, 2000). Multicollinearity was examined using correlation matrices and collinearity diagnostics. Multicollinearity is explained as statistical phenomenon where two or more predictor variables in the model are highly correlated (Joshi, 2012). A linearity test was conducted, to show the amount of change or rate of change between scores on two sets of variables and is constant for the entire range of scored by the variables (Bai & Perron, 2008).

**3.14.4 Structural Equation Modeling Test**

Structural equation modeling (SEM) used AMOS to offer services that can be brought into service for data analysis using a two-phase process consisting of confirmatory measurement model and confirmatory structural model as suggested by Anderson and Gerbing (1988). SEM is an inclusive statistical approach used to test hypotheses on relations between observed and latent variables. SEM was chosen because it allows the analyses of multiple structural relationships simultaneously while maintaining statistical efficiency (Hair et al., 2006). It mixes characteristics of factor analysis and multiple regressions for studying both the measurement and the structural properties of theoretical models. SEM is explained by two sets of linear equations known as inner model and the outer model. The internal model identifies the relationships between latent variables, and the outer model specifies the relationships between latent variables and their linked observed or manifest variables (Turkyilmaz & Ozkan, 2007). SEM methodology will account for independent variable errors and model multiple relationships simultaneously, which results in more powerful tests of mean differences.

**3.14.5 Exploratory Factor Analysis**

The study's construct measures were initially tested using exploratory factor analysis (EFA) and were tested for reliability using SPSS 20. EFA is intended to explore the data if the links between the observed and latent variables are unknown or uncertain (Byrne, 2010). The extent of relationships among all measured variables to every factor was represented by factor loadings. A set of highly inter-correlated measured variables was grouped into a distinct factor. EFA will provide the study with information about numbers of factors that best represent the data. This means that in EFA, statistical units, not theory, derive the factors (Hair 2010).

### 3.14.6 Factor Analysis

Factor analysis was conducted on all the constructs to determine the ones that were regressed against the dependent variable, with the principal axis factoring with varimax rotation being employed (Yong & Pearce, 2013). Prior to the extraction of factors, the Kaiser-Meyer Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity was conducted to confirm whether there is a significant correlation among the variables in order to warrant the use of exploratory factor analysis (EFA). Narteh, (2013) posits that Bartlett's test of sphericity is a statistical test to check correlations of the variables by examining the correlation matrix. It gives the statistical significance of the correlation matrix with significant correlations among some of the variables (Hair, et al., 2010).

The overall KMO perform the interpretation of information regarding how the data will fair when factored. It is therefore an index that indicates the extent to which observed correlations are a function of variance shared across variables as compared to uniquely present among specific pairs of variables. If the number of samples in the factor analysis is 100 or larger, factor loadings in the range of ± 0.30 to ± 0.40 are considered to meet the minimal level of interpretation of structure. Loading of ±0 .50 or greater are considered practically significant, and loadings exceeding ± 0.70 are considered indicative of well-defined structure and are the goal of any factor analysis (Hair et al., 2006). Narteh (2013) on the study on determinants of student's loyalty in the Ghanaian banking industry used the Bartlett test of sphericity and the Kaiser-Meyer Olkin (KMO) to check whether there is a significant correlation among the variables.

### 3.14.7 Commonalities Test

This study also checked for commonalities. Commonality is the variance of an observed variable that is accounted for by the common factor (Kim & Mueller, 1978) and

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Communalities greater than 0.7 are recommended while fewer than 30 variables are analyzed (Field, 2009). Communality values will then be checked to measure the variability of each observed variable that could be explained by the extracted factors (Field, 2009). For the extraction of factors the Principal axes factor analysis was used. Factor extraction was used to find the number of factors that can adequately explain the observed correlation among the observed variables (Kim & Mueller, 1978). A factor that accounts for less than 5% of the variance was considered not important for further investigation. Also, only factors with a value of 0.1 or more were retained.

### 3.14.8 Goodness-of-fit Test

The goodness-of-fit test (normed chi-squared) is the $\chi^2$ statistics divided by the degree of freedom. The expected p-value for the chi-square statistic should not be significant to accept the null hypotheses and demonstrate good fit of the proposed model to the data. Chi-square statistic was indicated as being very sensitive to sample size, thus the ratio of chi-square to degrees of freedom ($\chi^2$/df) was used to assess fit (Robinson Jr, Leroy & Sue, Neeley, & Williamson, Kathleen 2011). A ($\chi^2$/df) ratio value less than 5 is acceptable fit between the hypothesized model and the sample data (MacCallum, Browne, & Sugawara, 1996). Parsimony-adjusted indexes (Root Mean Square Error of the Approximation, RMSEA) are well-defined as correction of model approximates of the discrepancy and complexity that is anticipated in the population, and the estimated hypothesized model to the population covariance matrix. While RMSEA value of zero indicates the best-fit approximation of the population covariance matrix, a value of less than 0.08 indicates good fit (Wong et al., 2011).

### 3.14.9 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was performed. CFA is appropriately used when the study has some financial knowledge of the underlying latent variable structure. On the

financial knowledge theory and empirical research, the study postulates relations between the observed measures and the underlying factors a priori and then tests the hypothesized model statistically (Byrne, 2010). The study used the two-phase process consisting of confirmatory measurement model and confirmatory structural model as suggested by Anderson and Gerbing (1988). The relationship between the selected measurement items (observed variables) and their associated latent constructs needs was tested to ensure that the items adequately measure their associated constructs. Singh and Smith, (2004) explains the procedure as a guarantees resultant measurement models which are accepted as "proper" measures of the constructs. If the study does not use this two-step procedure, it would be difficult to identify the source of model-fit problems (Kline, 2011). The two-step approach makes it possible to investigate the structural model as the source of inefficiency and to rule out problems in the measurement models (Singh & Smith, 2004).

Anderson and Gerbing (1988) were the first to use this two-step approach for employing SEM. In the first step, the study confirms the measurement model with the use of CFA, which showed the extent to which the perceived variables (indicators) represented an underlying latent construct (Hair et al., 2010). Garver & Mentzer, (1999) posits that the observed variables are assigned one construct or latent variable.

Once the measurement model was validated, the second step was carried out and structural relationships (path analysis) among latent variables or constructs (Garver & Mentzer, 1999) were estimated to explain the causal effect as well as the amount of unsolved variance. When applying EFA, the results presented a clear factor structure that had an acceptable level of cross loadings. In addition, internal consistency and the reliability of the items constituting each construct was estimated. Scale refinement was assessed using an item to total correlations analysis, with indicators with an item to total

correlation threshold of 0.3 and higher being maintained for further analysis (Hair et al., 2006).

Before confirmatory structural models was developed, properties of multi-item constructs were analysed for construct reliability and construct validity by conducting confirmatory factor analysis (CFA). Anderson and Gerbing, (1988), states that SEM is a useful method of testing the theoretical relationship between measurement of items and their construct. SEM therefore allows the development of a confirmatory measurement model and scale purification, measurement-item in reduction and testing for the measures' convergent and discriminator validity as well as validity and reliability Confirmatory factor analysis offers a more rigorous evaluation of unidimensionality and reliability than the early steps of exploratory factor analysis (Anderson & Gerbing, 1988).

## 3.15 Confirmatory Structural Model and Hypotheses Testing of Study Variables

Structural model in this study was examined by using SEM which aids in examining the hypothesized causal paths or links that is presented in the conceptual framework. In SEM the fit indices establish whether the overall model is acceptable, and if acceptable, the study establishes whether specific paths are significant (Moss, 2009). The study used two types of fit statistics commonly used, these includes absolute fit indices and incremental fit indices (Hair et al., 2010). For absolute fit indices, the study used AGFI, Goodness-of-fit Index (GFI) and Root mean square error of approximation (RMSEA), while for incremental the study used Comparative Fit Index (CFI) to determine the model fits.

Regression weights tested the contributions of each of the indicator to their relevant convergent validity. Regression weights were tested to explain the relationships since all the variables were in the same measurement scale. Path coefficients estimates

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determined the direction and strength of the factors. T statistics provided information on the importance of the relationship. T-statistics value (CR) tested whether the models were significant with the conventional critical value of -1.96 or 1.96 at 0.05 significance level (P<0.05).Given that the research model has multiple independent variables, a mediating variable, and the dependent variable, structural equation model (SEM) analysis and multiple regression analysis are the appropriate multivariate techniques (Fang et al., 2011).

In order to test causal relations of the variables, Structural Equation Modeling (SEM) in path analysis was used to construct the linkage between financial knowledge and expertise, financial business process and human capital with financial performance. Structural equation modeling (SEM) is a statistical methodology that takes a confirmatory approach to the analysis of a structural theory bearing on some phenomenon (Byrne, 2010). Path analysis models are concerned with the analysis of the relationships existing between latent variables (Kenett & Salini, 2011). Structural Equation Modeling (SEM) is chosen over regression analysis because SEM can simultaneously analyze all the paths in one analysis, and provides full information about the extent to which the study model was supported by the data than in regression techniques. Confirmatory factor analysis (CFA) was used to estimate the measurement model, which determines whether the manifest variables reflect the hypothesized latent variables, and to identify the underlying structure of service recovery model (Namkung et al., 2009).

Once the data collected was subjected to Confirmatory Factor Analysis (CFA) to assess the constructs, the goodness-fit test of the proposed research model using SEM was conducted. Universally accepted statistical indexes, such as Goodness-of-Fit Index (GFI), were used to assess the goodness-of-fit of the proposed model. The value of Root

Mean Square Error of the Approximation (RMSEA) of the proposed model was also ascertained to identify the reasonable error of approximation of the model before concluding that the proposed model is acceptably fit or not (Hair et al., 2006). Cengiz et al. (2007), in their study on the effects of failure recovery strategies on customer behaviours via complainants' perceptions of justice dimensions in banks used RMSEA that identified the reasonable error of approximation of the model.

The study also used the Analysis of Moment Structures (AMOS) component to construct a conceptual model linking the variables under study. SEM was used to confirm and explain conceptual models that involve attitude and perceptions (Argyrous, 2005). Mokhtar et al. (2012), in their study on the determinants of customer behavioral responses in Nigerian retail banks used AMOS 16 to test whether perceived financial innovation mediates the relationship between organizational capital and commercial banks financial performance. This study used the Baron and Kenny (1986) a four-step approach in which simple and multiple linear regressions was conducted and significance of the coefficients was examined in each step to analyze the effect of financial innovation on the performance of the commercial banks.

### 3.16 Ethical Considerations

Ethical consideration in research deals with voluntary participation by the respondents, confidentiality and anonymity purpose identification, analysis and reporting. To eliminate or control any ethical concern the researcher made sure that participation was completely voluntary. However, this may lead to low respondent level. To encourage high respondent multiple contacts are encouraged. This study applied multiple contacts per potential respondents in a bid to protect their rights. To shun possible harm such as embarrassment and uncomfortable feeling, the study did not include sensitive questions.

Respondents' confidentiality was ensured through the study to protect the respondent's identity (Tronchim, 2006) as well as through literature review for authors' acknowledgment. Participant identification was kept confidential and willingly to be used to identify who will not respond for follow up purposes.

All the respondents were explained the purpose of the study and the organization sponsoring it. A cover letter was used to explain that the results of the study was used for partial fulfillment for a Doctoral degree. The information obtained was used in academic fields to report the weakness and the problems experienced as well as the positive results of the study.

# CHAPTER FOUR

# RESEARCH FINDINGS AND DISCUSSION

## 4.1 Introduction

The main objective of this chapter was to provide the analysis of the data, interpretation of the results and findings. The findings are related to the research objectives and hypotheses that guided the study. Data was analyzed to investigate the mediating effect of financial innovation on the relationship between organizational capital and financial performance of commercial banks in Kenya. Baron and Kenny (1986), approach was used to investigate the mediating effect of financial innovation (ATMs, mobile banking, internet banking, and debit and credit cards) and the financial performance of commercial banks as indicated by return on assets and earnings before interest and tax. Quantitative analysis of the open-ended questions was undertaken. To ensure a good quantitative model, several steps were embarked on as well as key guidelines for restructuring the model. The analysis, therefore, was conducted using a two-phase process consisting of confirmatory measurement and confirmatory structural model. This chapter represents the empirical findings and results of the variables, data analysis in line with the specific details of the response rate and sample characteristics of the data collected, presentation of the data analysis, interpretation, and discussion of findings. Tables were used for data presentation.

## 4.2. Demographic Characteristic of Response Rate

The targeted respondents in the study comprised of the operations managers, credit managers and transactional managers of the 41 commercial banks in Kenya. Therefore, a total of 123 questionnaires were filled and returned which resulted in a response rate of 100%. According to Babbie (1990), a response rate of 50% is adequate however,

Mugenda (2008) argues that response rate of 50% is adequate, 60% good and above 70% is very good. Therefore, the response of 100% meets an acceptable response rate.

**Table 5:  Response Rate**

|  | Questionnaires Distributed | Questionnaires Received | % Response |
|---|---|---|---|
| Responses | 123 | 123 | 100 |

### 4.2.1 Gender of the Respondents

The demographic characteristic of the respondents in terms of their gender was collated and reviewed. This was found essential because the previous scholars' linked gender diversity to financial performance and profitability of the banking sector (Adams & Ferreira, 2009; Marinova et al., 2008; Plantenga & Remery, 2010). Of the 123 respondents, 78 were male representing 63%, while 45 were female representing 37%. This revealed the male domination of management in the banking sector. Analysis of gender in various levels of the banking industry revealed that most of the senior staffs in various financial departments of the commercial banks in Kenya are occupied by the male gender. Historically, the banking industry has been a male-dominated professional although more women are joining the profession in the current trend. In support, Omar and Davidson (2001) argued that the number of women pursuing banking careers has increased significantly. However, a study by Randøy (2006) concluded that the number of women holding managerial seats in the banking sector is still low and has no significant association with either accounting or financial performance. Table 6 represents gender tabulations.

**Table 6: Gender Demographics**

| Main Factor | Factor Level | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 78 | 63 |
| | Female | 45 | 37 |
| **Total** | | **123** | **100** |

### 4.2.2 Age of the Respondents

Age is a pointer of maturity of employees in the organization since it provides accuracy of the information and indicates the amount of energy that the employees have to help in achieving corporate goals (Darmadi, 2013). Respondents were requested to tick the age group appropriate to them. Fifteen representing (12%) of the respondents were in the age group between 25-30 years. Forty-three representing (34%) of the respondents were at the age group of (31-35) and forty-six representing 37% of the respondents were at the age bracket of (36-40) and ten representing 8% of the respondents were at the age bracket of (41-45). Majority of the respondents were in the youth brackets which is the age of 25 to 35 years. This indicates that commercial banks use seniority (First-In-First out) for determining the employees to retrench. On the other hand, only 7% of the respondents were above 45 years. This is in line with many banks workforce that is mainly aged below 50 years due to the periodic employee realignment that witnesses the exit of the older employee or through either voluntary or early retirement. Table 7 represents the age group.

**Table 7: Age Bracket**

| Main Factor | Factor Level | Frequency | Percentage (%) |
|---|---|---|---|
| Age Bracket | 25- 30 Years | 15 | 12 |
| | 31-35 Years | 43 | 34 |
| | 36-40 Years | 46 | 37 |
| | 41-45 Years | 10 | 8 |
| | 45 Years and above | 9 | 7 |
| **Total** | | **123** | **100** |

### 4.2.3 Academic Qualification of the Respondents

Most promotions to management levels in firms depend on one's academic qualification (Oladejo & Moruf, 2012). In terms of educational attainment, 94 respondents representing 76% had qualified with the first degree. It was found that 17 respondents representing 14% held a master's degree qualification and 12 respondents representing 10% had Ph.D. qualification. This implied that the banking industry has highly educated staff who understood the issues under discussion in the research questionnaire. In addition, it depicts that most of the employees working in the commercial banks *are* knowledgeable and are capable of adopting any financial innovation that the banks invest in to improve financial performance. The response to this question is shown in Table 8 below.

**Table 8: Academic Qualification**

| Main Factor | Factor Level | Frequency | Percentage (%) |
| --- | --- | --- | --- |
| Level of Education | PhD | 12 | 10 |
| | Masters | 17 | 14 |
| | Undergraduate | 94 | 76 |
| **Total** | | **123** | **100** |

### 4.2.4 Management Cadre

The Central Bank of Kenya's annual report of the year 2017 stated that approximately 20% of the employees were in the senior management cadre. The respondents were aggregated between the various cadres. The management cadres had well-structured finance departments with clear roles which managed overall financial innovation as well as communicating financial goals and key financial performance indicators. This data was sought because financial practices have evolved based on technological innovations. These results are shown in Table 9 below.

**Table 9: Cadre**

| Main Factor | Factor Level | Frequency | Percentage (%) |
|---|---|---|---|
| Cadre | Credit Manager | 41 | 33 |
| | Operational Manager | 41 | 33 |
| | Transactional Manager | 41 | 33 |
| **Total** | | **123** | **100** |

## 4.3 Data Screening and Cleaning

A questionnaire is a common tool used to collect data in business research. The questionnaire are screened and cleaned to make sure that respondents have no difficulties in answering the questions. Data screening and cleaning assesses the validity and reliability of the questionnaires (Saunders et al., 2009). Based on the results of the pilot study, the questionnaire may be edited (Kothari, 2004). Data set contains some errors which can significantly affect the final statistical results and can lead to the drawing of wrong conclusions if the errors have not been rooted out. In this study, data screening was crucial as it served as the foundation for a meaningful outcome from quantitative research.

Cooper and Schindler (2011), state that a pilot test is conducted to detect weaknesses in design, instrumentation and to provide proxy data for the selection of probability sample. The data screening in the current research was the first procedure used in pre-testing the questionnaire to ensure good research design of the final study. It involved examining and correcting the key variables using both descriptive and inferential statistics by employing SPSS and AMOS software.

## 4.3.1 Reliability of the Research Instruments

Reliability relates to the consistency of a measure and should have approximately the same responses each time the test is completed. Although it is not possible to give an exact calculation of reliability, its estimate can be achieved through different measures.

Homogeneity (internal consistency) can be assessed using Cronbach alphas (α) and Pearson coefficient. Strong correlation indicates high reliability and weak correlation indicate that the instrument may not be reliable. The acceptable reliability score ranges between 0 and 1.

Validity is the degree to which a concept is measured in a quantitative study meaning the range which a research instrument gets similar results repeatedly and consistently. This is in line with Heale and Twycross (2015), who states that construct validity refers to whether a study can draw influences about test scores related to the concepts being studied. Three types of evidence can be used to test construct validity; these include Homogeneity (the measurement of one construct), Convergence (the measurement of similar concept) and theory evidence (measures similar theoretical propositions of the construct). Construct reliability in this study was assessed through computing the composite reliability and the Cronbach alpha of the constructs. Composite reliability measures were evaluated by using SmartPLS.

Composite reliability of indicator items was all above the acceptable 0.7 threshold which means all the variables in the study exhibited construct reliability. Cronbach alphas were all above the 0.6 thresholds as specified for PLS analysis (Hair et al., 2006) indicating average to good reliability. All constructs were viewed to have acceptable reliability levels because the composite reliability scores for all constructs were above the 0.7 thresholds. Convergent validity was also assessed using the average variance extracted (AVE). The AVE of all constructs was above the 0.5 thresholds indicating that the latent constructs account for at least fifty percent of the variance in the items. This indicated that the measurement scales showed adequate measurement validity. Heale and Twycross (2015) measured the reliability of the construct and internal consistency analysis using Cronbach's alpha. They revealed that the different measures had good

internal consistency that was reflected by the values of coefficient alpha and mean inter-item correlation coefficient.

Cronbach's alpha reliability coefficient for each of the constructs was used to assess scale reliability for each of the constructs. The study revealed the Cronbach's alpha values for the financial knowledge and expertise were 0.789, financial business process 0.835, human capital 0.880, and financial innovation 0.937 while financial performance had 0.917 as shown Table 10 below. Hence, the Cronbach's alpha statistic average for this study is greater than 0.7. The value of 0.7 and above for the coefficient alpha to infer the internal consistency of the items was recommended by Nunnaly and Bernstein (1994). In this study, reliability is demonstrated by the overall Cronbach's alpha statistic is greater than 0.7. As shown on Table 10 below.

**Table 10: Reliability Statistics**

| Cronbach's Alpha | N of Items |
|:---:|:---:|
| .796 | 4 |

Reliability and validity (convergent and discriminant) were internally evaluated. The assessment of reliability, convergent validity, and discriminant validity met the respective threshold. This information is shown in Table 11 below.

**Table 11: Assessment of Reliability, Convergent Validity, and Discriminant Validity Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Financial knowledge of financial information system have attracted more depositors for the commercial banks | 12.33 | 4.230 | .816 | .637 |
| Financial knowledge and financial information system has enabled the customers to transact their deposits with ease. | 12.27 | 4.754 | .635 | .732 |
| Financial knowledge and financial information system have attracted corporate depositors and deposits. | 12.33 | 4.161 | .699 | .697 |
| Financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank. | 11.97 | 6.102 | .319 | .865 |

**Table 12:  Construct Reliability (2nd and 1st order constructs)**

| 2nd order constructs | First-order constructs | Cronbach's Alpha≥0.6 | Composite Reliability ≥0.7 | Average Variance Extracted (AVE) ≥0.5 |
|---|---|---|---|---|
| **Financial Knowledge and Expertise** | | **0.789** | **0.818** | **0.501** |
| | Financial Knowledge | 0.874 | 0.914 | 0.729 |
| | Experience | 0.799 | 0.869 | 0.624 |
| | Financial system management | 0.886 | 0.921 | 0.746 |
| **Financial Business Process** | | **0.835** | **0.869** | **0.629** |
| | Internal Process | 0.672 | 0.801 | 0.507 |
| | Innovation Network | 0.765 | 0.852 | 0.593 |
| | Cash Flows | 0.795 | 0.867 | 0.620 |
| **Human Capital** | | **0.880** | **0.901** | **0.543** |
| | Customer relations | 0.759 | 0.847 | 0.582 |
| | Employee Relations | 0.761 | 0.847 | 0.582 |
| | Customer Loyalty | 0.810 | 0.876 | 0.641 |
| **Financial Innovation** | | **0.937** | **0.945** | **0.521** |
| | ATMs | 0.861 | 0.905 | 0.705 |
| | Internet Banking | 0.761 | 0.852 | 0.600 |
| | Mobile Banking | 0.888 | 0.923 | 0.749 |
| | Debit Credit Cards | 0.853 | 0.901 | 0.696 |
| **Financial Performance** | | **0.917** | **0.937** | **0.715** |
| | ROA | 0.835 | 0.902 | 0.755 |
| | EBIT | 0.951 | 0.969 | 0.912 |

This aligns to the study by Al-basher and Shtanawi (2015), who examined the reliability and validity of the measurement model by evaluating internal consistency convergent validity and discriminant validity in their study on the impact of management information system on the financial performance of Islamic banks in Jordan –Jordan Islamic bank. Rouhari and Mahmodian (2012) evaluated the financial information system; business intelligence perspectives also assessed the reliability and validity of the measurement model by evaluating internal consistency (reliability), convergent validity

and discriminant validity. Smirat (2016) too evaluated the cash management practices and financial performance of small and medium enterprises (SMEs) in Jordan. A study by Bedford and Spekle (2018), on construct validity in survey-based management accounting and control research also examined the reliability and validity (convergent and discriminant) using Cronbach's alpha reliability efficient.

## 4.3.2 Validity of Data Collection Instruments

Validity refers to the accuracy of the measurement tools to reflect the reality of what is being studied (Saunders & Thornhill, 2012). To validate the content of the value construct and appropriateness, statistical conclusion validity, internal validity, construct validity and external validity are essential to finalize the measurement scale research (Drost, 2011).

Content validity has been adopted in this study to provide adequate coverage and a representative set of items of the questions being investigated (Trochim, 2006). On the bases of construct validity, it was hypothesized that a measurement of a concept relates strongly with other measures and negativity with the measures it should not agree with. According to Mertens, (2010), there exists a mixed reaction on the best measure of the construct.

## 4.3.2.1 Pearson Correlation and Discriminant Validity of 2nd Order Constructs

Pearson correlation tests the association, strength, direction, and relationship of variables between variables (Gogtay & Thatte, 2017). The study used Pearson correlation to test the relationship between the variables with an assumption that all the study variables are independent of each other.

**4.3.2.2 Validity Assessment - Discriminant Validity**

Discriminant Validity is the extent to which items measuring one construct differentiate from items measuring other constructs. There are two principles to assess discriminant validity. The first principle is the inter-construct correlation that should not be higher than 0.9. The second principle is the square root of the Average Variance Extracted (AVE) of the construct and should be larger than its correlation with the other constructs. Heale and Twycross, (2015), used the AVE to measure the explained variance of the construct and concluded that when comparing AVE with the correlation coefficient, the items of the construct explain more variance than the items of other constructs. The rule of the thumb says that the square root of the AVE of each construct should be much larger than the correlation of the specific construct with any other construct and should be at least 0.5 (Bagozzi et al., 2012; Fornell & Larcker, 1981). Wolins, et al. (1979) used the Multitrait-multi method matrix (MTMM) to analyse the correlation matrix of the first approach while Anderson and Gerbing (1982), used the first approach in examining the internal and external consistency.

As in correlation matrix illustrated in Table 13 below, the diagonal elements are the square root of the average variance extracted of all the latent constructs. If diagonal elements in a study are higher than the off-diagonal elements in the columns and rows, then the study is assumed to have discriminant validity. This situation is the case in the correlation matrix and thus the discriminant validity is confirmed.

The average variance extracted in this study for purposes of measurement ranged from 0.763 to 0.955 thus exceeding the threshold of 0.5. This indicated that the study had adequate levels of convergent and discriminant validity. This information is shown in Table 13 below.

**Table 13: Discriminant Validity of 1st Order Constructs**

| | ATMs | Cash Flows | Customer Loyalty | Customer relations | Debit Credit Cards | EBIT | Employee Relations | Experience | Financial knowledge | Financial system management | Innovation Network | Internal Process | Internet Banking | Mobile Banking | ROA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ATMs | **0.840** | | | | | | | | | | | | | | |
| Cash Flows | 0.465 | **0.787** | | | | | | | | | | | | | |
| Customer Loyalty | 0.592 | 0.417 | **0.801** | | | | | | | | | | | | |
| Customer relations | 0.661 | 0.509 | 0.596 | **0.763** | | | | | | | | | | | |
| Debit Credit Cards | 0.628 | 0.273 | 0.528 | 0.422 | **0.834** | | | | | | | | | | |
| EBIT | 0.083 | -0.002 | 0.228 | 0.194 | 0.116 | **0.955** | | | | | | | | | |
| Employee Relations | 0.562 | 0.476 | 0.600 | 0.561 | 0.495 | -0.030 | **0.763** | | | | | | | | |
| Experience | 0.422 | 0.151 | 0.444 | 0.564 | 0.337 | -0.005 | 0.480 | **0.790** | | | | | | | |
| Financial knowledge | -0.018 | 0.177 | 0.328 | 0.367 | 0.138 | 0.079 | 0.508 | 0.635 | **0.854** | | | | | | |
| Financial system management | 0.225 | 0.307 | 0.163 | 0.311 | 0.080 | 0.061 | 0.376 | 0.494 | 0.445 | **0.864** | | | | | |
| Innovation Network | 0.638 | 0.505 | 0.461 | 0.634 | 0.529 | -0.033 | 0.594 | 0.491 | 0.301 | 0.282 | **0.770** | | | | |
| Internal Process | 0.312 | 0.376 | 0.419 | 0.477 | 0.260 | -0.031 | 0.590 | 0.516 | 0.534 | 0.524 | 0.457 | **0.712** | | | |
| Internet Banking | 0.738 | 0.401 | 0.627 | 0.612 | 0.663 | 0.081 | 0.649 | 0.455 | 0.306 | 0.254 | 0.651 | 0.327 | **0.775** | | |
| Mobile Banking | 0.548 | 0.434 | 0.585 | 0.455 | 0.768 | 0.028 | 0.520 | 0.320 | 0.254 | 0.179 | 0.620 | 0.270 | 0.745 | **0.865** | |
| ROA | 0.106 | -0.002 | 0.190 | 0.175 | 0.109 | 0.716 | -0.037 | -0.006 | -0.019 | -0.018 | 0.001 | -0.123 | 0.023 | -0.022 | **0.869** |

**4.4 Inferential Statistics**

In order to test the hypothesis, inferential statistics was used to make inferences from the data to general conditions. Factor analysis was used to detect appropriate loading on the predicted construct and to examine convergent validity that illustrated relationship among sets of related items. In this study, factor analysis was mostly used for data reduction purposes as it facilities smaller set of variables from a large set of variables that are correlated to each other and create indexes with variables measured similar items. According to Kaiser (1974) values that are greater than 0.5 are recommended. This study dropped the items that fell below 0.5 hence strengthening the content validity of items.

**4.4.1 Factor Analysis**

Factor analysis was used to validate hypothetical constructs in order to cluster items or characteristics that seem to correlate highly with each other in defining a particular construct (Williams et al., 2012). Factor analysis is a common statistical method and is frequently employed in multi-indicator measures to determine whether a group of indicators tend to converge or bunch together and form a distinct cluster (Bryman, 2012; Zikmund, et al., 2012). Williams et al. (2012), suggest that factor analysis has two main uses: reducing a large number of variables into a smaller set of variables (factors), and improving construct validity. The researcher employed factor analysis due to the existence of a number of unobserved latent constructs (factors) that accounted for the correlations among the observed variables. Hence if the latent variables were held constant, the partial correlations among the observed variables become zero.

According to Tabachnick and Fidell (2007), constructs have convergent validity when the standardized factor loading is 0.50 and the squared multiple correlations (SMC) are greater than 0.30 (Hair et al., 2010). Bhattacharyya (2011), recommend that factor

loadings greater than 0.3 in absolute value are considered to be significant, while Montgomery et al. (2001), indicate that a minimum factor loading of 0.40 is recommended when factor analysis is used to improve construct validity. This study used a threshold of factor loading of 0.4 to assess the validity of the variable constructs. Alfawaz (2011), used construct validity in the study on information security management: a case study of an information security culture.

Several other techniques were employed in this study which included the Kaiser-Meyer Olkin (KMO) test of sampling adequacy and Bartlett's test. The KMO tests homogeneity of variances while the Barlett's test was used to verify assumptions that are if the samples are from populations with equal variances (Snedecor & Cochran, 1989). Field (2006) stated that it is important to calculate the variability in the variance for any given variable before extracting variables. Communality is as a result of the full amount of variance an original variable share with other variables included in the analysis (Hair, 2007). Furthermore, communality is the proportion of common variance present in the variable. Factor loading can be used to estimate communality where a model containing multiple constructs with communalities of less than 0.5 is required while less than 0.7 is required for a larger sample size (Hair, 2010). In this study, Communalities were assessed to determine the variance in each of the original variables explained by the extracted factors (Field, 2009). A variable with a communality value above 0.5 was applied. However, Pallant (2007) recommends that communalities values of less than 0.5 should be dropped because they have low explanatory power.

To examine whether the data collected was adequate, a measure of statistical test such as Kaiser-Meyer-Olkin (KMO) Sampling Adequacy and Barlett's Test of Sphericity were performed on all the study variables. For an adequate and appropriate data set for statistical analysis the value of KMO should be greater than 0.5 (Field, 2000).

## 4.4.1.1 Factor Analysis for Financial Knowledge and Expertise

Financial Knowledge and Expertise yielded a KMO statistics of 0.761 exceeding the KMO threshold value of 0.50 (Hair et al., 1998) for factorable items, further still, Ozdamar (2002), posits that the value of KMO should be over 0.6 in order to perform factor analysis. On the other hand, Barlett's test of sphericity showed a *p*-value of 0.000, showing that there were sufficient relationships among the variables investigated ($\chi^2$ =1407.915, *p=0.000(<.05)*). The results from the KMO and Bartlet's test of sphericity suggested that the data in this study was suitable for factor analysis. The communalities ranged from 0.549 to 0.900 thus showing that all were above the 0.5 cut-off points as posited by Pallant (2007), hence this shows the variables fitted well with other variables in their factor.

Based on the criteria, three factors were imputed which explained 76.507 % of the total variance in the data. The study performed factor analysis for all the five latent construct involved in the study before modelling the relationship in a structural model (SEM). Table 14 details the results from factor analysis. All the items measuring Financial Knowledge and Expertise attained factor loading above 0.5, therefore, were retained for further analysis.

**Table 14: Factor Analysis for Financial Knowledge and Expertise**

| Item | KMO | Bartlett's (df) $\chi^2$ | Sig. | %Variation | Factor loadings | Communalities |
|------|-----|--------------------------|------|-----------|-----------------|---------------|
| FKE1 | 0.761 | =1407.915 (d.f.=66) | 0.000 | *47.357* | 0.970 | 0.900 |
| FKE2 | | | | | 0.987 | 0.844 |
| FKE3 | | | | | 0.706 | 0.718 |
| FKE4 | | | | | 0.615 | 0.549 |
| FKE5 | | | | *17.663* | 0.652 | 0.798 |
| FKE6 | | | | | 0.889 | 0.795 |
| FKE7 | | | | | 0.815 | 0.777 |
| FKE8 | | | | | 0.583 | 0.676 |
| FKE9 | | | | *11.487* | 0.871 | 0.824 |
| FKE10 | | | | | 0.917 | 0.812 |
| FKE11 | | | | | 0.783 | 0.751 |
| FKE12 | | | | | 0.801 | 0.737 |
| | | | **cumulative %** | **76.507** | | |

## 4.4.1.2 Factor Analysis for Business Process

The business process yielded KMO statistics of 0.702 exceeding the KMO threshold value of 0.50 for factorable items. This is in line with Hair et al. (1998) and Büyüköztürk (2007), who states that KMO values lower than 0.50 indicate that the data used is not appropriate for factor analysis. They further revealed that values between 0.5 and 0.7 are moderately suitable, while values between 0.7 and 0.8, are very suitable. Values above 0.8 are excellently suitable and appropriate for factor analysis. On the other hand, according to Öztürk and Karakaş (2016), the P-value must be less than 0.05 in Bartlett's Test of sphericity. The results in this study indicated a *p*-value of 0.000, ($p< .05$), showing that there were sufficient relationships among the variables to investigate. The

results from the KMO and Bartlet's test of sphericity suggest that the data in this study is suitable for factor analysis. The communalities ranged from 0.555 to 0.838 thus showing that all were above the 0.5 cut-off points as posited by Pallant (2007), hence this shows the variables fitted well with other variables in their factor.

Based on the criteria, three factors were imputed which were able to explain 66.001 % of the total variance in the data. All the items measuring business process attained factor loading above 0.5, therefore, were retained for further analysis.

**Table 15: Factor Analysis for Business Process**

| Item | KMO | Bartlett's (df) | Sig. | % Variation | Factor loadings | Communalities |
|------|-----|-----------------|------|-------------|-----------------|---------------|
| FBP1 | 0.702 | $\chi^2$ =719.432 (d.f.=66) | 0.000 | 1.172 | 0.744 | 0.800 |
| FBP2 | | | | | 0.759 | 0.633 |
| FBP3 | | | | | 0.715 | 0.557 |
| FBP4 | | | | | 0.877 | 0.818 |
| FBP5 | | | | 1.456 | 0.597 | 0.672 |
| FBP6 | | | | | 0.906 | 0.838 |
| FBP7 | | | | | 0.763 | 0.740 |
| FBP8 | | | | | 0.729 | 0.618 |
| FBP9 | | | | 39.726 | 0.623 | 0.584 |
| FBP10 | | | | | 0.754 | 0.639 |
| FBP11 | | | | | 0.939 | 0.791 |
| FBP12 | | | | | 0.714 | 0.555 |
| | | | cumulative % | 66.001 | | |

### 4.4.1.3 Factor Analysis for Human Capital

Human capital yielded KMO statistics of 0.793 exceeding the KMO threshold value of 0.50 (Hair et al., 1998) for factorable items. On the other hand, Barlett's test of sphericity showed a p-value of 0.000, showing that there were sufficient relationships among the

variables to investigate. The results from the KMO and Bartlet's test of sphericity suggest that the data in this study is suitable for factor analysis. The communalities ranged from 0.626 to 0.870 thus showing that all were above the 0.5 cut-off points as posited by Pallant (2007), hence this shows the variables fitted well with other variables in their factor.

Based on the criteria, three factors were imputed which explained 68.958 % of the total variance in the data. All the items measuring human capital attained factor loading above 0.5, therefore, were retained for further analysis.

**Table 16: Factor Analysis for Human Capital**

| Item | KMO | Bartlett's (df) | Sig. | % Variation | Factor loadings | Communalities |
|------|-----|-----------------|------|-------------|-----------------|---------------|
| HC1 | 0.793 | $\chi^2$ =7954.970 (d.f.=66) | 0.000 | 0.689 | 0.666 | 0.646 |
| HC2 | | | | | 0.644 | 0.650 |
| HC3 | | | | | 0.718 | 0.626 |
| HC4 | | | | | 0.757 | 0.778 |
| HC5 | | | | 13.883 | 0.913 | 0.826 |
| HC6 | | | | | 0.748 | 0.729 |
| HC7 | | | | | 0.900 | 0.870 |
| HC8 | | | | | 0.868 | 0.830 |
| HC9 | | | | 44.386 | 0.640 | 0.804 |
| HC10 | | | | | 0.676 | 0.826 |
| HC11 | | | | | 0.662 | 0.752 |
| HC12 | | | | | 0.871 | 0.775 |
| | | | cumulative % | 68.958 | | |

### 4.4.1.4 Exploratory Factor Analysis

Exploratory factor analysis (EFA) was also used to identify latent factors, to reduce a large pool of observed variables to a manageable form and to examine the relationship

between variables with a prior hypothesis (Tabachnick & Fidell, 2013). In other words, EFA statistical method was used to uncover the underlying structure of a relatively large set of variables and determination of the pattern matrix in this study. EFA was applied first to examine the dimensions of each factor. This was followed by confirmatory factor analysis techniques to test and confirm the relationship between the observed variables under each hypothesized construct (Hair et al., 2010). CFA technique was applied to confirm and validate a prior hypothses about the relationship between a set of indicator variables or measurement items and their respective latent variable (Netemeyer et al., 2003; Bryne, 2001). In addition  CFA can be used to reduce the number of items that may threaten the dimensionality of a scale (Hair et al ., 2010; Bryne, 2010). This study used the CFA for two main reasons, first was to evaluate the reliability and validity of the model and to decide the goodness of fit (GOF) criteria indices. Subsequently, the measurement model was employed in this research for assessing the dimensionality, reliability, and validity of the measures.

To implement CFA, different statistical packages such as Analysis of Moments Structures (AMOS), Linear Structural Relationship (LISREL) and SmartPLS  that uses partial least squares (PLS) is recommended. This study adopted the AMOS version 20 and SmartPLS software for several reasons.  They propose the advantages of working directly from path diagrams. The packages also allow  the researcher to asses, estimate and present the model in an intuitive path, viewing observed measures and unobserved constructs variables in the hypothetical model. In addition, structural equation modeling (SEM) analysis technique is recommended. Version 21 was used to in order to apply SEM, to explore the statistical relationship between the test items of each factor and among the independent variable (organizational capital) and dependent variable (financial performance).

SEM analysis technique is key in this study as it offers a systematic mechanism to validate relationships among constructs and indicators as well as testing relationships between constructs in a single model (Hair et al., 2010). SEM is also a multivariate regression that describes the relationship between a set of observed dependent variable and a set of continuous latent variables. In addition, SEM offers an influential and rigorous statistical technique to deal with multifaceted models (Hafiz & Shaari, 2013). Confirmatory factor analysis (CFA) is used to validate the SEM relationship among contructs and indicators and to test the relationships between constructs by using the structural model. The relationships are described by 'the measurement model' (CFA) in the context of SEM while the relationship between the latent variables with direct arrows is called 'the structural model'.

Hafiz and Shaari (2013), in their study on Confirmatory Factor Analysis (CFA) of First Order Factor Measurement Model-ICT Empowerment in Nigeria used the CFA model to verify the factor structure of a set of observed variables. Schumacker and Lomax, (1996) distinguished Confirmatory Factor Analysis from Structural equation modeling (SEM) by the fact that in CFA there are no directed arrows between latent factors. That is CFA factors are not presumed to directly cause one another.

According to Bahl and Wali (2014), convergent and discriminant validity are considered to be subcategories or subtypes of construct validity and they work together. If there is evidence for both convergent and discriminant validity, then by definition there is evidence for construct validity. However, neither a single validity is sufficient for establishing construct validity. According to Pansuwong (2009), and Hair et al,. (2010), convergent factor loading should be 0.5, although the factor loading should be 0.7 and above to guarantee that the construct has convergent validity (Kline, 2005; Hair et al, 2010). In this study, the average loading was more than 0.7 meaning they were high

enough to be convergent and convergent were met. To determine discriminant validity, measurement should not be related. Confirmatory factor analysis (CFA) for measuring all the organizational capital variables and test its factorial validity were presented as follows.

**4.4.1.5 Confirmatory Factor Analysis for Financial Knowledge and Expertise**

Item loading (original sample)is the relationship between the item (question-statement) and the construct. The item loadings should be equal to or greater than 0.50 and statistically significant (Hair et al., 2009, as cited in Kock, 2015). All of the item loadings for financial knowledge and expertise presented were above 0.50 hence statistically significant as $p$ values were less than 0.05 as shown in the Table 17 below, therefore, served as validation parameters of confirmatory factor analysis (Kock, 2015).

Hazzi and Maidaon (2017), in their study on confirmatory factor analysis of the organizational citizenship behavior scale; Syrian experience used the confirmatory factor analysis (CFA) to check the model fitting and the validity that included the convergent and discriminant validity. A current study by Waseem (2018) on the development and construct validity of organization capital in customer relationship management context; A Confirmatory Factor Analysis approach used confirmatory factor analysis (CFA) for the development of a scale for measuring the organizational capital and to testing its factorial validity. Their results revealed that CFA of financial knowledge and expertise showed an acceptable fit to the data as shown in Table 17 below.

**Table 17: Confirmatory Factor Analysis for Financial Knowledge and Expertise**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|---|
| Financial knowledge | FKE1 | 0.946 | 0.946 | 0.008 | 114.937 | 0.000 |
| | FKE2 | 0.873 | 0.872 | 0.023 | 38.279 | 0.000 |
| | FKE3 | 0.837 | 0.837 | 0.026 | 31.751 | 0.000 |
| | FKE4 | 0.748 | 0.747 | 0.031 | 24.060 | 0.000 |
| Experience | FKE5 | 0.866 | 0.867 | 0.021 | 42.022 | 0.000 |
| | FKE6 | 0.765 | 0.765 | 0.035 | 22.105 | 0.000 |
| | FKE7 | 0.700 | 0.699 | 0.051 | 13.614 | 0.000 |
| | FKE8 | 0.819 | 0.819 | 0.029 | 28.602 | 0.000 |
| Financial system management | FKE9 | 0.838 | 0.836 | 0.029 | 29.108 | 0.000 |
| | FKE10 | 0.873 | 0.872 | 0.021 | 41.394 | 0.000 |
| | FKE11 | 0.859 | 0.860 | 0.018 | 48.197 | 0.000 |
| | FKE12 | 0.884 | 0.884 | 0.020 | 45.204 | 0.000 |

**4.4.1.6 Confirmatory Factor Analysis for Financial Business Process**

Item loading (original sample*)* is the relationship between the item (question-statement) and the construct. The item loadings ought to be equal to or greater than 0.50 and should be statistically significant (Hair et al., 1987 & 2009, as cited in Kock, 2015). All of the item loadings for the financial business process were above 0.50 and were statistically significant as *p* values were less than 0.05 as shown in the Table 18 below, therefore, served as validation parameters of confirmatory factor analysis (Kock, 2015). Naveed et al. (2017), tested the validity of the organizational change construct using confirmatory

factor analysis and showed that process, strategy, structure, culture, and technology are the main predictors of organizational change. They used the first-order and second-order confirmatory factor analysis using SEM- AMOS. Research by Yanamandram (2006), on exploratory and confirmatory factor analysis of the perceived switching costs models in the business services sector in Australian businesses strived to develop a model using various types of costs and to demonstrate good fit statistics.

**Table 18: Confirmatory Factor Analysis of Financial Business Process**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics ($|O/STDEV|$) | P Values |
|---|---|---|---|---|---|---|
| Internal Process | FBP1 | 0.639 | 0.634 | 0.081 | 7.857 | 0.000 |
| | FBP2 | 0.570 | 0.560 | 0.115 | 4.974 | 0.000 |
| | FBP3 | 0.796 | 0.801 | 0.034 | 23.656 | 0.000 |
| | FBP4 | 0.813 | 0.810 | 0.044 | 18.512 | 0.000 |
| Innovation | | | | | | |
| Network | FBP5 | 0.769 | 0.774 | 0.032 | 24.172 | 0.000 |
| | FBP6 | 0.853 | 0.852 | 0.029 | 29.218 | 0.000 |
| | FBP7 | 0.819 | 0.816 | 0.046 | 17.651 | 0.000 |
| | FBP8 | 0.619 | 0.622 | 0.075 | 8.259 | 0.000 |
| Cash Flows | FBP9 | 0.771 | 0.773 | 0.047 | 16.507 | 0.000 |
| | FBP10 | 0.839 | 0.836 | 0.031 | 27.499 | 0.000 |
| | FBP11 | 0.786 | 0.784 | 0.034 | 22.910 | 0.000 |
| | FBP12 | 0.751 | 0.746 | 0.060 | 12.432 | 0.000 |

**4.4.1.7 Confirmatory Factor Analysis of Human Capital**

Item loading (original sample) is the relationship between the item (question-statement) and the construct. The item loadings ought to be equal to or greater than 0.50 hence statistically significant (Hair et al., 1987 & 2009, as cited in Kock, 2015). All of the item loadings for human capital were

above 0.50 and were statistically significant as *p* values were less than 0.05 as shown in the Table 19 below, therefore, served as validation parameters of confirmatory factor analysis (Kock, 2015).

Gisela et al. (2012), in their study on human resources management policies and practices scale (HRMPPS); exploratory and confirmatory factor analysis validated HRMPPS using confirmatory factor analysis. Construct validity was provided using convergent and discriminant analyses. They concluded that the factors were consistent with the literature review with about 58% of the construct's total variance.

**Table 19: Confirmatory Factor Analysis of Human Capital**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|---|
| Customer relations | HC1 | 0.783 | 0.788 | 0.044 | 17.793 | 0.000 |
| | HC2 | 0.764 | 0.765 | 0.046 | 16.740 | 0.000 |
| | HC3 | 0.698 | 0.699 | 0.052 | 13.414 | 0.000 |
| | HC4 | 0.801 | 0.802 | 0.045 | 17.823 | 0.000 |
| Employee Relations | HC5 | 0.779 | 0.785 | 0.038 | 20.417 | 0.000 |
| | HC6 | 0.796 | 0.799 | 0.036 | 22.407 | 0.000 |
| | HC7 | 0.789 | 0.783 | 0.062 | 12.649 | 0.000 |
| | HC8 | 0.682 | 0.670 | 0.079 | 8.680 | 0.000 |
| Customer Loyalty | HC9 | 0.812 | 0.817 | 0.025 | 32.741 | 0.000 |
| | HC10 | 0.906 | 0.908 | 0.016 | 57.712 | 0.000 |
| | HC11 | 0.693 | 0.689 | 0.084 | 8.241 | 0.000 |
| | HC12 | 0.775 | 0.776 | 0.041 | 18.771 | 0.000 |

**4.4.1.8 Confirmatory Factor Analysis for Financial Innovation**

Item loading (original sample) is the relationship between the item (question-statement) and the construct. The item loadings ought be equal to or greater than 0.50 hence it

statistically significant (Hair et al., 1987 & 2009, as cited in Kock, 2015). All of the item loadings for financial innovation were above 0.50 and were statistically significant as *p* values were less than 0.05 as shown in the Table 20 below, therefore, served as validation parameters of confirmatory factor analysis (Kock, 2015).

**Table 20: Confirmatory Factor Analysis for Financial Innovation**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|---|
| ATMs | FI1 | 0.828 | 0.823 | 0.041 | 20.073 | 0.000 |
| | FI2 | 0.859 | 0.856 | 0.029 | 29.137 | 0.000 |
| | FI3 | 0.861 | 0.862 | 0.027 | 32.407 | 0.000 |
| | FI4 | 0.809 | 0.811 | 0.030 | 26.890 | 0.000 |
| Internet Banking | FI5 | 0.788 | 0.786 | 0.033 | 23.747 | 0.000 |
| | FI6 | 0.489 | 0.479 | 0.093 | 5.247 | 0.000 |
| | FI7 | 0.890 | 0.890 | 0.022 | 40.607 | 0.000 |
| | FI8 | 0.865 | 0.865 | 0.037 | 23.211 | 0.000 |
| Mobile Banking | FI9 | 0.826 | 0.825 | 0.029 | 28.177 | 0.000 |
| | FI10 | 0.874 | 0.872 | 0.022 | 38.870 | 0.000 |
| | FI11 | 0.886 | 0.888 | 0.021 | 43.181 | 0.000 |
| | FI12 | 0.874 | 0.871 | 0.028 | 31.331 | 0.000 |
| Debit Credit Cards | FI13 | 0.843 | 0.842 | 0.024 | 35.644 | 0.000 |
| | FI14 | 0.751 | 0.754 | 0.074 | 10.102 | 0.000 |
| | FI15 | 0.888 | 0.888 | 0.019 | 46.161 | 0.000 |
| | FI16 | 0.848 | 0.849 | 0.025 | 33.801 | 0.000 |

Wang and Ahmed (2004), examined the development and validation of the organizational innovativeness construct using confirmatory factor analysis and identified five dimensions of organization's overall innovativeness as financial, product, market, process, and behavioral innovativeness. They concluded that these formed the component factor of the organizational innovativeness constructs.

**4.4.1.9 Confirmatory Factor Analysis for Financial Performance**

Item loading (original sample) is the relationship between the item (question-statement) and the construct. The item loadings ought be equal to or greater than 0.50 hence it

statistically significant (Hair et al., 1987 & 2009, as cited in Kock, 2015). All of the item loadings for financial performance were above 0.50 and were statistically significant as *p* values were less than 0.05 as shown in the Table 21 below, therefore, served as validation parameters of confirmatory factor analysis (Kock, 2015). A recent study by Daovisan and davidson (2018), on confirmatory factor analysis of assets that influence informal garment workers' livelihood security in Laos sampled 333 respondents with confirmatory factor analysis.

The statistical model showed good fit and confirmed that financial assets positively influence livelihood security. Carton and Hofer (2005), addressed the measurement of organizational financial performance; identifying and testing multiple dimensions using confirmatory factor analysis and concluded that financial performance for both annual and time frames are unique contributions of the research. Tailab (2014), analyzed factors affecting the profitability of non-financial U.S firms. This study examined return on assets (ROA) and the ratio of earnings before depreciation, interest, and tax (EBIT) and established that multicollinearity did not exist among the independent variable.

**Table 21: Confimatory Factor Analysis for Financial Performance**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|---|
| ROA | ROA2015 | 0.856 | 0.857 | 0.031 | 27.374 | 0.000 |
| | ROA2016 | 0.955 | 0.958 | 0.012 | 76.548 | 0.000 |
| | ROA2017 | 0.788 | 0.796 | 0.074 | 10.629 | 0.000 |
| EBIT | EBIT2015 | 0.906 | 0.902 | 0.031 | 29.069 | 0.000 |
| | EBIT2016 | 0.981 | 0.981 | 0.004 | 278.141 | 0.000 |
| | EBIT2017 | 0.976 | 0.975 | 0.005 | 187.142 | 0.000 |

### 4.4.3 Structural Equation Model and Hypothesis Testing of the Study Variable

Using Structural equation model (SEM) that takes the confirmatory approach the study tested the relationship between independent and dependent variables. SEM was also used to assess the extent to which hypothetical constructs were suitable or fit the obtained data. Schumacker and Lomax (1996), defined SEM as general linear cross-sectional statistical modeling technique that presents an inclusive tool for evaluating and accepting theoretical models.

### 4.4.3.1 Confirmatory Structural Model and Hypothesis Testing of the Study Variable

Structural equation model (SEM) is a statistical method that takes the confirmatory approach to test the relationship between one or more independent and dependent variables by assessing the extent to which hypothetical constructs are suitable or fit the with the obtained data. SEM is increasingly employed in social sciences as it is considered to be an important technique for this field. Schumacker and Lomax (1996), defined SEM as general linear cross-sectional statistical modeling technique. SEM presents an inclusive tool for evaluating and accepting theoretical models. In achieving results SEM analysis has many stages as shown in Figure 4.1 below.
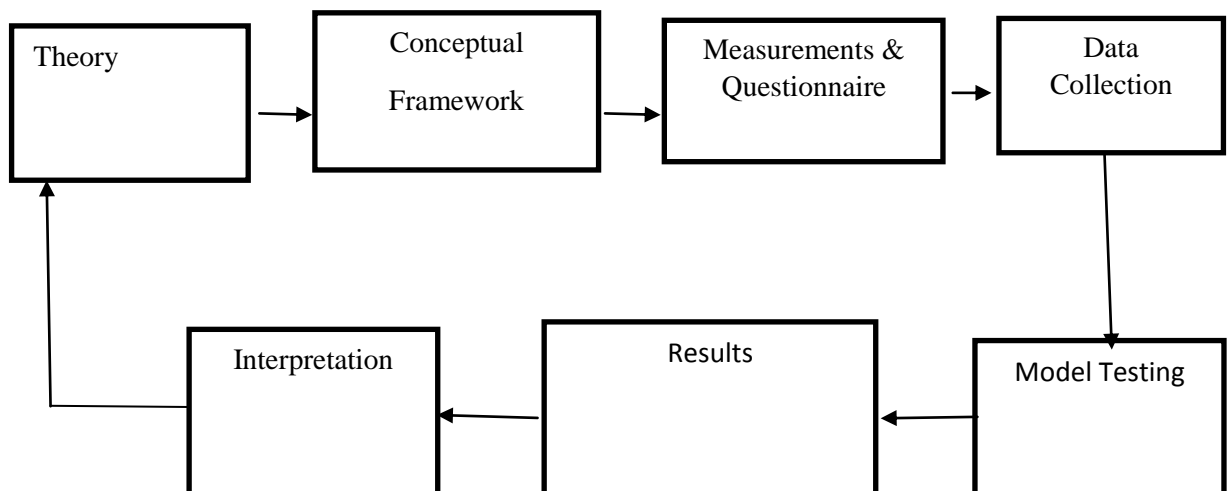


**Source Author (2021)**
**Figure 2: The Process of SEM**

In this study, SEM was used to test hypotheses and theoretical model fit. Exploratory data analysis (EDA) was used to produce a measurement model and paths analysis. This was used to understand the structure of the variables before data analysis undertaking to avoid violations of key assumptions in the consequent modeling process. Model fit testing was employed to establish whether the specific path was significant in the SEM.

### 4.4.4 Assessment of Model Fit Validity

To investigate the measurement model validity, a cluster of the goodness of fit (GOF) indices provided by SEM analysis techniques are used to enable the comparison between the theory (the hypothetical model) and the collected data (reality). The degree to which the hypothetical model and the collected data are similar reflects the goodness (or badness) of the proposed model (Hair et al., 2010). Therefore, the degree of structural model fit approves the consistency of a theoretical model as well as the estimated model based on the observed values (Byrne, 2010).

The structural equation modeling (SEM) uses three main types of fit measure indices which are absolute fit indices, incremental fit indices and parsimonious fit indices (Byrne, 2010). Absolute fit indices provide a direct evaluation of how the overall model fits with sample data. According to Hair et al., 2010, these indices are comparable with other types of Good-of-Fit Index (GFI) such as Root Mean Square Residual (RMR) and Standardized Root Mean Square Residual (SRMR). An incremental fit measure is also used to assess the fit of the proposed model by comparing it with an alternative base model. Incremental fit indices consist of Normed Fit Index (NFI) and Comparative indices among others that are designed to consider the complexity of the models by investigating whether the estimated model can be improved by specifying fewer estimated parameter path.

This study used Normed Fit Index (NIF) from incremental indices. Byrne (2010), recommended NIF as the key indices of fit supported by literature and has varied approaches to the assessment of model fit. SEM programs that use several fit indices mainly provide the same information. SRMR (standardized root mean square residual) was also analyzed. An SRMR value of less than 0.10 is acceptable (Henseler et al., 2015). This study used the second fit index to measure the NFI incremental fit as well as the value of Chi-square of the proposed model, comparing it against an appropriate benchmark. NFI standards that are above 0.9 usually represent an acceptable fit. Exact model fit was also used as the third fit to test the statistical (bootstrap-based) interpretation of the inconsistency between the empirical covariance matrix and the composite factor model implied covariance matrix. Dijkstra and Henseler (2015) suggested the dULS (i.e., the squared Euclidean distance) and dG (i.e., the geodesic distance) as the two different ways to compute this discrepancy. A model is considered to fit well when there is a small difference between the correlation matrix implied by the model being tested and the empirical correlation matrix due to sampling error. Hence, the difference between the correlation matrix implied by the model and the empirical correlation matrix should be non-significant ($p > 0.05$). Henseler et al. (2015) that dULS and dG < than the 95% bootstrapped quantile (HI 95% of dULS and HI 95% of dG)

**4.4.4.1 Goodness-of-Fit**

Goodness-of-fit of a statistical model refer to how well it fits a set of data. Goodness-of-Fit (GOF) summarizes the discrepancy between observed values and the values expected under the model in question. GOF measures can also be used in confirmatory data analysis that is testable to distinguish the null hypothesis and the alternative hypothesis.

This study applied Goodness-of-Fit (GOF) as an index for the complete model fit to verify that the model sufficiently explains the empirical data (Henseler et al., 2015). The

GOF values was between 0 and 1, where values of 0.10 (small), 0.25 (medium), and 0.36 (large) showed the global validation of the path model. A good model fit indicates that the model used is parsimonious and reasonable. The GOF is calculated using the geometric mean value of the average communality (AVE values) and the average $R^2$ value(s), and the GOF of the model is calculated by Equation (1) (Henseler et al., 2015).

**Table 22: Goodness of Fit Statistics in SEM**

| Fit Index | Acceptable Threshold Levels | References |
|-----------|------------------------------|------------|
| X2 | x2, p Value greater than 0.05 | |
| GFI | Value ≥ 0.90 | Henseler et al., (2016) |
| NFI | Value ≥ 0.90 | |
| CFI | Value ≥ 0.90 | Hair et al. (2010) |
| RMSEA | Value< .05 indicates good model fit | Bryne (2010) |
| | Value<.08 indicate reasonable fit | |
| | Value < .10 indicates poor fit | |

**4.4.4.2 Testing Model Fit**

An artificial statistics set was created according to a "true" model and evaluated two mis-specified and two correctly quantified models as examples of the weak fit model, satisfactory fit and good fit. In structural equation modeling (SEM), the fit indices are said to fit the observed data to the scope that the model-in pride covariance matrix that is equivalent to the empirical covariance matrix (Moss, 2009). Research by Marsh et al. (1996), posits that individuals utilize a range of fit indices. When a fit model has been stated, the empirical covariance matrix is given and a method has to be selected for parameter estimation. Different estimation methods have different distributional assumptions like $x^2$ which is assumed to be a traditional measure in assessing overall model fit and tends to be unreliable where sample size larger than 200 is used. However, according to studies done by Reinard (2006) and Schmacker and Lomax (2004) argues

that there is no agreement on the best single approach of evaluating model fit. To evaluate the structural model path coefficient relationship between financial business process and financial performance several testing model fit was used including Standardized Root Mean Residual (SRMR), Chi-Square, Normed fit model (NFI) Unweight Least Square Discrepancy ($d$ULS), Geodesic Discrepancy ($d_G$) and Goodness-of-fit (GOF).

The standardized root mean residual (SRMR) is an approximate fit index to establish approximate fit for a particular SEM model The standardized root mean residual (SRMR) was used to quantify how strongly the empirical correlation matrix differs from the model-implied correlation matrix. The acceptable range for SRMR index is between 0 and 0.08. The model is best fitting if the estimated and observed correlations are less than 0.08 apart the value of 0.056 ($< 0.08$) indicated a perfect fit and an acceptable fit.

The chi-square test of fit which is sometimes referred to as the test of exact fit should be used first. Relative chi-square is one of the general indices that account for free parameters in calculating the fitting index. The acceptable value of the index varies from 1 to 3. This indicated a perfect fit since it is lower than 3. The chi-square test of the model can be used to reject the SEM model.

Normed fit model (NFI) is also one of the comparative indices that are based on the correlation between variables. Bentler and Bonnett (1980), proposed that NFI value range from zero to one with a higher value indicating better values. Consequently, high coefficient leads to high NFI. In this study the NFI was 0.948 and was greater than 0.09 ($>0.09$). Thus the measurement model was well fitted since NFI that is greater than 0.9 (NFI$>$0.9) is acceptable.

To measure how strongly the empirical correlation matrix varies from the model implied that is correlation matrix, the unweighted least square discrepancy ($d$ULS) is used. A lower $d$ULS gives a better theoretical model fit. ADANCO 2.0.1 uses bootstrapping to come up with the 95% percentile (H195) and the 99% percentile (H199) for the $d$ULS to measure if the theoretical model is true. If the $d$ULS surpasses these values it is unlikely that the model is true. In this study the dULS < bootstrapped (HI95) of dULS 95%. This indicated that the data used fits the model well.

Geodesic discrepancy ($d_G$) is an additional method to qualify how strong the empirical correlation matrix differs from the model-implied correlation matrix. The lower the $d_G$, the better the theoretical model fit. ADANCO 2.0.1 uses bootstrapping to produce the 95% percentile (H195 and the 99% percentile (H199) for the $d_G$ of a true theoretical model. That is recommended $d_G$ should not exceed these values. In this study the dG < bootstrapped HI was 95% of the d$G$ indicating that the data used fits the model well.

Goodness-of-fit (GOF) measures the relative amount of the variance and covariance in the empirical covariance matrix, that is, it measures the amount of variance and covariance in the observed correlation matrix predicted by model-implied covariance matrix (Tanaka & Huba, 1984). GOF typically ranges between 0 and 1 with higher values indicating better fit and in some cases, a negative GOF may occur. The rule of thumb for this index is 0.95 which is indicative of good fit relative to the baseline model, however, if values are greater than 0.90, they are interpreted as indicating unacceptable fit (Schumacker & Lomax, 1996; Marsh & Grayson, 1995).The GOF of the model was 0.443, which shows that empirical data fits the model satisfactory and has substantial predictive power in comparison with the baseline value.

**4.4.4.3 Assessing the Outliers**

Tinsley and Brown, (2000), define outliers as abnormal or extreme values that are either one or a set of variables. In social studies, outliers can cause negative effects on data analysis. For example, data can contain collinearities and non-normality that can lead to negative variance estimates (e.g. an indicator error <0) (Brown, 2006). The effects of the outliers can deform statistical results which cannot be generalized. Outliers can occur due to results of an error in the data file for example entry of incorrect value, programming error such as recording, transforming variables, failure to identify missing data values correctly and the presence of valid but exceptional data point. In addition, outliers can be univariate related to items with an extreme value on a single variable or those variables exist in case of two or more variables (multivariate outliers).

In any univariate outliers' analysis, most researchers use the frequency distribution of the z scores. Tinsley and Brown (2000), state that if the Z score is greater than 3.29 with $p < .001$, there is univariate outlier. Based on this study the questionnaires were reviewed to ensure that the data of the outliers' case were entered correctly and there were no data entry errors. The Mahalanobis distance was employed to evaluate the multivariate outliers that are an unusual combination of values for a number of variables. Kline (2005) recommended that the Mahalanobosis distance is appropriate for evaluating the multivariate outliers. Mahalanobis D2 is a multidimensional version of a z-score. It measures the distance of a case from the centroid (multidimensional mean) of distribution, given the covariance (multidimensional variance) of the distribution. A case is a multivariate outlier if the probability associated with its D2 is 0.001 or less. D2 follows a chi-square distribution with degrees of freedom equal to the number of variables included in the calculation (Tabachnick & Fidell, 2007).

**4.4.4.3 Test of Normality**

A normality test determines if the data set is well-modelled by a normal distribution (Cao & Zhang, 2010). That is to determine whether sample data has been drawn from a normally distributed population. A distribution can deviate from normal by lack of symmetry (skewness) and pointiness (kurtosis). In practice, the values of these parameters should be zero in a normal distribution. An absolute value of the score greater than 3.0 is significant while a kurtosis greater than 8.0 is an extreme Kurtosis. In this study normality test was done using kurtosis and Skewness. Kurtosis is an indicator of "flattening" of distribution while Skewness is as a sign of asymmetry and deviation from a normal distribution. Skewness and kurtosis values that range from -3 and +3 (SE) are generally considered normal (Onwuegbuzie & Daniel, 2002).

**Table 23: Test of Univariate Normality**

| 2nd order constructs | First-order constructs | Skewness | | Kurtosis | |
|---|---|---|---|---|---|
| | | Statistic | Std. Error | Statistic | Std. Error |
| Financial Knowledge and Expertise | | -0.265 | 0.197 | -0.522 | 0.392 |
| | Financial Knowledge | -0.523 | 0.197 | -0.409 | 0.392 |
| | Experience | -0.463 | 0.197 | -0.542 | 0.392 |
| | Financial system management | -0.315 | 0.197 | -0.191 | 0.392 |
| Financial Business Process | | -0.528 | 0.197 | 0.646 | 0.392 |
| | Internal Process | -0.567 | 0.197 | 0.199 | 0.392 |
| | Innovation Network | -0.693 | 0.197 | 0.043 | 0.392 |
| | Cash Flows | -0.060 | 0.197 | 0.086 | 0.392 |
| Human Capital | | -0.085 | 0.197 | -0.083 | 0.392 |
| | Customer relations | -0.414 | 0.197 | 0.025 | 0.392 |
| | Employee Relations | -0.414 | 0.197 | 0.028 | 0.392 |
| | Customer Loyalty | -0.273 | 0.197 | -0.392 | 0.392 |
| Financial Innovation | | -0.446 | 0.197 | 0.667 | 0.392 |
| | ATMs | -0.359 | 0.197 | 0.301 | 0.392 |
| | Internet Banking | -0.293 | 0.197 | 0.390 | 0.392 |
| | Mobile Banking | -0.750 | 0.197 | 0.575 | 0.392 |
| | Debit Credit Cards | -0.423 | 0.197 | 0.024 | 0.392 |
| Financial Performance | | 0.364 | 0.197 | -0.415 | 0.392 |
| | ROA | -0.677 | 0.197 | -0.087 | 0.392 |
| | EBIT | 0.289 | 0.197 | 0.740 | 0.392 |

The results as presented in Table 23 show the skewness values are within the range of -3 and +3 for all factors. The study examined the indicators of univariate kurtosis and skewness. In social science research, it is hard or impossible to obtain a completely normal distribution although it should be close to normal distribution. In this study, the values of skewness and kurtosis were well within their rule of thumb ranges which provided support for univariate normality.

**4.4.4.4 Multicollinearity**

Multicollinearity occurs where two or more predictor variables in multiple regression model are correlated (Martz, 2013). In this study, the variance inflation factor (VIF) and

tolerance were used to test multicollinearity among the independent variables. Tolerance measures the impact of collinearity among the variables in a regression model and is calculated from $1 - R^2$ with a tolerance value close to 1 showing little multicollinearity, while a value close to 0 indicates the presence of multicollinearity (Belsley et al., 2004). The VIF gives an index that shows how much the variance of an estimated regression coefficient is increased because of collinearity (Wooldridge, 2000: Cohen et al., 2013).

**Table 24: Multicollinearity Test**

| 2nd Order constructs | First-Order Constructs | VIF | Tolerance |
|---|---|---|---|
| Financial Knowledge and Expertise | | 1.900 | 0.526 |
| | Financial Knowledge | 1.813 | 0.552 |
| | Experience | 1.539 | 0.650 |
| | Financial system management | 1.743 | 0.574 |
| Financial Business Process | | 1.321 | 0.757 |
| | Internal Process | 1.527 | 0.655 |
| | Innovation Network | 1.638 | 0.611 |
| | Cash Flows | 1.329 | 0.753 |
| Human Capital | | 1.799 | 0.556 |
| | Customer relations | 1.312 | 0.762 |
| | Employee Relations | 1.502 | 0.666 |
| | Customer Loyalty | 1.876 | 0.533 |
| Financial Innovation | | 1.125 | 0.889 |
| | ATMs | 1.570 | 0.637 |
| | Internet Banking | 1.900 | 0.526 |
| | Mobile Banking | 1.179 | 0.848 |
| | Debit Credit Cards | 1.196 | 0.836 |
| Financial Performance | | 1.694 | 0.590 |
| | ROA | 1.591 | 0.629 |
| | EBIT | 1.857 | 0.539 |

Dependent Variable: Financial Performance

Results in Table 24, show that the VIF statistic is above 5 an indicator of multicollinearity and should be removed from regression models. Given the results shown in Table 4.21, VIF values range from 1.125 to 1.900. The study, therefore, concludes that there is no evidence of multicollinearity in the data.

**4.4.4.5 Test for Heteroscedasticity**

Heteroscedasticity occurs when the variability of a variable is unequal throughout the range of values of a second variable that predicts it (Vinod, 2008). Researcher used Heteroscedasticity to cover both models with a discrete and continuous distribution of the variances of the errors. In this study, Heteroscedasticity was tested by performing the Breuch-pagan / Cook-Weisberg test which tests whether the null hypotheses error variances are equal. The test was also used to examine if the alternative hypotheses error variances are a multiplicative function of variables (Vinod, 2008).

Homoscedasticity is evident when the value of "Prob > Chi-square" is greater than 0.05 (Park, 2008).

**Table 25: Heteroscedasticity Test**

| Ho | Variables | Chi2(3) | Prob>Chi2 |
|---|---|---|---|
| Constant Variance | FKE, FBP, HC, FI and FP | 13.742 | 0.442 |

Table 25 shows that the constant variance (Chi-square= 13.742) is insignificant ($p = 0.442$). The study fails to reject the null hypotheses and concluded that the error variance was equal therefore heteroscedasticity was not a problem in the data. Table 25 represents this information.

**4.4.4.6 Linearity Test**

Linearity test refers to the ability to provide results that are directly proportional to the concentration of the analysis in the test sample. Linearity test was used to represents the relationship between the independent variable and the dependent variable. To carry out the structural equation modeling analysis, the relationship between the independent and dependent variable should be radically consistent. To test for linearity the significant

value for deviation from the linearity should not be less than 0.05. That is the relationship between the independent variable and the dependent variable should be more than 0.05. Linearity was fixed by removing the outliers. Since the outliers had been removed in this study, linearity was assumed.

## 4.5 Descriptive Analysis

The study employed descriptive statistics for the objectives in which frequency distribution was undertaken. The chi square statistic was used for the measurement of the presence or absence of the statistical relationship between the independent and dependent variables at 5% level of significance.

### 4.5.1 Financial Knowledge and Expertise

The study sought to examine the relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya. To achieve this objective Likert scale of five construct was used. Descriptive statistics below presents the results of the indicators of financial knowledge and expertise as per the conceptual framework.

Financial knowledge of financial information system determines the set of skills and knowledge that allows managers and individuals to make informed and effective decisions on their financial resources. Respondents were asked about the financial information system, a majority (79%) of the respondent considered the financial system to attract more depositors for commercial banks while 17% of the respondent were undecided and a few did not agree (5%). The respondents were further asked whether financial knowledge system has enabled the customers to transact their deposits with ease, the majority (74%) agreed with this opinion, a few (10%) disagreed and while 17% were neutral. It was noted that 74% of the respondent who participated in the study agreed that financial knowledge and financial system have attracted corporate depositors

and deposits, while only 1% disagreed and 25% were either indifference or neutral. Similarly, over 87% agreed that financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank and only 1% disagree, as 13% are neutral. The average mean score was 4.158 with a standard deviation of 0.8615 which indicates that majority of the respondent agreed with the statement.

Experience in the financial information system was seen to attract more customers to the bank by7% of the respondent while 4% disagreed and 9% were undecided. On whether the experience in financial information system has helped to establish linkage with corporate depositors and deposits, 90% agreed while 2% disagreed and 8% were undecided. The majority (78%) agreed that experience in financial information system has helped in sharing of information with the bank's depositors; a few (23%) were undecided. Respondents were also required to answer the question of whether experience in financial information system has helped customers to transact cash withdrawals and different deposits with ease. Majority of the respondent (90%) agreed, while 11% were undecided.

Financial information system management was operationalized into right implementation, acceptable by employee and customers. Asked whether financial information system management has helped to increase the competence of employee, the majority (77%) of the respondent agreed while a few disagreed (1%) and 24% were neutral as shown in Table 26 Zhang and Li (2009) observed that financial information can reflect the current and future operating conditions of the banking industry. When employees were asked whether financial information system management has encouraged customer retention 76% agreed while 24% were either indifference or neutral. As on financial information system management helping the banks to share a lot

of information with their customers, 68% of the respondents agreed while 33% either disagreed or were neutral. 89% of the respondent indicated that financial information system management links the banks with external social networks such as customers and regulatory body, while a few (11%) were neutral.

The general level of Financial Knowledge of Financial Information System was determined by calculating the means and standard deviations for the various statements as per the responses and tabulated. The results were presented in the Table 26 below.

**Table 26: Financial Knowledge and Expertise**

|  | N | Mean | Std. Deviation |
|---|---|---|---|
| Financial knowledge of financial information system have attracted more depositors for the commercial banks | 123 | 3.93 | 0.841 |
| Financial knowledge and financial information system has enabled the customers to transact their deposits with ease. | 123 | 3.82 | 1.017 |
| Financial knowledge and financial information system have attracted corporate depositors and deposits. | 123 | 4.00 | 0.800 |
| Financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank. | 123 | 4.32 | 0.761 |
| Experience in financial information system has helped to attract more customers to the bank. | 123 | 4.20 | 0.826 |
| Experience in financial information system has helped to establish linkage with corporate depositors and deposits. | 123 | 4.26 | 0.734 |
| Experience in financial information system has helped in sharing of information with the banks depositors. | 123 | 4.09 | 0.758 |
| Experience in financial information system has helped customers to transact cash withdrawals and different deposits with ease. | 123 | 4.17 | 0.636 |
| Financial information system management has helped to increase the competence of employee. | 123 | 4.03 | 0.768 |
| Financial information system management has encouraged the customer retention. | 123 | 4.02 | 0.799 |
| Financial information system management helped the banks to share a lot of information with their customers. | 123 | 3.93 | 0.973 |
| Financial information system management links the banks with external social networks such as customers and regulatory body. | 123 | 4.27 | 0.690 |
| **Grand Total** |  | **4.09** | **0.800** |

The results indicate that financial knowledge of financial information system has attracted more depositors for the commercial banks (mean=4.09, standard deviation=0.856), financial knowledge and financial information system have attracted corporate depositors and deposits (mean=4.12, standard deviation=0.832). Financial knowledge and financial information system has enabled the use of computer software as a means of communication among all members of the bank (mean=4.43, standard deviation=0.735). The results also indicated that experience in the financial information system has helped to establish linkage with corporate depositors and deposits (standard deviation=0.672), has helped in sharing of information with the bank's depositors (mean=4.05, standard deviation 0.710), helped customers to transact cash withdrawals and different deposits with ease (mean=4.29, standard deviation=0.649).

Financial information system management has effected changes in the customer relations. This can be identified in increase the competence of the employee( mean= 4.00, standard deviation= 0.712) Financial information system management has encouraged customer retention (mean=4.17, standard deviation=0.804) financial innovation system management helped the banks to share a lot of information with their customers(mean=4.04, standard deviation=1.019) and financial information system management links the banks with external social networks such as customers and regulatory body( mean= 4.38, standard deviation=0.681).

The average mean score was 4.09 with a standard deviation of 0.800 which indicates that majority of the respondent agreed with the statement. This is in line with a study by Shibia and Kieyah (2016), on Financial Literacy, Individual Choices among Financial Access Strands in Kenya. These authors attributed the financial performance of organizations to various financial knowledge systems. To encourage financial knowledge

and financial information system some commercial banks have created financial infrastructure program that helps to strengthen these systems in Kenya.

Rouhani and Mahmodian (2012), examined the impact of financial information systems; Business intelligence perspectives (Iranian Companies Listed on Stock Exchange Case Study) and revealed that business intelligence perspective helps Iranian Companies listed on the stock exchange to plan and implement financial information systems for better decision support. In support, experience in financial information systems helps the commercial banks to meet their financial obligation as an when they fall due (Rom & Rohde, 2007). Therefore, it should be the responsibility of the banks' management to lead from the front and encourage those below them. The success of information system management relies on the user participations and the relationship with the developers (Kaur & Aggrawal, 2013). The process of financial information system management in the banking sector involves the process of collecting and storing data to retrieve them to meet the needs of information managers at the right time hence great effectiveness (Al-Azzawi, 2011).

### 4.5.2 Financial Business Process and Practice

The second specific objective of the study aimed to establish the relationship between the financial business process and practice and financial performance of Commercial Banks in Kenya. The objective was verified from the respondents by use of Likert scaled statement on a questionnaire. Descriptive statistics below presents the results of the indicators of financial business process and financial performance as per the conceptual framework.

Measuring financial business processes has become a central issue since banks are challenged to achieve effective and efficient results. The majority (76%) of the

respondents agreed that internal financial business process measures have helped to attract more depositors for the commercial banks, while a few 5% disagreed and 17% were neutral. A study by Onjue, et al., 2018), on the influence of business process reengineering on electronic commerce strategy as adopted by commercial banks in Kenya revealed that internal financial business process measures have a positive and significant relationship with Electronic Commerce strategy as adopted by commercial banks. Only a few (10%) respondent disagreed or were neutral on internal financial business process measures and how they have encouraged the sharing of information, ideas and financial knowledge among the banks' employees as the majority (91%) of the respondent agreed. Further analysis revealed that majority of the respondent (83%) agreed that internal financial business process measures have encouraged convenience and security of customers' accounts while 15% were neutral and only a few disagreed (1%). This means that the majority of the respondents agreed with the statement. Analysis of how internal financial business process measures enabled the banks to conclude deals previously facilitated by external social networks revealed that 83% agreed while 16% either disagreed or were neutral.

The general level of financial business process was determined by calculating the means and standard deviations for the various statements as per the responses and tabulated. The results were presented in the Table 27 below.

**Table 27: Financial Business Process and Practice**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| Internal financial business process measures have helped to attracted more depositors for the commercial banks | 123 | 3.95 | 0.838 |
| Internal financial business process measures have encouraged the sharing of information, ideas and financial knowledge among the bank's employees | 123 | 4.14 | 0.618 |
| Internal financial business process measures has encouraged convenience and security of customers' accounts | 123 | 4.20 | 0.652 |
| Internal financial business process measures enabled the banks to conclude deals previously facilitated by external social networks. | 123 | 4.24 | 0.739 |
| Financial Innovation network has helped to attracted more customers to the bank. | 123 | 4.11 | 0.861 |
| Financial Innovation network has successfully established linkage with banks customers. | 123 | 4.24 | 0.690 |
| Financial Innovation network has successfully helped in sharing of information with the banks corporate depositors. | 123 | 4.25 | 0.785 |
| Financial Innovation network has successfully helped to gain a lot of information from the banks customers. | 123 | 4.24 | 0.682 |
| Cash flows in terms of profits have motivated investors to the banks. | 123 | 4.26 | 0.711 |
| Cash flows have created customers loyalty. | 123 | 4.06 | 0.761 |
| Cash flows from customer's deposits have contributed positively to banks annual profitability. | 123 | 3.97 | 0.932 |
| Cash flows have enabled the banks to maintain its liquidity ratios. | 123 | 4.37 | 0.694 |
| **Grand Total** | | **4.17** | **0.747** |

The results indicate that internal financial business process and practice measures have helped to attract more depositors for the commercial banks (mean=3.95, standard deviation=0.838), have encouraged the sharing of information, ideas and financial knowledge among the bank employees(mean=4.14, standard deviation=0.618), has encouraged convenience and security of customer's accounts(mean=4.20, standard

deviation=0.652) and enable the banks to conclude deals previously facilitated by external social networks(mean=4.24, standard deviation=0.739).

The results, also indicated that financial innovation network has helped to attract more customers to the bank (mean=4.11, standard deviation=0.861), has successfully established linkage with banks customers (mean=4.24, standard deviation=0.690), has helped in sharing of information with banks corporate depositors (mean=4.25, standard deviation=0.785) and has helped to gain a lot of information from the banks customers (mean=4.24, standard deviation=0.682).

Most of the respondents indicated that cash flows had effected changes resulting in terms of profits have motivated investors to the banks (mean=4.26, standard deviation=0.711), have created customers loyalty (mean=4.06, standard deviation=0.761), from customer's deposits cash flows have contributed positively to banks annual profitability (mean=3.97, standard deviation=0.932), and enabled the banks to maintain its liquidity ratios (mean=4.37, standard deviation=0.694).

### 4.5.3 Human Capital

The third specific objective of the study was to assess the relationship between human capital financial performances of Commercial Banks in Kenya. The data for this objective was gathered using Likert scale questionnaires.  Descriptive statistics below presents the results of the indicators of human capital and financial performance of commercial banks in Kenya as per the conceptual framework.

Majority of the respondents (78%) agreed that customer relation systems have attracted more depositors in the Commercial banks, 14% were neutral while 7% of the respondents did not support the statement that customer relation systems have attracted more depositors in the Commercial banks.

Asked on their views on customer relations during transactions, 79% of the respondents were in agreement that customer relations enable customers to transact their deposits with ease, 18% of the respondents were neutral on the question while 3% of the respondents disagreed with the statement that customer relations enable customers to transact their deposits with ease.

Majority of the respondents (65%) agreed that customer relations in the banking sector creates an environment for employees to identify and make contact with their customers, with 13% of the respondents remaining neutral and 22% disagreeing that customer relations in the banking sector create an environment for employees to identify and make contact with their customers. 68% of the respondents were in agreement that customer relations create a good relationship with customers that makes the existing customers enroll new customers, 16% were neutral while 6% disagreed that customer relations create a good relationship with customers that makes the existing customers enroll new customers.

This section sought to get views on the effect of employee relations on the performance of Commercial banks in Kenya. 86% of the respondents were of the view that employee relations have helped the bank to retain customers and hence improved performance, 11% of the respondents remained neutral while 3% of the respondents disagreed that employee relations have helped the bank to retain customers and hence improved performance. Majority of the respondents (80%) agreed that employee relations have helped to establish linkage with corporate depositors and deposits, 16% being neutral while 4% of the respondents disagreed with the statement that employee relations have helped to establish linkage with corporate depositors and deposits. Asked their views on employee relations and comprehensive data systems, 81% of the respondents agreed that employee relations have helped in Comprehensive data systems of the customer profile

and transactions, 15% were neutral while 4% of the respondents disagreed that employee relations have helped in comprehensive data systems of the customer profile and transactions. Majority of the respondents (70%) agreed that employee relations have created financial information systems resources that are in synchronization with technological advancements, 25% were neutral while 5% of the respondents disagreed with the statement that employee relations have created financial information systems resources that are in synchronization with technological advancements.

This section sought to get views on the effect of customer loyalty on the performance of Commercial banks in Kenya. Majority of the respondents (75%) agreed that customer loyalty has helped to increase the liquidity of banks by increased deposits, 18% were neutral while 8% of the respondents disagreed that customer loyalty has helped to increase the liquidity of banks by increased deposits. Asked on whether customer loyalty has encouraged financial information updates from the Banks, 60% of the respondents were in agreement, 30% were neutral while 10% of the respondents disagreed that customer loyalty has encouraged financial information updates from the commercial banks. Further still, the study sought to know if customer loyalty links the banks with external social networks such as customers and regulatory body, where 71% of the respondents agreed that customer loyalty links commercial banks with external social networks such as customers and regulatory body, 23% were neutral to the statement while 6% of the respondents disagreed with the statement. The general level of human capital was determined by calculating the means and standard deviations for the various statements as per the responses and tabulated. The results were presented in the Table 28 below.

**Table 28:  Human Capital**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| Customer relations system have attracted more depositors for the commercial banks | 123 | 4.13 | 0.877 |
| Financial knowledge and financial information system have created Customer relations that enable the customers to transact their deposits with ease. | 123 | 4.06 | 0.681 |
| Customer relations creates an environment for banks employees to identify and make contacts with their customers | 123 | 3.76 | 1.133 |
| Customer relations creates good relationship with customers that makes the existing customers to enroll new customers | 123 | 4.19 | 0.862 |
| Employee relations has helped the bank to retain customers and hence improved performance. | 123 | 4.17 | 0.674 |
| Employee relations have helped to establish linkage with corporate depositors and deposits. | 123 | 4.14 | 0.693 |
| Employee relations have helped in Comprehensive data systems of the customer profile and transactions. | 123 | 4.02 | 0.762 |
| Employee relations have created financial information systems resources that are in synchronization with technological advancements. | 123 | 3.96 | 0.853 |
| Customer loyalty has helped to increase the liquidity of banks by increased deposits. | 123 | 3.99 | 0.917 |
| Customer loyalty has encouraged financial information updates from the Banks. | 123 | 3.99 | 0.983 |
| Customer loyalty helped the banks to share a lot of information with their customers. | 123 | 3.89 | 0.777 |
| Customer loyalty links the banks with external social networks such as customers and regulatory body. | 123 | 3.90 | 0.863 |
| **Grand Total** | | **4.02** | **0.840** |

The results indicated that customer relations system have attracted more depositors for the commercial banks(mean=4.13, standard deviation=0.877), customer relations that enable the customers to transact their deposits with ease have been created by financial knowledge and information system(mean=4.06, standard deviation=0.681), customer relations have created an environment for banks employees to identify and make contacts with their customers(mean=3.76, standard deviation=1.133),  and creates good

relationship with customers that makes the existing customers to enroll new customers(mean=4.19, standard deviation=0.862).

Additionally, employee relations has a positive impact on the banks which are, retain customers and hence improve performance( mean=4.17, standard deviation=0.674), have helped establish linkage with corporate depositors and deposits(mean=4.14, standard deviation=0.693), a positive impact in comprehensive data systems of the customer profile and transactions (mean=4.02, standard deviation=0.762), and employee relations have created financial information systems resources that are in synchronization with technological advancements (mean=3.96, standard deviation=0.853).

The results indicate that customer loyalty has helped to increase the liquidity of banks by increased deposits (mean=3.99, standard deviation=0.917), has encouraged financial information updates from the banks (mean= 3.99, standard deviation=0.983), helped the banks to share a lot of information with their customers (mean=3.89, standard deviation=0.777), and links the bank with external social networks such as customers and regulatory body (mean=3.90, standard deviation=0.863).

The grand total of a mean=4.02 and standard deviation = 0.840 shows that nowadays banks are required to benchmark and enhance human capital standards by setting the human resource department in the banking sector.

### 4.5.4 Financial Innovation

This section sought views regarding the mediating effect of financial innovation (Automated Teller Machine (ATMs), Internet banking, Mobile Banking, Debit and credit cards) on the financial performance of the commercial banks.

This study sought to establish the influence of Automated Teller Machine (ATMs) regarding the individual deposits in the commercial banks. The majority (83%) of the respondent agree that ATMs attract more individual depositors for commercial banks and are satisfied by ATMs. 76% of the respondents answered in the affirmative, a few (2%) responded negatively while 22% were neutral. On corporate depositors and easy withdraw there were more respondents (74%) who agreed with the statement, a few (4%) disagreed as 22% were neutral. On the influence of the internet banking services and the attraction of more customers hence improved performance, the majority (76%) of the respondent agreed while 3% disagreed and 21% of the respondents were neutral. Thirty-six percent disagreed that Internet banking services have established linkage with corporate depositors and deposits. On whether the internet banking services improved in comprehensive data systems of the customer profile and transactions only 3% disagreed while 86% agreed and 11% were neutral. Majority of the respondent (85%) agreed that customers are encouraged to deposit and withdraw cash at their comfort, while 14% are neutral and only 1% disagreed. The finding indicates that majority (88%) of the respondents agreed that ATMs services lower the transaction cost of the banks' customers, while few (11%) claim that lack of knowledge and 2% of the respondents disagreed.

Based on the evaluation on the mobile banking and the increased the liquidity of the bank by increased deposits as agreed by 86% of the respondents, 15% were neutral and 4% disagreed. Mobile banking attracts more depositors and deposits as agreed by 68% of the respondents, while 26% were neutral and few (5%) disagreed. Seventy-seven percent of the respondent agree that Mobile banking services help the banks' customers to transact with ease hence high deposits, 3% of the respondent disagreed and 20% were neutral. Mobile banking services links the banks with external social networks such as

customers and regulatory body as agreed by 79% of the respondents, a few (5%) of the respondent disagreed and 15% were neutral.

The general level of financial innovation was determined by calculating the means and standard deviations for the various statements as per the responses and tabulated. The results were presented in the Table 29 below.

**Table 29: Financial Innovation**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| ATMs system have attracted more individual depositors for the commercial banks | 123 | 4.12 | 0.595 |
| ATMs have encouraged more customer satisfaction. | 123 | 4.09 | 0.724 |
| ATMs have created services that attract corporate depositors and easy withdraw. | 123 | 4.06 | 0.761 |
| ATMs services lower the transaction cost of the banks customers. | 123 | 4.23 | 0.598 |
| Internet banking services has attracted more customers hence improved performance. | 123 | 4.06 | 0.771 |
| Internet banking services has established linkage with corporate depositors and deposits. | 123 | 3.41 | 1.247 |
| Internet banking services has helped in Comprehensive data systems of the customer profile and transactions. | 123 | 4.14 | 0.618 |
| Employee relations have encouraged the customers to deposit and withdraw cash at their comfort. | 123 | 4.11 | 0.584 |
| Mobile banking services has created customer loyalty has helped to increase the liquidity of banks by increased deposits. | 123 | 4.18 | 0.725 |
| Mobile banking services have attracted more banks depositors and deposits that increase performance in the banks. | 123 | 3.93 | 0.851 |
| Mobile banking services helps the banks customers to transact with ease hence high deposits, | 123 | 4.10 | 0.706 |
| Mobile banking services links the banks with external social networks such as customers and regulatory body. | 123 | 4.17 | 0.866 |
| Debit and credit cards have positively increased the commission based income | 123 | 4.11 | 0.851 |
| Debit and credit cards have positively influenced the increase of interest based income. | 123 | 4.13 | 0.712 |
| Debit and credit cards have positively expanded the income generation of the banks. | 123 | 4.02 | 0.735 |
| Debit and credit cards have increased the customer's transaction and deposits. | 123 | 4.05 | 0.798 |
| | | **4.06** | **0.759** |

The results indicate that ATMs system have had a positive impact on commercial banks. ATMs have attracted more individual depositors for the commercial banks (mean=4.12, standard deviation=0.595), encouraged more customer satisfaction (mean=4.09, standard deviation=0.724), created services that attract corporate depositors and easy withdraws (mean=4.06, standard deviation=0.761), and they have lowered the transaction cost of the banks customers (mean=4.23, standard deviation=0.598).

Internet banking has improved performance by attracting more customers (mean=4.06, standard deviation=0.771), established linkage with corporate depositors and deposits (mean=3.41, standard deviation=1.247), helped in comprehensive data systems of the customer profile and transactions (mean=4.14, standard deviation=0.618) and has encouraged the customers to deposit and withdraw cash at their comfort (mean=4.11, standard deviation=0.584).

From the results, the impact of mobile banking has created customer loyalty which has helped to increase deposits (mean=4.18, standard deviation= 0.725), have attracted more banks depositors and deposits that increase performance in the banks (mean=3.93, standard deviation =0.851), helps the banks customers to transact with ease hence high deposits (mean=4.10, standard deviation=0.706), links the banks with external social networks such as customers and regulatory body (mean= 4.17, standard deviation=0.866).

Debit and credit cards have positively influenced the commission based income (mean=4.11, standard deviation=0.851). The increase of interest based income (mean=4.13, standard deviation=

0.712), expanded the income generation of the banks (mean= 4.02, standard deviation= 0.735), and increased the customer's transaction and deposits (mean=4.05, standard deviation = 0.798). Further study was done by Nadia et al. (2003) in the US and revealed that use of the ATMs led to internal cost-cutting leading to better performance.

The grand total of mean =4.06 and standard deviation=0.759 shows that most respondents know the level of financial innovation networks that have linkage with banks customers. The respondents were asked to compare the financial innovation network with the banks' corporate depositors. Specifically, financial innovation network inputs received from the commercial banks created value to corporate depositors.

A study by Dew (2007) on ATMs in Australia confirms these findings by concluding that ATMs assisted the commercial banks to improve the individual depositors. Respondents were also required to indicate if more customers. Lftekhar et al. (2009), argue that ATMs installed in retail payment systems make more customers satisfied. This states that partnerships among banks and intermediate financial institutions (such as saving and credit cooperative societies and microfinance institutions) indicating the potential that ATMs have in the enhancement of banks performance.

The finding shows that internet banking provides a convenient platform to enable customers to transact easily. Previous scholars concluded that internet banking improved banks performance (Pooja & Singh 2009; Simpon, 2002). The results are also in line with previous studies such as Mabrouk and Mamogholo (2010), who argued that mobile banking had enabled the banks to increase their incomes and profitability. Njoroge et al. (2010), noted that mobile banking in Kenya has led to an increase in profitability of banks through the expansion of the range of services offered by the banks; therefore, increasing the bank's incomes.

In Kenya, mobile banking has highly penetrated mainly due to the ease and speed in which customers transact. This has led to the popularization of mobile banking to the customers hence an increase in the collaboration between the telecommunication companies and the banks such as M-Shwari, M-Kesho, Pesa pap, KCB Mpesa and many more. The collaboration increases more opportunities for the banking sector.

### 4.5.5 Financial Performance Measurement

Financial performance of commercial banks was the dependent variable. The annual supervision report published by CBK for each bank data for three years was used as indicators of financial performance in this study.  The study sought to find the trend of financial performane of the commercial banks in  three years (2015-2017). The study used  Return on Assets (ROA) and Earning Before Intrest and Tax (EBIT) as the main indicators financial performane of the commercial banks. Return on assets (ROA) is a ratio that relates to the income earned by the banks and the assets used in the business operations.   Return on assets (ROA) is commonly measured by net income / total assets. This study used the return on asset to provide information about management's performance in utilizing the assets net income to increase financial performance and the financial trends.  Return on Assets (ROA) and Earning Before Intrest and Tax (EBIT) were calculated at bank levels and a detailed descriptive analyses of the variables were computed to summarize the results. Table 30 below represents the mean and standard deviaton of the financial performance of commercal banks for the period 2015 to 2017.

**Table 30: Financial Performance Measures**

|  |  | 2015 | 2016 | 2017 | GRAND TOTAL |
|---|---|---|---|---|---|
|  | | **ROA** | | | |
| Sample | Mean (M) | 0.857 | 0.958 | 0.796 | 0.866 |
| Standard Deviation (STDEV) | | 0.031 | 0.012 | 0.074 | 0.677 |

|  |  | 2015 | 2016 | 2017 | GRAND TOTAL |
|---|---|---|---|---|---|
|  | | **EBIT** | | | |
| Sample | Mean (M) | 0.902 | 0.981 | 0.975 | 0.954 |
| Standard Deviation (STDEV) | | 0.031 | 0.004 | 0.005 | |

The analysis reveals mixed results on the average Return on Assets (ROA) and Earning Before Intrest and Tax (EBIT) for the period under study. The financial performance ratios ROA and EBIT Table 30 above shows the results in terms of financial performance of the overall mean return on assets (ROA) for the period 2015 to 2017. The study established overall mean return on asset (ROA) for the full sample was 0.866, (86.6% ) while the values of standard deviation ranged from 0.074 to 0.012 indicating high value of financial performance. The mean average of Earnings Before Interest and Tax was 0.954 (95.4%) whereas Values of standard deviation ranged from 0.031 to 0.004 while EBIT ranged from 0.902 to 0.975 indicating a significant effect on financial performance.

**Table 31: Regression Analysis on Financial Performance**

| Construct | Item | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|
| ROA | ROA2015 | 0.857 | 0.031 | 27.374 | 0.000 |
| | ROA2016 | 0.958 | 0.012 | 76.548 | 0.000 |
| | ROA2017 | 0.796 | 0.074 | 10.629 | 0.000 |
| GRAND TOTAL | | **0.866** | | | |
| EBIT | EBIT2015 | 0.902 | 0.031 | 29.069 | 0.000 |
| | EBIT2016 | 0.981 | 0.004 | 278.141 | 0.000 |
| | EBIT2017 | 0.975 | 0.005 | 187.142 | 0.000 |
| **Grand Total** | | **0,954** | | | |

The analysis of the regression model conducted by the yielded a chi-square value ranging from10.629 to 76.548 of ROA. The lowest return on assets was recorded in 2017 (10.629) while the highest was recorded in 2016 (76.548). This clearly indicated that the ratios fluctuated throughout 2017. The P value of .000 (p<0.05) indicated that without mediation Return on assets (ROA) was significant.

Earnings Before Interest and Taxes is a financial performance measurement that calculates the operating profits. In this study it was calculated to show the profit a firm generates from its operations alone without regard to interest or taxes. The mean value of 29.069 to 278.141 of EBIT with p-value of 0.000 (p<0.05) imply that both cases were statistically significant and hence the null hypothesis was rejected.

## 4.6 Correlation Analysis

Correlation analysis indicates the nature and magnitude of the relationship between research variables. Sekaran and Bougie (2010), argues that correlation analysis shows the direction, strength, and significance of the relationship among the variables of the study.

A positive correlation shows that when one variable increases the other variable will also increase, while a negative correlation indicates that as one variable increases the other variable decreases.

Coefficient of the correlation analysis is presented in a matrix, as shown in Table 32. Pearson correlation results in the table shows a positive relation between financial business process and financial performance with a Pearson correlation of (r= 0.646) was obtained. The results of this study illustrated a positive correlation between organizational capital and financial performance at (r=0.624) and a two-tale significance level. Results therefore show a positive correlation between all the variables was positively correlated. The Table 32 below further shows that correlation coefficient between organizational capital and financial performance was statistically significant at (r=0.624), and human capital on the financial business process was 0.398 significant at a two-tail significant level. Additionally, there was positive correlation between financial knowledge and expertise and financial performance (r=0.549). This means that an increase in financial knowledge and expertise will lead to the improved financial performance of commercial banks.

**Table 32: Pearson Correlation and Discriminant Validity of 2nd Order Constructs**

| | Financial Knowledge and Expertise | Financial Business Process | Human Capital | Financial Performance | Organizational Capital |
|---|---|---|---|---|---|
| Financial Knowledge and Expertise | **0.793** | | | | |
| Financial Business Process | 0.646$^{**}$ | **0.722** | | | |
| Human Capital | 0.571$^{**}$ | 0.398$^{**}$ | **0.845** | | |
| Financial Performance | 0.549$^{**}$ | 0.649$^{**}$ | 0.455$^{**}$ | **0.737** | |
| Organizational Capital | 0.551$^{**}$ | 0.401$^{**}$ | 0.595$^{**}$ | 0.624$^{**}$ | **0.708** |

** $P < 0.05$

## 4.7 Relationship Between Organizational Capital and Financial Performance

The researcher was interested in establishing the amount variance accounted for the direct effect in model 1 (without mediation) and indirect model 2 (with mediation) and which of the two was more significant. Testing the direct effect involves examining the influence of the predictor variables (financial knowledge and expertise, financial business process and human capital) on the dependent variable (financial performance). To evaluate the inherent relationship between the dependent and independent variables, this study used ANOVA, correlation analysis and regression.

## 4.7.1 Relationship Between Financial Knowledge and Expertise and Financial Performance

The first objective of this study was to evaluate the relationship between financial knowledge and financial performance of commercial banks in Kenya. To test the first

hypothesis, that there is no statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya. To test the hypothesis, regression analysis models were analysed to establish the relationship between the constructs, the 5% significance level ($\alpha=0.05$) was appropriate to test whether the independent variable was significant. The results are presented in Table 33 below.

**Table 33: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-----|----------|-------------------|----------------------------|
| 1 | .721[a] | .519 | .515 | .30401 |

Predictors: (Constant), Financial knowledge and Expertise

The primary data results showed that Financial Knowledge and Expertise had moderate explanatory power on financial performance as it accounted for $R^2 = 0.519$ which is 51.9% of its variability. This shows that about 51.9% of the variation in financial performance is explained by the model. The data results show that 48.1% is unexplained by the model. The adjusted $R^2$ accounted for 0.515 which is 51.5% is slightly lower than the $R^2$ value. This is a precise indicator of the relationship between the independent and the dependent variable because it is sensitive to the addition of irrelevant variables. From the results, it means that Financial Knowledge and Expertise has a strong influence on the financial performance of Commercial banks in Kenya.

**Table 34: ANOVA Test Financial Knowledge and Expertise**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 12.075 | 1 | 12.075 | 130.654 | .000[b] |
| | Residual | 11.183 | 121 | .092 | | |
| | Total | 23.258 | 122 | | | |

a. Dependent Variable: Financial Performance

b. Predictors: (Constant), Financial Knowledge and Expertise

The ANOVA analysis results on Table 34 shows that the overall P-value was .000 < 0.05. A p-value closer to zero is an indicator that the model is very strong while a large p-value closer to 0.05 implies a weak or partial relationship between independent variables and dependent variables. The study shows that there was significant level for Financial Knowledge and Expertise at p= .000, which enables the researcher to conclude that Financial Performance and Expertise affects financial performance of commercial banks in Kenya. The P-value of 0.000 is less than 0.05 significant level; therefore, the study rejected the null hypothesis.

**Table 35: Coefficients of Financial Knowledge and Expertise**

| Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|
| B | Std. Error | Beta | T | Sig. |
| .787 | .195 | | 4.026 | .000 |
| .744 | .065 | .721 | 11.430 | .000 |

a. Predictors: (Constant), Financial Knowledge and Expertise as a composite

b. Dependent Variable: Financial Performance computed as composite.

The results presented in Table 35 indicated that the financial knowledge and expertise on financial performance was significance ($\beta$ =.744,t= 11.430,p <0.05) has an increase in the financial performance. In this regard, the relationship between financial knowledge and expertise and financial performance was significant. The study accepted the

alternative hypothesis and concludes that there is a statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya. As financial knowledge and expertise increases the financial performance increases too. Therefore, the null hypothesis is rejected since $\beta \neq 0$ and p-value $< 0.05$. The regression model was;

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

$Y = 0.787 + 0.744X_1$……………………………….Equation 4.1

Where,

$Y$ = financial performance, $X_1$ = financial knowledge and expertise

The simple regression model indicates that financial knowledge and expertise had a higher influence on the financial performance. The influence of the financial knowledge and expertise on financial performance was measured using return on assets and earnings before interest and taxes. The indicators were calculated for three years (2015, 2016 and 2017) based on financial statement from the Central Bank of Kenya.

## 4.7.2 Relationship between Financial Business Process and Financial Performance

This second objective was to evaluate the relationship between financial business process and practice, and financial performance of Commercial Banks in Kenya. The study hypothesized that financial business process has no effect on financial performance of commercial banks. The main indicator financial business process was internal business process, financial innovation networks and cash flows of the commercial banks. Financial performance is as a result of financial business process. The results are presented in Table 36.

**Table 36: Model Summary of Financial Business Process and Practice**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-----|----------|-------------------|----------------------------|
| 1 | .740[a] | .548 | .544 | .29476 |

Predictors: (Constant), Financial Business Process and Practice

The R square is a basic matrix that explains how much the variance is explained by the model. Adjusted R square is a modified version of R-squared that adjusts for predictors not significant in a regression model. The results presented in Table 36 indicated that $R^2$ = 0.548. This means that 54.8% of the variation is explained while 45.2% of the variation of the financial business process is unexplained. Adjusted $R^2$ value is 0.544 which is 54.4% slightly lower than the $R^2$ value. This is a precise indicator of the relationship between financial business process and financial performance on commercial banks in Kenya. An adjusted $R^2$ of 54.4% of financial business process is explained by the model and 45.6% is not explained by the model. This is an indicator that financial business process has a strong influence on the financial performance of the Commercial Banks in Kenya.

**Table 37: ANOVA Test on Financial Business Process and Practice**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|---------|-------|
| 1 | Regression | 12.745 | 1 | 12.745 | 146.691 | .000[b] |
| | Residual | 10.513 | 121 | .087 | | |
| | Total | 23.258 | 122 | | | |

a. Dependent Variable: Financial Performance

b. Predictors: (Constant), Financial Business Process

Likewise, the results presented in Table 37 show the effect of financial business process on financial performance. An F-value of 146.691 was further revealed with a P value of

0.000 (< 0.05) indicating that the adopted regression model is statistically significant and can be used to make further inferences. The null hypothesis that there is no statistically significant relationship between financial business process and financial performance was rejected and conclusion was made that financial business process has positive significant effect on financial performance.

However, the P-value of 0.000 is lower than the significant P-value of 0.05, hence financial business process has influence on financial performance. This is an indication that financial business process such as internal business process, financial innovation network and cash flows will enhance the financial performance.

**Table 38: Coefficients for Financial Business Process and Practice**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | .464 | .211 | | 2.198 | .030 |
| | Financial Business Process | .864 | .071 | .740 | 12.112 | .000 |

For Coefficients variations of the model allowed the researcher to identify the Coefficient direction of the independent variable. Based on the coefficients results shown in the Table 38 above, the effect of financial business process on the financial performance, revealed a statistically significant relationship. The coefficients of financial business process was at ($\beta$=.740, t=2.548, p <0.05) showing a statistically significant relationship between financial business process and the financial performance of commercial banks.

As a check for the condition, that will lead to the rejection or acceptance of the null hypothesis the regression model used.

$Y = \beta_0 + \beta_2 X_2 + \varepsilon$

$Y = .464 + .864 X_2 + \varepsilon$……………………………….equation 4.2

Y= financial business process, $X_1$= financial performance

Overall regression results presented in Table 38 indicate that financial business process has a positive effect on financial performance. The study accepted the alternative hypothesis and concluded that financial business process influences the financial performance of Commercial Banks in Kenya.

### 4.7.3 Relationship between Human Capital and Financial Performance

The third objective was to assess the relationship between human capital and financial performance of Commercial Banks in Kenya. To establish the relationship between human capital and financial performance of commercial banks the study hypothesized that human capital has no effect on financial performance of commercial banks. Human capital can adjust or develop new organization behavior hence adding value to the organization. The main indicators of human capital were customer relations, employee relations and customer loyalty in the commercial banking. Financial performance is as a result of human capital.

**Table 39: Model Summary of Human Capital**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|-----------------------------|
| 1 | .714[a] | .510 | .506 | .30698 |

Predictors: (Constant), Human Capital

The results presented in Table 39 indicated the effect of human capital on financial performance of commercial banks at $R^2 = 0.510$. This means that 51% of the variation is explained in the model while 49% of the variation of human capital process is unexplained. Adjusted $R^2$ value is 0.506 which is 50.6% slightly lower than the $R^2$ value. This is a precise indicator of the relationship between human capital and financial performance. This proves that human capital has a strong influence on the financial performance of the Commercial Banks in Kenya.

**Table 40: ANOVA Test Human Capital**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 11.855 | 1 | 11.855 | 125.802 | .000[b] |
| | Residual | 11.403 | 121 | .094 | | |
| | Total | 23.258 | 122 | | | |

a. Dependent Variable: Financial Performance

b. Predictors: (Constant), Human Capital

For ANOVA, regression model was used to test the significance of the null hypothesis the F value was used to determine whether the test is statistically significant. The results showed an F value of 125.802 and P-value of 0.000 which is lower than the significant P-value of 0.05. This implies that human capital has significant effect of on financial performance. The null hypothesis was therefore rejected and the study concluded that human capital has statistically significant effect on financial performance in Commercial banks.

**Table 41: Coefficients of Financial Performance**

| Unstandardized Coefficients | | Standardized Coefficients | | |
| --- | --- | --- | --- | --- |
| B | Std. Error | Beta | T | Sig. |
| .787 | .195 | | 4.026 | .000 |
| .744 | .065 | .721 | 11.430 | .000 |

Dependent Variable: Financial Performance

Unstandardized coefficient measures how the dependent variable is expected to increase (positive coefficient) or decrease (negative coefficient) when the independent variable is increased by one (Orodho, 2009). Table 41 above shows that the relationship between human capital and financial performance is directly proportional by β =0.787. This indicates the degree change in the outcome of financial performance for every 1-unit of change in the predictor variable. Unstandardized Coefficient for human capital variable was tested to determine its effect on financial performance. The unstandardized Beta coefficient of β=.787 means that 78.7% of human capital influenced financial performance.

Standardized Beta Coefficient was used to measure the effect of independent variable human capital on financial performance. Beta= 0.721 means that human capital of 72.1% strongly influenced the financial performance. Therefore, success of financial performance can be accounted for by human capital which was statistically significant. This was supported by p value of 0.000 which is less than the conventional probability of 0.05 significant levels.

The result revealed that all the factors were statistically significant ($\beta$=.744, t=11.430, p <0.05).

The regression model used,

$Y = \beta_0 + \beta_3 X_3 + \varepsilon$

$Y = .787 + .744X_3 + \varepsilon$………………………….equation 4.3

Y= human capital, $X_1$= financial performance

Overall regression results presented in Table 41 indicate that human capital has a positive effect on financial performance. The study rejected the null hypothesis and concluded that human capital influences the financial performance of Commercial Banks in Kenya.

### 4.7.4 Mediating effect of financial innovation on the relationship between Organizational Capital and Financial Performance

The fourth objective was to assess the mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. To test the fourth hypothesis that, there is no statistically significant mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. To calculate the magnitude of the mediating effect this study used mediation models (direct and the indirect effect) with regression analysis. Sobel product of coeffient approach analysis that involves model 1 and model 2 was used to present the effect of X on Y was used to calculate the indirect effect by multiplying two regression coefficients.

According to Baron and Kenny (1986), mediating effect function is met if the following conditions are met *(a)* the independent variable make a significant influence to the dependent variable in the absence of mediator variable; *(b)* the independent variable make a significant influence to the mediator variable; *(c)* the mediator make a significant

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influence to the dependent variable. A mediation model seeks to classify and describe the process that underlines a perceived relationship between independent and dependent variables through the inclusion of a third hypothetical variable, known as a mediator variable.

For the mediating effect of financial innovations (direct) on the relationship between organizational capital (financial knowledge and expertise, financial business process, human capital) and financial performance. The of direct path of financial knowledge and Expertise, → financial performance, Financial Business Process → financial performance and Human Capital→ financial performance was evaluated. If the direct effect is not significant, there is no mediation. However, if the direct path is statistically significant, mediating variable is included and bootstrapping procedure is used. Additionally, if the indirect path is not statistically significant after bootstrapping, there is no mediation. The results of the three hypothesis and interpretations were provided in the sections below. The presence of mediation effects was determined by focusing on the significance of the indirect impact arising from Sobel Test.

**Table 42: Sobel Product of Coeffient Approach**

| Sobel product of coeffient approach | |
| --- | --- |
| Model 1 | $Y=\beta 0 + \beta 1X + \beta 2M + e$ |
| Model 2 | $M=\beta 0 + \beta 1X + e$ |

The regression coefficient for indirect effect of each independent variable was calculated to test for statistical significance.

**4.7.4.1 Mediating Effect of Financial Innovation on the Relationship between Financial Knowledge and Expertise and Financial Performance.**

A mediation analysis was performed using Sobel test to test the effect of financial innovations on the relationship between financial knowledge and expertise and financial

performance. The direct and indirect path was evaluated. The statistical significance of direct path of financial knowledge and expertise, → financial performance is tested to determine the effect of independent variable without the mediating variable. Based on Sobel test the direct (also known as partial) effect of financial knowledge and expertise on financial performance is not mediated by financial innovation. However, if the direct path is not significant, mediating variable is included and bootstrapping procedure is used. There is no mediation if the indirect path is not significant after bootstrapping. The presence of mediating effects was determined by focusing on the significance of the indirect impact arising from Sobel Test.

**Table 43: Mediating Effect of Financial Innovation on the relationship between Financial Knowledge and Expertise and Financial Performance**

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Squared | Std Error of Estimate |
| 1 | .381 | .143 | .128 | .101316 |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | .076 | 1 | .076 | 6.494 | .005 |
| | Residual | .370 | 37 | .010 | | |
| | Total | .426 | 36 | | | |

| Coefficients | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandrdized Coefficiemts | | Standardized Coefficients | | . |
| | | B | Std. Error | Beta | T | Sig |
| 1 | (Constant) | .542 | .167 | | 3.075 | .005 |
| | Financial knowledge and Expertise as a composite | .573 | .186 | .381 | 2.558 | .015 |

a. Predictors: (Constant), Financial knowledge and Expertise

b. Dependent Variable: financial performance

An estimate of the standard error of *ab* product ($SE_{ab}$) is needed so as to set up a *z* test statistic. The *ab* product is said to be statistically significant if $+1.96 \leq z \geq -1.96$. The sobel test was used to test the hpothetical data on financial knowledge and expertise and to compute the unstandardized regression, coefficients and standard errors or the *t* values for and b path coefficients.

The results in the Table 43 indicated that the influence of financial knowledge and expertise on performance was significant (R square =.143, F=6.496, p<0.05) with 13% of the variation in financial performance as explained by the variation in financial knowledge and expertise. The beta was also significant (β= 0.573, t=2.558, p< 0.05). This indicated that the independent variable is significantly related to the dependent variable in the absence of the mediating variable.

**Table 44: Path coefficients for the relationship between meditated financial knowledge and expertise and Financial Performance**

| Path | β | Std Error | Standard Deviation | T Statistics | P Values |
|---|---|---|---|---|---|
| Financial Knowledge and Expertise ↓ Financial Innovation | 0.398 | 0.396 | 0.081 | 4.914 | 0.000 |
| Financial Innovation ↓ Financial Performance | 0.342 | 0.343 | 0.088 | 3.886 | 0.000 |
| Financial Knowledge and Expertise ↓ Financial Performance | 0.699 | 0.697 | 0.103 | 6.786 | 0.000 |

Sobel test: Z=3.048, *p*=0.0023

The path coefficient are the β weights from the respective regression analyses. Results of regression analysis show that the direct path was statistically significant. The Sobel test and bootstrapping results in Table 44 indicated that financial innovation mediated the relationship between financial knowledge and expertise and financial performance and the mediation was statistically significant (*p*<0.05). The results indicated that financial

innovation had a positive and significant effect on financial performance ($\beta$=0.398, $p < 0.05$). Financial knowledge and expertise was found to have a positive and significant effect on financial innovation ($\beta$=0.342, $p < 0.05$). The path model was estimated through bootstrapping without the interaction of a mediator (financial innovation). Therefore, inclusion of financial innovation as a mediator was meaningful.

The indirect path was required to verify that financial innovation mediates the relationship between financial knowledge and expertise and financial performance. To ascertain the significance of the indirect path the value of standard deviation was computed in order to obtain the t value of the indirect path. The value of indirect indicated by (FKE → FI → FP). The Sobel test for the indirect represented Z=3.048, $p$=0.0023(<0.05) which is greater than 1.96 and therefore the mediating effect was interpreted to be statistically significant and at the 0.05 level. The null hypothesis was rejected. This type of analysis is mostly informative because it examines a mediator which is affected by a predictor variable. The mediator then hypothetically causes a change in the outcome (dependent) variable, which may have been as a result of direct effect of the predictor variable (Hayes, 2013; Baron & Kenny, 1996). Significance test results for the mediating effect of financial innovation organizational capital and financial performance of Commercial banks were at 91%

### 4.7.4.2 Mediating Effect of Financial Innovation on the Relationship between Financial Business Process and Financial Performance

**Table 45: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .439 | .202 | .191 | .081606 |

**ANOVA**

| Mode | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .076 | 1 | .080 | 8.966 | .005 |
| | Residual | .370 | 38 | .009 | | |
| | Total | .426 | 40 | | | |

| | | | **Coefficients** | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Unstandrdized Coefficiemts** | | **Standardized Coefficients** | | |
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | .546 | .130 | | 3.275 | .005 |
| | Financial knowledge and Expertise as a composite | .572 | .156 | .381 | 3.158 | .015 |

a. Predictors: (Constant), Financial Business Process

b. Dependent Variable: financial performance

The Sobel test results of financial business process revealed that z score was statistically significance (R Square = .202, F=8.966, p< 0.05) with 15% of the variation in financial performance being significantly explained. The z score not containing a zero value suggested that the indirect effect is significant. Therefore, the first condition was met. The beta was also significant ($\beta$=0.572, t=3.158,<0.05), hence satisfying the second

condition that states the independent variable should be significantly related to the mediator variable.

The path model was estimated through bootstrapping without the interaction of a mediator (financial innovation). The results revealed that the direct path was statistically significant. Therefore, inclusion of financial innovation as a mediator was meaningful. The indirect path was required to verify that financial innovation mediates the relationship between financial business process and financial performance. The third condition (FBP → FI → FP) of mediation is to explain the mediating variables on the dependent variable. The regression analysis shows that financial innovation significantly affects financial performance ($\beta$ = .381, p< 0.05). This suggests that the third was condition was met.

The mediating effect of financial innovation on the relationship between financial business process and financial performance was measured to determine the variable's mediating functions. Results of regression analysis show that the direct path was statistically significant. The Sobel test and bootstrapping results in Table 46 indicated that financial innovation mediated the relationship between financial business process and practice and financial performance and the mediation was statistically significant ($p<0.05$). The results indicated that financial business process and practice had a positive and significant effect on financial performance ($\beta=0.476$, $p < 0.05$). Financial business process and practice was found to have a positive and significant effect on financial innovation ($\beta=0.295$, $p < 0.05$). The path model was estimated through bootstrapping without the interaction of a mediator (financial innovation). Therefore, inclusion of financial innovation as a mediator was meaningful.

**Table 46: Path coefficients for the relationship between mediated Financial Business Process and Practice and Financial Performance**

| Path | B | Std Error | Standard Deviation | T Statistics | P Values |
|---|---|---|---|---|---|
| Financial Business Process ↓ Financial Innovation | 0.295 | 0.296 | 0.073 | 4.041 | 0.000 |
| Financial Business Process ↓ Financial Performance | 0.476 | 0.476 | 0.116 | 4.103 | 0.000 |
| Financial Innovation ↓ Financial Performance | 0.378 | 0.377 | 0.087 | 4.345 | 0.000 |

Sobel test: Z=2.959, p=0.0031

The first Path coefficient refers to the path between the independent variable and the mediator variable. The standard error of this path (coefficient), financial business process → financial innovation of $S_e$= 0.296, the path between the mediator and dependent variable financial business process → financial performance $S_b$ =0.476. To determine whether the mediation effect is statistically significant through the use of Sobel test the z-score was used. If $+1.96 \leq z \geq -1.96$  z-score, the mediation effect is interpreted to be statistically significant at 0.05 level.  The results revealed in the Sobel test Z=2.959 and p=0.0031. This suggests that the mediation effect is statistically significant. Hence the null hypothesis was rejected.

## 4.7.4.2 Mediating Effect of Financial Innovation on the Relationship between Human Capital and Financial Performance

The study sought to establish the mediating effect of financial innovation on human capital and financial performance. Baron and Kenny approach was used to test for the mediating effect.

**Table 47: Regression Mediating Effect of Financial Innovation**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .491 | .212 | .181 | .101606 |

**ANOVA**

| Mode | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | | .070 | 1 | .090 | 6.566 | .005 |
| Regression | | .470 | 38 | .019 | | |
| | Residual | .426 | 40 | | | |
| | Total | | | | | |

| | | Coefficients | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandrdized Coefficiemts | | Standardized Coefficients | | |
| | | B | Std. Error | Beta | T | Sig. |
| 2 | (Constant) | .446 | .147 | | 3.275 | .005 |
| | Human Capital | .472 | .176 | .381 | 3.158 | .015 |

a. Predictors: (Constant), Human Capital

b. Dependent Variable: financial performance

The results show that the influence of human capital on financial performance was significant ($R^2$= .212, F=6.566), Therefore the first condition was met. The beta was also significant ($\beta$=.472, t=3.158,<0.05), hence satisfying the second condition that states that the independent variable should be significantly related to the mediator variable.

The path model was estimated through bootstrapping without the interaction of a mediator (financial innovation). The results revealed that the direct path was statistically significant. Therefore, inclusion of financial innovation as a mediator was meaningful. The indirect path was required to verify that financial innovation mediates the relationship between human capital and financial performance. The third condition (HC

→ FI → FP) of mediation is to explain the mediating variables on the dependent variable. The regression analysis shows that financial innovation significantly affects financial performance ($\beta$ = .472, p< 0.05). This suggests that the third was condition was met.

To establish the mediating effect of financial innovation on the relationship between human capital and financial performance was measured to determine the variable's mediating functions. Results of regression analysis show that the direct path was statistically significant. The Sobel test and bootstrapping results in Table 48 indicated that financial innovation mediated the relationship between human capital and financial performance and the mediation was statistically significant ($p<0.05$). The results indicated that human capital and practice had a positive and significant effect on financial performance ($\beta=0.296$, $p < 0.05$). Human capital was found to have a positive and significant effect on financial innovation ($\beta=0.257$, $p < 0.05$). The path model was estimated through bootstrapping without the interaction of a mediator (financial innovation). Therefore, inclusion of financial innovation as a mediator was meaningful.

**Table 48: Path coefficients for the relationship between Human Capital and Financial Performance**

| Path | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|
| Financial Innovation ↓ Financial Performance | 0.315 | 0.313 | 0.018 | 17.500 | 0.000 |
| Human Capital ↓ Financial Innovation | 0.257 | 0.258 | 0.012 | 21.417 | 0.000 |
| Human Capital ↓ Financial Performance | 0.296 | 0.295 | 0.012 | 24.667 | 0.000 |

Sobel test: Z=16.172, p=0.0000

In order to estimate the path coefficient Financial Innovation → Financial Performance and Human Capital → Financial Innovation Sobel test was done. The Sobel results revealed that Z=16.172 and p=0.000 (<.05) was statistically significant. In this study the Sobel z score were carried out for the hypothetical data on financial innovation (ATMs, Internet banking, Mobile banking and Debit cards) and financial performance (return on assets and earning before tax).. Because z=16.172, with p=.0000, represented the effect of human capital mediated by innovation capital on financial performance and can be judged statistically significant. The null hypothesis is judged to be statistically significant if +1.96 ≤ z ≥ -1.96.    The financial innovation variable mediated the relationship between human capital and financial performance. Hence the null hypothesis is rejected.

## 4.7.4.3 Mediating Effect of Financial Innovation on the relationship between Organizational Capital and Financial Performance

The study established the mediating effect of financial innovations on the relationship between organizational capital (financial knowledge and expertise, financial business process, human capital) and financial performance. To evaluate the significance of direct path of financial knowledge and Expertise,→ financial performance, financial business process → financial performance and Human Capital→ financial performance. If the direct effect is not significant, there is no mediation. However, if the direct path is significant mediating variable is included and bootstrapping procedure is used. If the indirect path is not significant after bootstrapping, there is no mediation.   The results of the three hypothesis and interpretations were provided in the table 49 below. The presence of mediation effects was determined by focusing on the significance of the indirect impact arising from Sobel test. The results of each of the independent variables were discussed below:

**Table 49: Path Coefficients for the Overall Mediated Model**

| Path | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|
| Financial Business Process ↓ Financial Innovation | 0.297 | 0.298 | 0.093 | 3.194 | 0.002 |
| Financial Business Process ↓ Financial Performance | 0.333 | 0.336 | 0.123 | 2.707 | 0.008 |
| Financial Innovation ↓ Financial Performance | 0.446 | 0.441 | 0.113 | 3.947 | 0.000 |
| Human Capital ↓ Financial Performance | 0.448 | 0.451 | 0.131 | 3.420 | 0.001 |
| Human Capital ↓ Financial Innovation | 0.287 | 0.285 | 0.092 | 3.120 | 0.002 |
| Organizational Capital ↓ Financial Innovation | 0.378 | 0.375 | 0.097 | 3.897 | 0.000 |
| Organizational Capital ↓ Financial Performance | 0.512 | 0.508 | 0.06 | 8.533 | 0.000 |

Sobel test: Z=17.173, p=0.0000

In respect to the overall mediating effect of financial innovation on the organizational capital and financial performance, the Sobel test results in Table 49 indicated that financial innovation mediated the relationship between organizational capital and financial performance and the mediation was statistically significant with $\beta=0.512$, p=0.000 ($p<0.05$). The results also indicated that organizational capital had a positive and significant effect on financial performance ($\beta=0.378$, p=0.000 ($p < 0.05$). The path model was estimated through Sobel test with the interaction of a mediator (financial

innovation). The results Sobel z score: Z=17.173, was greater than +1.96 and p=0.0000(<.05) showed that inclusion of financial innovation as a mediator was meaningful. Therefore, the study failed to accept the null hypothesis.
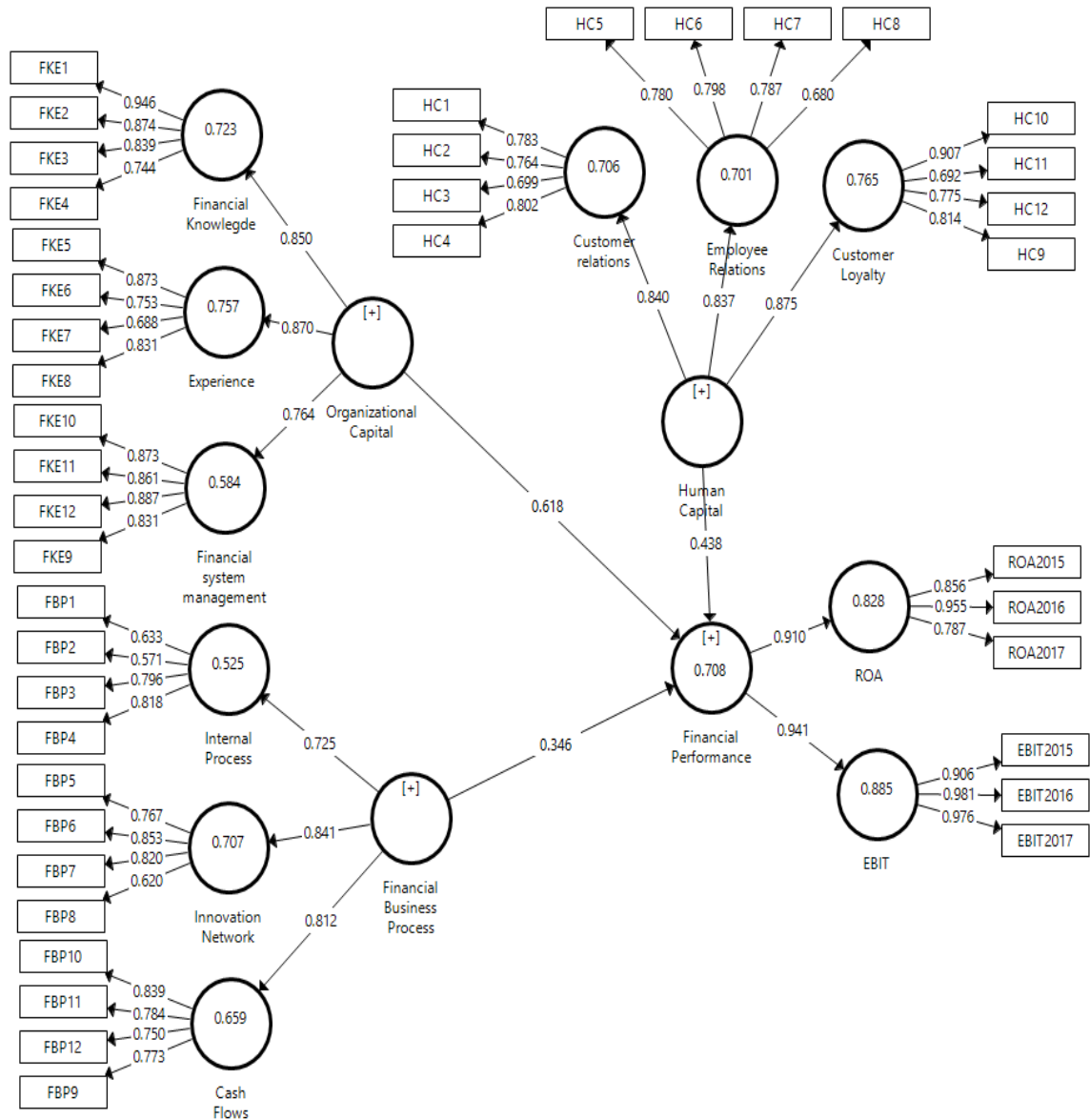


**Figure 3: Overall Mediated Model**

Similarly, an overall structural equation model was established by extending the hypothesized relationships among the latent variables using one-headed arrows as shown in figure 4.1. In the hypothesized relationship financial performance was taken as the dependent variable or endogenous latent variable. Three independent variables, which is

financial knowledge and expertise, financial business process and human capital, were taken as the exogenous variables. The model confirms statistical significance relationship in the mediated financial innovation and financial performance. Financial innovation can therefore be considered as the key construct in commercial banks financial performance.

## 4.8 Summary of the Hypotheses Results

Hypotheses were tested to determine whether the significant of the mediating variable. Null hypothesis was tested as the default position that there is no significant relationship between three variables being studied under the assumption that if $P<0.05$, then it would be rejected or otherwise fail to be rejected (Hair et al., 2006). The four hypotheses were presented, which affirm that financial innovations are the key mediators of organization capital and financial performance. A summary of findings from the hypothesis test of the study are provided in Table 50 below.

**Table 50: Summary of Hypothesis**

| Null | Hypothesis Statement | Hypothesis Testing | Remark/ Conclusion |
|------|----------------------|--------------------|--------------------|
| $H_{01}$ | There is no statistically significant relationship between financial knowledge and expertise and financial performance of Commercial Banks in Kenya. | Regression analysis p value (0.0023) | $H_0 1$ was rejected |
| $H_{02}$ | There is no statistically significant relationship between financial business process and financial performance of Commercial Banks in Kenya | Regression analysis p value (.0031) | $H_0 2$ was rejected |
| $H_{03}$ | There is no statistically significant relationship between human capital and financial performance of Commercial Banks in Kenya. | Regression analysis p value (0.000) | $H_0 3$ was rejected |
| $H_{04}$ | There is no statistically significant mediating effect of financial innovation on the relationship between organizational capital and financial performance of Commercial Banks in Kenya. | Mediated regression analysis Sobel value (0.000) | $H_0 4$ was rejected |

From the results in Table 50, the study established a positive and significant relationship between financial innovation and financial performance of the commercial banks.

The Sobel test results in Table 49 indicated that financial innovation mediated the relationship between organizational capital and financial performance and the mediation was statistically significant with p=0.000 ($p<0.05$). The results also indicated that organizational capital had a positive and significant effect on financial performance (p=0.000 ($p < 0.05$). Based on the path model through Sobel test, it was concluded that interaction of a mediator (financial innovation) had Sobel z score: Z=17.173, which was greater than +1.96 and p=0.0000(<.05) this showed that inclusion of financial innovation as a mediator was meaningful. Therefore, the study failed to accept the null hypothesis.

## CHAPTER FIVE

## SUMMARY, CONCLUSION AND RECOMMENDATON

### 5.1 Introduction

This chapter represents a summary of key findings of the study, the relevant discussions, conclusion and the recommendations. The study examined the relationship between organizational capital and financial performance of commercial banks in Kenya. It also investigated the mediating effect of financial innovation and the relation between organizational capital and financial performance of commercial banks in Kenya. The study focused on organizational capital as the independent variable and its indicators were financial knowledge, financial business process and practice, and human capital. Financial performance indicators that were studied were, return on assets (ROA) and earnings before interest and tax (EBIT). The mediating variable was financial innovation which included automated teller machines, internet banking, mobile banking and debit cards. Conclusion and recommendations were then presented based on the output of the descriptive and inferential statistics analyses, research objectives and hypotheses of the study. Suggestions for further studies were also captured as a way of filling the gaps identified in the study.

### 5.2. Summary of the Major Findings

The study sought to investigate the mediating effect of financial innovation on the relationship between organizational capitals on financial performance of commercial banks in Kenya. The study employed a descriptive research design, alongside quantitative methods to collect data from 123 commercial bank finance managers in 41 commercial banks. These respondents included credit managers, operation managers and transactional managers. The following is a summary of results by key research questions.

In assessing financial knowledge and expertise within the banks, results of the study indicated that majority of the respondent agreed that financial knowledge and expertise support the financial performance in the commercial banks. This was explored by testing four main hypotheses namely; there is no statistically significant relationship between financial knowledge and expertise and financial performance, there is no statistically significant relationship between financial business process and practice and financial performance, there is no statistically significant relationship between human capital and financial performance, Financial Innovation does not have statistically significant mediating effect on the relationship between organizational capital and financial performance of financial banks.

The study engaged in measuring the organizational capital and sought to understand the extent to which the respondents participated in various financial innovation processes, implementation as well as monitoring and evaluation. The descriptive analysis pointed to a possible mediation of financial innovation and financial performance. The study found that demographic characteristic has a significant effect on the performance of the banking sector. From the analysis, it was found that there was a significant relationship between gender, age, academic qualification, number of years worked, with the financial performance of commercial banks. One very interesting finding in this study is that gender, age and the number of years worked has a significant effect on financial performance in the banking sector. This is shown by a statistically significant relationship between gender, age and working experience and could be an important concept in the banking sector. Therefore, whatever measures that could be taken to improve gender, age or experience of the employees has an effect on the financial performance on the commercial banks. The summary of the findings is presented for each of the objectives examined.

**5.2.1 To Examine the Relationship Between Financial Knowledge and Expertise and Financial Performance of Commercial Banks in Kenya**.

In the first objective the study sought to examine the relationship between financial knowledge and expertise and financial performance of commercial banks. The study revealed that majority of the respondents attributed the financial performance of organizations to various financial knowledge systems. The study further realized that financial knowledge and expertise affected the financial performance to a great extent. The finding of the study also revealed the calculated p-value of the ANOVA showed that financial knowledge and expertise with ($\beta$=.740, p-value =0.000(<0.05) statistically significantly influence the financial performance of commercial banks. The results also evidenced a statistically significant relationship between financial knowledge and expertise, financial knowledge of information system, experience in financial information and financial performance of the commercial banks.

**5.2.2. To Evaluate the Relationship Between Financial Business Process and Practice, and Financial Performance of Commercial Banks in Kenya.**

The second objective of the study sought to evaluate the relationship between financial business process and practice, and financial performance of Commercial Banks in Kenya. The study demonstrated that the financial business process and practice has a strong relationship with the financial performance of commercial banks. This suggested that financial performance of commercial banks in Kenya can be accounted by the business process empowerment. The study echoed a strong positive relationship of financial business process and practice with the financial performance of commercial banks. The study therefore confirms the hypothesis that there is a relationship between financial business process and practice. This necessitated the rejection of the hypothesis that there is no relationship between financial process and practice and financial performance of commercial banks in Kenya.

### 5.2.3 To Assess the Relationship Between Human Capital and Financial Performance of Commercial Banks in Kenya.

In the third objective of the study sought to evaluate the relationship between human capital and financial performance of commercial banks in Kenya. The study established a significant relationship level of 0.000. This concluded that human capital influence financial performance of commercial banks. In addition based on the analysis of factors of human capital namely, customer relations, employee's relations, and customer loyalty it was revealed that adjusted $R^2$ of 0.506 (50.6) was slightly lower than $R^2$ of 0.510 indicating that human capital moderately influenced the financial performance of commercial banks. Consequently, the hypothesis that there is no relationship between human capital and financial performance were rejected.

### 5.2.4 To Analyze the Mediating Effect of Financial Innovation on the Relationship Between Organization Capital and Performance of Commercial Banks in Kenya.

In the fourth objective, the study sought to find out whether financial innovation meditates the relationship between organizational capital and financial performance of commercial banks. Mediation tests were performed to test if the Baron and Kenny (1986), conditions were met as well as Sobel test. This implies that financial innovation mediates the relationship between organizational capital and financial performance. In addition, interactions with financial innovations and organization capital such as financial knowledge, experience in financial information system and financial information influences the direction and strength of financial performance. These relationships are important sources of financial information for bank managers to get new knowledge and to develop new ideas.

**5.3 Recommendation and Policy Implication**

The finding of study have important implications for policy makers that can be drawn for the purposes of enhancing management of financial innovations in commercial banks and other financial institutions in Kenya. The research results showed that financial innovation mediates organizational capital and financial performance. Financial innovation can be considered as the key construct in financial performance of commercial banks. Offering high standards of financial innovation should be managed to increase customer retention in order to improve financial performance.

Management of commercial banks' should endeavor to increase and strengthen their financial innovation such as ATMs, internet banking, Mobile banking and debit and credit cards to generate superior financial performance. Particularly financial knowledge and expertise should be encouraged to enhance increased deposit mobilization by commercial banks (CBK, 2017). Therefore the management of commercial banks should enhance financial innovativeness procedures to match them with the right financial services. Moreover, financial knowledge and expertise can help the respective commercial banks in monitoring and evaluating financial innovation to reduce the cases of ICT related fraud such as mobile banking and internet banking as well as Cybercrime. Furthermore intensive financial knowledge and expertise of information systems, financial business process and practice and human capital was found to positively influence financial performance of commercial banks. Commercial banks in Kenya should embrace financial innovations with an aim of imparting financial knowledge and expertise related skills for proper needs assessment.

Financial innovations were found to partially mediate the relationship between financial business process and practice and financial performance of the banking sector. In the banking sector, management should make initiatives to enhance financial innovations,

(ATMs, internet banking, mobile phones and debit and credit cards) as the key components that enhance the absorptive capacity of financial business process in terms of internal business process measures, financial innovation network and cash flows to improve financial performance. Additionally, management should actively promote and improve financial innovations to increase financial performance.

Financial innovation was also found to mediate the relationship between financial business process and expertise and financial performance. In commercial banks financial innovations facilitates and strengthen financial business process and expertise networks in order to increase their information networks. Management of commercial banks should enhance linkages to maximize on organizational capital resources that may be obtained through financial business process and practice. Managers with relevant knowledge, skills and competence on internal business process measures, financial innovation network, and cash flows should be encouraged to obtain and share information through financial innovations to achieve greater synergy in increasing financial performance and increase competitiveness.

Financial innovation was also found to mediate the relationship between human capital and financial performance of commercial banks. Human capital may manifest itself in the form of customer relationships, employee relations and customer loyalty. Management of commercial banks should invest on human capital as it translates into improved financial performance. This implies that if the banks invest in human capital the financial performance in terms of return on assets (ROA) and earnings before interest and tax (EBIT) will improve. Human capital largely depends on the customer relationship, employee relation and customer loyalty that influence the decisions they make. The banking sector management should focus on building a high human capital base to increase the customer relations, employee relations and customer loyalty's which

in turn will have increased transaction and deposits. Notably financial performance is improved by having human capital with high financial innovation knowledge such as ATMs, internet banking, mobile banking and debit cards that have high empowerment in making quality decisions. Furthermore, financial innovation (ATMs internet banking, mobile phones and debit and credit cards) are the key components that mediate the relationships between organizational capital and financial performance. Management should therefore strengthen their social networks and linkages in order to maximize on the returns that may be obtained through such networks. ATMs are secure, effective and reliable to be used by customers. In addition, the banks should strengthen their ICT services and linkages so as to maximize ATM networking as well as to reduce the cost of transactions. Commercial banks should enhance financial performance by carefully evaluating the various alternatives and understanding of human capital.

Furthermore, the influence of internal business process measures, financial innovation networks, and cash flows translates to improved financial performance. Contributions by human capital are believed to have a significant influence on financial performance. Financial innovation network should be attributed to their outreach and leveraged on digital platforms hence enact policies and laws through parliament to safeguard the customers of the banks. Managers with relevant financial knowledge and expertise, financial business process systems and human capital should be encouraged to adopt them as cost-effective channels.

### 5.3.1. Recommendations for Further Research

The study sought to investigate mediating effect of financial innovation on the relationship between organizational capital and financial performance. The findings and conclusions were limited to commercial banks. The researcher utilized a likert questionnaire. The study recommends that future researchers should consider carrying

out a similar study in other financial institutions to evaluate any variation in responses. Future, researchers should also introduce different variables rather than financial knowledge and expertise, financial business process and practice and human capital or moderating effect of such variables on the relationship between organizational capital and financial performance.

The four most outstanding financial innovations that increase the financial performance in the banking sector include ATMs, internet banking, mobile banking and debit cards are all mediating variables and their measurement criteria is not harmonized.  Other studies can be carried out to investigate the influence of all these variables to improve financial performance.

## 5.4 Conclusions

Financial performance is a key focus of commercial banks. This study investigated mediating effect of financial innovation on the relationship between organizational capital and financial performance. The researcher inferred some important conclusions on the basis of the findings. In regard to the first objective there is a relationship between financial knowledge and expertise and financial performance. Similarly, based on the second objective, financial business process and practice is statistically significant and thus there is a relationship between, financial business process and practice and financial performance. In addition, on the third objective human capital, is statistically significant and hence there is a relationship between human capital, and financial performance of Commercial Banks in Kenya.

Further, the study sought to analyze the mediating effect of financial innovation on the relationship between organization capital and performance of Commercial Banks in Kenya. Based on this objective the researcher concluded that financial innovation mediates the relationship between organizational capital and financial performance.

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# APPENDICES

## Appendix I: Introduction Letter

Date……………………….
To……………………………

**TO WHOM IT MAY CONCERN** I am a PhD candidate at Kabarak University and currently conducting a research as partial requirement for award of the degree of philosophy in Business Administration- Finance Option. my research topic is "Mediating Effect of Financial innovation on the Relationship between Organizational Capital and Financial Performance in Commercial Banks in Kenya."

The purpose of this letter is to request you to participate as a respondent in this study by completing the attached questionnaire as accurately as possible. all information collected will be used for academic purposes only.

Thank you

Virginia Wachira.
GDB/M/1621/09/16

## Appendix II: Questionnaire

**General Information**

This questionnaire is to collect data for purely academic purposes. The study questionnaire is meant to test mediating effect of financial innovation on the relationship between organization capital and firm Performance in Commercial Banks in Kenya. All information was treated with strict confidence. Do not put any name or identification on this questionnaire.

Answer all the questions as indicated by a cross mark (x) or a tick(√), the option that applies.

**Section I: General Information**

1. Name of the bank branch (Optional)…………………………………..

2. Please indicate your gender

    Male                  ( )

    Female                ( )

3. Please indicate your age

    25- 30 years          ( )

    30-35 years           ( )

    35-40 years           ( )

    40-45 years           ( )

    Over 45 years         ( )

4. Please indicate your rank in the bank

    Branch Manager        ( )

    Operations Manager    ( )

    Credit Manager        ( )

5. Please indicate your level of education

    PhD                   ( )

    Masters               ( )

    Undergraduate         ( )

Other (Specify)…………………………………………………………………….

**Section Ii: Effect of Organizational Capital on Financial Performance**

**A: The Effect of Organizational capital and Financial Performance**

This section has statements regarding the effect of organizational capital on the financial performance of the commercial banks. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using across mark (x) or a tick(√)

| No | Statement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **Financial knowledge and Expertise** **Financial knowledge of Financial Information system** | | | | | | |
| 1. | Financial knowledge of financial information system have attracted more depositors for the commercial banks | | | | | |
| 2 | Financial knowledge and financial information system has enabled the customers to transact their deposits with ease. | | | | | |
| 3 | Financial knowledge and financial information system have attracted corporate depositors and deposits. | | | | | |
| 4. | Financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank. | | | | | |
| **Experience in Financial information system** | | | | | | |
| 5 | Experience in financial information system has helped to attract more customers to the bank. | | | | | |
| 6 | Experience in financial information system has helped to establish linkage with corporate depositors and deposits. | | | | | |
| 7 | Experience in financial information system has helped in sharing of information with the banks depositors. | | | | | |
| 8 | Experience in financial information system has helped customers to transact cash withdrawals and different deposits with ease. | | | | | |
| **Financial information system management** | | | | | | |

| No | Statement | | | | | |
|---|---|---|---|---|---|---|
| 9 | Financial information system management has helped to increase the competence of employee. | | | | | |
| 10 | Financial information system management has encouraged the customer retention. | | | | | |
| 11 | Financial information system management helped the banks to share a lot of information with their customers. | | | | | |
| 12 | Financial information system management links the banks with external social networks such as customers and regulatory body. | | | | | |

## B: Financial Business Process and Practice on Financial Performance

This section has statements regarding the effect of financial business process and practice on the financial performance of the commercial banks. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a cross mark (x) or a tick

| No | Statement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **Internal financial business process measures\** | | | | | | |
| 1. | Internal financial business process measures have helped to attracted more depositors for the commercial banks | | | | | |
| 2 | Internal financial business process measures Have encouraged the sharing of information, ideas and financial knowledge among the banks employees | | | | | |
| 3 | Internal financial business process measures has encouraged convenience and security of customers' accounts | | | | | |
| 4. | Internal financial business process measures enabled the banks to conclude deals previously facilitated by external social networks. | | | | | |
| | | | | | | |

**Financial Innovation network**

| No | Statement | | | | | |
|----|-----------|---|---|---|---|---|
| 5 | Financial Innovation network has helped to attracted more customers to the bank. | | | | | |
| 6 | Financial Innovation network has successfully established linkage with banks customers. | | | | | |
| 7 | Financial Innovation network has successfully helped in sharing of information with the banks corporate depositors. | | | | | |
| 8. | Financial Innovation network has successfully helped to gain a lot of information from the banks customers. | | | | | |
| **Cash flows** | | | | | | |
| 9 | Cash flows in terms of profits have motivated investors to the banks. | | | | | |
| 10 | Cash flows have created customers loyalty. | | | | | |
| 11 | Cash flows from customer's deposits have contributed positively to banks annual profitability. | | | | | |
| 12 | Cash flows have enabled the banks to maintain its liquidity ratios. | | | | | |

**B: Human Capital and Financial Performance**

This section has statements regarding the effect of Human capital on the financial performance of the commercial banks. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a cross mark (x) or a tick (√)

| No | Statement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|----|-----------|-------------------|----------|---------|-------|----------------|
| | | 1 | 2 | 3 | 4 | 5 |
| **Customer relations** | | | | | | |
| 1. | Customer relations system have attracted more depositors for the commercial banks | | | | | |
| 2 | Financial knowledge and financial information system have created Customer relations that enable the customers to | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | transact their deposits with ease. | | | | | |
| 3 | Customer relations creates an environment for banks employees to identify and make contacts with the their customers | | | | | |
| 4. | Customer relations creates good relationship with customers that makes the existing customers to enroll new customers | | | | | |
| **Employee relations** | | | | | | |
| 5 | Employee relations has helped the bank to retain customers and hence improved performance. | | | | | |
| 6 | Employee relations have helped to establish linkage with corporate depositors and deposits. | | | | | |
| 7 | Employee relations have helped in Comprehensive data systems of the customer profile and transactions. | | | | | |
| 8. | Employee relations have created financial information systems resources that are in synchronization with technological advancements. | | | | | |
| **Customer loyalty** | | | | | | |
| 9 | Customer loyalty has helped to increase the liquidity of banks by increased deposits. | | | | | |
| 10 | Customer loyalty has encouraged financial information updates from the Banks. | | | | | |
| 11 | Customer loyalty helped the banks to share a lot of information with their customers. | | | | | |
| 12 | Customer loyalty links the banks with external social networks such as customers and regulatory body. | | | | | |

**Section III: The Mediating Effect of Financial Innovation on Organizational Capital and Financial Performance**

This section has statements regarding the mediating effect of financial innovation on the financial performance of the commercial banks. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a cross mark (x) or a tick (√)

| No | Statement | Strongly Disagree | Disagree Agree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **Automated Teller Machine (ATMs)** | | | | | | |
| 1. | ATMs system have attracted more individual depositors for the commercial banks | | | | | |
| 2 | ATMs have encouraged more customer satisfaction. | | | | | |
| 3 | ATMs have created services that attract corporate depositors and easy withdraw. | | | | | |
| 4. | ATMs services lower the transaction cost of the banks customers. | | | | | |
| **Internet banking** | | | | | | |
| 5 | Internet banking services has attracted more customers hence improved performance. | | | | | |
| 6 | Internet banking services has established linkage with corporate depositors and deposits. | | | | | |
| 7 | Internet banking services has helped in Comprehensive data systems of the customer profile and transactions. | | | | | |
| 8. | Employee relations have encouraged the customers to deposit and withdraw cash at their comfort. | | | | | |
| **Mobile banking** | | | | | | |
| 9 | Mobile banking services has created customer loyalty has helped to increase the liquidity of banks by increased deposits. | | | | | |
| 10 | Mobile banking services have attracted more banks depositors and deposits that increase performance in the banks. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | Mobile banking services helps the banks customers to transact with ease hence high deposits, | | | | | |
| 12 | Mobile banking services links the banks with external social networks such as customers and regulatory body. | | | | | |
| **Debit and credit cards** | | | | | | |
| 13 | Debit and credit cards have positively increased the commission based income | | | | | |
| 14 | Debit and credit cards have positively influenced the increase of interest based income. | | | | | |
| 15 | Debit and credit cards have positively expanded the income generation of the banks. | | | | | |
| 16 | Debit and credit cards have increased the customer's transaction and deposits. | | | | | |

## Appendix III: List of Commercial Banks

**List of Commercial Banks**

| No. | Commercial Bank |
| --- | --- |
| 1. | African Banking Corporation Ltd |
| 2. | Bank of Africa |
| 3. | Bank of Baroda |
| 4. | Bank of India Ltd. |
| 5. | Barclays Bank of Kenya Ltd. |
| 6. | Charter House Bank Ltd |
| 7. | Citibank, N.A. |
| 8. | Commercial Bank of Africa Ltd. |
| 9. | Consolidated Bank of Kenya Ltd. |
| 10. | Co-operative Bank of Kenya Ltd. |
| 11. | Credit Bank Ltd. |
| 12. | Development Bank of Kenya Ltd. |
| 13. | Diamond Trust Bank Kenya Ltd. |
| 14. | Dubai Bank Kenya Ltd. |
| 15. | Ecobank Ltd |
| 16. | Equity Bank Ltd |
| 17. | Family bank ltd |
| 18. | Fidelity Commercial Bank Ltd. |
| 19. | First Community Bank of Kenya Ltd. |
| 20. | Guaranty  trust bank |
| 21. | Guardian Bank Ltd. |
| 22. | Gulf African Banks |
| 23. | Habib Bank A.G. Zurich. |
| 24. | Habib Bank Ltd. |
| 25. | I& M BANK LTD |
| 26. | Jamii Bora Bank |
| 27. | Kenya Commercial Bank Ltd |
| 28. | Middle East Bank of Kenya Ltd |
| 29. | National Bank of Kenya Ltd |
| 30. | National Industrial Credit Bank Ltd. |
| 31. | Oriental Commercial Bank Ltd. |
| 32. | Paramount Universal Bank Ltd. |
| 33. | Prime Bank Ltd. |
| 34. | Sidian Bank ltd |
| 35. | Stanbic Bank Kenya Ltd |
| 36. | Standard chartered  Bank Kenya Lt |
| 37. | Spire bank ltd |
| 38. | Trans-National bank ltd |
| 39. | UBA Kenya bank ltd |
| 40. | Victoria commercial bank |

## Appendix IV: Collected Data

**Secondary Data**

**Financial Performance**

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|---|
| ROA | ROA2015 | 0.856 | 0.857 | 0.031 | 27.374 | 0.000 |
| | ROA2016 | 0.955 | 0.958 | 0.012 | 76.548 | 0.000 |
| | ROA2017 | 0.788 | 0.796 | 0.074 | 10.629 | 0.000 |
| EBIT | EBIT2015 | 0.906 | 0.902 | 0.031 | 29.069 | 0.000 |
| | EBIT2016 | 0.981 | 0.981 | 0.004 | 278.141 | 0.000 |
| | EBIT2017 | 0.976 | 0.975 | 0.005 | 187.142 | 0.000 |

**Factor Analysis**

Organizational capital

**Financial knowledge and expertise**

**Component Matrix[a]**

| | Component/ factor loading 1 |
|---|---|
| Financial knowledge of financial information system has attracted more depositors for the commercial banks | .922 |
| Financial knowledge and financial information system have enabled the customers to transact their deposits with ease. | .821 |
| Financial knowledge and financial information system have attracted corporate depositors and deposits. | .873 |
| Financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank. | .803 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Experience in the financial information system**

**Component Matrix[a]**

|  | Component 1 |
|---|---|
| Experience in the financial information system has helped to attract more customers to the bank. | .678 |
| Experience in the financial information system has helped to establish linkage with corporate depositors and deposits. | .845 |
| Experience in financial information system has helped in sharing of information with the banks' depositors. | .783 |
| Experience in the financial information system has helped customers to transact cash withdrawals and different deposits with ease. | .630 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Financial information system management**

**Component Matrix[a]**

|  | Component 1 |
|---|---|
| Financial information system management has helped to increase the competence of the employee. | .849 |
| Financial information system management has encouraged customer retention. | .795 |
| Financial information system management helped the banks to share a lot of information with their customers. | .777 |
| Financial information system management links the banks with external social networks such as customers and regulatory body. | .836 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Human capital**

**Customer relations**

**Component Matrix<sup>a</sup>**

| | Component 1 |
|---|---|
| Internal financial business process measures have helped to attracted more depositors for the commercial banks | .733 |
| Internal financial business process measures have encouraged the sharing of information, ideas and financial knowledge among the banks' employees | .734 |
| Internal financial business process measures have encouraged convenience and security of customers' accounts | .693 |
| Internal financial business process measures enabled the banks to conclude deals previously facilitated by external social networks. | .800 |

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

**Employee relations**

**Component Matrix<sup>a</sup>**

| | Component 1 |
|---|---|
| Financial Innovation network has helped to attract more customers to the bank. | .933 |
| Financial Innovation network has successfully established linkage with banks customers. | .912 |
| Financial Innovation network has successfully helped in sharing of information with the banks' corporate depositors. | .916 |
| Financial Innovation network has successfully helped to gain a lot of information from the banks' customers. | .823 |

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

**Customer Loyalty**

<p align="center"><strong>Component Matrix<sup>a</sup></strong></p>

| | Component 1 |
|---|---|
| Cash flows in terms of profits have motivated investors to the banks. | .725 |
| Cash flows have created customers loyalty. | .758 |
| Cash flows from customer's deposits have contributed positively to banks annual profitability. | .834 |
| Cash flows have enabled the banks to maintain their liquidity ratios. | .605 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.


**Financial innovation**

**Automated Teller Machines**

<p align="center"><strong>Component Matrix<sup>a</sup></strong></p>

| | Component 1 |
|---|---|
| Customer relations system have attracted more depositors for the commercial banks | .727 |
| Financial knowledge and financial information system have created Customer relations that enable the customers to transact their deposits with ease. | .871 |
| Customer relations creates an environment for banks employees to identify and make contacts with their customers | .871 |
| Customer relations create a good relationship with customers that makes the existing customers enroll new customers | .885 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Internet Banking**

#### Component Matrix[a]

| | Component 1 |
|---|---|
| Employee relations has helped the bank to retain customers and hence improved performance. | .951 |
| Employee relations have helped to establish linkage with corporate depositors and deposits. | .947 |
| Employee relations have helped in Comprehensive data systems of the customer profile and transactions. | .959 |
| Employee relations have created financial information systems resources that are in synchronization with technological advancements. | .961 |

**Mobile Banking**

#### Component Matrix[a]

| | Component 1 |
|---|---|
| Customer loyalty has helped to increase the liquidity of banks by increased deposits. | .653 |
| Customer loyalty has encouraged financial information updates from the Banks. | .866 |
| Customer loyalty helped the banks to share a lot of information with their customers. | .784 |
| Customer loyalty links the banks with external social networks such as customers and regulatory body. | .796 |

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

**Debit and Credit cards**

#### Component Matrix[a]

| | Component 1 |
|---|---|
| Customer loyalty has helped to increase the liquidity of banks by increased deposits. | .653 |
| Customer loyalty has encouraged financial information updates from the Banks. | .866 |
| Customer loyalty helped the banks to share a lot of information with their customers. | .784 |
| Customer loyalty links the banks with external social networks such as customers and regulatory body. | .796 |

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

**Analysis of Dependent Variable**

### Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| ROA 2015 | 8 | -1.34 | 6.56 | 3.6625 | 2.25587 |
| ROA 2016 | 8 | .14 | 6.00 | 3.7463 | 2.19308 |
| ROA 2017 | 8 | -1.99 | 5.68 | 2.7788 | 2.48292 |
| Valid N (listwise) | 8 | | | | |

### Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Net income before interest and tax 2015 | 8 | -1684.00 | 23445.00 | 10555.0000 | 9154.70884 |
| Net income before interest and tax 2016 | 8 | 162.00 | 28482.00 | 12672.8750 | 11393.67834 |
| Net income before interest and tax 2017 | 8 | -1371.00 | 27472.00 | 11450.0000 | 11271.65022 |
| Valid N (listwise) | 8 | | | | |

### Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Total Asset 2015 | 8 | 81190.00 | 467741.00 | 264088.7500 | 146799.98262 |
| Total Asset 2016 | 8 | 69432.00 | 504778.00 | 270139.5000 | 167836.22375 |
| Total Asset 2017 | 8 | 69051.00 | 555630.00 | 298804.1250 | 186081.04890 |
| Valid N (listwise) | 8 | | | | |

### Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| EBIT2015 | 8 | 1685.00 | 23445.00 | 11001.7500 | 8270.69513 |
| EBIT2016 | 8 | 162.00 | 28482.00 | 12771.8750 | 11104.17849 |
| EBIT2017 | 8 | 740.00 | 27471.00 | 11740.7500 | 10103.61232 |
| Valid N (listwise) | 8 | | | | |

| Construct | Item | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|---|
| Financial knowledge | FKE1 | 0.946 | 0.946 | 0.008 | 114.937 | 0.000 |
| | FKE2 | 0.873 | 0.872 | 0.023 | 38.279 | 0.000 |
| | FKE3 | 0.837 | 0.837 | 0.026 | 31.751 | 0.000 |
| | FKE4 | 0.748 | 0.747 | 0.031 | 24.060 | 0.000 |
| Experience | FKE5 | 0.866 | 0.867 | 0.021 | 42.022 | 0.000 |
| | FKE6 | 0.765 | 0.765 | 0.035 | 22.105 | 0.000 |
| | FKE7 | 0.700 | 0.699 | 0.051 | 13.614 | 0.000 |
| | FKE8 | 0.819 | 0.819 | 0.029 | 28.602 | 0.000 |
| Financial system management | FKE9 | 0.838 | 0.836 | 0.029 | 29.108 | 0.000 |
| | FKE10 | 0.873 | 0.872 | 0.021 | 41.394 | 0.000 |
| | FKE11 | 0.859 | 0.860 | 0.018 | 48.197 | 0.000 |
| | FKE12 | 0.884 | 0.884 | 0.020 | 45.204 | 0.000 |

**Path Coefficients for the Relationship Between Mediated Financial Business Process And Practice And Financial Performance**

| path | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|
| Financial Business Process → Financial Innovation | 0.295 | 0.296 | 0.073 | 4.041 | 0.000 |
| Financial Business Process → Financial Performance | 0.476 | 0.476 | 0.116 | 4.103 | 0.000 |
| Financial Innovation → Financial Performance | 0.378 | 0.377 | 0.087 | 4.345 | 0.000 |

Sobel test: Z=2.959, p=0.0031

**Path Coefficients for the Relationship Between Human Capital and Financial Performance**

| path | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values |
|---|---|---|---|---|---|
| Financial Innovation → Financial Performance | 0.315 | 0.313 | 0.018 | 17.500 | 0.000 |
| Human Capital → Financial Innovation | 0.257 | 0.258 | 0.012 | 21.417 | 0.000 |
| Human Capital → Financial Performance | 0.296 | 0.295 | 0.012 | 24.667 | 0.000 |

Sobel test: Z=16.172, p=0.0000

# Cronbach's Alpha

Scale: Organizational capital

**Financial knowledge of financial Information system**

## Reliability Statistics

| Cronbach's Alpha | N of Items |
|:---:|:---:|
| .796 | 4 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|:---:|:---:|:---:|:---:|
| Financial knowledge of financial information system have attracted more depositors for the commercial banks | 12.33 | 4.230 | .816 | .637 |
| Financial knowledge and financial information system has enabled the customers to transact their deposits with ease. | 12.27 | 4.754 | .635 | .732 |
| Financial knowledge and financial information system have attracted corporate depositors and deposits. | 12.33 | 4.161 | .699 | .697 |
| Financial knowledge and financial information system enabled the use of computer software as a means of communication among all members of the bank. | 11.97 | 6.102 | .319 | .865 |

**Experience in the Financial Information System**

## Reliability Statistics

| Cronbach's Alpha | N of Items |
|:---:|:---:|
| .718 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Experience in financial information system has helped to attract more customers to the bank. | 12.90 | 2.852 | .442 | .693 |
| Experience in the financial information system has helped to establish linkage with corporate depositors and deposits. | 12.83 | 2.420 | .647 | .569 |
| Experience in financial information system has helped in sharing of information with the banks' depositors. | 13.03 | 2.447 | .549 | .630 |
| Experience in the financial information system has helped customers to transact cash withdrawals and different deposits with ease. | 12.63 | 2.930 | .399 | .717 |

## Financial Information System Management

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .824 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Financial information system management has helped to increase the competence of the employee. | 12.60 | 4.179 | .711 | .753 |
| Financial information system management has encouraged the customer retention. | 12.73 | 3.995 | .618 | .795 |
| Financial information system management helped the banks to share a lot of information with their customers. | 12.70 | 4.010 | .598 | .806 |
| Financial information system management links the banks with external social networks such as customers and regulatory body. | 12.67 | 4.299 | .693 | .763 |

**Overall Organizational Capital**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .884 | 12 |

**Financial business process**
**Internal financial Business Process**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .723 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Internal financial business process measures have helped to attract more depositors for the commercial banks | 12.07 | 2.616 | .503 | .667 |
| Internal financial business process measures have encouraged the sharing of information, ideas and financial knowledge among the banks' employees | 11.97 | 2.861 | .508 | .668 |
| Internal financial business process measures have encouraged convenience and security of customers' accounts | 12.03 | 2.654 | .460 | .694 |
| Internal financial business process measures enabled the banks to conclude deals previously facilitated by external social networks. | 12.43 | 2.392 | .587 | .614 |

**Financial Innovation Network**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .913 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Financial Innovation network has helped to attract more customers to the bank. | 12.83 | 5.040 | .877 | .863 |
| Financial Innovation network has successfully established linkage with banks customers. | 12.87 | 5.154 | .840 | .876 |
| Financial Innovation network has successfully helped in sharing of information with the banks' corporate depositors. | 13.20 | 4.166 | .842 | .885 |
| Financial Innovation network has successfully helped to gain a lot of information from the banks' customers. | 12.90 | 5.748 | .703 | .920 |

## Cash flows

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .701 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Cash flows in terms of profits have motivated investors to the banks. | 13.13 | 1.913 | .468 | .665 |
| Cash flows have created customers loyalty. | 13.10 | 2.093 | .529 | .610 |
| Cash flows from customer's deposits have contributed positively to banks annual profitability. | 12.80 | 2.166 | .641 | .556 |
| Cash flows have enabled the banks to maintain their liquidity ratios. | 12.57 | 2.599 | .355 | .709 |

## Overall scale: Financial Business Process and Practice

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .863 | 12 |

**Scale: Human Capital**

**Customer relations**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .855 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Customer relations system have attracted more depositors for the commercial banks | 12.87 | 3.775 | .566 | .865 |
| Financial knowledge and financial information system have created Customer relations that enable the customers to transact their deposits with ease. | 13.07 | 2.754 | .754 | .795 |
| Customer relations creates an environment for banks employees to identify and make contacts with their customers | 12.70 | 3.528 | .754 | .804 |
| Customer relations create good relationship with customers that makes the existing customers enroll new customers | 12.97 | 2.861 | .770 | .783 |

**Employee relations**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .765 | 4 |

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Employee relations has helped the bank to retain customers and hence improved performance. | 11.90 | 4.231 | .513 | .736 |
| Employee relations have helped to establish linkage with corporate depositors and deposits. | 11.90 | 4.024 | .587 | .697 |
| Employee relations have helped in Comprehensive data systems of the customer profile and transactions. | 12.30 | 3.872 | .568 | .708 |
| Employee relations have created financial information systems resources that are in synchronization with technological advancements. | 12.10 | 4.093 | .592 | .695 |

## Customer Loyalty

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|---|---|
| .771 | 4 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Customer loyalty has helped to increase the liquidity of banks by increased deposits. | 11.90 | 5.334 | .454 | .778 |
| Customer loyalty has encouraged financial information updates from the Banks. | 12.33 | 3.954 | .726 | .639 |
| Customer loyalty helped the banks to share a lot of information with their customers. | 12.47 | 3.706 | .587 | .714 |
| Customer loyalty links the banks with external social networks such as customers and regulatory body. | 12.30 | 3.597 | .595 | .711 |

**Overall scale: human capital**

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .820 | 12 |

**Mediating variable: Financial innovation**

**Automated Teller Machine**

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .703 | 4 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| ATMs system have attracted more individual depositors for the commercial banks | 12.67 | 2.644 | .490 | .643 |
| ATMs have encouraged more customer satisfaction. | 12.47 | 2.395 | .611 | .571 |
| ATMs have created services that attract corporate depositors and easy to withdraw. | 12.90 | 2.162 | .448 | .684 |
| ATMs services lower the transaction cost of the banks' customers. | 12.47 | 2.533 | .449 | .663 |

**Internet Banking**

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .766 | 4 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Internet banking services have attracted more customers hence improved performance. | 12.60 | 3.214 | .641 | .670 |
| Internet banking services has established linkage with corporate depositors and deposits. | 12.70 | 2.700 | .654 | .667 |
| Internet banking services have helped in Comprehensive data systems of the customer profile and transactions. | 12.50 | 3.776 | .614 | .701 |
| Employee relations have encouraged the customers to deposit and withdraw cash at their comfort. | 12.70 | 3.872 | .413 | .785 |

## Mobile Banking

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .791 | 4 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Mobile banking services has created customer loyalty has helped to increase the liquidity of banks by increased deposits. | 13.13 | 3.430 | .621 | .729 |
| Mobile banking services have attracted more banks depositors and deposits that increase performance in the banks. | 13.20 | 3.545 | .581 | .748 |
| Mobile banking services help the banks' customers to transact with ease hence high deposits, | 13.00 | 4.000 | .684 | .735 |
| Mobile banking services links the banks with external social networks such as customers and regulatory body. | 13.37 | 2.585 | .641 | .746 |

**Debit and credit cards**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|:---:|:---:|
| .771 | 4 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|:---:|:---:|:---:|:---:|
| Debit and credit cards have positively increased the commission-based income | 12.80 | 2.510 | .551 | .729 |
| Debit and credit cards have positively influenced the increase of interest-based income. | 12.97 | 2.723 | .510 | .748 |
| Debit and credit cards have positively expanded the income generation of the banks. | 12.87 | 2.947 | .571 | .727 |
| Debit and credit cards have increased the customer's transaction and deposits. | 12.87 | 2.189 | .690 | .648 |

**Overall scale: Financial innovation**

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|:---:|:---:|
| .889 | 16 |

**Appendix V: Kabarak University Research Authorization Letter**



KABARAK                    UNIVERSITY

Private Bag - 20157
KABARAK, KENYA                    Tel: 0773 265 909
http://kabarak.ac.ke/institute-postgraduate-studies/    E-mail: directorpostgraduate@kabarak.ac.ke

**BOARD OF POSTGRADUATE STUDIES**

26th April, 2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: <u>VIRGINIA KIRIGO WACHIRA- REG. NO. GDB/M/1621/09/16</u>

The above named is a Doctor of Philosophy student at Kabarak University in the School of Business & Economics. She is carrying out research entitled *"Mediating Effect of Financial Innovation on the Relationship between Organizational Capital and Financial Performance of Commercial Banks in Kenya"*. She has defended her proposal and has been authorized to proceed with field research.

The information obtained in the course of this research will be used for academic purposes only and will be treated with utmost confidentiality.

Please provide her with a necessary information to complete her report.

Thank you.

Yours faithfully,

Dr. Betty Jeruto Tikoko
DIRECTOR, POSTGRADUATE STUDIES

Kabarak University Moral Code

*As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord.  (1 Peter 3:15)*

**Appendix VI: NACOSTI Research Authorization Letter**



# NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
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Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

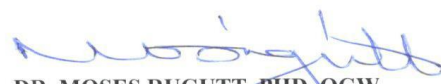Ref: No. **NACOSTI/P/19/30653/31234**

Date: **12th June, 2019**

Virginia Kirigo Wachira
Kabarak University
Private Bag - 20157
**KABARAK.**

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *"Mediating effect of financial innovation on the relationship between organizational capital and financial performance of commercial banks in Kenya"* I am pleased to inform you that you have been authorized to undertake research in **all Counties** for the period ending **12th June, 2020.**

You are advised to report to **the County Commissioners and the County Directors of Education, all Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

**DR. MOSES RUGUTT, PHD, OGW**
**DIRECTOR GENERAL/CEO**

Copy to:

The County Commissioners
All Counties.

The County Directors of Education
All Counties.

# Appendix VII: NACOSTI Research Permit

THIS IS TO CERTIFY THAT:
**MS. VIRGINIA KIRIGO WACHIRA**
of KABARAK UNIVERSITY, 0-20157
Kabarak,has been permitted to conduct
research in *All Counties*

on the topic: *MEDIATING EFFECT OF*
*FINANCIAL INNOVATION ON THE*
*RELATIONSHIP BETWEEN*
*ORGANIZATIONAL CAPITAL AND*
*FINANCIAL PERFORMANCE OF*
*COMMERCIAL BANKS IN KENYA*

for the period ending:
*12th June,2020*

Permit No : NACOSTI/P/19/30653/31234
Date Of Issue : 12th June,2019
Fee Recieved :Ksh 2000

...........................
**Applicant's**
**Signature**

...........................
*Director General*
**National Commission for Science,**
**Technology & Innovation**

---

## THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science,
Technology and Innovation (Research Licensing) Regulations, 2014.

### CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
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Website: www.nacosti.go.ke

**REPUBLIC OF KENYA**

**National Commission for Science, Technology and Innovation**

**RESEARCH LICENSE**

Serial No.A 25286

**CONDITIONS: see back page**

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**Appendix VIII: List of Publications**

# DIGITAL FINANCIAL INNOVATION SERVICES AND THEIR IMPACT ON THE PERFORMANCE OF COMMERCIAL BANKS IN KENYA

Virginia Kirigo Wachira[1i],
Fredrick Kalui[2],
John Gathii[3]

[1]Meru University of Science and Technology,
Kenya
[2]Prof., Egerton University,
Kenya
[3]Dr., Kabarak University,
Kenya

**Abstract:**

The study aimed at investigating the impact of digital financial services on the financial performance of Commercial Banks in Kenya using secondary dataset generated from the Central Bank of Kenya (CBK) and the Communication Authority of Kenya (CAK) for a period of five years (2015-2019). To achieve this objective, the study used a multiple regression and Pearson correlations. The study using the Pearson correlations found negative correlations between mobile money (registered mobile money accounts, active mobile money agents and mobile money deposits and withdrawals), digital payments (P2P transfers) and performance of commercial banks. However, the study found positive and significant relationship between customer deposits, Gross non-performing loans and performance of commercial banks in Kenya. The study therefore concludes that digital financial services offered by Fintech companies have a negative impact on the performance of Commercial banks in Kenya and recommends that commercial banks should continuously develop more digital financial services and collaborate more with Fintech companies to improve on their performance. The originality of this study will be of benefit to managers of Commercial banks.

**JEL:** G21, G23, N27, O30, O31, O39

**Keywords:** digital finance, digital financial services, P2P payments, mobile money, fintech

# Crowdfunding in Kenya: Factors for Successful Campaign

## The Case of Kickstarter Crowdfunding Platform

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Virginia Kirigo Wachira
*Meru University of Science and Technology*
vkwachira2012@gmail.com

SUMMARY

The study aimed at investigating the factors that lead to successful crowdfunding campaigns in Kenya. The success factors of reward-based crowdfunded campaigns vary in different countries due to differences in cultures, legal requirements, social interactions, political and business environments. With very minimal research on crowdfunding funding in Kenya, the study therefore, aimed at analyzing reward-based crowdfunding in Kenya using Kickstarter data, and identifying the crucial factors necessary to run a successful campaign. To achieve this objective, the study used a multiple regression and Pearson correlations. The study found a statistically significant regression equation hence the regression model was considered a good fit. The study using the Pearson correlations analysis found a very strong and positive statistical correlation between updates, amount pledged, backers, and successful projects, moderate but positive statistical correlation between comments, new backers, returning backers, and successful projects. However, there was a negative but insignificant correlation between the goal, funding period, and successful projects. The novelty will be of great benefit to project funders who want to run successful projects in Kenya. This is because the concept of crowdfunding is still new in Kenya and has not been widely publicized, accepted, or researched. The results of this study will guide potential founders on the do's and don'ts of running a successful campaign. Finally, the study recommends further research on the success factors of other crowdfunding models in Kenya as the study solely focused on the reward-based model.

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