

**EFFECT OF FINANCIAL TECHNOLOGY ON PROFITABILITY
OF PUBLICLY LISTED BANKS IN KENYA**


SIMON NATUMI TIPIS

**A RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD
OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE,
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES,
UNIVERSITY OF NAIROBI**

NOVEMBER, 2022

DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed: _____  _____ Date: ____ October 24, 2022 ____

SIMON NATUMI TIPIS

D63/36366/2020

This research project has been submitted for examination with my approval as the University Supervisors.

Signed:  _____ Date: 07 NOVEMBER 2022

PROF. CYRUS IRAYA

DEPARTMENT OF FINANCE AND ACCOUNTING

UNIVERSITY OF NAIROBI

ACKNOWLEDGEMENT

Firstly, is to thank God for the opportunity to start the journey and continuously walk ahead of me during my academic journey. Second, is to profusely thank my supervisor Prof. Cyrus Iraya who has been an inspiration and mentor during this project, and the corrections, encouragement and his wisdom went a long way to help complete this project.

I also thank my family for their constant encouragement during my academic journey through the years and I thank them for their unconditional love.

DEDICATION

This research project is dedicated to my lovely family who have been a source of great inspiration as I dedicated myself towards completion of this project and I remain forever thankful to them. I also would like to thank my Twin whom we endeavored to start this journey together and finish strong together this graduate journey.

TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
LIST OF TABLES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	x
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study.....	1
1.1.1 Financial Technology.....	2
1.1.2 Profitability	3
1.1.3 Financial Technology and Profitability	4
1.1.4 Commercial Banks in Kenya	5
1.2 Research Problem	6
1.3 Research Objective	8
1.4 Value of the Study.....	8
CHAPTER TWO: LITERATURE REVIEW	10
2.1 Introduction	10
2.2 Theoretical Framework	10
2.2.1 Financial Intermediation Theory	10
2.2.2 Diffusion of Innovation Theory.....	11
2.2.3 Technology Acceptance Model.....	12
2.3 Determinants of Profitability	13
2.3.1 Financial Technology.....	13
2.3.2 Asset Quality.....	14
2.3.3 Firm Liquidity.....	15
2.3.4 Firm Size.....	15

2.3.5 Capital Adequacy.....	16
2.4 Empirical Review.....	16
2.4.1 Global Studies.....	16
2.4.2 Local Studies	18
2.5 Conceptual Framework.....	20
2.6 Summary of the Literature Review and Research Gaps	21
CHAPTER THREE: RESEARCH METHODOLOGY	23
3.1 Introduction.....	23
3.2 Research Design.....	23
3.3 Population and Sample.....	23
3.4 Data Collection	23
3.5 Data Analysis	24
3.5.1 Diagnostic Tests.....	24
3.5.2 Analytical Model	24
3.5.3 Tests of Significance.....	25
CHAPTER FOUR: DATA ANALYSIS RESULTS AND FINDINGS	26
4.1 Introduction.....	26
4.2 Descriptive Statistics.....	26
4.3 Diagnostic Tests.....	27
4.3.2 Multicollinearity Test.....	28
4.3.3 Heteroskedasticity Test.....	28
4.3.4 Autocorrelation Test.....	29
4.3.5 Stationarity Test.....	30
4.3.6 Hausman Test.....	31
4.4 Correlation Results.....	31
4.5 Regression Results	32
4.6 Discussion of Research Findings	34

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	37
.....
5.1 Introduction	37
5.2 Summary of Findings	37
5.3 Conclusions	38
5.4 Recommendations for Policy and Practice	39
5.5 Limitations of the Study	40
5.6 Suggestions for Further Research	41
REFERENCES.....	43
APPENDICES	50
Appendix I: Commercial Banks in Kenya	50
Appendix II: Publicly Listed Commercial Banks in Kenya	51
Appendix III: Research Data.....	52

LIST OF TABLES

Table 4.1: Descriptive Results	26
Table 4.2: Test for Normality	28
Table 4.3: Multicollinearity	28
Table 4.4: Heteroskedasticity Results.....	29
Table 4.5: Test of Autocorrelation.....	30
Table 4.6: Levin-Lin Chu unit-root test.....	30
Table 4.7: Hausman Test Results.....	31
Table 4.8: Correlation Results	32
Table 4.9: Regression Results.....	33

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ATM	Automated Teller Machine
CBK	Central Bank of Kenya
GDP	Gross Domestic Product
KCB	Kenya Commercial Bank
MSME	Micro, Small and Medium Enterprises
NPL	Non- Performing Loans
NSE	Nairobi Securities Exchange
ROA	Return on Assets
ROE	Return on Equity
ROS	Return on Sales
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
VIF	Variance Inflation Factors

ABSTRACT

Financial technology endures to alter and shape the Kenyan banking sector. The Kenyan banking sector has progressively focused on financial technology as a strategic instrument to achieve organization goal of reducing costs and maximizing revenues. Despite this, commercial banks have performed inconsistently in relation to profitability, with some recording a rise in ROA whereas others experiencing a decline. The main aim of this research was to establish fintech effect on profitability of listed banks in Kenya. The independent variables for the research were mobile banking, internet banking and agency banking while the control variables were asset quality, firm size and capital adequacy. The dependent variable was profitability measured using ROA. The study was guided by financial intermediation theory, diffusion of innovation theory and technology acceptance model. Descriptive research design was utilized in this research. The 11 listed banks in Kenya as at December 2021 served as target population. The study collected secondary data for five years (2017-2021) on an annual basis from CBK and individual listed banks annual reports. Descriptive, correlation as well as regression analysis were undertaken and outcomes offered in tables followed by pertinent interpretation and discussion. The research discovered a 0.6023 R square value implying that 60.23% of changes in listed banks profitability can be described by the six variables chosen for this research. The multivariate regression analysis further revealed that individually, mobile banking and internet banking have no significant effect on profitability of listed banks in Kenya. However, agency banking produced positive and significant values for this study ($\beta=0.0109$, $p=0.003$). Both firm size and capital adequacy have a positive effect on profitability of listed banks as shown by ($\beta=0.3082$, $p=0.000$) and ($\beta=0.1305$, $p=0.007$) correspondingly. Asset quality displayed a negative and significant profitability influence as shown by ($\beta=-0.5718$, $p=0.021$). The study recommends that listed banks should enhance their agency banking as this will contribute significantly to their profitability. Further, the study recommends the need for listed banks to reduce their credit risk as it adversely affects profitability in a negative way. Future research ought to focus on other financial institutions in Kenya to corroborate or refute the conclusions of this research.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Financial Technology (fintech) has significantly affected the operation of financial firms and created the foundation for the financial institutions to differentiate between their products and their competitors. Abdulkarim and Ali (2019) argue that fintech is vital for channeling money to effective resolutions and allocating risk to individuals who can exploit them, and this enhances profitability. Fintech is anticipated to improve financial inclusion, resulting in improved efficiency of the intermediaries (Rasheed, Law, Chin & Habibullah, 2016). Neaime and Gaysset (2018) emphasized generally that, fintech has a substantial effect in enhancing firm financial profitability.

This research was anchored on financial intermediation theory and reinforced by diffusion of innovation theory as well as the technology adoption model. Financial intermediation theory by Diamond (1984) was the anchor theory as it observes financial institutions such as banks tend to develop innovative products and services to meet the differing needs of clients. In the process, they are able to reach more customers leading to enhanced profitability. According to Rogers (1995), the mechanism whereby a new invention spreads through a particular social system depends on the use of a particular preference channel. The Technology Acceptance Model (TAM) clarifies how consumers use and benefit from a cutting-edge idea (Davis, 1989). In establishing the adoption of new technologies by listed banks in Kenya TAM was utilized.

Commercial banks in Kenya were the focus of the research; this is because fintech continuously alters and shape the Kenyan banking sector. The Kenyan banking industry has placed an unprecedented amount of emphasis on financial technologies

as a tactical tool to accomplish the organization's goal of minimizing expenses and maximizing revenues. KCB has been promoting KCB MPESA and adopted Fuliza in 2019, Equity has been using Equitel and Eazzy banking app, NCBA bank has been offering Mshwari and recently Fuliza. Other banks also have some aspect of mobile lending through their digital platforms (CBK, 2020). The big question is whether the profitability resulting from the use of financial technologies has improved.

1.1.1 Financial Technology

Any technical advancement affecting the financial industry and its operations is referred to as fintech (Sheleg & Kohali, 2011). Fintech can also refer to firms combining financial services with modern technology in offering user-friendly, transparent, automatic, and effectual internet-based as well as application-oriented services (Triki & Faye, 2013). Fintech, according to Freytag and Fricke (2017), is innovative technology that enables financial services. Financial institutions are anticipated to make available future social network platforms, permitting customers to exploit their mobile phones to access investment options made possible by fintech (World Bank, 2017).

Fintech provides a range of technological options for comfort, faster reaction time and operating efficiencies (Klapper, 2016). Fintech has affected many financial industry players. As a result, services of asset management have improved by providing retailers wealth management services via streamlined systems, algorithm proposals to assist decision-making and managed portfolios artificially through robots. The financial sector has also been affected by monitoring tax liability, spending, credit, saving, bank service provision besides traditional banking, distribution leading technology allows for quicker transaction, mobile transfer, the usage of

cryptocurrencies, and data analytics allows for cellular lending to individuals and small businesses (Yang & Liu, 2016).

In regard to operationalization, fintech has been operationalized before in various ways (Demirguc-Kunt et al., 2018). Fintech has been operationalized before in terms of mobile banking, internet banking, ATMs, agency banking among others. Internet banking provides financial services via a bank's website. Peer-to-peer financing is a kind of lending that allows people to lend to one another and also loan money which are not used as mediators by a bureaucratic bank (Koki, 2018). This research endeavoured quantifying fintech usage magnitude, as defined by the total transactions carried out via agency banking, internet banking, and mobile banking.

1.1.2 Profitability

Profitability refers to the ability of a firm to make income out of its resources (Srivastava & Srivastava, 2016). Profitability is replicated in the company Return on Assets (ROA) and value added. Profitability is the survival indicator of a firm and acts as source of fund if ploughed back into the business (Baba & Nasieku, 2016). High profit can promote financial soundness and stability of firms, and too low profit might discourage customers from buying hence leading to collapse of the same institutions. Profitability depicts the overall status of firm's financial health over a specific duration and also indicates firm's management efficiency in using its resources to maximize the wealth of shareholders (Naz, Ijaz & Naqvi, 2016).

The focus on profitability is of importance as it majorly touches on items that directly change financial statements or the company's reports (Nzuve, 2016). The company's profitability is the primary evaluation tool used by external stakeholders. Consequently, the company's profitability is used as a metric. How successfully the

company meets its financial objectives determines its profitability. The profitability of a firm is the outcome of accomplishing both internal and external goals (Nyamita, 2017).

The commonly used ratio measures of profitability are Return on Assets (ROA) and Return on Equity (ROE) (Mukasinayobye & Mulyungi, 2018). ROA is the firm's total income to its total asset and it shows how a firm is able to make income through efficient utilization of its assets. ROA is adopted in this study as an indicator of firm's profitability because it gives the comprehensive measure of overall firm's profitability and it indicates the managerial efficiency in converting the firm's asset into total earnings. ROE is the amount of profit a firm earns in comparison to invested equity by shareholders. ROE reflects firm's management efficiency in using shareholder's funds (Marozva, 2017). As the most widely used indicator of profitability, ROA was used in the current study (Fatihudin & Mochklas, 2018).

1.1.3 Financial Technology and Profitability

The diffusion of innovation hypothesis says that every economically impactful change centers on entrepreneurship, market power and innovation. Based on this perceptive emerge theories about the fintech revolution. Rogers (1995) trusts that invention momentarily creates a monopoly, wherein imitators contest and eradicate monopolies. Therefore, if financial institutions employ fintech and secure hedging other institutions via new goods as well as services, they will definitely affect profitability.

With the number of fintech transactions rise, households, credit as well as savings offerings for everyone is simplified (Mehotra & Yetman, 2015). Long-term financial institutions efficiency is one of the probable fintech benefits (Rasheed, Law, Chin & Habibullah, 2016). According to Zins and Weill (2016), ensuring that individuals can

easily access and make use of these services is essential for promoting social growth and sustainable economic development, reducing poverty, and aiding in the stabilization of the financial sector.

Improved financial access, as per Lenka and Sharma (2017), encourages the creation of jobs in rural regions since inhabitants there will have more disposable income and be able to save and expand their deposits that boost economic growth generally because of the multiplier effect. The difficulty to obtain funding due to suboptimal fintech embracing has a negative effect on a financial institution's effectiveness. Since it's assumed that the poor's incapacity to invest in and save for sources of income stems from a lack of money. On the other side, fintech's simplified access to finance stimulates companies to make more investments and take on more risk, increasing the financial institution's profitability (Neaime & Gaysset, 2018).

1.1.4 Commercial Banks in Kenya

Kenyan banks have come a long way from the first locally incorporated bank- the co-operative bank to 40 at the end of 2021. CBK regulates all commercial banks and these banks have to comply with various regulations as may be directed by the regulator. Like all banks worldwide, commercial banks in Kenya provide financial intermediation, facilitate payments, and account settlements. They contribute significantly to the GDP and fund MSMEs (Nyanchama & Long, 2018). Out of the 42 banks operating in Kenya by end of 2021; 12 are listed at the Nairobi Securities Exchange and they formed the focus of the current study as they provide details on their fintech undertakings.

Financial technology endures to alter as well as shape the Kenyan banking sector. The Kenyan banking sector has progressively focused on financial technology as a

strategic device of attaining organization goal of cost reduction and maximizing revenues. KCB has been promoting KCB MPESA and adopted fuliza in 2019, Equity has been using Equitel and Eazzy banking app, NCBA bank has been offering Mshwari and recently Fuliza. Other banks also have some aspect of mobile lending through their digital platforms (CBK, 2020). The big question is whether the financial performance resulting from the use of financial technology has improved.

Commercial banks' profitability has varied; some have witnessed a rise in ROA whereas others have experienced a drop. In an attempt to preserve financial stability in the market, we have witnessed more bank merging over the past few years as well as some banks, like National bank and Chase bank, fail owing to poor performance (CBK, 2020). This sufficiently supports the necessity for research into the potential effects of financial technology on profitability and for legislative recommendations that safeguard the financial risk that banks assume and the money held by stakeholders.

1.2 Research Problem

Fintech use by the financial sector has improved drastically globally. Financial processes counting trading stocks, offering financial products, electronic payments, and payment execution have all gained from the enhancement. Consequently, the financial institutions quality services globally has enhanced (Babajide et al., 2015). Abdulkarim and Ali (2019) argue that fintech is vital for channeling resources to effective drives and risk allocation to individuals who can exploit them, and this increases profitability. Neaime and Gaysset (2018) emphasized generally that, fintech has a considerable impact in boosting profitability of financial firms.

Although the profitability of the commercial banks in Kenya has been on the rise in the last five years, the banks reported a decline in profitability in 2020 from 159.1 billion shillings to 112.1 billion shillings. The profit reported in 2020 was lower than the one reported in 2017, 133.2 billion shillings, and 2018, 152.7 billion shillings. In addition, some commercial banks in Kenya such as National Bank, Chase Bank and Imperial bank have faced profitability challenges to the extent of closing operations (CBK, 2021). At the same time, the adoption of fintech has been on the rise. Commercial banks in Kenya therefore offer a good context to investigate whether the rise in fintech adoption contributes to their profitability.

Despite the fact that there have been worldwide studies in this area, they have primarily concentrated on specific fintech components and how they relate to profitability. Francis, Blumenstock, and Robinson (2017) examined digital credit in developing economies. In their investigation, they came to the conclusion that borrowers are likely to suffer negative effects from this easily accessible, high rate digital credit. Wadhe and Saluja (2015) looked at how electronic banking affects Indian banks' profitability from 2006 to 2014. The data showed that electronic banking has a favorable relationship with profitability in both private and public sector banks. Ndagijimana (2017) focused on how mobile lending affected Rwandan commercial banks' performance but neglected to mention other fintechs. Since each of these studies was carried out in a different environment, the conclusions cannot be extrapolated to the current circumstance.

Locally, Abdulkadir (2019) studied how commercial banks in Kenya profitability is impacted by fintech and concluded that fintech has a favorable impact on performance. This study finding was also supported by Kemboi (2018). In contrast,

Online banking has no significant impact on bank operational efficiency, as per Chirah (2018) investigation of alternative banking channels' effects on bank operational efficiency in Kenya. Kamande (2018) showed the statistically meaningful excellent outcomes of only agency banking with statistically irrelevant, positive profitability connections among ATM, internet and mobile banking. The current study is motivated by the fact that despite the existence of prior studies there exist contextual, conceptual and methodological gaps that need to be filled. Conceptually, prior studies have operationalized fintech differently hence findings depend on the operationalized method. Contextually, prior conclusive studies have mostly focused on developed economies. Methodologically, the research methodologies adopted have not been uniform hence explaining variance in results. The current research was based on these gaps and attempts to answering the research question; how does fintech influence profitability of publicly listed banks in Kenya?

1.3 Research Objective

The objective of this research was to determine the effect of fintech on profitability of publicly listed banks in Kenya.

1.4 Value of the Study

This research results will contribute to the prevailing theoretical and empirical literature on fintech and profitability. The results will also aid in theory creation because they will shed light on the limitations and applicability of the existing theories to the research variables. Subsequent studies may also be carried out based on the recommendation and suggestions for further research.

The government and the regulator CBK may find the research's conclusions useful in creating restrictions for the population that is the subject of the study. By outlining the

risk-return tradeoffs present in these companies and their effects on profitability, the research results will be useful to investors who are thinking about investing in the population under study.

The conclusions will aid investors as well as practitioners comprehend the link between the two variables, that is important for ensuring strong management team with diverse opinion and competences streamlining operations as well as managing fintech, edifice confidence among corporate stakeholders, that eventually enhance profitability.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter clarifies the theories on which fintech and profitability is based. It too discusses the prior empirical studies, knowledge gaps recognized, summarizing with a conceptual framework and hypotheses depicting the anticipated link among the research variables.

2.2 Theoretical Framework

This segment examines the theories that underpin the study of fintech and performance. The study reviewed the financial intermediation theory, diffusion of innovation theory and technological acceptance model.

2.2.1 Financial Intermediation Theory

This theory was proposed by Diamond (1984) and it serves as the anchor theory. The theory plays a central role in the financial intermediation process predominantly among banks to mitigate information asymmetry that lies between borrowers and lenders, hence their constant interaction assists lenders in producing credit worthy information to borrowers. Information that is provided gives creditors and loan officers a strong incentive in assessing and appraising credit to those that require it. Modern theories state that the business of financial intermediation is pegged on economic imperfections from 1970s with limited contributions (Jappelli & Pagano, 2006). The presence of the intermediaries is based on their capability to lower transaction and information costs from asymmetries (Tripe, 2003).

The biggest criticism of the financial intermediation theory is its inability to give recognition to the role of lenders in the process of risk management (Levine et al.,

2000). Scholtens and Van Wensveen (2000) stated that they do not recognize credit risk management as an important aspect in the financial industry and emphasizing the participation costs concept. They suggested future developments in the financial intermediation theory to understand challenges in the financial sector.

The theory is pertinent to the research because enhancing the profitability of listed banks can be attained via fintech solutions that permits modest and appropriate banking activities for customers. Financial intermediaries utilize mobile apps and other digital lending mechanisms that are useful in lowering transactional costs brought about by information asymmetry. They hence play a central role in effective functioning of financial markets. The theory is useful in understanding how fintech and profitability relate.

2.2.2 Diffusion of Innovation Theory

The founder of this idea was Rogers (1962). An innovation is any newly introduced ideas, practices or item into a social structure whereas, on the contrary, innovation dissemination is the way the new concept is transmitted over a period of time to the social system via a default route. In this regard, this theory attempts to outline how new innovations are accepted and utilized in a social system such as mobile banking and online banking (Clarke, 1995). Rogers (1995) broadened the idea by saying that the study on technological diffusion was insufficient, further explaining that the technology cluster had additional distinctive characteristics that were thought to be fully linked. That is why the advantages and repercussions of embracing or refusing to embrace innovation should be notified to people and societies at large. Rogers (2003) says plainly that interpersonal connections are necessary because dissemination includes a social process.

Robinson (2009) criticizes the theory for taking a dramatically different view of other change theories. It is not about attempting to persuade people to change, though about making progress or re-inventing goods and character, so that they can better suit what the person wants or needs. In this idea, people do not change, but innovations have to adapt to the demands of the people. The invention process takes time, as per Sevcik (2004), and it does not happen immediately. He also believes that the spread of innovation and the opposition to changes has the greatest impact on the process of innovation because it delays it down.

Rogers (2003) argues that the perception of these characteristics by an organization affects the degree of breakthrough technology adoption. If an organization realizes the benefits arising from fintech, these innovations will be taken into account when additional technologies are available. Innovation is quicker adopted in companies having internet access as well as information technology than in those lacking. The hypothesis is based on the present research, which shows how innovations like fintech are taken up by financial institutions. This theory is pertinent to the research as it helps in understanding how fintech is taken up by listed banks and how this influences profitability.

2.2.3 Technology Acceptance Model

Davis (1989) founded technology acceptance model and is sometimes referred to as the Davis model. The model takes into account how users embrace new technologies, which is used to choose a system that is both practical and advantageous to them. Moon and Kim (2015) examined the fundamentals of TAM validity and discovered that user acceptance is influenced by the usage of technology and other usability factors rather than the fundamental design of TAMs. The assumption that a

technology or computer system will greatly enhance work performance once it is implemented defines its anticipated usefulness (Davis, 1989).

The ease with which a system can be utilized is still valued; it is a sign that the user has mastered its use and the new technology. The model emphasizes ease of use as a way to forecast system utility (Gefen, Karahanna & Straub, 2013). In relation to Potaloglu and Ekin, (2015 people are more likely to adopt electronic banking when they believe it is efficient. Features such as perceived usability simplicity and perceived utility are seen as essential to the promotion of e-banking.

Research methodology has changed due to the theory of technology acceptance. The current research mainly aims to establish the merits and demerits of integrating fintech into listed banks in Kenya and to assess how simple or complex it is to use fintech within the banking industry in Kenya.

2.3 Determinants of Profitability

There are various firm profitability determinants; these factors originate internally or externally the firm. Firm-specific internal variables that can be changed internally. They include fintech, credit risk, firm liquidity, asset base and capital adequacy. The external factors are usually macro in nature and affect all firms in the economy such as political stability and growth rate (Athanasoglou et al., 2005).

2.3.1 Financial Technology

Abdulkarim and Ali (2019) argue that fintech is vital for channeling resources to efficient use and risk allocation to individuals who can utilize them, and this increases profitability. Fintech is anticipated to improve financial inclusion, resulting in improved efficiency of the intermediaries (Rasheed, Law, Chin & Habibullah, 2016).

Neaime and Gaysset (2018) emphasized that generally, fintech has a considerable impact in boosting profitability of financial firms.

With the number of fintech transactions rise, households, borrowing and savings products are simplified for all (Mehotra & Yetman, 2015). Long-term performance of financial institutions is one of the projected benefits of fintech (Rasheed, Law, Chin & Habibullah, 2016). As per system Zins and Weill, (2016) ensuring individuals can simply access as well as capable of utilizing these services is imperative in nurturing social growth and economic sustainability, reducing poverty, and aiding in financial sector stability.

2.3.2 Asset Quality

This indicates a bank's asset risk and stability. It estimates the asset quality magnitude among the characteristics that impact banks' health. The value of assets under the control of a bank is heavily dependent on credit risk, and the quality of the assets owned by the bank heavily relies on specific risks, level of NPLs, and debtors cost to the bank. This ratio should be at the lowest level. If lending is susceptible to risk in a well-functioning bank, the indicator in this case would be the applied interest margins. A low ratio shows an insufficient risk cover by the margins (Athanasoglou et al., 2009).

A bank's assets primarily consist of a loan portfolio, current as well as fixed assets, and other investments. The quality of assets mostly improves with the age and bank size (Athanasoglou et al., 2005). The primary assets that generate income for banks' are loans. The loan portfolio quality hence determines bank performance. Good quality assets reduce losses arising from NPLs, and this subsequently impacts performance (Dang, 2011).

2.3.3 Firm Liquidity

Liquidity refers to a company's ability, in this example a bank, to pay its debts that are due within a year with the help of cash and quickly liquidating short-lived assets. Therefore, it occurs as a consequence of the capacity to satisfy debt obligations to creditors without other current assets liquidation (Adam & Buckle, 2013).

When businesses lack access to external financing, having an adequate amount of liquid assets enables them to finance their operations and make investments. Companies having this level of liquidity are able to cover unforeseen liabilities and commitments that must be paid (Liargovas & Skandalis, 2008). According to Almajali et al. (2012), a bank's liquidity has a major effect on the loan amounts it can afford to make to customers; as a result, banks must maintain more liquid assets and less short-term liabilities. Increased firm liquidity, according to Jovanovic (1982), may be detrimental to the firms.

2.3.4 Firm Size

Firm size regulates by how much legal as well as financial factors influence a bank. Since large companies collect cheap capital and produce huge income, bank size is closely linked to capital adequacy (Amato & Burson, 2007). Bank's total assets book value is usually used to determine its size. Furthermore, ROA is positively correlated with bank size, demonstrating that large banks can achieve economies of scale and lower operational costs yet growing their loan portfolios (Amato & Burson, 2007). Magweva and Marime (2016) found that bank size is correlated with capital rationing and that profitability increases with size.

Amato and Burson (2007) mentioned that a firm's size is dependent on the assets owned by the organization. One could argue that a bank's ability to invest and earn

more money depends on the amount of assets it owns as opposed to smaller businesses with less assets. Additionally, a larger firm can have extra collateral which can be used as security for more credit services (Njoroge, 2014). According to Lee (2009), a company's assets under its control have an effect on its profitability level over time.

2.3.5 Capital Adequacy

Also called the capitalization ratio, the adequacy ratio shows how equity and total assets are related. It shows the ability of a bank to remain solvent by regulating risks. Berger and Humphrey (1991) in an investigation showed a negative relation between capital adequacy and performance. In imperfect capital markets, institutions with sufficient capital ought to reduce borrowing to back a specific asset class, hence lowering the predicted bankruptcy costs hence incur less financing costs.

A financial institution with sufficient capital signals the market that a superior performance is to be anticipated. The results of Magweva and Marime (2016) revealed that capital holdings are positively associated to bank profitability, indicating that Greek banks are in a stable financial position. Also, Amato and Burson (2007) showed a positive causality between capital contributions and profitability.

2.4 Empirical Review

Local as well as global researches have determined the link between fintech and profitability, the objectives, methodology and findings of these studies are discussed.

2.4.1 Global Studies

In order to determine how the internet affects the output and productivity of nearby banks, De Young et al. (2015) performed research in Oslo, Norway. This study, which

was conducted between 2006 and 2014, focused on a population of 29 financial institutions. The response variable's information was collected using secondary data, whereas the predictor variables' information was gathered using primary data. The results showed that while local banks' earnings are much lower and their operational costs are also higher than those of their competitors, they perform worse than those that have adopted online banking.

Wadhe and Saluja's (2015) study focused on electronic banking impact on bank profitability in India from 2006 to 2014. The research utilized data relating to Indian commercial banks. The relationship between banking services and profitability was examined via multiple regression analysis. E-banking has been linked to higher profitability for both private and public sector banks, according to research. According to this study, profitability rises as the number of ATMs rises. There were some links, however weak, between the financial institutions' profits and the number of branches.

Khamis (2016) has investigated impact of agent banking techniques on customer services of commercial bank in Ghana. Services provided to clients have a significant impact on such elements as decreased banking hall waits times, reduced service costs and personally tailored banking services, leading to the conclusion that the development of excellent financial services and customer service is closely related. In addition, the research showed that bank representatives substantially enhance the overall efficiency and quality of customer service in banks. As a consequence, the research deemed it essential for financial institutions to develop methods to guarantee their employees are properly motivated and to propose the usage of performance based incentives.

King'ang'ai et al. (2016) examined financial outcome of banks' performance via agents in the Rwandan country of East Africa utilizing four Rwandan commercial bank currently functional by 31 December 2015. The results from the research showed that the regulation of bank agencies, low transaction cost via banking agencies, access to banking-related services through bank agents and general development in the market had a favorable effect on performances in terms of financial position of commercial bank. Findings of linear regression model have created a favorable connection among agency banking effect and performances in terms of financial position of commercial bank.

Dawood et al. (2019) studied the mobile lending influence on household poverty mitigation in Indonesia. The research reveals that mobile lending reduces absolute poverty among households using the Binary Logistic model and data from 300.000 families from the 2017 Indonesian National Social and Economic Survey. Mobile financing can also make up for low asset levels, a lack of non-agricultural jobs in rural areas, and a lack of education among family heads. Additionally, it will lessen the incentives for the poor to migrate from low-skilled rural areas to urban ones in search of non-agricultural job prospects.

2.4.2 Local Studies

Tuwei (2016) has investigated impact of agent banking techniques on customer services of commercial bank. Services provided to clients have a significant impact on such elements as decreased banking hall waits times, reduced service costs and personally tailored banking services, leading to the conclusion that the development of excellent financial services and customer service is closely related. In addition, the research showed that bank representatives substantially enhance the overall efficiency

and quality of customer service in banks. As a consequence, the research deemed it essential for financial institutions to develop methods to guarantee their employees are properly motivated and to propose the usage of performance based incentives.

Using secondary data gathered between 2013 and 2017, Muli (2018) investigated how commercial banks efficiency is influenced by fintech. All 42 banks operational in Kenya were sampled. The variable predictor has been chosen as fintech based on the value of transactions executed by ATMs, mobile banking, internet, and agency banking. Performance was utilized as a study response variable. The findings showed that the good and important effects of bank size, liquidity, capital adequacy, ATMs and mobile banking were achieved. Internet banking and agency banking have been identified as statistically negligible factors for efficiency in commercial banks.

By use of 42 commercial banks in Kenya, Kamande (2018) explored how performance of Kenyan commercial bank is influenced by electronic banking. Electronic banking was the predictor measured quantitatively using banking transaction through mobile, online and agency platforms. ROA was utilized in evaluating financial performance. Between January 2013 and December 2017, five years of secondary data collection. The results of this research revealed positively significant impact of bank size, agency banking, ATMs, capital adequacy and liquidity on ROA. Internet and mobile banking were not significant indicators of financial success of commercial banks.

By use of secondary data collected annually between 2013 and 2017, Kinyua (2018) sought to discover how Kenyan banks' efficiency has been impacted by internet banking. The sample was taken from the 42 banks of Kenya. As the predictor variable of the research, the natural logarithm of the total transaction value obtained through

online banking was utilized. Efficiency was used as the study's response variable, measured using ROA. The results revealed that online banking has improved the ROA of banks in Kenya. The research too revealed that banks with more liquidity are likely to outperform banks that are less liquid. Bank size also exhibited the same influence while capital sufficiency did not have a significant influence on ROA.

Using descriptive Survey approach, Abdulkadir (2019) in Kenya performed an in-depth survey of how commercial banks operation is affected by mobile banking. Mobile banking was operationalized using the volume of transactions executed via mobile banking. All the data was collected from commercial banks financial reports. In accounting for bank size, the investigation utilized total assets and capital adequacy ratio as variables. Regression analysis as well as Pearson correlation were done. According to the study, financial technologies helped people succeed financially.

2.5 Conceptual Framework

Displayed in figure 2.1 is the projected link between the variables. The predictor variable was fintech denoted by the transactions value via mobile apps, internet banking and agency banking. The control variables were asset quality given as NPL to total loans, firm size given by total assets natural log and capital adequacy by core capital to risk weighted assets. The response variable was profitability given by ROA.

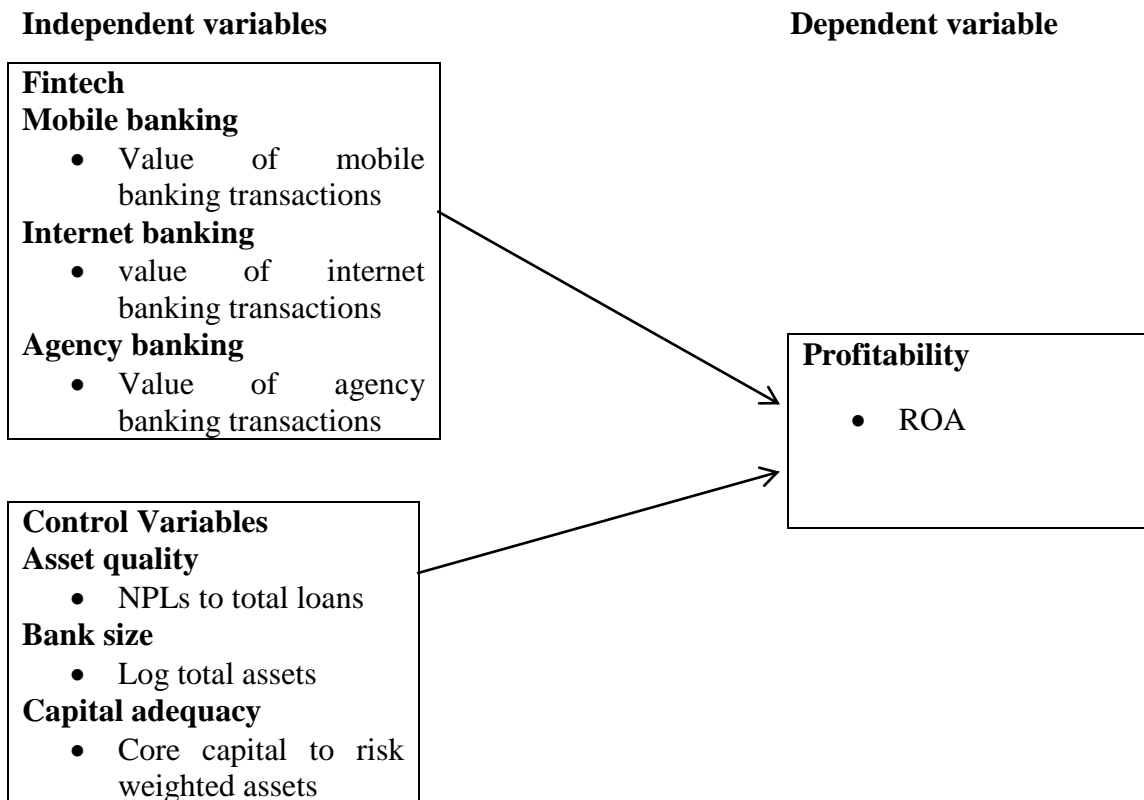


Figure 2.1: The Conceptual Model

Source: Researcher (2022)

2.6 Summary of the Literature Review and Research Gaps

The theoretical reviews exhibited the forecast link between fintech and the profitability of financial institutions. Profitability's key determinants have been covered. There is a knowledge gap that has to be filled based on the research that have been examined. Different findings have been drawn about the connection between fintech and profitability from the studies that have been analyzed. The variations between the studies might be attributed to the diverse operationalizations of fintech by the various researchers, showing that the operationalization model affects the conclusions.

Moreover, numerous studies used various designs, some of which depended on empirical analysis to draw conclusions and others of which relied on existing

literature to gauge the relationships between the variables. Researchers' inconsistent results failed to pinpoint the precise connection between fintech and the volume of transactions made through agency banking, internet banking, and mobile banking. This highlights the need for additional study in future research to bridge the gap via hypothesizing the impact of fintech on profitability.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the methods employed in realizing the study objective that was determining how fintech affects profitability of publicly listed banks. Precisely, the research highlights the; the design, data collection, and analysis.

3.2 Research Design

A descriptive design was implemented in determining how fintech and profitability of publicly listed banks relate. This design was suitable since the researcher was particularly interested in the phenomenon nature (Khan, 2008). Additionally, it was adequate for describing how the occurrences are related to one another. Additionally, this design authentically and precisely represented the variables, providing satisfactory responses to the research questions (Cooper & Schindler, 2008).

3.3 Population and Sample

All observations from a group of interesting events listed in an investigation make up a population (Burns & Burns, 2008). The study population was the 40 banks in Kenya as at December 2021 (Appendix I). The sample for the research comprised the 11 commercial banks listed at the NSE (Appendix II).

3.4 Data Collection

Secondary data was relied on in this research which was extracted from annual published financials of the listed banks from 2017 to 2021 and captured in data collection forms. The reports were extracted from the CMA financial publications of the specific banks and bank annual reports. The precise data obtained comprised net income, total assets, mobile banking transactions, internet banking transactions,

agency banking transactions, total loans, total assets, liquid assets, core capital, risk weighted assets.

3.5 Data Analysis

To evaluate the data, SPSS software version 24 was employed. The results were presented quantitatively in tables and graphs. Measures of central tendency and dispersion were calculated using descriptive statistics, and standard deviation provided for each variable. Correlation and regression were used in inferential statistics. The size of the link between the research variables was established via correlation, and cause and effect relationships between the variables were acquired via regression. The link between the dependent and independent variables was established linearly via a multivariate regression.

3.5.1 Diagnostic Tests

The panel data methodology comprises of fixed effects model and the random effect. In choosing between random and fixed effects model, Hausman test was utilized. The null hypothesis of Hausman test was that the data fits random effects model against alternative hypothesis that states that the data fits fixed effects model (Khan, 2008). Relevant diagnostic test for this study included; multicollinearity, normality, unit root, homoscedasticity and autocorrelation. Diagnostic tests that measured data reliability included correlation which measured the consistency in the same group of data at different times by graphing the data in a scatterplot and computing Pearson's correlation coefficient.

3.5.2 Analytical Model

The following equation was applicable:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Where: Y = profitability given by net income to total assets

β_0 = y intercept of the regression equation.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = are the regression coefficients

X_1 = mobile banking given by log total value of mobile banking transactions

X_2 = internet banking given by log total value of internet banking transactions

X_3 = Agency banking given by log total value of agency banking transactions

X_4 = Asset quality as measured by the ratio of NPLs to total loans on an annual basis

X_5 = Firm size as measured by the natural logarithm of total assets

X_6 = Capital adequacy as given by the ratio of total core capital to risk weighted assets

ε = error term

3.5.3 Tests of Significance

Parametric tests established significance of the general model and variables. ANOVA was used to do the F-test, which established the model significance, and a t-test, which established every variable significance.

CHAPTER FOUR: DATA ANALYSIS RESULTS AND FINDINGS

4.1 Introduction

This chapter offers descriptive statistics and the results and interpretations of various tests namely; test of normality, Multicollinearity, heteroskedasticity tests, autocorrelation and stationarity test. The chapter also presents the results of Pearson correlation and regression analysis.

4.2 Descriptive Statistics

This segment offers the descriptive findings from the collected data. The descriptive results include mean and standard deviation for every research variables. The analyzed data was acquired in distinct listed banks annual reports for duration of 5 years (2017 to 2021). The number of observations is 55 (11*5) as 11 listed banks provided complete data for the 5 year period. The outcomes are displayed in Table 4.1.

Table 4.1: Descriptive Results

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	55	-.009	.040	.02375	.011743
Mobile banking	55	4.323	5.514	4.95253	.371069
Internet banking	55	7.253	9.407	8.06409	.472436
Agency banking	55	8.473	17.293	13.96349	1.853165
Asset quality	55	.0116	.5650	.094124	.1047837
Firm size	55	12.387	16.404	14.57438	1.062366
Capital adequacy	55	.0578	.1180	.073220	.0126670
Valid N (listwise)	55				

Source: Field data (2022)

4.3 Diagnostic Tests

As rationalised in chapter three, the researcher steered diagnostic tests to ensure that the assumptions of Classic Linear Regression Model (CLRM) are not violated and to attain the appropriate models for probing in the significance that the CLRM hypotheses are infringed. As a result, pre-approximation and post-approximation assessments of the regression model were performed prior to processing. The multicollinearity test and unit root test were the pre-approximation tests used in these situations, whereas the normalcy test, test for heteroskedasticity, and test for autocorrelation were the post-estimation tests.

4.3.1 Normality Test

The normality of data can be tested using a variety of methods. The most commonly utilized approaches include the Shapiro–Wilk test, Kolmogorov–Smirnov test, skewness, kurtosis, histogram, mean and standard deviation. The most extensively used normality tests are the Kolmogorov–Smirnov test and the Shapiro–Wilk test. The Shapiro–Wilk test is better for small sample sizes ($n < 50$ samples), while it can also be used on more extensive samples selections, whereas the Kolmogorov–Smirnov test is better for $n > 50$ samples. As a result, the study used the Kolmogorov–Smirnov test as the numerical method of determining normality. For the above tests, the null hypothesis says that the data are obtained from a normal distribution population. When P-value is below 0.05, null hypothesis is rejected and the data are said to be not normally distributed.

Table 4.2: Test for Normality

	Kolmogorov-Smirnov	P-value
ROA	7.303	0.401
Mobile banking	5.428	0.504
Internet banking	3.763	0.515
Agency banking	4.153	0.427
Asset quality	5.239	0.500
Firm size	5.145	0.401
Capital adequacy	7.303	0.401

Source: Research Conclusions (2022)

Evident in Table 4.2 results, all the study variables have a p value above 0.05 and therefore possess normal distribution.

4.3.2 Multicollinearity Test

Multicollinearity transpires when the regression model independent variables are significantly linked. Multicollinearity was assessed using the VIF and tolerance indices. If the VIF value is above ten and the tolerance score is below 0.2, multicollinearity is present, and the assumption is broken. The VIF values are less than 10, indicating no problem with multicollinearity.

Table 4.3: Multicollinearity

Variable	Collinearity Statistics	
	Tolerance	VIF
Mobile banking	0.714	1.401
Internet banking	0.629	1.590
Agency banking	0.697	1.434
Asset quality	0.703	1.422
Firm size	0.661	1.513
Capital adequacy	0.677	1.477

Source: Research Findings (2022)

4.3.3 Heteroskedasticity Test

The residual variance from the model must be constant and unrelated to the independent variable in linear regression models calculated using the Ordinary Least Squares (OLS) method(s). Homoskedasticity refers to constant variance, whereas

heteroscedasticity refers to non-constant variance (Field, 2009). The research utilized the Breusch-Pagan/Cook-Weisberg test to check if the variation was heteroskedastic. The null hypothesis implies constant variance, indicating that the data is homoscedastic. The outcomes are presented in Table 4.4.

Table 4.4: Heteroskedasticity Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
chi2(1)	=	0.8179
Prob > chi2	=	0.6218

Source: Research Findings (2022)

As evident in Table 4.4 null hypothesis was not rejected owing to the 0.6218 p-value, which was statistically significant ($p > 0.05$). As a result, the dataset had homoskedastic variances since the P-values of Breusch-Pagan’s test for homogeneity of variances above 0.05. The test thus confirmed homogeneity of variance. The data can therefore be used to conduct panel regression analysis.

4.3.4 Autocorrelation Test

Serial correlation, also known as autocorrelation, makes the standard errors of coefficients appear to be less than in linear panel data models, resulting in higher R-squared and erroneous hypothesis testing. Autocorrelation was verified via Durbin-Watson test. If the Durbin-Watson test results in a value of 2, the error terms of regression variables are uncorrelated (i.e. between 1 and 3). The nearer the figure to 2 is; the better. The outcomes are presented in Table 4.5.

Table 4.5: Test of Autocorrelation

Durbin Watson Statistic
1.982

Source: Research Findings (2022)

The Durbin-Watson statistic was 1.982, according to the findings in Table 4.5. The fact that the Durbin-Watson statistic was near to 2 demonstrates that the error terms of regression variables are uncorrelated.

4.3.5 Stationarity Test

The research variables were subjected to a panel data unit-root test to establish if the data was stationary. The unit root test was Levin-Lin Chu unit root test. At a standard statistical significance level of 5%, the test was compared to their corresponding p-values. In this test, the null hypothesis is that every panel has a unit root, and the alternative hypothesis is that at least one panel is stationary. The Levin-Lin Chu unit root test outcomes are listed in Table 4.6.

Table 4.6: Levin-Lin Chu unit-root test

Levin-Lin Chu unit-root test			
Variable	Statistic	p value	Comment
ROA	6.7722	0.0000	Stationary
Mobile banking	7.6975	0.0000	Stationary
Internet banking	6.5126	0.0000	Stationary
Agency banking	8.5031	0.0000	Stationary
Asset quality	8.2718	0.0000	Stationary
Firm size	7.2447	0.0000	Stationary
Capital adequacy	7.1132	0.0000	Stationary

Source: Research Findings (2022)

As demonstrated in Table 4.6, this test concludes that the data is stationary at a 5% level of statistical significance since the p-values all fall below 0.05.

4.3.6 Hausman Test

When using panel data, it is essential to establish if a fixed effect or random effect model is more desirable. For the purpose of choosing the best panel regression model, the Hausman specification test was used. In essence, a Hausman specification test determines if the unique errors have a relationship to the regressors, with the null hypothesis being that they do not (random effect is preferred). Fixed effects were utilized if the P-value was significant (below 0.05), while random effects were used otherwise. The results of the Hausman test are shown in Table 4.7.

Table 4.7: Hausman Test Results

chi2(6)	P-Value
24.72	0.0000

Null Hypothesis: The appropriate model is Fixed Effects

Source: Research Findings (2022)

4.4 Correlation Results

To determine the degree and direction of link between each predictor variable and the response variable, correlation analysis was carried out. The correlation findings in Table 4.8 display correlation nature between the research variables in relation to magnitude and direction. The correlation results disclose that mobile banking and internet banking have a weak positive but not significant link with profitability of listed banks in Kenya. Agency banking has a moderate positive as well as significant link with profitability of listed banks ($r=0.460$) at 5% significance level. The outcomes disclose that asset quality and profitability have a negative as well as significant correlation ($r=-0.632$) at 5% significance level. The outcomes also reveal that both capital adequacy and size had positive as well as significant relation with profitability of listed banks as depicted by p values below 0.05.

Table 4.8: Correlation Results

		ROA	Mobile banking	Internet banking	Agency banking	Asset quality	Firm size	Capital adequacy
ROA	Pearson Correlation	1						
	Sig. (2-tailed)							
Mobile banking	Pearson Correlation	.096	1					
	Sig. (2-tailed)	.485						
Internet banking	Pearson Correlation	.095	.179	1				
	Sig. (2-tailed)	.491	.191					
Agency banking	Pearson Correlation	.460**	.036	-.121	1			
	Sig. (2-tailed)	.000	.797	.381				
Asset quality	Pearson Correlation	-.632**	.141	-.072	.242	1		
	Sig. (2-tailed)	.000	.305	.601	.075			
Firm size	Pearson Correlation	.503**	-.073	-.135	-.198	-.274*	1	
	Sig. (2-tailed)	.000	.596	.325	.147	.043		
Capital adequacy	Pearson Correlation	.420**	.065	.104	-.973**	-.189	.170	1
	Sig. (2-tailed)	.001	.640	.450	.000	.168	.215	

** . Correlation is significant at the 0.01 level (2-tailed).
* . Correlation is significant at the 0.05 level (2-tailed).
c. Listwise N=55

Source: Research Findings (2022)

4.5 Regression Results

To determine the extent to which profitability of listed banks is described by the chosen variables, regression analysis was used. In Table 4.9, the regression's findings were displayed. From the conclusions as epitomized by the adjusted R^2 , the studied independent variables explained variations of 0.6023 of profitability of listed banks in

Kenya. This suggests that other factors not studied account for 39.77% of the variability in profitability of banks in Kenya, while the six variables account for 60.23% of those variations.

The data had a 0.000 significance level, according to Table 4.9's ANOVA results, which suggests that the model is the best choice for drawing conclusions about the variables.

Table 4.9: Regression Results

Source	SS	df	MS	Number of obs	=	55
Model	.004535169	6	.000755861	F(6, 48)	=	12.11
Residual	.002994949	48	.000062395	Prob > F	=	0.0000
				R-squared	=	0.6023
				Adj R-squared	=	0.5526
Total	.007530117	54	.000139447	Root MSE	=	.0079

ROA	Coefficients	Std. Err.	t	P>t	[95% Conf. Interval]
<u>Mobilebanking</u>	.620009	.510384	1.21	0.226	[-.38754 .627559]
<u>Internetbanking</u>	.220897	.166568	1.33	0.187	[-.10792 1.568736]
<u>Agencybanking</u>	.01095	.0034317	3.19	0.003	[-.40967 .387773]
<u>Assetquality</u>	-.571773	.2467968	-2.32	0.021	[-.08806 -1.05548]
<u>Firmsize</u>	.308207	.0791304	3.89	0.000	[-.15311 .463345]
<u>Capitaladequacy</u>	.130491	.0048635	2.68	0.007	[.00352 .022581]
<u>_cons</u>	.46064	.1642727	2.80	0.005	[-.78261 .138672]

Source: Research Findings (2022)

The regression model's coefficient was as follows;

$$Y = -0.4606 + 0.0109X_1 - 0.5718X_2 + 0.3082X_3 + 0.1305X_4$$

Where:

$Y = \text{ROA}$ $X_1 = \text{Agency banking}$; $X_2 = \text{Asset quality}$; $X_3 = \text{Firm size}$; $X_4 = \text{Capital adequacy}$

4.6 Discussion of Research Findings

The objective of this research was establishing the effect of fintech on profitability of listed banks in Kenya. The research applied a descriptive design whereas population was the 11 listed banks in Kenya. Complete data was acquired from all the 11 listed banks in Kenya and which were considered adequate for regression analysis. The research applied secondary data which was acquired from CBK and individual listed banks annual statements. The independent variable was fintech measured as the value of transactions via mobile apps, internet banking as well as agency banking while the control variables were; asset quality, firm size and capital adequacy. Both descriptive as well as inferential statistics were useful in examining the data. This section discusses the findings.

The correlation results disclose that mobile banking and internet banking have a weak positive but not substantial link with profitability of listed banks in Kenya. Agency banking has a moderate positive as well as significant link with profitability of listed banks. The outcomes disclose that asset quality and profitability have a negative as well as significant correlation. The outcomes also reveal that both capital adequacy and size had positive as well as significant relation with profitability of listed banks.

Multivariate regression outcomes revealed that the R square was 0.6023 implying that 60.23% of changes in profitability of listed banks are due to five variables alterations selected for this study. This means that variables not considered explain 39.77% of changes in profitability. The overall model was also statistically significant as the p

value was 0.000 that is below the 0.05 significance level. This infers that the overall model had the required goodness of fit.

The multivariate regression analysis further revealed that individually, mobile banking and internet banking have no significant effect on profitability of listed banks in Kenya. However, agency banking produced positive and significant values for this study ($\beta=0.0109$, $p=0.003$). Both firm size and capital adequacy have a positive effect on profitability of listed banks as shown by ($\beta=0.3082$, $p=0.000$) and ($\beta=0.1305$, $p=0.007$) correspondingly. Asset quality displayed a negative and significant profitability influence as shown by ($\beta=-0.5718$, $p=0.021$).

These conclusions concur with King'ang'ai et al. (2016) who examined financial outcome of banks' performance via agents in the Rwandan country of East Africa utilizing four Rwandan commercial bank currently functional by 31 December 2015. The results from the research showed that the regulation of bank agencies, low transaction cost via banking agencies, access to banking-related services through bank agents and general development in the market had a favorable effect on performances in terms of financial position of commercial bank. Findings of linear regression model have created a favorable connection among agency banking effect and performances in terms of financial position of commercial bank.

The research findings also concur with Kamande (2018) who scrutinized how performance of Kenyan commercial bank is impacted by electronic banking. Electronic banking was the predictor measured quantitatively using banking transaction through mobile, online and agency platforms. ROA was utilized in evaluating financial performance. The results of this research revealed positively significant impact of bank size, agency banking, ATMs, capital adequacy and

liquidity on ROA. Internet and mobile banking were not significant indicators of financial success of commercial banks.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The key aim of the research was determining how fintech influences the profitability of listed banks in Kenya. This section includes a summary of the findings from the previous chapter as well as the conclusions and limitations of the study. Additionally, it makes recommendations for potential policy measures. The chapter provides recommendations for further research.

5.2 Summary of Findings

The research objective was to assess how fintech influence profitability of listed banks in Kenya. The research applied a descriptive design whereas population was the 11 listed banks in Kenya. Complete data was acquired from all the 11 listed banks in Kenya and which were considered adequate for regression analysis. The research applied secondary data which was acquired from CBK and individual listed banks annual statements. The independent variable was fintech measured as the value of transactions via mobile apps, internet banking and agency banking while the control variables were; asset quality, firm size and capital adequacy. Both descriptive as well as inferential statistics were applied in analyzing the data. This section discusses the findings.

The correlation results disclose that mobile banking and internet banking have a weak positive but not significant link with profitability of listed banks in Kenya. Agency banking has a moderate positive as well as significant link with profitability of listed banks. The outcomes disclose that asset quality has a negative as well as significant

correlation. The outcomes also reveal that both capital adequacy and size had positive as well as significant relation with profitability of listed banks.

Multivariate regression outcomes revealed that the R square was 0.6023 inferring that 60.23% of changes in profitability of listed banks are due to five variables alterations selected for this study. This means that variables not considered explain 39.77% of changes in profitability. The overall model was also statistically significant as the p value was 0.000 that is below the 0.05 significance level. This infers that the overall model had the required goodness of fit.

The multivariate regression analysis further revealed that individually, mobile banking and internet banking have no significant effect on profitability of listed banks in Kenya. However, agency banking produced positive and significant values for this study ($\beta=0.0109$, $p=0.003$). Both firm size and capital adequacy have a positive effect on profitability of listed banks as shown by ($\beta=0.3082$, $p=0.000$) and ($\beta=0.1305$, $p=0.007$) correspondingly. Asset quality displayed a negative and significant profitability influence as shown by ($\beta=-0.5718$, $p=0.021$).

5.3 Conclusions

The research intention of the research was establishing correlation between fintech and Kenyan listed banks profitability. The study concludes that mobile banking and internet banking have no significant effect on profitability of listed banks. The research also comes to the conclusion that agency banking significantly and positively affects the profitability of Kenya's listed banks.

The findings designated that asset quality had a negative and significant effect on profitability of listed banks. This may imply that listed banks with high credit risk have low levels of profitability. This can be clarified by the sense that a rise in credit

risk implies reduction in interest income which negatively affects the profitability of listed banks.

The research outcomes further depicted that firm size exhibited a positive as well as significant influence on profitability which might mean that an increase in asset base of a listed bank leads to enhanced profitability. This can be explained by the fact that listed banks with more assets are likely to have developed structures to monitor the internal operations of a firm leading to better profitability. Bigger listed banks are also likely to have better governance structure which can also explain the high profitability associated with firm size.

The study conclusions revealed that capital adequacy had a positive as well as significant effect on profitability. This may mean that the listed banks that have adequate capital are able to meet their obligations when they fall due and are also able to take advantage of investment opportunities that might arise in the course of doing business and therefore high levels of profitability compared with firms that has less capital adequacy.

5.4 Recommendations for Policy and Practice

The study revealed that agency banking possesses a significant positive effect on profitability of listed banks. The study recommends the need for listed banks to enhance their agency banking as this will contribute positively to their profitability. Policy makers ought to develop strategies on how banks can adopt agency banking in the most effective way.

The study's results indicate that asset quality significantly and negatively affected profitability. Hence, the research commends that listed banks administrators should endeavor to lower the amount of non-performing loans. This can be accomplished by

developing efficient ways for managing credit risk that will allow the listed banks to discriminate between creditworthy and non-creditworthy borrowers.

From the study findings, capital adequacy was found to enhance profitability of listed banks, this research recommending that listed banks should keep adequate capital levels to sustain their obligations when they fall due whereas simultaneously time enjoying short term investment chances which may arise. The policy makers ought to set a limit of the capital adequacy level that listed banks should have as too much capital adequacy is also disadvantageous as it comes with opportunity costs.

5.5 Limitations of the Study

The focus was on various factors which are thought to influence profitability of Kenyan listed banks. The study specifically examined six explanatory factors. Though, in certainty, there is presence of other variables probable to influence profitability of firms including internal like corporate governance attributes and managerial efficiency whereas others are beyond the control of the firm like interest rates as well as political stability.

In this research, a five-year duration from 2017 to 2021 was selected. There is no evidence that comparable results will remain the same across a longer time frame. Moreover, it is impossible to predict if the same outcomes would persist until 2021. Given that additional time contains instances of big economic transitions like recessions and booms, it is more dependable.

The data quality was the main restriction for this research. It is impossible to conclusively conclude that the study's findings accurately reflect the current reality. It has been presumed that the data utilized in the study are accurate. Due to the current conditions, there has also been a great deal of incoherence in the data measurement.

The research utilized secondary data rather than primary data. Owing to the constrained data availability, only some of the growth drivers have been considered.

The data analysis was performed using regression models. Owing to the limitations associated with using the model, like inaccurate or erroneous findings resulting from a change in the variable value, the researchers would not be able to generalize the conclusions precisely. A regression model cannot be performed using the prior model after data is added to it.

5.6 Suggestions for Further Research

It has been suggested that several areas for advanced future research to be done on the basis of the tangible information gathered and the clarifying comprehension established in this research. First, other financial technology aspects influence firm profitability apart from the three selected for this study. More research can be conducted to determine and evaluate them. Additionally, other factors moderate, intervene, or mediate the relationship between fintech and firm profitability apart from firm size, asset quality and capital adequacy. Further research can be done to identify and analyze them.

The current research scope was restricted to five years; more research can be performed past five years to determine whether the results might persist. Thus, inherent future studies may use a wider time span, which can either support or criticize the current research conclusions. The scope of the study was additionally constrained in terms of context where listed banks were examined. Further studies can be extended to other financial firms to establish if they complement or contradict the current study findings. Researchers in the East African region, the rest of Africa, and

other global jurisdictions can too perform the research in these jurisdictions to ascertain if the current research conclusions would persist.

The research only used secondary data; alternate research may use primary data sources such in-depth questionnaires and structured interviews given to practitioners and stakeholders. These can then affirm or criticize the results of the current research.

This research used multiple linear regression as well as correlation analysis; future research could use other analytic techniques such factor analysis, cluster analysis, granger causality, discriminant analysis, and descriptive statistics, among others.

REFERENCES

- Abdulkadir, I. (2019). *Effect of financial innovations on financial performance of commercial banks in Kenya*, Unpublished MSc Research Project, University of Nairobi
- Abernathy, W.J., & Utterback, J.M. (2015), *Innovation and the evolution of technology in the Firm*, Harvard University Press, Cambridge, MA.
- Aigner, D.J., Lovell, C.A.K., & Schmidt, P. (1977). Formulation and estimation of Stochastic Frontier Models, *Journal of Econometrics* 6(1), 21-37.
- Almajali, Y.A., Alamro, S.H., & Al-Soub, Y.Z (2012). Factors affecting financial performance of Jordanian insurance companies listed at Amman stock exchange. *Journal of Management Research*, 4(2), 91-101
- Amato, L. & Burson, T. (2007). The effects of firm size on profit rates in the financial service, *Journal of Economic and Economic Research*, 8(1), 61- 81
- Athanasoglou, P., Brissimis, S., & Delis, M. (2005). Bank-specific, industry-specific and macroeconomics deterrents of bank profitability, *Bank of Greece*, No. 25
- Athanasoglou, P., Sophocles, B., & Matthaios, D. (2009). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money*. [Online] 121-136.
Available from: <http://ssrn.com/abstract:1106825>

- Babajide, A. A., Adegboye, F. B., Omankhanlen, A. E., (2015). Financial Inclusion and economic growth in Nigeria. *International Journal of Economics and Financial Issues*, 5(3).
- Burns, N. & Burns, S. (2008). *The Practice of Nursing Research: Conduct, Critique and Utilization: 5th Edition*: St Louis, Elsevier Saunders
- Central Bank of Kenya (2020). *Statistical bulletin*. Nairobi: Government press.
- Charnes, A. Cooper, W.W. & Rhodes, E. (1978). Measuring the efficiency of decision-making units. *European Journal of Operation Research*, 2(6), 429-444
- Cooper, D. R., & Schindler, P. S. (2008). *Business research methods*. New Delhi: Tata McGraw-Hill Publishing Company Limited
- Dang, U. (2011). The CAMEL rating system in banking supervision. *E-journali*, 18(7), 257-273
- Daraio, C. & Simar, L.L. (2016). *Advanced robust and nonparametric methods in efficiency analysis*. Research gate
- Darrab, I. A. & Khan, M. R. R. (2010). Development of analytical relation between maintenance, quality and productivity. *Journal of Quality Maintenance*, 16(4), 341-353.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–339.

- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The global Findex database 2017: Measuring financial inclusion and the financial innovations revolution. The World Bank.
- Diamond, W. (1984). Financial intermediation and delegated monitoring, *Review of Economic Studies*, 51(3), 393-414
- Farrel, M.J. (1957). The measurement of productive efficiency. *Journal of Royal Statistical Society Series A General*, 120(3), 253-281
- FinAccess (2016). *Financial inclusion in Kenya*. International Monetary Fund
- Freytag, A., & Fricke, S. (2017). Sectoral linkages of financial services as channels of economic development—An input–output analysis of the Nigerian and Kenyan economies, *Review of Development Finance*, 7(1), 36-44
- Hackman, C. (2018). Business performance and strategic new product development activities: An empirical investigation. *Journal of Product Innovation Management*, 12(2), 214-23.
- IFSB (2015). *Performance of Savings and Credit Cooperatives in Kenya*, Annual Review
- Jappelli, T. & Pagano M. (2006). *Role and Effects of Credit Information Sharing: In The Economics of Consumer Credit*, edited by G. Bertola, R. Disney and C. Grant, MIT Press: Cambridge, Massachusetts, 347-371
- Jovanovic, B. (1982). Selection and the evolution of industry. *Econometrics*, 50, 649-670

- Kamande, J. (2018). *Effect of fintech on financial performance of commercial banks in Kenya*, Unpublished MBA project, University of Nairobi
- Khan, J. A. (2008). *Research Methodology*. New Delhi. APH Publishing Corporation
- Kim, D. W., Yu, J. S., & Hassan, M. K. (2018). Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance*, 43, 1e14.
- Klapper, L., (2016). *Financial Inclusion has a big role to play in reaching the SDG's* [Online]. Washington DC: Consultative Group to Assist the Poor.
- Kohali, A. & Sheleg, A. (2011). *Alternative banking channels*. Tefen Tribune, Spring Issue, 2011.
- Kombe, S.K. & Wafula, M.K., (2015). Effects of Internet Banking on the Financial Performance of Commercial Banks in Kenya. *International Journal of Scientific and Research Publications*, 5(5), 64-75
- Kumar, S., & Gulati, R. (2008b). "Evaluation of technical efficiency and ranking of public sector banks in India," *International Journal of Productivity and Performance Management*, 57 (7), 540 - 568.
- Lee, J. (2009). Does the size matter in firm performance? Evidence from US public firms, *Internal Journal of the Economic of Business*, 16(2), 199- 203
- Levine, Loayza & Beck (2000). Financial Intermediation and Growth: Causality and Causes, *Journal of monetary economics* 46, 31-77

- Magweva, R., & Marime, N. (2016). Bank specific factors and bank performance in the multi-currency era in Zimbabwe. *African Journal of Business Management*, 10(15), 373-392
- Moody Investor Services (2019). *Default Trends and Rating Transitions in Africa*. Moody Investor Services, June 2019
- Mudibo, F. (2015). Effect of savings and credit co-operative societies' financial services on demand for credit by members - a survey of deposit taking saccos in Nairobi. *International Journal of Social Science and Technology*, 3(8);423-456
- Muganga, D. (2010). *The role of regulation and supervision of microfinance institutions: evidence from South Africa and its implications on the development of non-deposit taking Microfinance regulation in Kenya* . Nairobi.
- Mwangi, M. (2014). *The influence of members' income and conduct of saccos in the relationship between characteristics and efficiency of saccos in Kenya*, Unpublished PhD Thesis, University of Nairobi
- Naz, F., & Naqvi, F. (2016). Financial performance of firms: evidence from Pakistan Cement Industry. *Journal of Teaching and Education*, 5(01), 81-94.
- Neaime, S., & Gaysset, I. (2018). Financial inclusion and stability in MENA: Evidence from poverty and inequality. *Finance Research Letters*, 24(1), 230-237

- Ogwen, W. (2019). *Effect of financial innovations on financial performance of licensed microfinance institutions*, Unpublished MBA Project, University of Nairobi
- Pagano, M., & Jappelli, T. (1993). Information sharing in credit markets. *The Journal of Finance*, 43(5), 1693- 1718.
- Rao, M., & Lakew, T. (2012). Determinants of profitability of commercial banks in a developing country; Evidence from Ethiopia. *International Journal of Accounting and Financial Management Research* 2(3); 1-20
- Rasheed, B., Law, S.-H., Chin, L., & Habibullah, M. S. (2016). The role of financial inclusion in financial development: International evidence. *Abasyn University Journal of Social Sciences*, 9(2), 330-348
- Rogers, E. M. (1995). A prospective and rROAospective look at the diffusion model. *Journal of Health Communication*, 9(1), 13-19.
- Sheleg, O., & Kohali, A. (2015). The impact of internet banking on the performance of Romanian banks: DEA and PCA approach. *Procedia Economics and Finance*, 20, 610-622.
- Sindani, W. M., Muturi, W., Ngumi, P. (2019). *Effect of financial distribution channels evolution on financial inclusion in Kenya*, Nairobi, Kenya
- Stoica, O., Mehdian, S., & Sargu, A. (2015). The impact of internet banking on the performance of Romanian banks: DEA and PCA approach. *Procedia Economics and Finance*, 20, 610-622.

- Triki & Faye (2013). *Financial inclusion in Africa*. Ghana: African Development Bank.
- Waithanji, M.N. (2016). *Effect of agent banking as a financial deepening initiative in Kenya*. Unpublished MBA Project, University of Nairobi.
- Wambua, K. P. (2015). The effects of corporate governance on Savings and Credit Cooperatives (SACCOs) financial performance in Kenya. *Journal of Corporate Finance and Management*, 3(2), 133-1141.
- Wanalo, E. (2018). *Effect of technological financial innovations on financial performance of firms of commercial banks in Kenya*, Unpublished MBA Research Project, University of Nairobi
- World Bank (2017). *The Findex Global Database 2017* [Online]. Washington D.C: World Bank. Available from: datatopics.worldbank.org/financial_inclusion/ [Accessed 20 October 2019].
- Zins, A., & Weill, L. (2016). The determinants of financial inclusion in Africa, *Review of Development Finance*, 6(1), 46-57

APPENDICES

Appendix I: Commercial Banks in Kenya

1. ABSA Bank Kenya Plc	2. Gulf African Bank Limited
3. Access Bank(Kenya) PLC	4. <u>Habib</u> Bank A.G Zurich
5. African Banking Corporation Limited	6. I & M Bank Limited
7. Bank of Africa Kenya Limited	8. Imperial Bank Limited
9. Bank of Baroda(Kenya) limited	10. Jami Bora Bank Limited
11. Bank of India	12. KCB Bank Kenya Limited
13. Charter house Bank Limited	14. Mayfair CIB Bank Limited
15. Citibank N.A Kenya	16. Middle East Bank (K) limited
17. Consolidated Bank of Kenya	18. M-Oriental Bank Limited
19. The Cooperative Bank of Kenya	20. National Bank of Kenya Limited
21. The Credit Bank Limited	22. NCBA Bank Kenya PLC
23. Development Bank of Kenya	24. Paramount Bank Limited
25. Diamond Trust Bank of Kenya	26. Prime Bank Limited
27. DIB Bank Kenya Limited	28. SBM Bank Kenya Limited
29. Eco Bank Kenya Limited	30. <u>Sidian</u> Association Bank Limited
31. Equity Bank of Kenya Limited	32. Spire Bank Limited
33. Family Bank Limited	34. <u>Stanbic</u> Bank Kenya Limited
35. First Community Bank Limited	36. Standard Chartered Bank Kenya
37. Guaranty Trust Bank(K) Limited	38. UBA Association Kenya Bank
39. Guardian Bank Limited	40. Victoria Commercial Bank Limited

Source: CBK (2021)

Appendix II: Publicly Listed Commercial Banks in Kenya

- 1) ABSA Bank Kenya Plc
- 2) BK Group Plc
- 3) Co-operative Bank of Kenya Limited
- 4) Diamond Trust Bank Kenya Limited
- 5) Equity Group Holdings Limited
- 6) Housing finance Group Limited
- 7) I&M Holdings Limited
- 8) KCB Group Limited
- 9) National Bank of Kenya Limited
- 10) NCBA Group Plc
- 11) Stanbic Holdings Plc
- 12) Standard Chartered Bank Limited

Source: Nairobi Securities Exchange (2021)

Appendix III: Research Data

Bank	Year	ROA	Mobile banking	Internet banking	Agency banking	Asset quality	Firm size	Capital adequacy
ABSA	2017	0.035	5.229	7.999	13.760	0.0363	15.332	0.0727
	2018	0.028	5.289	8.182	14.577	0.0267	13.573	0.0686
	2019	0.026	5.247	8.079	14.940	0.0521	14.286	0.0669
	2020	0.023	5.303	8.917	14.722	0.0556	14.465	0.0679
	2021	0.020	5.331	8.189	15.115	0.0610	14.998	0.0662
Cooperative bank	2017	0.034	4.721	7.899	14.072	0.0427	13.758	0.0711
	2018	0.036	4.692	7.848	13.029	0.0334	15.034	0.0768
	2019	0.029	4.688	7.731	13.022	0.0428	15.011	0.0768
	2020	0.031	4.677	8.248	13.254	0.0702	15.578	0.0755
	2021	0.031	4.602	7.253	13.502	0.1027	16.112	0.0741
Diamond Trust Bank	2017	0.024	4.335	8.130	16.112	0.0116	14.473	0.0621
	2018	0.024	4.323	7.594	16.133	0.0241	14.276	0.0620
	2019	0.019	5.350	7.942	14.321	0.0325	14.288	0.0698
	2020	0.019	5.338	7.684	14.378	0.0666	15.268	0.0696
	2021	0.019	5.446	8.025	14.636	0.0629	15.616	0.0683
Equity Bank	2017	0.040	5.289	8.038	8.473	0.0401	14.426	0.1180
	2018	0.035	5.247	8.646	8.765	0.0326	15.198	0.1141
	2019	0.036	5.303	8.040	8.937	0.0782	15.635	0.1119
	2020	0.035	5.331	8.112	8.982	0.0691	14.631	0.1113
	2021	0.036	5.330	7.893	14.510	0.0983	15.810	0.0689
HF Group	2017	0.017	4.692	7.803	13.706	0.0715	12.438	0.0730

Bank	Year	ROA	Mobile banking	Internet banking	Agency banking	Asset quality	Firm size	Capital adequacy
	2018	0.013	4.688	8.340	14.077	0.0658	12.652	0.0710
	2019	0.002	4.677	8.347	14.217	0.0950	13.478	0.0703
	2020	0.010	4.602	7.794	14.403	0.1400	12.387	0.0694
	2021	0.002	4.529	7.826	13.678	0.2428	13.474	0.0731
I&M Bank	2017	0.037	4.547	7.654	12.438	0.0157	14.836	0.0804
	2018	0.037	4.455	7.810	12.652	0.0400	14.657	0.0790
	2019	0.030	4.489	7.784	13.478	0.0568	15.143	0.0742
	2020	0.026	4.335	7.727	12.387	0.1280	15.496	0.0807
	2021	0.033	4.323	7.794	13.474	0.1204	16.198	0.0742
KCB	2017	0.035	5.365	7.692	15.496	0.0465	16.404	0.0645
	2018	0.033	5.439	7.971	16.198	0.0528	16.372	0.0617
	2019	0.030	5.429	7.667	13.923	0.0682	13.149	0.0718
	2020	0.034	5.476	8.427	14.970	0.0758	13.172	0.0668
	2021	0.028	5.514	8.496	15.174	0.0628	14.291	0.0659
National Bank of Kenya	2017	-0.009	5.289	7.867	16.552	0.1074	13.473	0.0604
	2018	0.001	5.247	7.521	17.119	0.1469	13.262	0.0584
	2019	0.007	5.303	7.597	17.293	0.4511	13.123	0.0578
	2020	-0.001	5.331	8.036	17.168	0.4560	13.795	0.0582
	2021	-0.008	5.330	8.490	13.112	0.5650	13.178	0.0763
NCBA	2017	0.030	5.166	8.178	14.089	0.0132	12.968	0.0710
	2018	0.017	5.207	7.774	13.254	0.0676	15.661	0.0754
	2019	0.029	4.737	7.575	14.251	0.0635	16.210	0.0702
	2020	0.023	4.760	8.192	13.175	0.1073	15.935	0.0759

Bank	Year	ROA	Mobile banking	Internet banking	Agency banking	Asset quality	Firm size	Capital adequacy
	2021	0.023	4.837	8.026	14.129	0.1238	16.061	0.0708
Stanbic Holdings	2017	0.024	4.925	9.407	13.042	0.0299	13.562	0.0767
	2018	0.021	4.934	9.161	13.456	0.0481	14.290	0.0743
	2019	0.017	5.012	9.117	14.169	0.0505	14.979	0.0706
	2020	0.022	4.771	8.875	14.455	0.0666	14.970	0.0692
	2021	0.021	4.721	9.372	14.617	0.0945	14.799	0.0684
Standard Chartered	2017	0.027	4.692	7.562	13.562	0.0724	14.378	0.0737
	2018	0.036	4.688	7.631	14.290	0.1015	14.704	0.0700
	2019	0.024	4.677	7.695	14.979	0.0829	14.957	0.0668
	2020	0.028	4.602	7.952	14.970	0.0901	14.831	0.0668
	2021	0.027	4.529	7.916	14.799	0.1169	14.540	0.0676

