THE EFFECT OF FINANCIAL TECHNOLOGY ON FINANCIAL INCLUSION BY THE FINANCIAL INSTITUTIONS IN LESOTHO

BY

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DECLARATION

I declare that this is my original work. It has not been used at any university. Any sources that I have referenced or quoted have been adequately identified and acknowledged through comprehensive references.

Signed…………………………………… Date…28-02-2022…………………………….

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

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DEDICATION

God, who made all this possible. All glory unto Him. I want to dedicate this project to my husband, Motlatsi Moabi, my mother, Ntsoaki Phakisi, and my son Bataung Moabi for their financial or emotional support during my project. Thank you for inspiring me to dream and providing a platform to realize my ambitions.

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LIST OF ABBREVIATIONS

AFI   - Alliance for Financial Inclusion

CBL   - Central Bank of Lesotho

ETL   - Econet Telecom Lesotho

FI   - Financial Inclusion

FINTECH   - Financial Technology

FNB   - First National Bank

GDP   - Gross Domestic Product

GFC   - Global Financial Crisis

LCA   - Lesotho Communication Authority

LPB   - Lesotho Post Bank

MDGs   - Millenium Development Goals

MFIs   - MicroFinance Institutions

SACCOs   - Savings and Credit Cooperative Societies

SIMM   - Scaling Inclusion through Mobile Money

SLB   - Standard Lesotho Bank

SUFIL   - Support to Financial Inclusion

VCL   - Vodacom Lesotho

ABSTRACT

More than 50 percent of the population in developing countries does not have any form of financial account. Lesotho is not an exemption because about 38 percent of adults have no bank account. This suggests that a significant percentage of the adult population lacks access to financial services in the country. Considering the role of financial inclusion in social-political and economic development, many studies have been conducted in developed nations to establish how it is impacted by financial technology. The few studies done on Lesotho primarily focus on one measure of financial technology, mobile money. This study intends to fill the gap by assessing the effect of other measures; mobile money transfer, online and ATM banking, bank infrastructure on financial technology in Lesotho. The study employed 9-year secondary quarterly series sourced from the World Development Indicators and the Central Bank of Lesotho. Both descriptive and inference analyses were used for analysis purposes. The correlation analysis indicates that mobile money transfer, online banking, ATM banking, banking infrastructure, and interest rates are positively associated with financial inclusion.

In contrast, economic growth has a negative relationship with financial inclusion. Findings from the regression analysis show that all measures of financial technology positively impacted financial inclusion except mobile money transfer. Also, the estimated model has an R-Squared of 0.92, which implies that whenever there is variation in financial inclusion, the independent variables are responsible for 92 percent of the changes. The study recommends increasing bank branches, especially in remote areas, enhancing deposits accounts which lead to growth in deposit and withdrawal transactions.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Several emerging nations, majorly African, are associated with financial exclusion due to limited access to financial services. This is so because there are exit gaps within the infrastructure of the banking sector (Andrianaivo and Kpodar, 2012). Beck and Maimbo (2013) report that close to 2-5 billion people globally suffer from limited access to financial services, thus forcing them to depend on cash or informal financial services. In Lesotho, close to 38% of the population, an adult, owns an account in a banking institution. That means a large proportion of the adult population is still limited in accessing services offered by the banks. (Ketly and Kasi, 2015) The official banking sector has not succeeded in delivering or meeting the financial needs of the millions of consumers in Lesotho. Studies have reported that there is bias by banks in favor of affluent consumers due to the high cost of physical infrastructure and operational costs, and low profits and when serving customers with low income (Dube et al., 2014). This inadequate financial service reduces the ability to save, repay and manage risk responsibly as well as exposes the poor to poverty indirectly (Donovan, 2012)

It was predicted that the economy of Lesotho shall have declined by 5.2% in 2020; this is a result of a 0-6% growth experienced in 2019. The decline was also contributed by measures undertaken to contain the spread of the COVID 19 pandemic and low demands by external parties, especially those in the mining and manufacturing sectors. In the same 2020, the growth in the mining industry as estimated declined by 34.5, while in the service sector, the decline was 29.3, marking a drop of 9.9% and 4.2% in the two sectors,

respectively. There is a connection between the economy of Lesotho and that of S.A, with imports from S.A accounting for at least 80% of the country's total imports.

Jefferis and Manje (2014) report four licensed banks in Lesotho. This includes standard Lesotho Bank (SLB) Net Bank Lesotho, First National Bank (FNB) Lesotho, and Lesotho Postbank (LPB). They control a more significant proportion of the market within the financial industry of Lesotho, with total assets amounting to close to 42.3% of the GDP. It is also reported that there are eight credits-only microfinance institutions (MFIC) with significant growth observed at Letshego among the eight. The number of official man leaders is estimated at 154, which operate on a small scale. The country has many savings and credit cooperatives (SACCDs), but only Boliba saving and credit cooperative society operates on a relatively large scale.

Significant investments risk hinders the availability of traditional sources of finding, during such moments, it is through innovations, that means to new technology venture are provided the increase in technology as well as in economic progressive promotes growth in the complexity of business processes as well as the introduction of new types of risks. Thus, it prompts the financial system to adapt to changes and modernize to meet the unique demands of business entities and the challenges posed by the modern world. Financial innovation theory primarily relates to their effects on the financial system. There is a need for sustainable financial innovation, which is critical in boosting economic growth as well as social wealth (Blach, 2011)

There have been many changes experienced within the banking and financial markets. These markets centers have significantly obtained advantages from the advancement in all dimensions of technological operation such as computer hard and software capability, the

speed of telecommunications, and their efficiency mobile access, mainly through mobile cellphones, tablets, and other handheld devices. The banking services business was carried out in the ancient empires of Babylon, Syria, and Judea at its origin. A modern bank was first The Bank of Venice which was founded in 1157(Colvin,2017); from ancient times, the banking sector has globally been improving its regulations and operations at large. Quite a several study models and hypotheses have been applied to expound on aspects that promote the adoption of technology in the banking industry globally. This study focus on three significant models: the technology acceptance model (TAM), which Fred Davis pioneered in 1986. The modification of the theory of reasonable action is aimed at explaining how individuals adapt technologies. The second unified theory of acceptance and use of technology (UTAUT) pioneered Venkatesh in 2003. It suggests four key indicators influencing behavior: age, gender, experience, and voluntaries. The third theory is the innovation diffusion theory (IDT) by E.M Rodgers (1962). It was first applied in communication to explain the development and spreading of ideas.

1.1.1   Financial Technology

Financial innovators can be interpreted as the developments of new offers in the market, formation of new entities, embracing modern technology, and other dimensions that present newness in the financial markets. The advancement in technology has initiated innovative methods in the banking industry globally and regionally. In the current arena, banks and other financial institutions are better positioned to provide more customer-tailored products that customers can access at any time, any place. The emergency of financial technology has become as powerful as a new market force due to the coming together of many disconnected trends. Many advances have been observed in computer

devices and digital technology, the internet, mobile telecommunication without forgetting economics and finance. This has mainly advanced traditional sections of the study, thus creating important potential new business structure and operations (Arner, Barber, and Buckly, 2015)

Financial technology is popularly referred to as Fintech. It has promoted many opportunities for the banks, which helps them improve their products and services delivery but is associated with new risks that banks face now. In addition, banks also fight their regulations, which promotes threats in terms of markets and counterparty fragmentations. Industries globally are sensitized to and be informed of the likelihood of disruptive technology that replaces the industrial structures in place, products, and services of different entities. The banking industry is highly influenced since they provide online products (Blach, 2011).

Digital currencies have emerged due to the development led by fintech. Much debate has focused on digital currencies that analyze technology and economics. However, digital currencies can significantly influence the manner of the transaction daily. The digital currencies, in this case, include bitcoins and cryptocurrencies. In modern society, these digital currencies are rapidly and widely being invested in by individuals. Most analysts focus on determining whether digital currencies may replace standard currencies at some point. (Carstens, 2021)

According to the World Bank (2017) data, it's reported that several opportunities are set to increase the number of accounts owned among 1.7 billion adults who remain unbanked. Further, the data indicate the ways to leverage new offers to the market and technologies to better utilize accounts among those who hold one. (Kate 2019) reports that Fintech credit

activities have rapidly increased in many states over recent years. (CCAF 2019) has that a $284billion estimate from Fintech credit was extended globally in 2016, up from $11 billion in 2013. China recorded the highest market in 2016; the United States and the United Kingdom came after China on the list with other large advanced economies further behind PWC (2016). The survey indicates that the potential markets suggest that the projected demands of P2P markets in the USA will be USD 150 Billion by 2025

1.1.2 Financial Inclusion

Financial inclusion means the process that facilitates the convenient access, at hand, and utilization of a financial system for region participants. It involves the accessibility of financial services, including payments services, channels for remittance, saving loans, and insurance services provided by the formal financial system has several benefits. One benefit is that it makes it easier to allocate critical resources, reducing the cost of capital efficiently. The second benefit is the access to the appropriate financial services and necessary to better the management of funds daily. The third benefit is the helpful role of decreasing the increment of informal sources of loan facilities such as money, leaders who often are presented as being exploitative (Sarmay, 2012)

Banking stability and economic sustainability can be much achieved if inclusive finance is ensured. From a sample of 31 Asian countries between 2004 and 2016, Li, Wu, and Xiao (2020) report that FI positively influences financial sustainability. Neaime and Gaysset (2015) also carried out an empirical study of MENA countries. The study gets across relations between FI and bank stability. In addition, Beck, Senbet, and Simbanegayi (2014) present FI as one of the critical drivers of the financial growth and stability of the banking sector. Ahmed and Malik (2019) also report the significant impacts of FI on bank stability.

On some occasions, FI has been presented as incomplete without the implementation of DFI is said to have strengthening impacts on functions of FI since there is an excellent connection between FI and DFI, the gap of FI through the implementation of the latest technological innovation (Moufakkit and Mohammed, 2020)

1.1.2 Financial Technology and Financial Inclusion

Many studies have confirmed that financial technology and technological innovations are extensively interlinked. On the other hand, financial innovations provide a way to fund innovative technical ventures when traditional sources of financing are not available as a result of great investments risk involved. Technological and economic progress increases the complexity of business processes. It brings new risk types, and their financial systems and markets are left with no choice but to adapt to the changes (Blach, 2021). Fintech looks into how new and advanced redefined the strategic landscape for banks. The need to analyze the impact of Fintech on banks should not be overstated, given how complex they are, especially in terms of regulation. As such, regulators and policymakers will have an in-depth knowledge of ensuring that these innovations are not hurtful to the global economy (Coetzee, 2018). Fintech plays a significant role in the transformation manner in which smaller entities and low-income members of society obtain financial services. Bank and their agents, microfinance institutions, and informal networks traditionally provided financial assistance with little competition. Majorly their operations passed on cash transactions and in-person encounters with financial creditworthiness monitoring and means for clients to become financially educated. Digital banking services have significantly increased due to the outbreak of COVID 19, which restricts movements of people from place to place. Through the developments of digital platforms, consumers are

in a better position to obtain the most out of their money by allowing them to compare the price and suitability of different companies' products and services (Sahay al 2020)

1.1.3 Financial Technology and Financial Inclusions in Lesotho

During an event titled broadening the horizons for all, the collaborations and fintech for financial inclusions were addressed. The event took place on the 29th of Nov 2018, which was in honor of Lesotho's financial inclusion Day. The central bank of Lesotho (CBL) participated in collaborations with the alliance for financial inclusions (AFI) among other stakeholders. The financial inclusions day for Lesotho provides a platform for information concerning regional and economic development, raising awareness about the importance of financial inclusions analyzing regulatory and policy advancement, and accessing the challenges and success factors in advancing financial inclusions. Dr. Matlanyane held that national conference aims to provide an opportunity to draw lessons from pioneers in financial inclusions (Sekantsi L. 2018)

Reports indicate that Lesotho Post Bank launched a mobile wallet service, Khetsi, in 2019. The services were made available to both Vodacom and Econet. This included withdraws, utility payments, bill payments, and community loans and savings. Khetsi started operations as a mobile virtual wallet that held payments card information. The bank was recorded as the most notable in serving rural and urban Basotho unbanked or underbanked. Vodacom m-Pesa obtained a license by the central bank of Lesotho as an independent financial services provider, trading as VCL financial service, which drives financial inclusion and economic empowerment. This service was initiated in 2013, and by 2019 it had obtained one million users and over one billion in monthly transactions. M-Pesa indicates that its intention is becoming a full-fledged financial services company. The

business was set to be taken over by VCL financial services; Palesa Mphunyetsane reports that this move aimed at promoting new alternatives to the market (Kajane, 2020)

The support to financial inclusion in Lesotho (SAFIL) was initiated as a financial inclusion drive by UNDP Lesotho in conjunction with the Ministry of Finance and the Central Bank of Lesotho from 2012 to 2014. The projects aimed at improving accessibility of financial services for those with low income, particularly women and youth. According to the proponents of this initiative, the financial sector education and technology for inclusive finance with a critical focus on women, youth, and the disadvantaged. Due to stakeholders' participation, the Lesotho SIMM created inclusions through the mobile money project. The UNDP's goal with this project was to assist Lesotho's Ministry of Finance and the central bank in connecting the rural population, particularly the unbanked, to financial services. (UNDP, 2019)

1.2 Research Problems

Necessary measures are being exploited globally to boost financial inclusions to facilitate access to a broad array of financial market offers by those unbanked and the underbanked populations residing majorly from remote locations in developing countries. Reports have indicated that small enterprises form the lifeblood of developing economies though the majority of them do not have access to proper financial services for varied reasons. The core vision of the policy-leadership alliance owned and directed by reserve banks is to ease the access to financial services by the world's unbanked population. To achieve this, the coalition has partnered with regulators, institutions with global operations, and practitioners in the private sector (Jones,2012)

On the 29th of Nov 2018, the Republic of Lesotho initiated collaboration and fintech for financial inclusions. During the financial inclusion Day, the country obtains a platform where information is shared addressing regional economic development, raising awareness about the necessity of financial inclusion, discussing the regulatory and policy advancement, and accessing the challenges and success factors in advancing financial inclusions. (Sakatsi, 2018). In addition to the financial inclusion day, there are established support for financial inclusion in Lesotho (SUFIL), which aims to improve the accessibility of financial service for individuals whose income level is low, especially youth and women (UNDP 2019). Some research has been carried out around the concept of financial technology and financial inclusions. Frank (2010) surveyed how mobile banking influences performance financially for the firms quoted at the New York Stock Exchange (NYSE) between 2001 and 2008. According to the findings of this study, the financial performance of commercial banks quoted at NYSE significantly improved as a result of adopting mobile banking. Another study by Fatima and Kiran (2011), which aimed to investigate how mobile banking influences the performance of the organization financially for commercial banks in Pakistan, reports that there was a vast improvement in the financial output of commercial banks in Pakistan after launching mobile banking. Siddik (2016) also accessed the impacts of electronic banking on the performance of banks in Bangladesh. His work reveals that electronic banking presents a positive influence on bank performance.

At the local level, Hemmen (2019) looks into how the drivers of financial inclusions and fintech innovations influence women in developing regions. The study validates the presence and impacts of technological legislative, accessibility, and gender empowerment

motivations. The findings of the study report that to boost the financial inclusion within developing regions, the need for legislation necessary to deal with innovation and fintech needs to be addressed. Tsemane (2015) studied the effectiveness of mobile money in improving financial inclusions in Lesotho. The study found mobile money to be gradually improving into the daily lives of Basotho. Thatho (2020) carried out a study that accessed the correlation between mobile money and financial inclusions in Lesotho. The study results indicate that of the three variables of mobile money only to connect with financial inclusion, that is, numbers of mobile money registered accounts and the volume of mobile money transactions.

When the above studies are keenly analyzed, they can be observed globally. The study by Frank (2010) at the NYSE was based on how mobile banking has influenced the commercial banks' financial performance. Siddik (2016) addressed the impact of online banking on banks output, while Fatima and Kiran's work focused on mobile money and bank performance in Pakistan. All these studies were carried out in another context different from Lesotho; they have concentrated majorly on one variable: mobile banking and financial performance of financial inclusions. Studies carried out within Lesotho include Thatho (2020), who examined the interactions between mobile money and financial inclusion, and Tsemane (2015), who also addresses the effectiveness of mobile money in bettering financial inclusion in Lesotho. It can be noted that the studies in the existing literature have focused on mobile money as financial technology, thus leaving other critical variables. This forms the knowledge gap that this study aims to fill by addressing other technology variables such as online banking, banking infrastructure, and mobile phones industry with economic growth and interest rate as the control variables.

1.3 Objective of the Study

The objective of this study was to examine the relationship between financial technology and financial inclusion by the financial institutions in Lesotho.

1.4 Value of the Study

The results obtained from this paper shall provide new knowledge to the available value of this study add to the literature that already exists on financial inclusion and technology in Lesotho. It will also inform policymakers and regulators in terms of sound financial decision-making.

This paper also has the goal of examining the role of financial technology in offering a long-term solution to the issue of financial inclusion. The study's findings may be of significant interest to scholars since they will better understand the way in which financial services are being offered in Lesotho. Additional other investigators may utilize the results or in their investigations or to identify areas for further research.

The importance of this research is that it will assist the management and workers of Lesotho banks in better understanding the implications of financial technology on financial inclusion. The experience was highly beneficial to these banks' decision-making in developing sustainable development strategies and running their daily operations. An understanding of the role banks play in the country's financial inclusion would help banks make better decisions that would improve the financial performance of the financial institutions.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Chapter two presents the different theories that address financial inclusion and financial technology. It also provides a review of the empirical studies on the effect of these technologies on financial inclusion. The lost section of the chapter summarizes the literature review and the knowledge gap.

2.2 Theoretical Framework

Quite a number of the study models have been applied to explain aspects that promote technology adoption in the banking sector. Some of these include the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Reasoned Actions (TRA), and Diffusion of Innovation Theory (IDT). This study shall be anchored on three major theories: TAM, UTAUT, and IDT.

2.2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) is among the most relevant dynamic and stable theories applied in interpreting consumer IT/is adoption. As reported by Davis, the perception of utility is the starting point for IT usage. Fred Davis propounded this theory during his doctoral dissertation in 1986. The theory is an improved form of the theory of reasonable action, which explains consumers' use of technologies. This theory argues that broad drivers of computer acceptability contribute to the interpretation of individual behavior across different end-user technologies and user demographics. The theory outlines two central beliefs, including Parcened Usefulness (PU) and Perceived Ease of Use (PEU), where PU has expressed as the potential users' subjective chance that using a

particular system will advance their actions. At the same time, PEU is the level to which the potential user anticipates the target system to be simpler to use (Davis, 1989).

TAM helps uncover specific flows in the society in Portera and Douthub's (2009) study, according to Durondo. (2016)-Despite the establishment of information usage, studies have shown that the old illiterate law-income earners are seeing a considerable loss concerning the younger better educated and high-income earners -TAM confirms that age education, wedges, and rate are linked to an opinion about the value of information and that beliefs can influence attitude towards and use of skills that aims to improve to access to information.

According to a study conducted in the United States by Kadlec in 2014, 75 percent of millennials would choose to use financial services from online platforms such as PayPal, Amazon, or Google order than a bank; one-third would be keen to change banks in 90 days, 53 percent are certain of all banks being similar, whereas 71 percent would preferably have dental surgery than cooperate with the bank. Product and service offerings have been revolutionized due to banks' changing consumer behavior and expectations. The usage of technology by a group of people who cannot envision a world in its absence is at the heart of this (Coetzee, 2018).

Jeong and Yoon (2013) look at the elements that influence m-banking uptake in Singapore. Five characteristics were discovered using the expanded TAM model. These features include utility, easy to use, reliable, self-efficacy, and economic cost, all perceived. According to their survey findings, these factors directly impact consumers' behavioral intent to use m-banking.

2.2.2 Innovation Diffusion Theory

The diffusion of innovation theory (IDT) was coined in 1962 by EM Rodgers. IDT was used first in communication to explain the development of ideas or products and how these are moved across a given population. The end effect of this dissemination holds that individuals assume a new thought or dimension of the social setup. Adoption involves deciding to put innovation to its full potential as the best course of action. According to Rogers, diffusion is shared over time among social system members through specified routes. The critical dimension of diffusion of innovations is highlighted as innovation, communication channels, time, and the social system (Sahin, 2006).

Wani and Ali (2015) note that an individual's attitude towards the notion lies in how it appears to that individual. Scholars hold that innovation does need to be neither new nor recent but rather a hold idea nor concept that users perceive as being unmistakeably utilized. For instance, smartphones can be viewed as innovation if they are brought into such a group of objects. Some may hold that smartphones are not innovations. Diffusion theory presents the study of changes in an opposed manner. This is so because it views change as primarily about the evolution if not reinvention of products as well as I behaviors better to fit the needs of individual groups under this theory, is perceived as the development through which an innovation is transferred to members of the social system overtime through specific media.

Perception at a personal level determines the extent of adoption. One may look at a telephone debit card as something similar to the wins it replaces. Communication media through which innovation spread such a mass media which allow quick awareness of new ideas, one on one communication with the near-peer about innovation is majorly needed

for most people to be convinced to adopt. Thus, the diffusion of innovation is presented essentially as a social process in which individuals are not swayed by a scientific assessment of invention but rather a typical evaluation of innovation-based subjectively on the experience of others with similar courses action (Rodger,1995).

2.2.3 Unified Theory of Acceptance and Use of Technology

Together with his research team, Venkatesh looked into the following eight technology acceptance theories in 2003. Theory of reasoned ACTRON (TRA), theory of planned behavior (TPB) technology acceptance model (tam), Tam And Tab were matched together to form (c-TAM-TPB), model of PC utilization (MPCU) innovation diffusion theory (IDT), motivate onal model of this study proposed a new approach known as the unified theory of acceptance and use of technology (UTAUT) to serve as a suitable form offering benefits from the unique features of technology.

The UTAUT presents four key indicators which have influenced behavior. These include age, gender, experience as well as voluntaries. Vacates further proposed that behavioral intention impacted the users to a greater extent without moderation effect assumed between purposes and use. As part of the conclusion, it was held that contrary to the money studies which hold previously been conducted, self-efficiency and anxiety had no direct impact on behavioral intentions; thus, that could be antecedents for one of the independent variables in the UTAUT model (abash nab & Pearson, 2007).

2.3 Determinants of Financial Inclusions

2.3.1 Financial Innovation

The concepts of financial innovation can be interpreted as advancement in financial technologies and systems. Users obtain more ownership and control over their financial well-being due to the financial services they offer (Bara, 2016). Black (2011) reports that the demand-side theory experiences financial market defects as the critical causes of new advances remarkably symmetric information, agency costs, and transaction costs. These flaws are perceived to promote a desire for solutions that give way for market actors to lessen their harmful impacts. Modern solutions to payments systems and instruments such as innovation to bring down transaction costs and new financing tools have been developed to enlarge the availability of funding sources and provide more flexibility in restructuring cash flows.

Financial innovation improves the penetration of financial products and services among those disadvantages economically. In addition, technological advancement has made accessible financial services and other products for individuals and corporate entities that might otherwise be disadvantaged financially. Through the provision of financial help, the credit market devilment, monetary policy transmission, and its operation framework has been enlarged globally since innovation improves the financial system efficiency. The critical role of innovation is perceived to be easing financial intermediation. Invention within the financial sector provides support to various other economic functions since they are simply incomplete financial market that majorly exists to respond to agency concerns (DAH, 2020).

Referring to the conceptual framework employed in identifying the determinants of financial inclusion, socio-economic characteristics, including income, literacy, and population, had a substantial relationship with the level of financial inclusions. Furthermore, physical infrastructure for communication and information has an extended connection to financial inclusion. Deposits and credits penetration was also found a perfect correlation with the sector. Finally, credit- deposit ratio as well as investment ratio was indicated as having no significant correlation with financial inclusion (Chith & Selvan, 2013).

2.3.2. Economic Growth Rate

According to the World Bank ranking, Lesotho is classified as a lower-middle-income country. In the past few years, the country's economic performance experienced a negative downturn due to sluggish global economic growth amid a significant downturn in the emerging and well-advanced economies. Much prolonged political instability accompanied by slow economic growth in the South Africa economy also led to the sluggish economic performance within the Kingdom of Lesotho to a greater extent. The growth rate observed in the real GDP stood at 1.2%, and 0.4% in 2018 and 2019, respectively, and more drop is anticipated due to the outbreak of the COVID-19 Pandemic (World Bank, 2021).

The unemployment rate has remained relatively high at 22.5%, as observed in 2019 with the regional imbalance and high poverty levels. The poverty rates within the Kingdom of Lesotho are estimated to have increased from 26.6% in 2019 to 29.4% in 2020, using the 81.9/person/day as the international poverty line. Furthermore, the COVID-19 related

lockdown measures have promoted negative shock on the labor market, resulting in job and income loss, especially in urban areas. (World Bank, 2021).

The growth trajectory of Lesotho and its recovery depend so much on the pandemic path in South Africa because the two countries have close economic ties with each other. The economy is anticipated to expand by 41% in 2021 and 4.4% in 2022 as a result of the mining as well as construction related to the second phase of the Lesotho highlands water project. The inflation rate is estimated to decline to 4.9% in 2021 and 4.8% in 2020 due to the subdued demand promoted by the second pandemic wave in S.A. The total public debt is estimated to go up to 62.8% of the GDP in 2021 due to the pandemic, which breaches the SADC convergence criterion of 60% of the GDP (AED, 2021).

2.3.3. Interest Rates

The benchmark interest rate for the Central Bank of Lesotho was held at 3.5% during the November 2020 meeting. This was to ensure that the impact of the cut which was made before flowed through the economy. According to the Central Bank's Committee, the domestic economy was projected to contract by 6% in 2020 due to the economic fallout of the COVID-19 outbreak. The economy was projected to gradually recover then get back to its growth path at an average rate of 4.33% over the 2021/2022 period on the back of a rebound in mining and construction and broad-based recovery as containment measures of the COVID-19 Pandemic take root. In the year 2020 average inflation rate was recorded at 5% before the increase to 5.2% in 2021, and it is anticipated to rise to 5.3% in 2022. (World Bank, 2021).

The monetary policy committee (MPC) in Lesotho established the benchmark for interest rates. Since 2015 the Central Bank policy rate was selected as the official interest rate; this

replaced the 91 days Treasury bill (TB) rate. In the September 2020 MPC meeting, the benchmark interest rate was cut by 275 basis points for six months, aiming to mitigate the effects of COVID-19 shock and maintain macroeconomic stability. According to the policymakers, economic recovery in Lesotho is estimated to gradually occur between 2021 and 2022, while the inflation rate is projected to stand at 5.2% in 2021 and 5.3% in 2022. (World Bank, 2021).

2.4. Empirical Literature Review

Frank (2010) conducted a study to investigate the effect of mobile banking on the financial output of the firm quoted at the (NYSE) between the years 2001 and 2008. The study used the secondary data of the listed firms that had adopted mobile banking, and the study used SPSS software in data analysis for the sample of 25 entities that were selected. The study computed and analyzed the financial performance ratio. The findings showed that commercial banks' financial performance at NYSE improved after adopting mobile banking.

Fatima and Kiran (2011) assessed how mobile banking had impacted the performance of commercial banks in Pakistan from 2000 to 2010. The study sampled 20 banks and collected secondary data from the annual published financial reports, analyzed using the SPSS software. The study also computed financial rations and analyzed them. The study findings indicated that commercial banks' financial performance in Pakistan improved after launching mobile tanking.

Ene et al. (2019) examined the impact of online banking on financial inclusion in Nigeria using an annual series from 2008 to 2017. The authors also utilized a multiple regression analysis and two proxies for online banking – the number of automated teller machines

(ATMs) and point-of-sale (POS) machines. They found that the number of ATMs and POS positively impacted financial inclusion. However, the relationship between ATMs and financial inclusion was insignificant. They recommend improving ATMs services to meet international standards and increase the number of POS machines and locations.

Iqbal and Sami (2017) studied the starring role commercial plays in terms of financial inclusion in India from 2007 to 2013. Like Ene et al. (2019), they used an annual time series and a multiple regression analysis. The empirical findings show that the number of bank branches and credit deposit ratio on GDP positively impacted financial inclusion. On the contrary, it was established that ATMs' growth had an insignificant influence on the economy.

In a more recent study, Nyimbiri (2021) used multiple regression and correlation analyses to assess how financial technology, especially mobile money, has impacted financial inclusion in 15 Sub-Saharan African countries. The study found a direct relationship between the number of registered mobile money users and financial inclusion using secondary panel data. ATM banking and GDP per capita as an income indicator positively influence financial inclusion. However, the GDP per capita relationship is not significant. Lenka and Barik (2018) studied how the growth of mobile money and internet use impacts financial inclusion in Asian Association for Regional Cooperation nations. A financial inclusion index was constructed by the researcher using the principal component analysis. They also used panel data from 2004 to 2014 and three separate empirical approaches. The results show that financial inclusion is directly influenced by mobile phone growth and internet usage. In addition, income and unemployment have direct and inverse impacts on financial inclusion.

Siddik (2016) carried out a study to determine how electronic banking (e-banking) influenced the performance of commercial banks in Bangladesh. The study applied a purposive sampling technique where 25 banks were used. The study used questionnaires in obtaining data there were made available to the respective bank's head office or MIS department through personal visits to determine when e-banking was adopted and its influence on bank performance. Only 13 out of the 25 banks responded to give a response rate of 52% that was considered sufficient in achieving the study's objectives. According to the findings, e-banking positively influences bank performance in Bangladesh, as shown by ROE over a while.

Shihadeh (2018) carried out a study focusing on determining whether Jordanian tanks could make more earnings by improving their financial inclusion. The study obtained data from banks, which was received from 2009 to 2014. The researcher utilized gross income and ROA as bank performance ratios. At the same time, SME, number of deposits and credits, ATMs, ATM services, and credit cards formed the predictor variables of the study. The study's findings indicated that banks stand to earn more and improve their performance when financial inclusion is improved. The study further notes that financial inclusion initiatives impact the country's economic progress.

Aduda and Kalunda (2012) investigated the role of financial inclusion and financial sector stability in the financial performance of banks in Kenya. They reported that financial inclusion intervention needs to be maintained and so do the varieties of goods that make up financial inclusion to be recognized and made available. This was recommended because access and usage are distinct from each other. Thus, proper financial inclusion measures involve both access and use to be implemented. The study suggests that the

government should take up the role and be appropriately circumscribed. It has been demonstrated that excessive government action can cause more harm than good, thus incorporating appropriate items in proper banking models.

Abel (2018) analyzed the factors determining financial inclusion in Zimbabwe by adopting a logit approach. The study's findings indicate a link between age and financial inclusion. The study holds that financial inclusion increases within an increase in age until a certain point where further increase in age causes a decrease in financial inclusion. In addition, the findings of the study point out that education has a vital role in explaining Zimbabwe's financial inclusion. It is reported that educated members of society are better placed in comprehending the many available financial products. They also make informed choices, thus increasing their access to them.

Hemmen (2019) studies how financial and Fintech Innovation drivers impact women in the region still undergoing development. The study supported the finding that technological, legislative accessibility impacts genders empowerment motivations. The study also examined how worth and significant regional's culture and social norms are to variables such as technology and female empowerment.

The study's findings further present the reciprocity of the various variables and how changes in one influence another. This link is vital for women's financial inclusion in emerging regions through fintech innovation. The study recommends addressing the legislation to facilitate creation, thus paving the way for Fintech to boost financial inclusion in developing areas and countries. Unbanked women were projected to receive digital financing even in remote areas due to the development of technology infrastructure and access to digital devices such as phones. This can enhance accessibility where women in

poor regions overcome the inadequacy of collateral, credit history, and formal identity needed to acquire financial assistance.

Tsemane (2015) researched the effectiveness of mobile money in improving financial inclusion in Lesotho. The study adopted non-probability convenience sampling to draw the sample from the general population. The study experienced time limitations during data collection; thus, convenience sampling was chosen to be suitable. The study adopted questionnaires in collecting data distributed to mobile money users in both high and lowlands. The study established that mobile money was gradually becoming an everyday popular in Basotho. It was also found that significantly large sums of money were exchanged over the platform than was anticipated indicating that the population was utilizing the service for both significant and small financial transactions. In addition to payments of bills, it was discovered that a substantial fraction of mobile money users used it to obtain food, which forms a critical component of Basotho's daily existence.

2.5 Conceptual Framework

The conceptual framework talks about the design that best explains the topic. It is a pictorial illustration of the association between the dependent and independent variables of the study. The dependent variable is financial inclusion, while independent variables include mobile money transfer, online banking, banking infrastructure, and ATM Banking, as displayed in figure 2.1.

Figure 2.1: Conceptual Framework

Independent Variables

```
┌─────────────────────────────────┐
│ Mobile Money Transfer           │
│   •  Total mobile money         │──────────┐
│      transactions               │          │
└─────────────────────────────────┘          ▼        Dependent Variables
┌─────────────────────────────────┐       ┌──────────────────────────────┐
│ Online Banking                  │       │ Financial Inclusion          │
│   •  Total online banking       │──────▶│   •  Number of deposit       │
│      transactions               │       │      accounts with           │
└─────────────────────────────────┘       │      commercial banks        │
┌─────────────────────────────────┐       └──────────────────────────────┘
│ Banking Infrastructure          │                    ▲
│   •  Banking branches           │──────▶
│                                 │
└─────────────────────────────────┘          ┌──────────────────┐  ┌──────────────┐
┌─────────────────────────────────┐          │ Economic Growth  │  │ Interest Rate│
│ ATM Banking                     │          └──────────────────┘  └──────────────┘
│   •  Number of ATMs             │──────▶
└─────────────────────────────────┘                 Control Variables
```
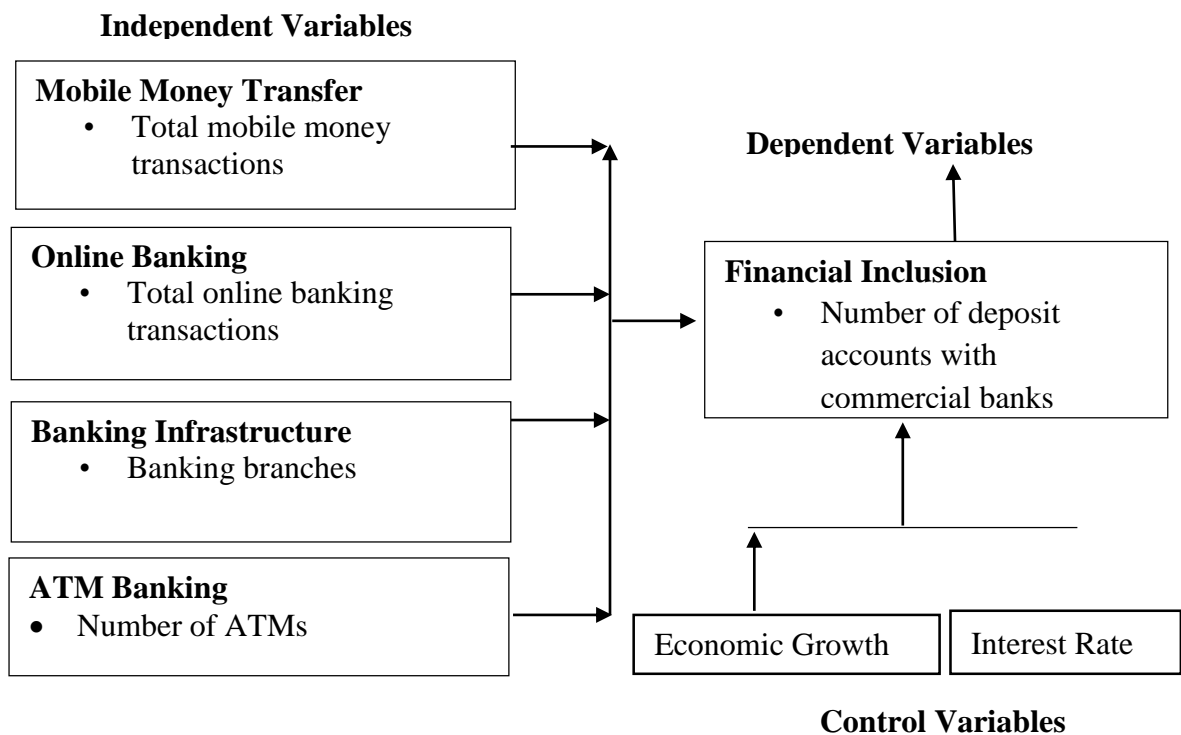
2.6 Conclusion

Financial technology represents the potential of widespread advantages to communities
and societies in general, as well as to the country's unbanked and under-banked population.
To integrate more unbanked consumers into the banked sector through FinTech and reduce
financial exclusion, a concerted effort including governments, non-governmental
institutions, and mobile network operators are crucial. This has the latent to grow markets
and other businesses, as well as create jobs and, as a result, build a large middle class.
These online-based operators are replacing traditional banking activities such as
intermediation. In this new financial technology-driven world, transactions just happen
without including the third party. Some of these new players do not even have a physical

address. This will lead to a reduction in banks' branches because the services provided by the banking branches can be obtained online through internet banking. Activities such as transferring money, paying bills, depositing, and banking statements can now be obtained online without visiting the bank. This also increases risks faced by banks, and they have to ensure that customers' information is safe at all times.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, a report of the methodology used to meet the research objectives is presented. It highlights the sample design, data analysis, etc.

3.2 Research Design

The study was carried out in the Kingdom of Lesotho, a country with highlands and lowlands. A research design summarizes a researcher's techniques to acquire, analyze, and interpret study data. It refers to a research effort's strategy, design, and structure. A research design is significant because it directs a researcher's procedures and decisions during a study and establishes the logic to evaluate the research findings (Creswell & Clark, 2007).

Exploratory studies, descriptive studies, and casual studies are the three categories of studies. Each one is designed for a given type of research. In this investigation, a descriptive study was used. This decision to use a descriptive study allows for the collection of valuable data that can disclose much information about FinTech and Financial Inclusion in Lesotho. Descriptive survey research is a type of study that aims to reveal the current state of the studied units. It summarizes the research units without attempting to modify the data generated by the research units. This type of design is utilized to acquire information on a phenomenon's current status (Cooper & Schindler, 2012). The decision to use a descriptive survey design enabled the investigator to generalize the study's result to the larger target population.

Clearly stated research topics or assumptions typically define a descriptive study. In addition to their explicitly stated objectives and hypotheses, such investigations include a correlation component, which checks if one of the several variables correlates with other factors (Tsemane, 2015).

3.3 Population of The Study

Any conclusions drawn from a sample are limited to the specific population from which the sample was taken. This group is the target demographic (Cooper & Schindler, 2012). A population is the sum of all the components of a study (Blumberg et al., 2008, p. 228). The focus of this study was on the selected financial institutions, with quaretly data on FinTech, FI, and selected macroeconomic variables being collected. The financial institutions, which consisted of four commercial banks and the eight selected MFIs, were the unit of analysis. The study utilized the quarterly data on financial institutions from 2012 to 2020.

3.4 Sample Design

Cooper & Schindler (2012) states that a sample represents a subset of the target population. Therefore, the subset should be carefully chosen to reflect that group accurately. Since the data utilized is time-series, it was attracted from the World Development Indicator and Central Bank of Lesotho to ensure it captures the entire financial sector and reflect the financial institutions that provide the FinTech services (Mobile Money, Online Banking, Banking Infrastructure, and Mobile Phone Industry) examined in the study.

3.5 Data Collection

Data collection can be interpreted as the procedure for acquiring and evaluating pieces of ideas on factors of interest under a given study. All study sectors rely on data collection to acquire relevant factors necessary to the study's objectives. Any data collection efforts aim to obtain high-quality facts to provide the evidence required to be converted into rich data analysis and relied upon to construct a convincing response to the questions under investigation. (Kabir, 2016)

The study utilized secondary data as it is easily accessible. The data on mobile money transfer, banking infrastructure, ATM banking, and online banking was collected from the Central Bank of Lesotho. At the same time, economic growth and interest rates were taken from the World Bank. Moreover, financial technology and financial inclusion data were gathered from the CBL annual operating and account supervisor reports and LCA annual reports.

3.6 Data Analysis

The data was processed for cleaning, transformed, and modeled to obtain insightful information for inferences to meet the study's objective. First, a descriptive analysis was conducted using EViews 12 Statistical package to explain and table the basic features of the data. The study looked at both measures of tendency and variability. Next, correlation and regression analyses were done to determine how financial technology such as online and internet banking and mobile money influences financial inclusion in Lesotho. Regression was used mainly to test for causality.

3.6.1 Diagnostic Test

Several diagnostic tests were carried out in this study to determine the validity and reliability of the study model, namely the normality test, autocorrelation test, multicollinearity test, and homogeneity test. The normality test is a vital step to determine the measures of central tendency. Data not normally distributed have a mean value that does not represent the study's data. Because of this, the researcher first tests the data for normality and then decides whether the mean can be used as a representative value of the data. The test for normality will be done using Kolmogorov–Smirnov test. When a given time series is compared to a lagged version, the autocorrelation reveals the degree of similarity. The autocorrelation is calculated when a variable's current and past values are compared. This can be done using the Durbin– Watson d test to see if there's any autocorrelation in a regression model's errors (Baum & Schaffer, 2013).

Multicollinearity, also called near-linear dependence, is when there is a high intercorrelation of two or more predictor variables. If predictor variables do not have a linear relationship, they are orthogonal. Relying solely on the correlation between predictors has challenges because the small or large correlation value is subjective and depends on the individual as well as the field of research. For this reason, the research used some indicators called variance inflation factors (VIF) to test for multicollinearity. The Variance Inflation Factor (VIF) is a method for measuring and quantifying how much variance is inflated (Daoud, 2017). In cross-section data, heteroscedasticity, or unequal variance, is common. The presence of heteroscedasticity could be due to many factors: Outliers in the data increase or decrease the error variance. Second, heteroscedasticity is a problem that frequently develops when the scale of a variable changes significantly within

a sample. The heteroscedasticity test that will be applied is the breusch-pagan test (B-P); the B-P test assumes a regularly distributed error term to determine the consistency of the variables across the observations (Carapeto & Holt, 2003).

3.6.2 Analytical Model

The regression equation will be determined as follows: $Y_t = (\beta_{0t} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6t} + \varepsilon_t)$

Table 3.1: Variable Measurement

	Meaning	Measurement
Y	Financial Inclusion	Deposit accounts with commercial banks.
X1	Mobile Money Transfer	This is measured using the total number of mobile money transactions.
X2	Online Banking	Measured by online banking transactions every quarter
X3	Banking Infrastructure	This is measured using the total number of branches for every institution
X4	ATM banking	Number of ATMs measured by the total number of ATMs for every institution
X5	Economic Growth	GDP growth rate
X_6	Interest Rates	Lending interest rate adjusted for inflation.
ε	Error term	
β	Regression coefficient	
t	Period	

3.6.3 Test of Significance

The statistical significance of the study was determined using the t-test, which examines the differences between two participant groups. It supposes the null hypothesis and the means of the two groups are equivalent. The value of the mean assumed will form the expected value of which data is compared against, and F-tests are statistical tests that compare the ratio of two variances under a null hypothesis using the F distribution. It's used to compare statistical models that have been fit to a data collection to find the models that best suit the population from the sampling data. The F test was used to confirm the overall importance of the entire model, while the t text will also be used to test the significance of coefficients at the value of regression coefficients level of 5%

CHAPTER FOUR: DATA ANALYSIS, FINDINGS, AND INTERPRETATIONS

4.1 Introduction

Chapter four explains descriptive analysis, diagnostic test results, and empirical results, including correlation and regression analyses, which are presented in tables. This chapter also covers the interpretation of coefficient of determination and ANOVA, discussion of results, etc.

4.2 Descriptive Analysis

Time series data have some unique features that are quickly reviewed when summarized. A quantitative summary was done to explain the essential characteristics of the data. The measure of central tendency–mean and the measures of variability, including the variance, standard deviation, kurtosis, and skewness, are reported in Table 4.1

Table 4.1: Descriptive Statistics

Variable	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Obs.
Financial Inclusion (log of total accounts with commercial bank in Maloti)	13.24	13.47	12.96	0.16	-0.26	1.63	36
Mobile Money Transfer (log of total mobile money transactions in Maloti)	14.4	14.68	13.95	0.21	-0.58	2.37	36
Online Banking (log of total value of online and internet banking transactions in Maloti)	11.56	12.75	10.31	0.55	0.08	3.22	36
Banking Infrastructure (log of sum of bank branches)	3.85	4.01	3.69	0.08	-0.71	2.79	36
ATM banking (log of total number of ATMs)	5.25	5.35	4.8	0.15	-2.2	6.58	36
Economic Growth (percentage change)	2.31	2.54	2	0.12	-0.38	2.98	36

Interest Rate (Real interest rate (%))	4.59	11.91	-3.24	4.39	-0.2	1.88	36

From table 4.1, the sum of observations for each variable is 36, a figure that is not large but within the minimum required observations for a quarterly analysis as proposed by Friedman (1962) and Ahmad (1988). In addition, the data shows a high level of reliability, given that the mean values are halfway between the highest and smallest values. For instance, financial inclusion has values between 12.96 and 13.47, with an average of 13.24. This implies that the importance of this variable is closer to the mean, which is a good measure of the central tendency of the data.

The total mobile money transfers range from 13.95 to 14.68, whereas online banking lies between 10.31and 12.75. The number of ATM banking recorded its highest values of 5.35 in the first and second quarter of 2020, while banking infrastructure had its maximum value of 4.01 in the first quarter of 2020. This resulted from commercial banks' strategy to improve financial inclusion through digital financial services in Lesotho.

Mobile money transfer has a standard deviation of 0.21, closer to its mean of 13.24. Online banking has the lowest and highest standard deviations of 0.08. All the variables have values that are close to their respective mean. The values of interest rates are widely spread out. All the variables are negatively skewed apart from online banking; thus, each variable value is concentrated on the left side of the distribution. A skewness of 0.08 suggests the mean of online banking is larger than the median, and the data points are more bent towards the right side of its distribution. Internet and ATM banking have kurtoses that are above 3. Hence, the tails of their distributions are heavier, unlike the rest of the variables.

4.3 Pearson Correlation Analysis

The Pearson's correlation coefficient measured the linear associations between the dependent variable and each independent variable. This approach is widely known because it is based on covariance. It provides details about both the degree and direction of a relationship. A perfect correlation exists when the coefficient is close to +1 or -1, whereas no correlation is present when the coefficient is 0. Strong correlation ranges from +0.50 or -0.50 and +1 or -1 while medium correlation is between +0.30 or -0.30 and +0.49 and -0.49. The degree of correlation is considered weak when the coefficient lies below +0.29 or -0.29. Table 4. 2 presents the result of the analysis.

Table 4.2 Pearson Correlation Coefficient

	Financial Inclusion	Mobile Money Transfer	Online Banking	Banking Infrastructure	ATM banking	Economic Growth	Interest Rate
Financial Inclusion	1.00						
Mobile Money Transfer	0.32*	1.00					
Online Banking	0.85***	0.28*	1.00				
Banking Infrastructure	0.92***	0.53***	0.91***	1.00			
ATM banking	0.43***	-0.17	0.19	0.21	1.00		
Economic Growth	-0.78***	-0.31*	-0.85***	-0.82***	-0.36**	1.00	
Interest Rate	0.47***	0.01	0.30*	0.33*	0.67	-0.46***	1.00

*, **, and *** signifies 10%, 5% and 1% significant levels

Table 4.2 shows that mobile money transfers, online banking, ATM banking, banking infrastructure, and interest rate positively influenced financial inclusion. Economic growth, proxied by the GDP growth rate, negatively correlates with financial inclusion. In addition, all variables have a statistically significant association with financial inclusion.

A coefficient of 0.32 indicates a moderate association between financial inclusion and mobile money transfer. This relationship is statistically significant at a 1 percent level. There is a strong positive relationship between financial inclusion and online banking, as evident by a coefficient of 0.85. This relationship is statistically significant at a 1 percent level. Increased online banking by 1 percent will trigger a rise in financial inclusion by 85 percent. Bank infrastructure and financial inclusion have a coefficient of 0.92, which indicates a strong positive relationship that is statistically at a 1 percent level. As bank infrastructure grows by a percent, financial inclusion increases by 92 percent.

A moderate positive significant relationship exists between ATM banking and financial inclusion. When there is a rise in ATM banking by 1 percent, financial inclusion increases by 41.3 percent. Economic growth and financial inclusion are negatively correlated, as shown by a coefficient of -0.78. The relationship is strong and statistically significant at a 1 percent level. An increase in economic growth by 1 percent will lead to a decrease in financial inclusion by 78 percent. As for interest rate, it is positively associated with financial inclusion. The relationship between online banking and banking infrastructure is strong and significant at 1 percent.

4.4 Diagnostic Tests

To ascertain that the estimates meet the regression assumptions, which is a pre-condition that the results are reliable, the researcher carried out several diagnostic tests. The results of these tests are reported in the sub-section as follows.

4.4.1 Multiple Collinearity Test Result

High intercorrelations among two or more independent variables in time series analysis lead to misleading results. The centered Variance Inflation Factor (VIF) investigated whether a high linear dependency exists among the independent variables. According to Hair et al. (1995), a VIF less than 10 is acceptable. Table 4.3 provides the test result.

Table 4.3: Test for Multicollinearity Result

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
Constant	1.26	19410.36	NA
Mobile Money Transfer	0.00	7444.52	1.60
Banking Infrastructure	0.04	8858.97	4.18
ATM banking	0.01	2649.56	1.99
Economic Growth	0.00	4.31	2.03
Interest Rate	0.02	1350.65	3.80

Inclusion of all the variables in the model results in high intercorrelation between mobile money transfer and online banking. As a result, online banking was dropped from the model, which results in table 4.3. As shown, all the independent variables centered VIF is below 5. The study concludes that the independent variables are not highly intercorrelated.

4.4.2 Test for Normality

To establish that the sample has been taken from a normally distributed population, the Jarque-Bera test for residual diagnostic was utilized. The test result is reported in table 4.4.

Table 4.4: Normality Test Result

Test	Test Statistic	P-value	Null Hypothesis	Inference
Jarque-Bera	9.68	0.01	Normal	Reject the null hypothesis

The test results show test statistics and a P-value of 9.679 and 0.01, respectively. The p-value is below the 5 percent level, as indicated by table 4.4. Therefore, the residual is not normally distributed. However, when the normality assumption does not hold, and other assumptions are valid, the estimates of the regression are still reliable (Wooldridge, 2012)

4.4.3 Test for Autocorrelation

An essential assumption of the linear regression is no relationship between the error term. A correlated error term leads to biased model estimates or incorrect error variance. The Bruesch-Godfrey LM test was used to examine the model for autocorrelation. Table 4.5 shows the test result.

Table 4.5: Autocorrelation Test Result

Test	Test Statistic	P-value	Null Hypothesis	Inference
Breusch-Godfrey Serial Correlation LM Test	6.98	0.07	No Autocorrelation	Fail to reject the null hypothesis

The P-value of the Chi-Square is 0.07 and higher than the 5 percent level; thus, we fail to reject the null hypothesis. The residual of the model is not autocorrelated.

4.4.4 Test for Heteroscedasticity

When the variance of the residual is different, the estimates of the model remain unbiased, but there is a considerable chance that hypothesis testing will be wrong. The study used the autoregressive conditional heteroscedastic (ARCH) test. The test result is shown below.

Table 4.6: Heteroscedasticity Test Results

Test	Test Statistic	P-value	Null Hypothesis	Inference
ARCH Test	0.33	0.85	Constant Variance	Fail to reject the null hypothesis

Since the probability value of the Chi-Square is 0.85, the study concludes that the model has constant variance.

4.5 Regression Analysis

Even though correlation and regression analyses quantify the strength and direction of the association between two variables, the correlation has some shortcomings. For instance, it does not establish cause and effect and prediction and optimization. With that in mind, a Log-Log multiple regression analysis was adopted to investigate how mobile money transfer, ATM banking, Interest rate, and the rest influence financial inclusion. The use of natural logs on both sides of the equation was done to ensure linearity in the parameter estimates.

4.5.1 Coefficient of Determination

Table 4.7 shows the coefficient of determination denoted by R-Squared. The table also includes the Adjusted R-Squared. An R-Squared of 0.92 implies that whenever there is a variation in financial inclusion, the independent variables are responsible for 92 percent of the changes. The Adjusted R-Squared of 0.91 means 91percent of the changes in financial inclusion is explained by the significant independent variables.

Table 4.7: Coefficient of Determination

Model Summary				
Model	R-Squared	Adjusted R-Squared	S.E of Regression	Sum squared resid
1	0.92	0.91	0.05	0.07

4.**5.2 Analysis of Variance (ANOVA)**

The ANOVA was generated to test the overall significance of the model. The estimated model has an F-statistic and p-value of 70.76 and 0.00. This means the null hypothesis that all coefficients are statistically equivalent to zero is rejected. As such, the study concludes that mobile money transfer, online banking, ATM banking, etc., jointly determined financial inclusion in Lesotho for the study period. Table 4.8 presents the result of the analysis.

Table 4.8: ANOVA Results

ANOVA				
	Log-likelihood	**F-statistics**	**Prob(F-statistic)**	**Durbin-Watson stat**
Model	61.31	70.76	0.00	1.22

4.5.3 Regression Coefficients Results

Since the empirical model meets all the assumptions of the classical linear regression, an interpretation of the coefficients was made. Coefficients of a log-log regression are interpreted as elasticities. The interpretations will provide a foundation for the discussion of results. Table 4.9 shows the coefficients, standard errors, and p-values.

Table 4.9: Coefficients of Regression

Dependent Variable: **Financial Inclusion**				
Method: **Least Squares**				
Sample: **2012Q1 2020Q4**				
Included observations: **36**				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**

Constant	5.56	1.12	4.96	0.00***
Mobile Money Transfer	-0.12	0.05	-2.52	0.02**
Banking Infrastructure	2.01	0.20	10.25	0.00***
ATM banking	0.23	0.08	2.88	0.01***
Economic Growth	0.002	0.00	0.74	0.46
Interest Rate	0.20	0.13	1.58	0.12

** and *** denote 5% and 1% significant levels

Financial Inclusion = 5.56 − 0.12Mobile Money Transfer +2.01Bank Infrastructure + 0.23 ATM Banking + 0.002Economic Growth + 0.201 Interest Rate

The constant term has a value of 5.56 which means the average financial inclusion is 5.56 when mobile money transfer, online banking, ATM banking, banking infrastructure, economic growth, and interest rate are equivalent to zero. It is also significant at a 1 percent level, as shown by a probability value of 0.001.

An elasticity of -0.12 for mobile money transfer is statistically significant at a 5 percent level. Increasing mobile money transfer by 1 percent will alter a fall in financial inclusion by 12 percent in Lesotho.

Unlike total mobile money transfer, bank infrastructure has an elasticity of 2.01 and a p-value of 0.000. This implies a direct relationship between financial inclusion and bank infrastructure for the study period. In other words, as commercial banks establish additional branches, it significantly increases financial inclusion in the Kingdom of Lesotho.

The elasticity of ATM Banking is 0.23, which shows a positive relationship between ATM banking and financial inclusion at a 1 percent significant level. An increase in bank banking by a percent will trigger a rise in financial inclusion by 23 percent. Put differently,

whenever the value in ATM transactions increases by a percent, it increases financial inclusion.

Similar to ATM Banking, Economic growth has an elasticity of 0.002 and is not statistically significant. Quite the same for interest rate elasticity. It has a positive relationship with financial inclusion, which is not significant.

4.6 Discussion of Results

This study was conducted to determine the relationship between financial technology and financial inclusion in Lesotho. Financial inclusion measured by deposit account with commercial banks is the response variable, whereas financial technology is measured by three explanatory variables, mobile money transfers, ATM banking, and banking infrastructure. Two control variables, economic growth and interest rate, were included in the study.

Based on the correlation analysis, the study concludes that financial inclusion has a positive relationship with mobile money which supports the work of Tsemane (2015) and Nyimbiri (2021). They found a positive and significant relationship between the two variables. Contrasting to mobile money transfer, online banking has a significant positive relationship with financial inclusion. Although the methods used by Ene et al. (2019) are different, this result is the same as his work on the impact of online banking in Nigeria. In addition, banking infrastructure, which is proxied by the number of banks' branches, and ATM banking have positive implications for financial inclusion. The bank infrastructure result aligned with Iqbal and Sami (2017), while the ATM banking result supports the study of Nyimbiri (2021).

Given the limitations of correlation analysis, a multiple regression analysis was conducted to determine causality. Following the empirical findings, the study concludes that mobile money transfer has negatively impacted financial inclusion in Lesotho as financial technology. Its impact is statistically significant. This finding disputes the work of Tsemane (2015) and Nyimbiri (2021), whose findings indicate a positive and meaningful relationship. While it is true that mobile money creates ease in the transaction, many rural communities with little or no education about the platform are still skeptical about using this medium to avoid theft.

Banking infrastructure has a positive and significant impact on financial inclusion in Lesotho. In other words, these two indicators move in the same direction. An increase in banking infrastructure will alter a rise in financial inclusion. The empirical finding is the result of Iqbal and Sami (2017). Growth in the number of banks or banking infrastructure increases access of far-reached communities to banking activities. It also creates higher diversification of deposits and assets for the branch banking system.

ATM banking positively affects financial inclusion, and its impact is statistically significant. This finding agrees with Nyimbiri (2021), whose works found that financial inclusion is positively influenced by ATM banking. The conclusion can be a result of the fact that ATMs are convenient. ATMs allow fast transactions like deposits, cash withdrawals, payment of bills, and funds transfer from one account to another. It can also be used to check account balances. As a result, the usage of this financial technology has increased over the past period in Lesotho.

Economic growth has positively impacted financial inclusion in Lesotho, especially in the commercial banking industry. The results of economic growth, which is measured by economic activity, agree with the finding of Lenka and Barik (2018) and Nyimbiri (2021). Unlike these studies, the empirical result is not significant. The findings on interest rates are also insignificant.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

A brief summary of the study is provided in chapter five to give a detailed account of the main points underlined. This chapter also captures the conclusion, recommendations, and provide areas for further research.

5.2 Summary

This research aims to establish the relationship between financial technology and financial inclusion in Lesotho. Financial technology was measured by several indicators–mobile money transfer, online banking, ATM banking, and bank infrastructure to confirm this relationship. The study included two essential control variables: economic growth and interest rate.

The study is anchored on four main theories; Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Reasoned Actions (TRA), and Diffusion of Innovation Theory (IDT). TAM explains how people accept technological tools because these tools are vital and easy to use, while the UTAUT combines eight theories aimed at individuals' intentions. TRA discusses the association between attitude and behavior, and IDT describe how, why, and the speed at which individuals accept new ideas and the spread of technology.

A descriptive research design and a secondary quarterly series from the World Development Indicators and the Central Bank of Lesotho were utilized. These data were

collected from commercial banking institutions operating in Lesotho for a 9 years, starting in 2012. Both descriptive and inference analyses were conducted for analysis purposes. The descriptive consisted of the mean, standard deviation, skewness, and kurtosis analysis. Inference analyses consisted of correlation and regression.

Before analyzing the data, several tests were done to ascertain that the results were trustworthy for policy recommendations. The test for multi-collinearity indicates the linear dependency between the explanatory variables is not high, autocorrelation and heteroscedasticity tests results prove the error terms are not autocorrelated, and the variance is constant. A normality test was also conducted on the residual of the estimated model. The study concludes that the residuals does not follow a normal distribution based on the findings. However, this can be allowed, especially when other tests are valid.

From the descriptive analysis, findings show that the mean values of the variables are midway between the highest and lowest values. This implies a good measure of the central tendency of the dataset. It also shows a unique level of consistency of the dataset, making it suitable for analysis.

The Pearson correlation indicates mobile money transfer, banking infrastructure, online banking, ATM banking, and interest rate positively associated with financial inclusion. In contrast, economic growth is negatively related to financial inclusion. All these variables have a statistically significant relationship with financial inclusion. Using regression analysis, the study found that all measures of financial technology positively impacted financial inclusion except mobile money transfers. These measures were all significant at 1 and 15 percent levels, respectively.

5.3 Conclusion

The study results show that financial technology such as mobile money, online banking, and ATM banking significantly impacts offering banking and financial services. Despite the perceived role of these technological instruments, some are not necessarily enhancing financial inclusion. It can be established that the negative impacts of mobile money transfer on financial inclusion in Lesotho mean the adoption of this tool by financial institutions is for cost reduction and profit maximization. These institutions see mobile money as a means of operation cost reduction especially in remote areas where the formation of new branches is associated with a huge cost. Little attention is given to educating the people, especially the rural population on the benefits and risks of using this technology.

Even though some financial technology reduces financial inclusion, banking infrastructure has a direct and significant effect on financial inclusion in Lesotho. Access to more bank branches ensures a meaning percent of the population has access to financial services. It reduces the longer commuting time and high transport cost, especially for those remote communities where access to financial service is limited.

The study also concludes that ATMs banking increases financial inclusion because many institutions, especially banks, consider ATMs vital to retail banking. ATMs allow for fewer human tellers, and they can be available all day. Customers can also do banking activities 24 hours by becoming their tellers, considering the limited banking hours. This increases customer satisfaction, but it also reduces the cost of regularly visiting the banks.

5.4 Recommendations

Following the findings and conclusion, some recommendations are given as follows:

Commercial banks should increase their branches, especially in remote areas with limited financial or banking services access. This should be followed by promoting the opening of deposits accounts. It will lead to growth in the number of depositors as well as the quantity of deposit and withdrawal transactions.

The study further recommends that regulatory authorities such as the Central Bank of Lesotho (CBL) increase the number of licensed microfinance institutes to enhance the delivery of financial services in areas with limited or no accessibility.

The government should create and fund programs that boost liable financial innovations. This will aid in the transition from a traditional to a modern banking system. The CBL should also improve onsite and offsite examinations to ensure institutions are not using financial technology for higher gain.

Lastly, the study recommends the need to better understand those that lack access to financial services. This is crucial for crafting of policies and ensuring financial products and services are aligned with the needs of these individuals. At the heart of this should be the promotion of increasing the number of ATMs to ensure that people have access to banking services at any time of the day.

5.5 Limitations of the Study

The study makes use of secondary data that was sourced from the Central Bank of Lesotho and the World Bank. Although some scrutiny was done, data accuracy is not certain because there is a likelihood that the data is not free from bias and error since it was taken from financial institutions on a quarterly basis.

This work focus on three measures of financial technology. Other measures such as Agency banking, which ensures banks offer branchless services at a low cost, were not included, especially in rural communities through a network of agents and merchants.

Online banking had some missing values from 2010 to 2011. As a result, the duration of the study was changed from 2010-2020 to 2012-2020, thus reducing the number of observations.

Available data was for nine years. The lack of data for trend analysis over a longer duration allowed data values influenced by disasters such as COVID-19 to skew the data and therefore not provide an accurate representation of the overall trend.

5.6 Suggestions for Further Research

Further research can be conducted using the variables for a more extended period given most of the technology emerged a few years back. Moreover, data could be collected regularly for a prolonged time with additional variables to allow a more detailed analysis.

This project used secondary data to study the effect of financial technology and financial inclusion in Lesotho; further research must be carried out, which will also use primary data collected using questionnaires or interviews to broaden the context to include various financial institutions' players in this study. Other measures of financial technology can be included in future studies.

Finally, a similar study can be done using primary and secondary data to give a clear vision of what influences financial inclusion in Lesotho. Also, preliminary data could be compared to secondary data and used to confirm the validity of current secondary data.

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APPENDICES

Appendix 1: Raw Data Collection Form

Quarter	Financial Inclusion (total accounts with commercial banks in Maloti)	Mobile Money Transfer (total mobile money transactions in Maloti)	Online Banking (total value of online and internet banking transactions in Maloti)	Banking Infrastructure (sum of bank branches)	ATM banking (total number of ATMs)	Economic Growth (percentage change)	Interest Rate (Real interest rate (%))
2012Q1	476793	1140514.25	31535	40	200	2.54	2.63
2012Q2	459364	1171127.5	37842	40	200	2.52	4.34
2012Q3	441934	1201740.75	44149	40	200	2.49	6.05
2012Q4	424505	1232354	50456	40	205	2.47	7.77
2013Q1	436979	1371839.25	57872.75	40	205	2.44	5.75
2013Q2	449453	1511324.5	65289.5	43	203	2.41	3.72
2013Q3	461926	1650809.75	72706.25	43	195	2.38	1.7
2013Q4	474400	1790295	80123	45	150	2.35	-0.33
2014Q1	478454	1877418.5	84178.5	45	121	2.38	-1.05
2014Q2	482508	1964542	88234	46	121	2.41	-1.78
2014Q3	486562	2051665.5	92289.5	46	140	2.44	-2.51
2014Q4	490616	2138789	96345	46	150	2.48	-3.24
2015Q1	510213	2139127	96845	47	180	2.41	-2.35
2015Q2	529811	2139465	97345	47	190	2.34	-1.45
2015Q3	549408	2139803	97845	47	190	2.27	-0.56
2015Q4	569005	2140141	98345	47	200	2.21	0.33
2016Q1	574278	2175835	98608.75	49	204	2.21	3.23
2016Q2	579551	2211529	98872.5	49	204	2.21	6.12
2016Q3	584824	2247223	99136.25	49	203	2.22	9.01
2016Q4	590097	2282917	99400	49	203	2.22	11.91
2017Q1	597605	2307388.75	101650	49	203	2.25	11.27
2017Q2	605113	2331860.5	103900	49	204	2.29	10.64
2017Q3	612621	2356332.25	106150	49	204	2.32	10.01
2017Q4	620129	2380804	108400	49	203	2.36	9.37
2018Q1	633461	2181138.25	114205.75	49	203	2.35	7.43
2018Q2	646793	1981472.5	120011.5	49	204	2.34	5.48
2018Q3	660124	1781806.75	125817.25	49	203	2.33	3.53
2018Q4	673456	1582141	131623	50	204	2.32	1.58
2019Q1	669678	1607014	153902.5	50	195	2.3	3.17

2019Q2	665900	1631887	176182	50	200	2.27	4.76
2019Q3	662122	1656760	198461.5	50	204	2.25	6.35
2019Q4	658344	1681633	220741	50	201	2.23	7.94
2020Q1	670696	1651886.75	252000.25	55	210	2.17	8.21
2020Q2	683048	1622140.5	283259.5	53	210	2.11	8.47
2020Q3	695400	1592394.25	314518.75	53	208	2.06	8.74
2020Q4	707753	1562648	345778	52	208	2	9.01

Source: Central Bank of Lesotho and World Bank

Appendix 2: Logged Data Form

Quarter	Financial Inclusion (log of total accounts with commercial bank in United States Dollar)	Mobile Money Transfer (log of total mobile money transactions in Maloti)	Online Banking (log of total value of online and internet banking transactions in Maloti)	Banking Infrastructure (log of sum of bank branches)	ATM banking (log of total number of ATMs)	Economic Growth (percentage change)	Interest Rate (Real interest rate (%))
2012Q1	13.07	13.95	10.31	3.69	5.3	2.54	2.63
2012Q2	13.03	13.97	10.48	3.69	5.3	2.52	4.34
2012Q3	13	14	10.66	3.69	5.3	2.49	6.05
2012Q4	12.96	14.02	10.83	3.69	5.32	2.47	7.77
2013Q1	12.99	14.12	10.94	3.69	5.32	2.44	5.75
2013Q2	13.01	14.21	11.06	3.76	5.31	2.41	3.72
2013Q3	13.04	14.3	11.18	3.76	5.27	2.38	1.7
2013Q4	13.07	14.4	11.29	3.81	5.01	2.35	-0.33
2014Q1	13.08	14.44	11.34	3.81	4.8	2.38	-1.05
2014Q2	13.09	14.49	11.38	3.83	4.8	2.41	-1.78
2014Q3	13.1	14.53	11.43	3.83	4.94	2.44	-2.51
2014Q4	13.1	14.58	11.48	3.83	5.01	2.48	-3.24
2015Q1	13.14	14.58	11.48	3.85	5.19	2.41	-2.35
2015Q2	13.18	14.58	11.49	3.85	5.25	2.34	-1.45
2015Q3	13.21	14.58	11.49	3.85	5.25	2.27	-0.56
2015Q4	13.25	14.58	11.5	3.85	5.3	2.21	0.33

Source: Author's computation and World Bank

2016Q1	13.26	14.59	11.5	3.89	5.32	2.21	3.23
2016Q2	13.27	14.61	11.5	3.89	5.32	2.21	6.12
2016Q3	13.28	14.62	11.5	3.89	5.31	2.22	9.01
2016Q4	13.29	14.64	11.51	3.89	5.31	2.22	11.91
2017Q1	13.3	14.65	11.53	3.89	5.31	2.25	11.27
2017Q2	13.31	14.66	11.55	3.89	5.32	2.29	10.64
2017Q3	13.33	14.67	11.57	3.89	5.32	2.32	10.01
2017Q4	13.34	14.68	11.59	3.89	5.31	2.36	9.37
2018Q1	13.36	14.58	11.64	3.89	5.31	2.35	7.43
2018Q2	13.38	14.48	11.69	3.89	5.32	2.34	5.48
2018Q3	13.4	14.38	11.74	3.89	5.31	2.33	3.53
2018Q4	13.42	14.27	11.79	3.91	5.32	2.32	1.58
2019Q1	13.41	14.29	11.92	3.91	5.27	2.3	3.17
2019Q2	13.41	14.3	12.05	3.91	5.3	2.27	4.76
2019Q3	13.4	14.32	12.18	3.91	5.32	2.25	6.35
2019Q4	13.4	14.34	12.3	3.91	5.3	2.23	7.94
2020Q1	13.42	14.32	12.42	4.01	5.35	2.17	8.21
2020Q2	13.43	14.3	12.53	3.97	5.35	2.11	8.47
2020Q3	13.45	14.28	12.64	3.97	5.34	2.06	8.74
2020Q4	13.47	14.26	12.75	3.95	5.34	2	9.01