UNIVERSITY OF CAPE TOWN

GSB DEFIC DEVELOPMENT FINANCE CENTRE

MASTER OF COMMERCE IN DEVELOPMENT FINANCE

EQUIS ACCREDITED ASSOCIATION OF MBAS ACCREDITED AACSB ACCREDITED

Financial Technology and Financial Inclusion in Zambia

A Dissertation

Presented to:

The **Development Finance Centre (DEFIC)**
Graduate School of Business
University of Cape Town

In partial fulfilment
Of the requirements for the Degree of
Master of Commerce in Development Finance

By

Mwaba Mwela

May 2024

Supervisor: Prof. Abdul Latif Alhassan

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ACKNOWLEDGMENTS

I wish to extend my heartfelt appreciation to my supervisor, Professor Latif Alhassan, for his invaluable leadership, commitment, and support during the entirety of the dissertation endeavor. I would like to express my gratitude to the entire GSB Development Finance body for affording me the opportunity to contribute my study to the current corpus of knowledge and delve into my personal interests.

I express my gratitude to my mother for her support and encouragement during my academic pursuits. I express my gratitude to my siblings for their support and encouragement, which has motivated me to exert diligent effort and become the catalyst for the transformation I aspire to witness in the world. I express my gratitude to my friends and the enthusiastic advocates who provided encouragement and support during this endeavor. I am grateful for the consistent support, and the creation of motivating settings that helped me overcome the challenges of earning this degree. I have been very fortunate.

This thesis is dedicated to my late father, Tom Kapandila Mwela, who consistently provided me with unwavering support and confidence in my abilities. I will always be grateful for him and the time I got to spend with him.

In conclusion, I would like to express my gratitude to the all-powerful God, the creator and ultimate being of life.

ABSTRACT

Financial inclusion as defined by the World Bank means that individuals and businesses have access to useful and affordable financial products and services that meet their needs through transactions, payments, savings, credit and insurance delivered in a responsible and sustainable way. It is a widespread topic globally, with the potential to severely reduce poverty and the gender gap in developing countries. One area that can drive the financial inclusion agenda is digitization. This study sought to examine the impact of financial technology on financial inclusion in Zambia. With FinTech's global influence evident, the research aimed to ascertain its specific implications for Zambian financial inclusion, considering the country's unique challenges and opportunities related to the integration of technology. Three core questions guided the research: (i) the correlation between financial technology and financial inclusion, (ii) the influence of financial literacy campaigns on financial inclusion in Zambia, and (iii) the influence of socio-demographic factors on financial inclusion in Zambia. The study used a quantitative method to look into the connection between different factors that affect financial inclusion, such as socio-demographic variables and drivers like financial technology, financial literacy, and financial advice. The drivers were based on a 2020 FinScope survey data set with information from over 12 000 people.

The results of the data analysis suggest no significant relationship between the usage of financial technology and financial inclusion (both formal and informal), indicating that FinTech did not have an impact on financial inclusion. The low levels of digital financial usage, with only 0.8% of the respondents utilizing financial technology, underscore the notion that access does not necessarily lead to increased usage. Financial literacy, a perceived critical factor, had a significant relationship with financial inclusion in the Zambian context. In spite of financial literacy being a critical driver, the region had the highest correlation and was considered the key driver for the respondents in the sample. This indicates the critical role that infrastructure plays in driving financial inclusion in a country like Zambia. Leveraging other research, the challenges identified are mostly associated with usage and hence may lean on financial literacy awareness. Increased access does not necessarily translate to more usage. The Zambian government can focus on the drive towards increasing usage of digital platforms by addressing the infrastructure that inhibits usage. We should prioritize addressing the barriers to accessibility and usage of digital financial services, given the region's significant impact on financial inclusion. In addition, institutions

should enhance digital platforms to support the drive towards online payments and digitization in underserved areas. This will require a level of financial literacy if it is to yield the desired results. Formal institutions should collaborate with informal groups to provide more formalized banking options, ensuring the essence of communal trust remains intact. Further, institutions should understand the challenges faced by different age groups and adapt services to cater to varying age demographics, taking cultural influences into consideration. These recommendations provide a framework for financial institutions in Zambia to bolster financial inclusivity and align their services more closely with the populace's needs.

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List of Abbreviations

AFI	Alliance for Financial Inclusion
ATM	Automated Teller Machine
BOZ	Bank of Zambia
CPH	Census of Population and Housing
CSAs	Census Supervisory Areas
DCE	Digital Channel Enhancement
DFS	Digital Financial Services
EA	Enumeration Areas
FFI	Formal Financial Inclusion
FI	Financial Inclusion
Findex	Financial Inclusion Database
Fintech	Financial Technology
FSD	Financial Sector Deepening
FT	Financial Technology
GPFI	Global Partnership for Financial Inclusion
HDI	Human Development Index
INFE	International Network on Financial Education
NFC	Near-Field Communication
NFIS	National Financial Inclusion Strategy

NGO	Non-Governmental Organization
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Linear Squares
POS	Point-of-Sale
ROSCAs	Rotating Savings and Credit Associations
SACCOs	Savings and Credit Co-operative Societies
SME	Small and Medium-sized Enterprise
SMME	Small, Micro and Medium Enterprises
SPSS	Statistical Package for the Social Sciences
VSLAs	Village Savings and Loan Associations
WBG	World Bank Group
ZAMSTATS	Zambia Statistics Agency
ZANACO	Zambia National Commercial Bank
ZICTA	Zambia Information and Communication Technology Authority
CAPI	Computer Aided Personal Interviews

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Financial inclusion has been recognized as one of the critical drivers in reducing poverty and achieving economic growth. According to the 2014 Global Findex report, only 34% of the individuals above the age of 15 in developing countries were making or receiving digital payments (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015). This number has since increased to 57% according to the 2021 Global Findex report (Demirgüç-Kunt, Klapper, Singer, & Ansar 2022). The 2021 Global Findex report highlights the impact that the COVID-19 pandemic had on digital adoption. It reports that in sub-Saharan Africa, 39% of the mobile money account holders used their accounts to save. In addition, more than one third of individuals in developing economies paid a utility bill from an account after the start of the COVID-19 pandemic (Demirgüç-Kunt et al., 2022). The report further highlights digitization as a powerful tool to promote financial inclusivity in developing economies. While a majority of developing economies saw an increase in account ownership between 2017 and 2021, as reported by Global Findex, overall account ownership in Zambia remained stagnant between the same period. Account ownership in financial institutions saw a significant decline of 12 percentage points, dropping from 36% to 24%. On the other hand, mobile money account ownership experienced a notable increase of 14 percentage points, rising from 28% to 42%. As a result, there was a net movement of a 2% increase.

In 2019, financial inclusion in Zambia remained relatively low at 59.3%. In order to tackle this issue, the government, in an effort to promote financial inclusion, reached out to financial firms and encouraged collaboration with key stakeholders to enhance economic productivity among the population (Chisengela, 2019). Financial inclusion that contributes to economic productivity is crucial for a country's overall economic advantage. According to Bruhn and Love (2014), it has the potential to improve the financial situation and job prospects of disadvantaged and underprivileged individuals.

According to Zins and Weill (2016), the three main factors that influence financial inclusion are (i) ownership of bank accounts, (ii) the amount of money deposited in those accounts, and (iii) the utilization of bank credit. However, it is worth noting that in the Zambian economy, the public relies on financial services beyond traditional banking. The transition from traditional banking

procedures has resulted in a broader platform that reaches even the most distant locations and is accessible to individuals of practically every literacy level. Because it is mostly a cash economy, the usage of bank credit is not considered to be a prominent indication of financial inclusion.

The concept of financial inclusion has undergone significant changes over time. However, greater research is required to examine the progress made thus far, its effects on end users, and potential strategies for further enhancing the level of inclusion. According to Allen, Demirgüç-Kunt, Klapper, and Martinez Peria (2016), the lack of inclusive financial institutions can lead to the presence of poverty traps, which can hinder economic advancement. This is due to the fact that financial instruments provide individuals with the means to invest in their education, finance projects, and engage in entrepreneurial activities.

1.2 Research Problem

While FinTech has gained significant traction globally and has the potential to address the issue of financial exclusion, its specific impact on financial inclusion in Zambia remains relatively unexplored. Hence there is need to investigate the specific challenges and opportunities faced by Zambia in adopting and implementing innovations and financial technology (FinTech) solutions. The research aims to assess the extent to which FinTech has addressed or exacerbated issues of financial exclusion, considering factors such as accessibility, affordability, and usability of financial services. Moreover, the study seeks to uncover the complex dynamics between FinTech adoption, financial inclusion, and the socio-economic factors that influence individuals' ability to benefit from these technologies. The problem areas that this study seeks to address are summarized as follows:

1) How has the advancement of financial technology impacted financial inclusion and contributed towards closing the gap in Zambia?
2) What role does financial literacy play in driving the financial inclusion agenda?
3) How can the socio-demographic factors be used to advance financial inclusion in Zambia through financial technology?

By tackling these identified problem areas, we will ultimately find answers to the central research question regarding impact. The following paragraphs delve into concise discussions of these identified issues.

The Closing of Financial Literacy Gaps in Zambia

Zambia, situated in sub-Saharan Africa, is a developing nation where the majority of the population is engaged in the informal sector. According to a study conducted by the International Labour Organisation in 2018, the research revealed that the informal employment rate in Zambia stood at 88.7% among the working population. Among the informal workers, 87.5% were found to be employed in the informal sector, while 1.2% were employed in the formal sector (Geda, Weeks, & Moono, 2018). Given the substantial proportion of the workforce engaged in the informal sector and their significant contributions to the country's economic productivity, it becomes imperative to implement nationwide financial literacy initiatives. This need is particularly pronounced for Zambia, where the prevalence of informal employment is notably high.

According to Lusardi, Mitchell, and Curto (2009), 'financial literacy' consists of two main dimensions: the first is the understanding of financial matters or the possession of financial knowledge, and the second is the utilization or application of such knowledge. Financial literacy involves not only possessing financial knowledge but also having the ability and confidence to utilize that knowledge for making decisions that enhance one's financial well-being. This capacity for making informed financial decisions is often referred to as appropriate financial behavior. Evaluating financial literacy, therefore, involves assessing an individual's proficiency in comprehending and effectively applying financial information. However, it is important to note that there is no universally accepted standard for measuring financial literacy. Consequently, researchers have employed various measures to assess this concept (Oseifuah, 2010; Sucuahi, 2013; USAID, 2009).

It becomes evident that in order to enhance financial inclusion, financial institutions face the responsibility of incorporating financial education into their offered financial services. This ensures that as individuals engage with financial services, they also receive valuable financial education, particularly within the informal sector. In support of this notion, Mpembele and Sakala (2020) recommend that the Zambian Government and other stakeholders within the country's financial system should develop targeted strategies aimed at improving the financial literacy of informal sector entrepreneurs. They argue that such efforts would significantly benefit small, micro, and medium-sized enterprises (SMMEs) by enhancing their access to financial services, particularly credit. Given the high prevalence of informality within the sector, financial education

possesses immense potential to address unemployment and poverty challenges in the country.

In the context of literacy, it is essential to take into consideration the packaging and delivery of financial information. The informal sector comprises individuals with diverse educational and literacy backgrounds. Therefore, financial institutions must be mindful of how they structure and present financial information, as this can significantly influence how effectively it is understood and embraced by those in the informal sector.

The Compatibility of Financial Services with the Zambian Informal Sector

Zambia has previously adopted financial technologies developed in other countries without adequately considering the specific needs of its own population. As a result, a disconnect has emerged between the services provided and the actual requirements of the Zambian people. The existing financial services do not fully cater to the financial needs of the informal sector, creating a perception that formal financial services are undesirable and complex. Consequently, achieving financial inclusion appears unattainable for the average informal sector worker. These mismatches have prompted the proliferation of informal financial services, which, although relatable to the informal sector workers, are often unreliable and unsustainable. The appeal of these informal services lies in their perceived understanding of the financial needs within the informal sector, making them attractive alternatives.

This research, therefore, seeks to increase the compatibility of formal financial service providers by placing a focus on the financial services needs of the informal sector, as well as increasing the financial literacy levels so that the two aspects rise to close the knowledge gap that exists on both sides.

Increasing Financial Inclusion in the Informal Sector in Zambia

Zambia's National Financial Inclusion Strategy (NFIS) 2017–2022, developed by the Ministry of Finance and National Planning, aims to see 70% of adults using formal financial services by 2022 (MOF, 2017: 4). Whether these ambitions will be achieved depends largely on how the financial inclusion strategy will be rolled out. The overall goal of financial inclusion in Zambia, as stipulated in the National Financial Inclusion Strategy 2017–2022, is to "achieve universal access to, and usage of, a broad range of quality and affordable financial services that meet the needs of

individuals and enterprises".

Considering that the primary aim of financial inclusion is to benefit the less privileged and lower income groups in society, the existing definition could be criticized for lacking specificity in identifying the specific target groups. Given the significant size and potential of the informal sector in driving economic growth and development, it would be reasonable to consider defining financial inclusion in the Zambian context with a focus on addressing the financial service needs of the informal sector.

The Zambian government has worked together with other organizations to develop the NFIS in an effort to raise the level of financial inclusion in the country. A renewed commitment to financial inclusion in Zambia is represented by the NFIS, which builds upon past measures taken by the government. The vision of the strategy is to achieve universal access to a wide range of affordable and quality financial products and services, enabling all Zambians to benefit from financial inclusion. This vision aims to empower individuals and firms by providing opportunities to manage risks, plan for the future, achieve goals, and access affordable financing for innovation and business growth (MOF, 2017: xi).

Currently, the financial inclusion landscape in Zambia reveals that over 3.5 million adults – which accounts for approximately 41% of the adult population – experience financial exclusion. Furthermore, over 5 million adults – approximately 60% of the adult population – do not access financial products and services from regulated providers, as noted in the NFIS (MOF, 2017: xi). These disparities are evident across various dimensions, such as rural versus urban areas, men versus women, youth versus adults, and small and medium enterprises (SMEs) versus large firms. Moreover, there exists a considerable amount of unexplored capacity to use digital technologies in order to enhance accessibility and mitigate expenses. Limited outreach is observed among non-banking financial organizations, which include insurance companies, pension providers, and microfinance institutions. In addition, the NFIS highlights that the limited financial literacy among consumers and insufficient consumer protection procedures serve as obstacles to the extensive utilization of formal financial products and services for achieving financial goals (MOF, 2017: xi).

In order to mitigate these deficiencies, the NFIS facilitates cooperation across the private and public domains. The successful execution of this cooperative endeavor is anticipated to result in

notable achievements, such as:

- a rise in the overall financial inclusion – both formal and informal – from 59% to 80%;
- an increase in formal financial inclusion from 38 to 70% by 2022;
- enhanced physical accessibility to top-notch financial delivery channels;
- innovation in financial products and services;
- broader adoption of digital financial services;
- increased availability of affordable financing for small and medium-sized enterprises (SMEs) and agricultural entities; and
- improved consumer protection and financial capabilities of consumers (MOF, 2017: xi).

While the NFIS has made progress in establishing a comprehensive strategy for financial inclusion in Zambia, there is still much work to be done to achieve the ambitious goals outlined in the strategy. Continued efforts and effective implementation will be crucial in realizing the vision of universal financial inclusion for the Zambian population.

1.3 Research Questions

The primary research question of this research is: "What is the impact of financial technology and digital channel advancement on financial inclusion in Zambia?". Other secondary research questions include:

- What is the nature of the relationship between financial technology usage and financial inclusion in Zambia?
- What are the major factors affecting financial inclusion in Zambia?

1.4 Research Objectives

The primary aim of this research is to conduct a comprehensive assessment of the impact of technological advancements on the provision of financial services to end users in Zambia, with a focus on determining whether this impact has been negative, positive, or neutral. In addition to this overarching objective, the study also seeks to address the following secondary research objectives:

- To examine the relationship between the usage of financial technology and financial inclusion in Zambia
- To examine other key factors that affect financial inclusion

Through the analysis of these secondary research objectives, the study aims to provide valuable insights into the intricate dynamics between financial technology, financial inclusion, and financial literacy in the Zambian context.

1.5 Justification of Study

The significance of this study encompasses several compelling factors. Utilizing indices for measuring financial inclusion enables consistent year-on-year comparisons, providing a framework to assess progress in financial inclusion across African countries over multiple time periods. Furthermore, it facilitates cross-country and intra-country comparisons regarding financial inclusion levels and the enhancement of digital channels, akin to other indices like the Human Development Index (HDI). Consequently, this study holds immense value for policymakers, program managers, financial institutions, and NGOs seeking to identify causal factors that can enhance their respective financial inclusion programs by improving specific sub-indices. Additionally, the private sector stands to benefit significantly as it guides investments towards cost-effective, reflective, and beneficial financial inclusion innovations for economies. Researchers will also gain valuable insights, as this study paves the way for in-depth exploration of index utilization in measuring financial inclusion in Africa. Furthermore, it sets the stage for a vital conversation aimed at crafting a more precise definition and classification system that encompasses both financial inclusion and financial technology.

1.6 Organization of Study

An outline of the organization of the successive sections of this study follows. In the second chapter, a comprehensive evaluation of the extant scholarly works concerning financial technology, financial inclusion, and financial literacy is presented alongside an analysis of the theoretical and empirical discoveries pertaining to these three topics. Deconstructing the methodology, the third chapter describes the variables, data, and regression analysis utilized in the investigation. Once the data analysis is complete, Chapter Four contains a breakdown of the conclusions into more specific terms. In the fifth and final chapter of the report, the conclusions and recommendations for future research are derived from a summary and interpretation of the

results obtained from the data analysis and regression. Furthermore, recommendations are provided regarding potential policy and regulatory measures that Zambia can implement to close the existing gaps in financial inclusion and expedite its advancement towards achieving sustainable financial inclusion penetration.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This chapter examines research on financial technology, financial inclusion, and financial literacy. The initial portion will present a comprehensive introduction to financial technology, financial inclusion, and financial literacy by elucidating the vocabulary and concepts associated with these themes. The subsequent round of the conversation will delve into a comprehensive examination of financial technology and financial literacy within the context of Zambia. The theoretical review portion will encompass the existing theories that establish a connection between the independent variables of financial technology and financial literacy and the dependent variable of financial inclusion. The forthcoming conceptual framework will analyze the correlation between financial technology and financial inclusion, as well as the association between financial literacy and financial inclusion, subsequent to the theoretical evaluations. The third section of the study, the empirical review, focuses on the examination of existing research pertaining to financial inclusion, financial literacy, and financial technology.

2.1 Definition of Concepts

2.1.1 Financial Inclusion

Financial inclusion is a multidimensional concept that has been subject to varying definitions among scholars and organizations. The holistic approach of the Global Partnership for Financial Inclusion (GPFI) encompasses three dimensions: (i) consumption, (ii) access, and (iii) the quality of financial services and products. It takes into account both the supply and demand aspects of financial inclusion within this framework. On the supply side, which pertains to financial service providers, access comprises several elements such as the affordability of a service or product, its closeness and convenience, availability, and the presence of frameworks and laws. According to the Alliance for Financial Inclusion (AFI) and the Financial Inclusion Working Data Group (2013), usage refers to the assessment of the level of consumption of financial services and products from the perspective of demand. According to Triki and Faye (2013), quality refers to the capacity to provide customized financial products that are in line with the income levels of individuals. Financial inclusion is commonly understood as the provision of inexpensive, timely, and high-quality financial products and services to persons who are without access to the traditional banking

system – commonly referred to as unbanked individuals. This viewpoint emphasizes creative methods, such as raising awareness about finances and providing education, with the goal of enhancing financial welfare and enabling economic and social integration. In the context of this research, the World Bank's definition is employed, which defines financial inclusion as the percentage of individuals and businesses that make use of formal financial products and services (Global Findex, 2014). According to Chibba (2009), this definition emphasizes the need of providing accessible and convenient formal financial services to all sectors of the population. It emphasizes the need for practical and inexpensive solutions that satisfy the needs of individuals in a responsible and sustainable manner. The inclusion of mobile money accounts and transactions as a financially inclusive tool is crucial, as highlighted by Demirgüç-Kunt, Klapper, Singer, and Van Oudheusden (2015), who have extended the previously examined definitions to encompass this particular facet of financial inclusion.

2.1.2 Financial Literacy

In a broad sense, financial literacy encompasses the awareness, knowledge, abilities, attitudes, and conduct that are essential for the purpose of making well-informed and prudent financial choices. Such literacy serves as a critical component in enabling individuals to effectively oversee their financial affairs, safeguard themselves against financial exploitation, and ultimately attain financial autonomy and prosperity. The understanding and application of financial literacy may differ across regions, economies, and cultures. As of late, there has been a growing recognition of the interdependent nature of financial literacy and financial inclusion. It is emphasized in research conducted by Chakravarty and Pal (2013) that in order to enhance the financial welfare of the general public, financial literacy should be implemented in conjunction with financial inclusion. Comprehending the importance of financial literacy is crucial when considering the advancement of financial inclusion. In light of the 2012–2013 Financial Development Barometer findings in the World Bank Group report (2014), the significance of financial literacy is underscored. A significant majority of respondents (72%), identified ignorance regarding fundamental financial products and services as a substantial barrier to financial inclusion for disadvantaged communities. Additionally, the report posits that financial education stands as the most efficacious approach to enhance financial accessibility for individuals with modest income (WBG, 2014).

However, it should be noted that the definition of financial literacy may vary across various

geographical areas, as highlighted by Cohen and Nelson (2011). In developed economies, this may entail knowledge of credit cards and tax regulations, whereas in developing countries, it frequently pertains to fundamental concepts such as prudent borrowing and secure savings, among other elements. In order to proficiently traverse this terrain, it is critical to distinguish financial literacy from associated concepts like financial education and financial capability, as underscored by Gupta (2017) and Cohen & Nelson (2011).

2.1.3 Financial Technology

Financial technology is crucial in fostering a more inclusive financial sector by providing a range of products and services such as credit, payment solutions, savings accounts, and insurance. This technology empowers private enterprises, individuals, and governmental entities to conveniently and effectively access financial services. Enhanced financial inclusivity improves individuals' capacity to manage their personal and household finances, simultaneously contributing to economic growth and reducing poverty. This is achieved by promoting increased investments in education, better nutrition, improved savings practices, and facilitating borrowing for launching and expanding businesses. According to Lauer and Lyman (2015), over 2 billion adults worldwide lack access to formal financial services, which effectively excludes them from opportunities to enhance their quality of life. Given the evident disparity in financial inclusion, particularly affecting women, youth, and rural populations, Digital Channel Enhancement (DCE) are focused on designing products and services to narrow this gap. They provide accessible and affordable avenues for those who have been excluded from the financial system to save, conduct transactions, secure credit, and purchase insurance. As mobile phone ownership continues to surge, with nearly half of the population in developing nations already possessing a mobile device, the potential reach of DCE services expands significantly (Rizzo, 2014). In 2017, the Global Findex data illustrates the ongoing transformation in financial inclusion (Demirgüç-Kunt et al., 2018). This profound change has been driven by the introduction of digital payment methods, favorable governmental initiatives, and the rise of a new generation of financial services accessible via mobile phones and the internet. The remarkable capacity of financial technology to broaden the reach of financial accounts and enhance their usage is particularly evident in sub-Saharan Africa. Here, a noteworthy 21% of adults currently have a mobile money account, a figure nearly twice as high as what was observed in 2014, and this rate stands as the highest among all regions worldwide (Demirgüç-Kunt

et al., 2018).

Digital Channel Enhancement (DCE) Services

DCE encompasses a broad range of financial services that can be accessed and delivered through digital channels. These services include payment solutions, credit offerings, savings mechanisms, remittance facilitation, and insurance provisions. When we talk about 'digital channels' in the context of DCE, we are referring to various technological platforms and devices, such as smartphones, the internet, and more. Devices like smartphones and watches can be configured for near-field communication (NFC) transactions, while automated teller machines (ATMs) provide easy access to cash and, in some cases, allow for deposits. Point-of-sale (POS) terminals facilitate convenient payments. In addition to the mentioned digital services, electronically enabled cards offer enhanced security compared to traditional magnetic strip cards. Biometric tools, tablets, phablets, and other digital systems and devices also contribute to enabling the provision and utilisation of financial services. DCE models typically utilise agents and third-party intermediaries' networks to enhance accessibility and minimise the overall cost of service delivery (Ceyla et al., 2020). On a global scale, and specifically in Zambia, DCE aims to promote financial inclusion by granting excluded and underserved groups digital access to formal financial services. For these services to be viable, they must be customised to meet consumer needs, offered ethically, and priced in a way that is both accessible to users and sustainable for providers (Lauer & Lyman, 2015).

2.2 Overview of Financial Inclusion in Zambia

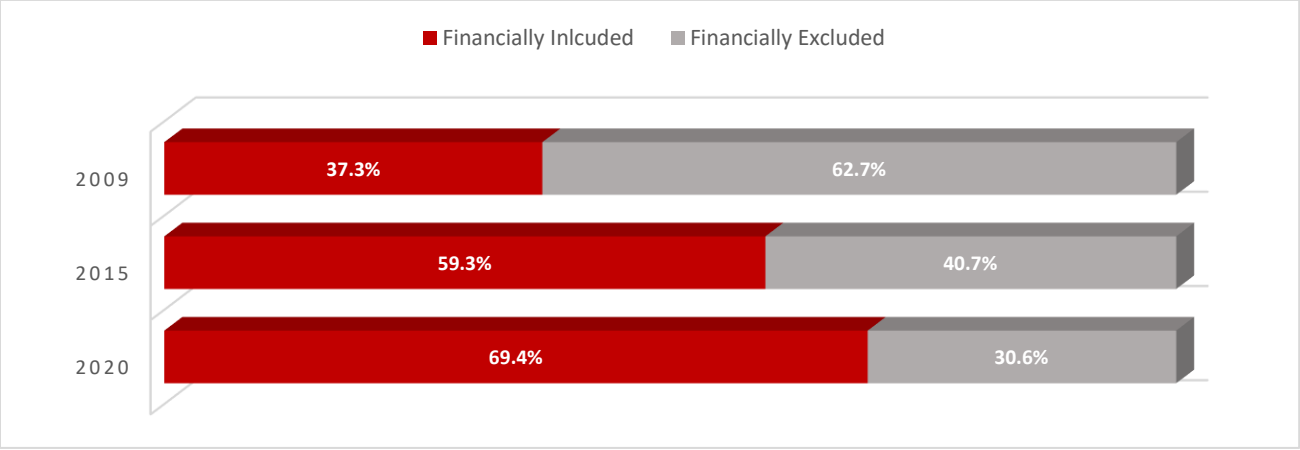
In Zambia, the Ministry of Finance has established a framework with the primary goal of fostering a financial sector that embodies inclusivity, resilience, stability, competitiveness, and innovation. This framework recognizes the pivotal role of the national payment system in facilitating the shift from cash-based transactions to digital transactions. The ultimate objective is to cultivate a financial sector that actively contributes to sustainable economic growth and the widespread generation of wealth (MOF 2017).

To propel the financial inclusion agenda, Zambia's Ministry of Finance and National Planning has implemented the National Financial Inclusion Strategy 2017–2022 (MOF, 2017) with the primary goal of achieving widespread access and utilization of high-quality, affordable financial services

tailored to the needs of individuals and businesses. A significant emphasis within the strategy is placed on expanding the reach and adoption of DCE services, considering them as pivotal drivers to enhance accessibility and utilization, ultimately contributing to improved financial inclusion in Zambia. The strategy outlines a challenging objective of raising the level of formal financial inclusion among adults from 38% in 2015 to a specific aim of 70% by the year 2022. The NFIS has created a specialized working group with the particular purpose of addressing delivery channels and digital payments in order to achieve this ambitious objective.

In line with these initiatives, the FinScope Zambia 2020 survey indicates significant strides, revealing a 25% increase in adults' access to financial services in the country from 2009 to 2020. Notably, the survey highlights a substantial rise in Zambia's level of financial inclusion, correlating with the expanded access to financial services. The survey findings demonstrate robust growth, with the percentage of adults having access to financial services increasing by 10.1 points, reaching 69.4% – approximately 6.6 million adults – in 2020. This marks a noteworthy improvement compared to the 59.3% – 4.8 million adults – recorded in 2015. Consequently, the proportion of adults excluded from financial services decreased to 30.6% – representing around 2.9 million adults – down from 40.7% – 3.3 million adults – during the same period (BOZ, 2020).

Figure 1: The percentage of advancements in financial inclusion



Source: FinScope Zambia 2020 Survey

The National Payment System Vision and Strategy for 2018–2022 by the Bank of Zambia (BOZ, 2018) outlines a detailed plan for payment systems, with a focus on inclusion, cost-effectiveness, appropriateness, efficiency, security, and interoperability. The strategy involves a range of actions,

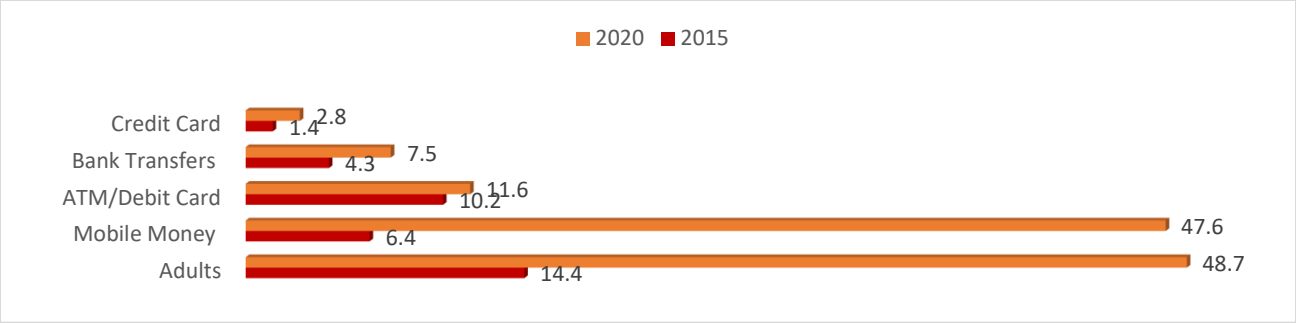
such as creating a strong regulatory framework, implementing a cybersecurity monitoring system, expanding access points and interoperable retail payment systems, digitizing government payments, improving the safety and efficiency of remittance services, and increasing efforts to raise awareness and promote DCE services. Furthermore, the strategic approach recognizes the increasing significance of critical domains such as financial inclusivity, cybersecurity, and safeguarding consumer interests.

2.3 Overview of Financial Technology in Zambia

Zambia's commitment to the 2016 Denarau Action Plan on Women's Financial Inclusion (AFI, 2016) within the scope of AFI's Maya Declaration is in line with the country's commitment to the FinTech policy. By 2022, this commitment hopes to have cut the gender gap in half on a nationwide basis. Recent years have seen a tremendous increase in the availability of bank accounts and the use of formal financial services, driven by important legislative and market improvements. Between 2011 and 2017, the proportion of people aged 15 and older with access to financial accounts more than doubled, with mobile money providers significantly contributing to this growth, notably since 2015. According to supply-side data, mobile money once again served as a major growth driver for access in 2018. The Bank of Zambia's regulatory actions have encouraged market growth, improving access to and use of DCE services.

A survey conducted by FinScope in 2020 in Zambia revealed that electronic payment methods were utilized in 48.7% of instances, indicating a notable increase compared to the 14.4% observed in the 2015 survey. Among these electronic payment methods, mobile money has become the most widely used, with a utilization rate of 47.6%, which is a substantial increase from the 6.4% reported in 2015. Credit card usage experienced a rather moderate increase from the 1.4% reported in 2015 to 2.8% (BOZ, 2020b).

Figure 2: The percentage of electronic payment channels utilized for the purpose of purchasing goods and services



Source: FinScope Zambia 2020 Survey

It is noteworthy that in 2017, according to Findex, there were differences in the ownership of financial accounts: only 40% of surveyed women and 41% of the surveyed rural population had accounts, compared to 52% of questioned males. When access to mobile money is considered, the gap decreases, with 26% of questioned females compared to 30% of surveyed males and 26% of the rural population compared to 28% of the whole surveyed population (Demirgüç-Kunt et al., 2018). Usage trends reflect this gender and rural-urban gap even more. In 2017, just 34% of the rural population participated in digital payments, compared to 39% of the overall population polled, while 35% of the surveyed women and 43% of the males reported using digital payments.

It is important to note that there has been a noticeable increase in the number of active DCE service accounts, which are accounts used for at least one transaction within a 90-day period. According to UNCDF-MM4P and the Bank of Zambia (2019), the number of these accounts increased dramatically from 2.3 million in 2017 to 4.3 million in 2018 – an 89% rise. As many users may have many mobile accounts, not all of these accounts directly translate into improved financial inclusion, but it is plausible to conclude that this expansion has significantly altered the overall environment. The volume of POS transactions – up 268% – and mobile money transactions – up 386% – increased significantly throughout the three years between 2016 and 2018 while the volume of ATM transactions saw a slight decrease of 4% (BOZ, 2020).

When compared to averages across income groups and sub-Saharan Africa, Zambia looks to have a relatively high level of financial inclusion. Zambia showed a greater level of account ownership than the norm for low-income nations and sub-Saharan Africa, according to Global Findex 2017 data. However, when compared to individual nations, Zambia's account ownership statistics are inferior to Ghana, Kenya, and Rwanda but equivalent to Côte d'Ivoire. (Demirgüç-Kunt et al.,

2018).

2.4 Adoption of Financial Inclusion

According to a 2015 Peruta study (Peruta, 2015), mobile money gives users a comparative advantage over traditional banks by offering more reasonably priced financial services. According to the report, the main goal of using mobile money is to encourage financial inclusion for individuals who are currently excluded. Zins & Weill (2016) compared 26 multinational banks in support of this and discovered that branchless banking, which includes mobile money, was 19% less expensive than competing alternatives (Donovan, 2012).

Ivatury and Mas (2008) went on to emphasise that mobile money's value proposition of reduced transaction costs, which serves as a significant driver for higher acceptability and utilization, is crucial for the promotion of financial inclusion. They used a case study from the Philippines to demonstrate this point. In that country, a normal bank transaction costs US$2.50, while a comparable transaction made using mobile money only costs US$0.50.

Furthermore, as observed by Gencer (2011), mobile money's use of ubiquitous infrastructure like mobile phones considerably expands its reach to a wider part of the public. This feature eliminates the need for additional bank branches and massive new ATM deployments, significantly lowering the cost of providing financial services to underserved areas. It is possible to include more people in the financial system by utilizing the vast network of mobile money agents.

2.5 Role of Mobile Network Operator Infrastructure in Financial Inclusion

Comparatively speaking, mobile network providers' infrastructure has grown to be more widespread than the old financial system, which is mostly focused on bank branches. The former is more accessible to a greater population than the latter since it provides wider access. Mobile financial services use the mobile network as a medium, and its main selling point is the ease with which customers may acquire worthwhile goods and services, making it simpler, more affordable, and more reliable to move money (Jenkins, 2008).

In this context, mobile financial services are expected to:

- give poor households access to necessary financial tools and, as a result, finances.

- cut down on the fees incurred by financial transactions including borrowing, saving, and sending money.
- enable people to engage in the official financial system with greater security, giving them access to reliable markets.

2.5.1 Account Ownership

Traditional banks and non-bank financial service providers, FinTech companies, and companies in diverse industries, such as utilities and agribusinesses, are increasingly collaborating. These collaborations are fueling the creation of cutting-edge financial services and solutions. Financial institutions are actively exploring digital advancements and collaborative alliances, such as mobile banking applications, bank agent networks, and connections between banks and digital wallets, in order to reduce their need on physical branch operations. Other financial service providers that are acknowledged for offering DCE services encompass Atlas Mara, Ecobank, FINCA, First National Bank, Investrust Bank, UBA, and Zanaco, in addition to banks and microfinance organizations. A survey conducted in 2018 encompassed a total of 13 service providers, comprising the 2 largest third-party service providers, all 3 mobile money service providers, and the bank that exhibited the most extensive outreach efforts (BOZ, 2018b).

2.5.2 Mobile Money

Zambia's digital financial services (DFS) market is now dominated by mobile money, with mobile network companies MTN, Airtel, and Zamtel accounting for 88% of all DFS users in 2018. Moreover, second-generation DCE services and goods, such as digital credit, savings, insurance, pay-as-you-go services, and merchant payments, have been gaining popularity at a quick rate. In line with a significant increase in transaction volumes and values over the same period, the active user base for these second-generation products increased from 1.3 million in December 2017 to 2.3 million in December 2018, according to UNCDF (2019). Remittances are increasingly being sent and received via mobile money, indicating a substantial shift in consumer behaviour. This shift is emphasised in the FinScope 2020 Zambia study (BOZ, 2020b), which shows how the use of mobile money for remittances dramatically differs from that of prior surveys and demonstrates its growing domination over unofficial channels for remittance transactions.

Table 1: Remittance channels between 2015 and 2020 (Percent)

	2015	2020
Channels used to send money	**Senders**	
Post office	22.6	0.2
Mobile money	22.1	56.8
Bank transfer/pay into bank account	17.0	2.7
Friends/family takes it there	16.6	2.0
Bus/taxi driver takes it there	5.0	0.5
Western Union/MoneyGram/Swift cash	4.9	0.8
Others	0.0	2.0
Channels used to receive money	**Receivers**	
Post office	22.2	0.4
Mobile money	18.1	88.4
Bank transfer/pay into bank account	15.4	5.1
Friends/family takes it there	13.3	7.4
Bus/taxi driver takes it there	4.4	0.5
Western Union/MoneyGram/Swift cash	6.2	1.5
Others	0.0	6.1

Source: FinScope Zambia 2020 Survey

2.7 Theoretical Framework

The theoretical review examines the hypotheses that have been proposed to explain how financial technology, financial inclusion, and financial literacy are related. Although there are many ideas about financial inclusion, according to Ozili (2021), this study will only employ those that have been mentioned in the empirical studies we have evaluated. As a result, the Social Learning Theory serves as the foundation for this study, and the Systems Theory and The Theory of plannrd behavior are the supporting theories that were taken from Ozili (2021) and Ajzen (1991).

2.7.1 Social Learning Theory (1977)

The idea was developed by Albert Bandura based on Ivan Pavlov's classical conditioning and B.F. Skinner's operant conditioning. According to the hypothesis, people might pick up new habits by watching and imitating others. Even in the absence of physical reproduction or direct reinforcement, learning is a social cognitive process that can only be facilitated by direct instruction or observation (Maisto et al., 1999). Due to the difficulty of achieving financial inclusion without social learning, this hypothesis is crucial to financial inclusion. Learning about financial technologies could benefit society as a whole. But even while learning occurs cognitively, this theory contends that social factors and sensory-motor skills might aid to accelerate the process of financial inclusion by enhancing learning. This was employed in the study Bongomin et al.,

(2016), which discovered that social learning can improve financial inclusion.

Regarding the recipients of the benefits of financial inclusion, there are several perspectives and points of view. Financial inclusion, according to certain studies, mostly helps the poor (Bhandari, 2018). In contrast, other research (Ghosh & Vinod, 2017; Demirgüç -Kunt & Klapper, 2013; Swamy, 2014) indicates that women are the main beneficiaries of financial inclusion outcomes. The economy and the financial system itself are seen as the main benefactors of financial inclusion, according to some perspectives (Mehrotra & Yetman, 2015; Kim et al., 2018; Swamy, 2014).

The literature tends to neglect other potential benefits of financial inclusion besides women and the poor. These people include children, the elderly, people living in institutions, people with physical and mental disabilities, and people who have been barred from the financial industry as a result of criminal offences. We will now go over four theories that provide justifications for who gains from financial inclusion.

2.7.2 Systems Theory of Financial Inclusion

The Systems Theory of Financial Inclusion posits that the presence of several subsystems, including the economic, social, and financial systems, play a vital role in attaining positive results in relation to financial inclusion. Consequently, it is envisaged that increased financial inclusion will be advantageous to these underlying subsystems. A substantial modification to a subsystem, which is a component of the system, can have a significant effect on the intended outcomes for financial inclusion. By enacting laws on financial sector agents, who play a crucial role in the financial system, it is possible to align their interests with those of individuals who solely utilise financial services. According to predetermined guidelines that protect consumers from exploitation and price discrimination, such rules may compel financial sector agents to provide consumers with affordable, high-quality financial services (Ozili, 2021). However, significant system-wide changes, such as the replacement of the current national financial inclusion plan with an entirely new one, may not always result in modifications to the existing subsystems. This is because modifications to a subsystem must be made at the level of that subsystem. The efficiency and effectiveness of the subsystems are crucial determinants of the success or failure of a national financial inclusion agenda, and, according to the Systems Theory perspective, the existing subsystems – whether economic, financial, or social – in a country are the ultimate beneficiaries

of financial inclusion (Ozili, 2021).

2.7.3 The Theory of Planned Behaviour

Digital financial services are one of the key drivers to financial inclusion. There have been various studies and research carried out to explore the vast nature of digital financial services, what influences individuals to take these up and how gaps that exist can be refined and bridged. The concept of the theory of planned behavior has been extensively examined in order to elucidate the impact of DFS on monetary inclusion. According to Ajzen (1991), this notion posits that an individual's conduct is influenced by their thoughts, subjective norms, and perceived behavioral control. Azjen's result aligns with the findings of Aker et al. (2016) and Fink et al. (2017), who employed a similar methodology to investigate the adoption of DFS. Their research demonstrated that attitudes towards DFS, perceived cultural norms, and perceived behavioral control are all crucial factors influencing the acceptance of DFS.

2.8 Conceptual Framework

2.8.1 Financial Technology and Financial Inclusion

FinTech has played a significant role in promoting financial inclusion around the globe. It is essential to examine the relationship between these two phenomena in order to comprehend how FinTech facilitates more accessible and efficient financial services. FinTech is the combination of finance and technology that aims to provide innovative solutions to conventional financial issues. It incorporates numerous facets, including digital banking, mobile payments, peer-to-peer lending, and crowdfunding platforms (Klapper, Demirguc-Kunt, & Singer, 2017). On the other hand, financial inclusion refers to the availability of accessible and affordable formal financial services to all individuals and businesses. The primary goal of financial inclusion is to promote social and economic development by enabling individuals to participate in the formal financial sector (Demirgüc-Kunt & Klapper, 2012). According to Chisengela (2019) and Zins and Weill (2016) the relationship between FinTech and financial inclusion is discussed as follows:

a) *Accessibility*: FinTech can significantly improve the accessibility of financial services to underserved communities by reducing physical barriers. Services like mobile banking or online

remittances allow people living in remote areas or lacking access to traditional banks to manage their finances with ease.

b) *Affordability*: Another critical aspect of financial inclusion is affordability; FinTech can enable customers to access a wide array of cost-effective financial services. For instance, digital transactions often have lower fees than their traditional counterparts, making it easier for people from low-income backgrounds to participate in formal economic activities.

c) *Innovation*: As an innovative force within the finance sector, FinTech can help come up with creative solutions that cater to the specific needs of unbanked or underbanked populations like microloans through P2P lending platforms help small and medium-sized businesses access credit without the need for collateral.

2.8.2 Financial Literacy and Financial Inclusion

Understanding the relationship between financial literacy and financial inclusion is an essential part of exploring the collective impact the two components have on shaping inclusive financial systems. De Bassa Scheresberg (2013), Christelis et al. (2010), and Van Rooij, Lusardi & Alessie (2011) have recognized the positive correlation between financial literacy and individuals' engagement in financial markets and utilization of financial institution services. A lack of financial literacy would result in a limited understanding of financial concepts and a lack of basic numeracy skills. In a study conducted in India and Indonesia, Cole et al. (2009) identified financial literacy as a significant determinant of the demand for financial goods, particularly among individuals who are uneducated and lack financial knowledge. Some of the conceptual frameworks that collectively contribute to individuals making informed and effective financial decisions throughout their lives include:

a) *Saving and investments*: Savings and investments focus on cultivating the habit of saving money and making strategic investment decisions. Individuals learn about various savings options, such as emergency funds and retirement accounts, as well as investment vehicles like stocks and bonds, with an emphasis on long-term wealth accumulation (Fernandes, Lynch & Netemeyer, 2014).

b) *Personal budgeting*: Understanding budgeting and financial planning involves creating a structured plan for managing one's income and expenses. This framework emphasizes the

importance of setting financial goals, tracking spending, and making informed decisions to achieve long-term financial stability (Lusardi & Mitchell, 2011).

c) *Economic issues*: Economic and market literacy involves understanding basic economic principles and market dynamics. This includes recognizing the impact of economic factors on personal finances, as well as gaining insights into investment decisions based on broader economic trends (Van Rooij, Lusardi & Alessie, 2011).

d) *Debt management*: Debt management involves understanding different types of debt, such as credit cards and loans, and developing strategies to effectively manage and reduce debt. This framework addresses interest rates, repayment plans, and responsible borrowing to maintain a healthy financial profile (Lusardi & De Bassa Scheresberg, 2013).

e) *Financial services*: Financial institutions and services literacy involves understanding the role of banks, credit unions, and other financial entities. Individuals learn to choose and use financial products wisely, including checking and savings accounts, credit cards, and loans (Sapienza & Zingales, 2011).

f) *Risk management*: Risk management in financial literacy involves recognizing and mitigating potential risks in financial decisions. This includes understanding insurance, diversification of investments, and overall strategies to protect against unexpected financial challenges (Bianchi, 2018).

g) *Consumer rights and responsibilities*: This framework emphasizes understanding financial contracts, consumer protection laws, and responsible financial behavior. Individuals learn about their rights as consumers, ethical financial practices, and how to navigate the legal aspects of financial transactions (Gerardi, 2010).

h) *Global financial literacy*: Global financial literacy expands individuals' awareness of international economic factors and global financial markets. This framework involves understanding how global events and trends can impact personal finances and investment decisions (Mitchell & Lusardi, 2015).

i) *Ethical and social considerations*: This framework encourages individuals to consider the broader social impact of their financial choices and promotes responsible and ethical financial behavior (Mullainathan, Noeth & Schoar, 2012).

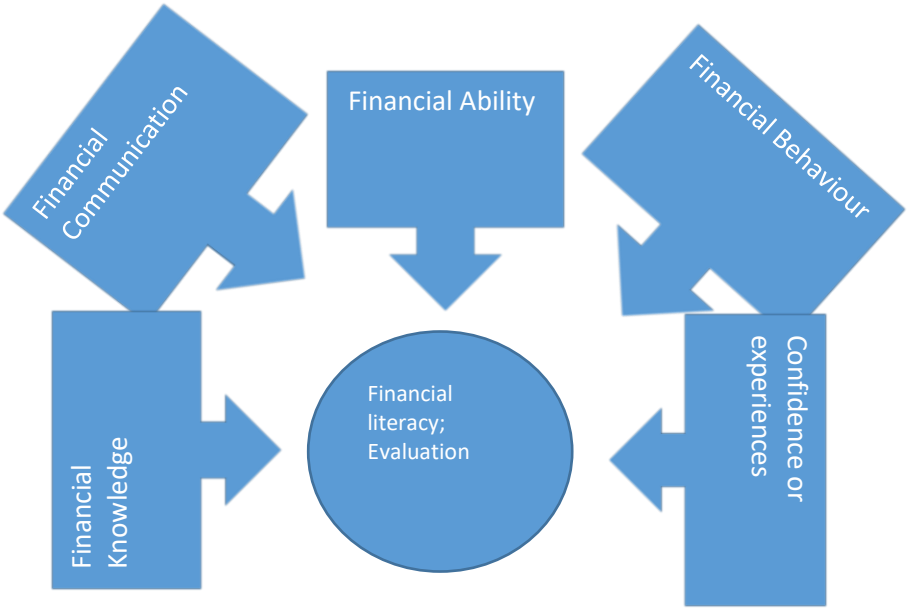
j) *Income and employment*: Income and employment literacy encompasses understanding sources of income, tax implications, and making informed career-related financial decisions.

Individuals learn to navigate salary negotiations, benefits packages, and the overall financial impact of their chosen professions (Lusardi & Mitchell, 2014).

Drawing upon the capability approach proposed by Amartya Sen (Kuklys, 2005) the framework positions financial literacy as a key enabler of individual empowerment. Sen's perspective, emphasizing the expansion of individuals' capabilities and choices, aligns seamlessly with the notion that enhanced financial knowledge equips individuals to make informed decisions, thereby broadening their participation in formal financial systems. Concurrently, the institutional theory provides a lens through which to examine the regulatory and organizational structures influencing financial inclusion, emphasizing the need for an enabling environment that facilitates accessibility and affordability.These frameworks provide a comprehensive perspective on financial literacy, covering knowledge, behavior, attitudes, access to financial services, and the broader economic and regulatory context.

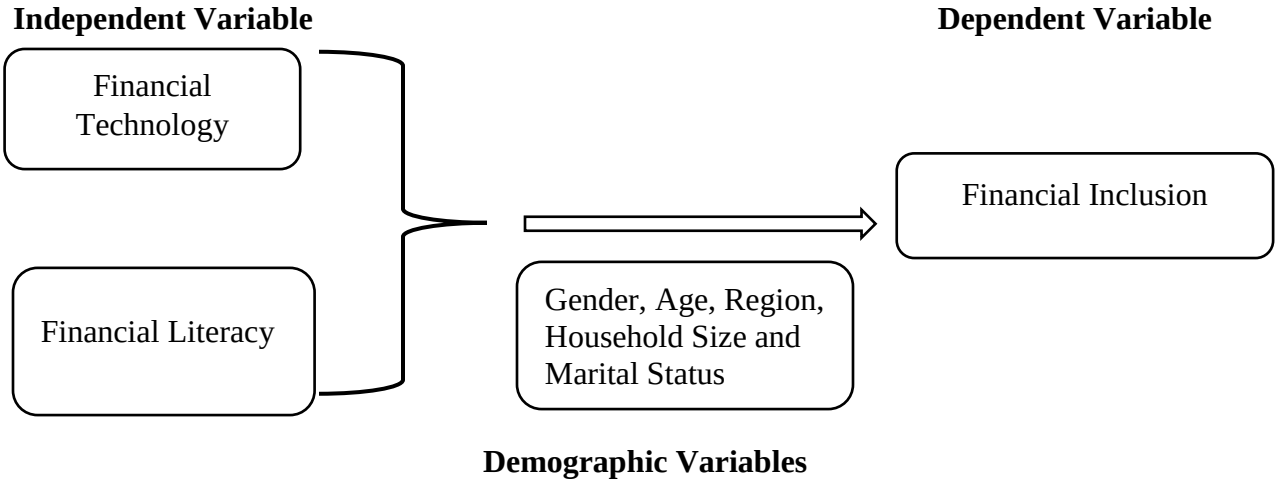
Financially literate individuals are better equipped to leverage and benefit from the opportunities presented by inclusive financial systems. Conversely, increased financial inclusion facilitates the practical application of financial literacy skills by providing individuals with access to banking, credit, insurance, and other essential financial services.

Figure 3: Conceptual Framework to Simplify Variable Relationship



Source: Ghasarma, Putri & Adam, 2017

Figure 4: Overall Conceptual Framework



Source: Author's Conceptual Framework (2024)

2.9 Empirical Review of Financial Inclusion

The empirical studies reveal the types of research studies that have been conducted on financial technology and financial inclusion in different parts of the world. This section covers studies on financial inclusion from Europe, Asia, and Africa.

In a study on the impact of digital finance on financial inclusion and stability in the United Kingdom, Ozili (2018) discovered that both emerging and developed economies benefit from digital finance provided by FinTech companies. The study also discovered that people with little and fluctuating income typically value digital finance's convenience more than the increased price they would have to pay to use these services from conventional, regulated banks. The intellectual foundation of the study is Agency Theory. However, the study did not disclose the technique employed to arrive at the results previously reported.

Arun and Kamath (2015) used an ethnographic research design to analyse financial inclusion policies and practices for 30 nations worldwide. The study examined the use of payment systems as the best point of entry and the adoption and use of financial goods as a specific objective. Despite the high degree of sophistication of the banking system, it was discovered that there were gaps in the level of access to banking and banking products for nations like South Africa, which suggested imbalanced intermediation and/or significant financial exclusion. Finally, this study

emphasised the cultural distinctiveness of 'indigenous money' and established the background for an investigation of the connections between culture and money. Indigenous money was fundamentally different from Western notions of money, which are at the core of laws governing financial transactions and welfare.

In order to determine how financial inclusion affects small enterprises and how financial literacy affects their performance, Sanistasya, Raharjo & Iqbal (2019) conducted an empirical study in Indonesia. The study was based on the Substantive Theory, and a quantitative method with Partial Least Square (PLS) analysis was applied. The results showed that financial literacy has a good and significant impact on business performance. Additionally, financial inclusion has a favourable impact on small businesses' performance.

A study by Bire, Sauw & Maria (2019) was also carried out in Indonesia with the aim of describing the impact of financial training – which is a mediator of financial inclusion – on financial literacy. The research demonstrated that financial training acted as a mediator in the relationship between financial literacy and financial inclusion. Last but not least, Kusumawati, Akmalia and Wardana (2022) did research on how financial technology and financial literacy affect financial inclusion in the Indonesian province of Yogyakarta. The purpose of the study was to determine how much financial literacy affects financial inclusion as a result of financial technology use. The research results demonstrated how financial technology affects financial inclusion through financial education. Sadly, this study failed to explain or connect the theory to the results.

According to Chen and Yuan's (2021) paper, 'Financial Inclusion in China: An Overview', financial inclusion in China has greatly advanced over the past 10 years as a result of policy support, the growth of the banking services framework, the emergence of digital finance, and cross-country evaluation.

Bongomin et al. (2016) carried out a study in Uganda titled 'Social Capital: Mediator of Financial Literacy and Financial Inclusion'. The Social Learning Theory, which Burrhus Frederic Skinner established in 1941, was used in the study. To administer the Sobel, Kenny, and Baron tests and evaluate the role of social capital as a mediator in the link between financial literacy and financial inclusion, the study used a cross-sectional research design. The study's findings demonstrated that social capital served as the sole mediator of the relationship between financial literacy and financial

inclusion. This study emphasises the critical role that social capital plays in mediating and enhancing the sharing of scarce resources, such as knowledge and abilities gained by underprivileged households through financial literacy campaigns. The results supported the social learning hypothesis, which contends that people learn from one another through social contact inside social institutions and through mutual observation, imitation, and modelling.

Zins and Weill (2016) conducted a study titled 'The Determinants of Financial Inclusion in Africa'. The study covered 37 African nations, and the data were taken from the Global Findex (2014) database of the World Bank. According to the research results, people with higher levels of education and income, as well as those who are older and wealthier, prefer financial inclusion. Furthermore, it was determined that the same factors that influence traditional banking also apply to mobile banking. The determinants of informal finance were found to be different from those of formal finance. Gender is a key factor in determining financial inclusion in Africa, particularly for families living in poverty. In many homes, only the men have bank accounts, while the women rely on unofficial savings and borrowing practices. The absence of suitable financial products for those who are financially excluded, as well as the documentation requirements and costs involved in opening a bank account, in addition to the difficulty in accessing banking facilities in rural areas, all have an impact on this behaviour (Chikalipah, 2017; Naidoo, 2014; Zins & Weill, 2016).

The elements that determine financial inclusion are categorised into three primary categories by Bozkurt, Karakus, and Yildiz (2018): (i) social factors, (ii) banking factors, and (iii) political factors. The authors emphasise that key social determinants that affect a nation's level of financial inclusion include education levels, unemployment rates, income distribution, and gender equality.

According to a report by Chileshe (2019) that examined the condition of financial inclusion in Zambia, 62% of the population is still not part of the official financial system. In rural places, this isolation is much more noticeable. It is interesting to note that these findings nearly matched those of the FinScope Zambia 2015 Survey Report (BOZ, 2015), which similarly showed that the country's financial inclusion rate was 59%. Kawimbe (2020) did a different study with an emphasis on Zambia's economic development, financial inclusion, and mobile financial services. This study used a systematic review approach – a sort of literature review that gathers pertinent articles from databases in order to produce a comprehensive and exhaustive account of the body of prior

research on the topic at hand. According to Kawimbe's study, existing research on financial inclusion and how it affects economic growth in Zambia is still in its infancy.

According to the UNCDF (2019), just 4% of Zambians had an active account with a digital banking provider. Even though 2002 saw the introduction of one of the first mobile money systems on the continent (Zap by Celpay), little progress was made in the business and it was believed to be stuck in the 'sub-scale trap'. Consequently, Zambia was not a viable market for mobile money since its population was too small and spread out. In 2019, Zambia's digital banking environment looked quite different, having seen rapid expansion that exceeded the wildest dreams of observers both locally and abroad. The UNCDF market development framework classifies the current industry stage as 'late expansion', with certain parts of the ecosystem having already entered the 'consolidation' phase. More so, the industry has matured from its 'early' stage to its 'late' stage. The data alone make it clear how much progress has been made in Zambia's digital banking environment since its inception. Lately, 44% of adults in Zambia use some form of electronic money, up from just 2% in 2014. Over the past five years, the number of active agents has increased from 13 to 478, or 478 per 100 000 people. The proliferation of DFS in Zambia can be directly attributed to the efforts of mobile money agents. Offering agents the right incentives and equipping them with the resources they need to manage their funds and grow their businesses has allowed mobile money to experience spectacular growth in the number of touchpoints it can be accessed through. A whopping 4 350 000 people were considered 'active customers' in 2019, up significantly from only 330 000 in 2015 (UNCDF, 2019).

2.9.1 Relationship between Financial Technology and Financial Inclusion

Technology in the financial sector makes economic progress simpler. Over the past two decades, there has been a significant increase in the use of financial technology and services connected to mobile money in developing countries. Due to the effect that digital transformation has had on the industry, the financial sector has experienced some of the most significant breakthroughs in recent memory, and FinTech projects are no exception. Mobile money and digital wallets are two examples of FinTech technologies that are assisting in closing the access gap between people who have access to traditional financial infrastructure and those who do not. These alternatives are assisting in filling the gap left by the collapse of conventional financial infrastructure.

The study carried out in 2022 by Goswami, Sharma, and Chouhan on the elements influencing the adoption of disruptive financial technology for financial inclusion in rural India sheds some light on what has transpired in Asia in terms of financial inclusion. There is evidence to imply that social pressure has a significant impact on how people behave and and how they decide whether or not to adopt new technologies in India's rural areas. Previous studies have shown that users' intention to use financial technology systems and their actual usage are positively correlated. Users' adoption and utilisation of financial technology services are significantly influenced by their perceptions of the technology's utility and their trust in the system's capacity to meet their demands (Venkatesh et al., 2003; Davis, 1989).

Additionally, the expansion of financial inclusion has given financial institutions new chances to offer mobile banking services to low-income, remote-area customers, enabling them to conduct cross-border transactions (Kaleem et al., 2019).

According to Yengeni (2020), the worldwide focus on financially including lower poverty levels has made learning how to promote banking among the previously unbanked in developing countries a serious issue on a global scale. Using the Sarma-developed financial inclusion criteria variables in conjunction with a two-stage principal component analysis, the study builds on earlier research by Cámara and Tuesta (2014). The study finds that financial inclusion is frequently positively and significantly related to the use of mobile accounts. Mobile banking expands the number of people who have access to banking services, but digital payments are more advantageous to those who already have an account. This is one of the most obvious differences between the effects of each type of influence.

Particularly in East Africa, the introduction of mobile money has significantly slowed the rate at which people access traditional financial services. The utilisation variable has been examined in previous studies, and it has been demonstrated that it is a crucial factor for determining the degree of financial inclusion. In spite of this, Africa still has potential for improvement in terms of the availability, usability, and accessibility of financial resources.

2.9.2 Relationship between Financial Literacy and Financial Inclusion

Kou et al. (2021) research demonstrated that financial literacy is a crucial factor affecting financial inclusion. This was found to be the case because of the major barriers associated with access to

finance. Individuals who are financially literate have the information and abilities necessary to properly evaluate a wide range of financial products and services, which is made possible by the fact that they have this literacy. This topic is given significant emphasis throughout this research because of the critical role that financial literacy plays in expanding access to financial services. Ghatak (2013) characterised financial literacy as the demand-side part of the financial inclusion equation in earlier research that explored the connection between financial literacy and financial inclusion. This aspect of the equation may be found in the equation. Fundamentally speaking, financial literacy refers to an individual's capability of comprehending and being aware of the many financial products and services that are available to them, whereas financial inclusion refers to the availability and accessibility of these products and services. A wide corpus of previous theoretical and empirical research, such as that conducted by Lusardi et al. (2013) and Sukumaran (2015), among a plethora of other sources, provided invaluable insights that were used in this study.

Utilisation of financial products and services in an efficient manner is absolutely necessary if one wants to derive their full value. The research conducted by Lusardi et al. (2013) emphasises that people who have a higher level of financial literacy are more inclined to participate in financial markets. Financial literacy can make a substantial contribution to guaranteeing the proficient use of financial products and services, as was noted in the aforementioned study. Research conducted by other academics, such as Kimball and Shumway (2006), Christelis, Jappelli, and Padula (2010), Van Rooij, Lusardi, and Alessie (2011), Yoong (2011), Almenberg and Dreber (2011), and Arrondel, Debbich, and Savignac (2012), lends credence to this argument. The findings of Sukumaran (2015) that financial literacy is a crucial factor in financial inclusion are echoed by Kasekende (2014), who provides additional support for the concept that increasing levels of financial literacy can improve access to financial services. Kasekende's (2014) findings also match Sukumaran's (2015) findings. According to Gardeva and Rhyne (2011), financial literacy can be interpreted as the master key that unlocks a variety of facets of financial inclusion.

In spite of this, there is a lot of grey areas surrounding the connection between financial literacy and financial inclusion. According to the findings of a number of investigations, such as the one conducted by Wachira and Kihiu (2012), increased levels of financial literacy do not automatically translate into increased levels of financial inclusion. This shows that knowledge of basic financial

concepts may not be sufficient on its own and that other factors that determine financial inclusion should also be taken into consideration. This study aims to provide complete knowledge of the relationship between financial literacy concepts and financial inclusion indicators, specifically within the context of Zambia. In view of the various perspectives that have been presented, as well as the need for more decisive insights, it is vital that studies such as this one be conducted. The purpose of this study is to address the limitations and inadequacies that were found in previous research

2.10 Chapter Summary

In conclusion, despite the fact that the influence of financial technology on financial inclusion has been intensively researched in the African context, in particular in nations such as Kenya, where mobile money has played an important role over the years, there is still a noticeable gap in the literature regarding countries such as Zambia. The existing body of research frequently places an emphasis on the factors that determine financial inclusion; nevertheless, there is a paucity of studies that quantify the precise influence that technological advancements in the financial sector have had on fostering financial inclusion in Zambia. This gap in the literature underlines the need for specific research that delves into the complexities of Zambia's financial environment, and how the adoption and integration of financial technology have influenced the accessibility and utilization of financial services. It is essential to fill this knowledge vacuum in order to gain a more in-depth understanding of the role that financial technology plays in sculpting the dynamics of financial inclusion in Zambia.

CHAPTER THREE: RESEARCH METHODOLOGY

Introduction

This chapter provides a detailed account of how the investigation will be carried out to assess the impact of financial technology on financial inclusion in Zambia, aiming to evaluate whether financial technology serves as an effective means to advance financial inclusion in the country. The chapter is structured into four primary components: data and research design, a detailed description of the dependent, independent and control variables and how they have been used in the estimation approach and lastly how the regression model has been estimated.

3.1 Data and Research Design

This study employs secondary data obtained from the 2020 FinScope Survey conducted in Zambia, supported by data from other reports by the Central Bank of Zambia such as the Annual Reports of 2011, 2014, 2017 and 2020 (BOZ, 2011; BOZ, 2014; BOZ, 2017; BOZ 2020b). The Bank of Zambia conducted the survey in partnership with Financial Sector Deepening Zambia, Rural Finance Expansion Programme, German Sparkassenstiftung, Ministry of Finance, and United Nations Capital Development Fund, with advisory assistance from FinMark Trust. The expertise and infrastructure for data collecting were given by the Zambia Statistics Agency (ZamStats), while the survey questions were designed through a consultation process that involved many stakeholders (BOZ, 2020).

3.1.1 Sampling Frame

The researchers utilized the 2010 Census of Population and Housing (CPH) of the Republic of Zambia as a basis for establishing the sampling frame for the FinScope 2020 Survey. The aforementioned framework underwent successive updates in order to accommodate alterations in districts and constituencies from 2010 to 2019. The territorial division of Zambia consisted of 10 provinces, which were further subdivided into districts, constituencies, and wards. The process involved the subdivision of wards into census supervisory areas (CSAs), which were further subdivided into enumeration areas (EAs). The boundaries of EAs were delineated on a census map, which included identifying details and a size measurement based on the number of households recorded in the 2010 CPH. The survey utilized this list of EAs as the sample frame (BOZ, 2020).

3.1.2 Sample Design and Implementation

The FinScope Survey employed a stratified cluster survey design, which involved a two-stage process of sampling, for data gathering. The selection of clusters within each province was initially conducted using the probability proportion to population size approach, leading to the selection of 866 EAs.

A home listing procedure was performed in the sampled EAs during the second step. A linear systematic sampling method was employed to select 15 families per cluster from the resulting household lists, which served as the sampling frame. In order to obtain a sample that accurately represented the entire nation, a total of 12 990 homes were chosen. Each household was represented by one adult member of 16 years old or older.

The survey utilized the modified Kish Optimal Square Root allocation method to ensure efficient resource allocation. This method guarantees that domains with insufficient population are oversampled, while the sample size in domains with excessive population is adjusted, allowing for accurate provincial estimates to be derived, taking into account the differences in provincial sizes (BOZ, 2020).

The study's fieldwork was conducted over a span of four weeks in September/October 2020, with a staff of 300 enumerators assigned to the task of data collecting. A comprehensive set of 12 781 in-person interviews were undertaken, with a noteworthy response rate of 98.4%. In order to enhance the process of data collection, the utilization of Computer Aided Personal Interviews (CAPI) was implemented, enabling the computerized input of data. Stringent quality control protocols were employed to guarantee the precision and dependability of the gathered data. The implemented strategies encompassed the utilization of enforced questionnaire flow and skip procedures within the CAPI program, alongside the implementation of consistency checks to identify and address any inconsistent responses, hence facilitating clarification by enumerators.

Before the fieldworkers underwent training, the application underwent a pre-testing phase to assure the seamless execution of questions on electronic devices. The field staff in the 10 provincial capitals participated in an intensive 12-day training session. Master trainers performed random spot checks on fieldworkers during interviews in different EAs to ensure adherence to quality standards. Furthermore, the daily data obtained from enumerators was checked by field supervisors

to ensure its completeness before to its transfer to the ZamStats website.

3.2 Description of Variables

3.2.1 Dependent Variable

Financial inclusion is the dependent variable in the study and it will be measured in terms of financial services' accessibility/usage/utilization. In the 2014 Global Findex, account ownership is defined as having an account either at a financial institution or through a mobile money provider (Demirgüç-Kunt et al., 2015. There are two categories of account ownership, the first category is for accounts with financial institutions – a bank, credit union, cooperative or microfinance institution. The second is basically mobile-phone-based services that are used to pay bills or send and receive money. According to Aggarwal and Klapper (2013), mobile money accounts are restricted to services that can be utilized by individuals without the need for a financial institution account. However, individuals who have mobile money accounts that are associated with a financial institution are regarded as having an account with said institution. The primary focus of this study will be on indicators related to accessibility and utilization. This study will examine the concept of accessibility in relation to formal financial inclusion, which encompasses many variables such as the ownership of banking products, investment/savings goods, credit/loan products, and insurance products. This research will examine the concept of financial inclusion, encompassing both formal and informal forms, as a component of the dependent variable.

Formal Financial Inclusion

Formal financial inclusion is focused on the use of formal financial products and services with institutions that are regulated. The entities encompassed within this category for this study consist of commercial or local banks, insurance companies and service providers, regulated and registered credit institutions like microfins, cooperatives and mobile network operators that offer mobile money services. The following is an exhaustive enumeration of the components encompassed within the sphere of formal financial inclusion.

a) *Account ownership*: This component measures the proportion of individuals or households that have access to a formal financial account, such as a bank account or mobile money account. In the study, account ownership can be operationalized through various indicators or proxies. These may include variables such as the percentage of individuals with bank accounts, the

proportion of the population using mobile money services, or the prevalence of savings accounts within the target population. These indicators capture the level of account ownership and provide insights into the inclusiveness of financial services.

b) *Access to credit*: This component examines the availability and usage of credit by individuals or households, including indicators such as loan application rates, loan approval rates, and the size of loans obtained. The purpose of this component is to assess how inclusive the credit system in Zambia is currently. Zins and Weill (2016) define access to credit as encompassing persons who have obtained loans from financial institutions within a 12-month time frame.

c) *Formal-use saving*: Formal savings is a key dependent variable in the study of financial inclusion. It refers to the extent to which individuals engage in saving activities through formal financial institutions such as banks, credit unions, or other regulated entities. Formal savings is an important indicator of financial inclusion as it reflects individuals' access to, and usage of, formal financial services.

d) *Use of mobile money services*: This variable assesses the adoption and usage of mobile money services, including indicators such as the number of mobile money transactions, mobile money account balances, and mobile money usage for payments and remittances.

Informal Financial Inclusion

According to the Uganda FinScope Survey (FSD, 2018), informal financial inclusion refers to the provision of financial services such as savings and credit by an institution or individual that is not regulated or supervised. These services include a range of financial options, such as savings groups, Village Savings and Loan Associations (VSLAs), Rotating Savings and Credit Associations (ROSCAs), community-based money lenders, and burial societies. In the Zambian context, informal financial inclusion would include;

Village banking: This concept was created to assist individuals with low incomes in raising capital while also enabling them to save. Village banks typically consist of individuals who collaborate to share and provide assurance for each other's loans by combining their resources from which individuals can borrow at a reasonable interest rate.

Chilimba is a savings activity commonly practised in Zambia. It entails a collective of individuals who willingly commit to making consistent, predetermined cash contributions that are distributed

to each member through rotating cycles.

Kaloba is a casual method of borrowing money from money lenders. Often referred to as loan sharks, these individuals are able to lend money with minimal paperwork, thus streamlining the process of obtaining credit. However, in many cases, because of the high risk involved with these loans, interest rates tend to be significantly higher than those offered by regulated financial institutions.

In order to assess an individual's informal financial inclusion, it was necessary for them to have engaged with one or more financial services or products within the past year.

3.2.2 Independent Variable

Financial Technology

This refers to the provision of financial products and services through digital platforms, including smartphones, the internet, and electronic payment systems. The increasing prevalence of mobile phones in facilitating financial transactions has prompted extensive research on the potential implications for financial inclusion. In Kenya, where M-PESA is extensively utilized, a study conducted by Suri and Jack (2016) demonstrated that the introduction and widespread adoption of M-PESA has resulted in a rise in financial inclusion. Demirgüç-Kunt et al. (2018) conducted further research which revealed a positive correlation between the implementation of DFS and the growth of account ownership and utilization of financial services in emerging nations. Based on existing literature and empirical evidence, this variable will be employed in the research to investigate the influence of FinTech service utilization on financial inclusion in Zambia. Financial institutions such as banks, FinTech companies, mobile network carriers, and insurance organizations have the capacity to provide a range of services.

In the Zambian context, the use of FinTech will be used to explore the uptake of digital financial services for financially related needs and the impact it has had on financial inclusion. These services include, mobile money, internet banking, e-commerce and any online (cashless) transactions/payments that individuals may have performed in the last 12 months. The FinScope Survey was carried out in 2020 while the COVID-19 pandemic was in its infancy, however, the expectation is that with the rise in cases, more people in rural communities took up digital financial

services hence a positive relationship.

3.2.3. Control Variables

Financial Literacy

This variable captures the level of knowledge and understanding of financial concepts among individuals or households, including indicators such as awareness of financial products, understanding of interest rates and fees, and basic financial management skills. The study seeks to examine how financial literacy influences the adoption and usage of financial technology, the understanding of digital financial services, and the ability to make informed decisions regarding digital financial products. By including financial literacy as an independent variable, the research hopes to assess its impact on various dimensions of financial inclusion, such as access to digital financial services, usage patterns, and the overall effectiveness of financial technology in promoting inclusive financial outcomes (Kasozi & Makina, 2021).

In order to measure financial literacy, a questionnaire was used with the guidance of the OECD/INFE 2020 International Survey of Adult Financial Literacy Guidelines, where a defined list of multiple-choice questions were asked of the respondents during the survey (OECD, 2020). The questionnaire has been designed to assess the knowledge, behavior and attitudes of the respondents. In order to analyse the results, the methodology described in the OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion was adopted by Zambia Statisitcs Office to analayze the results using the scores assigned to each of the attributes. The study employed an iterated principal factor analysis, utilizing a set of 13 indicators to assess the accuracy of responses. According to Hung & Yoong (2009), the ultimate literacy score for each individual is calculated by assigning weights to each correct response based on the estimated factor loadings. The scores assigned to each of the financial literacy indicators include knowledge, behavior and attitude, which have different maximum values that are used for the weighting. According to the OECD, the most heavily weighted factor is behavior. This is largely driven by the fact that behavioural questions make up a large part of the questionnaire, seeing as financial behavior is a key component in financial literacy. To gain further understanding on the approach used to measure financial literacy, kindly refer to Lusardi and Mitchell (2007b). The expectation is that as levels of financial literacy increase, financial inclusion also begins to increase.

Financial Advice

This is an important independent variable as it is used to establish whether respondents seek financial advice from family, friends or professional financial advisors. This variable is aimed at providing some insight into what may potentially drive financial behavior, why individuals pick certain products over others and whether their participation is self driven or influenced by their external environment. Financial advice can have an impact on financial inclusion because it acts as an information bridge between those who may not know and those that do. It has a critical role to play in the drive towards financial inclusion as the right advice means the right participation in both the formal and informal financial ecosystems. Various authors like Van Rooij, Lusardi & Alessie (2011) have found that in scenarios where financial literacy is not widespread, as is the case with most countries in sub-Saharan Africa, proper financial advice becomes critical for profitable investment. Adequate and proper financial advice is also believed to play a role in financial product choice (Cwynar et al., 2020). Financial advice may act as an opportunity to enhance financial knowledge, which further enhances financial capability. Financial capability is explained as how well an individual manages their resources (Xiao & O'Neill, 2018). A study by Königsheim et al. (2017) revealed that people with increased financial capability also depict efficient access to online resources and experts. Nguyen & Rozsa (2019) argue that financial literacy, which is a key component of financial capability, has an impact on financial advice-seeking behavior. A study carried out in China found that households that have high levels of financial literacy tend to also have high levels of financial advice-seeking behavior and the reason behind low performance of financial advice is the poor level of financial literacy (Johnson & Sherraden, 2007; Pan, Wu, & Zhang, 2020).

In this study, financial advice will be used as one of the independent variables picking up on some of the studies mentioned earlier that have been carried out in India and China.

Age

Age can influence individuals' financial behaviors, needs, and preferences. By including age as a control variable, the study seeks to determine whether different age groups experience varying levels of financial inclusion and whether the impact of financial technology on financial inclusion differs across age cohorts. The study considers individuals over the age of 16 as adults. According

to a study by Cnaan et al. (2012), age, gender, education and income become the barriers to the accessing of financial inclusion. According to Fungacova and Weill (2014), there is a non-linear relationship between age and financial inclusion. These studies have elaborated the key role that an indivdual's age plays on financial inclusion and hence this study will leverage these findings to explore how this applies in the Zambian context. The expectation is that as one grows older, the level of financial participation begins to increase. However, there is a point at which financial participation begins to reduce. Hence the relationship expected is positive and negative beyond a certain age group. However, the author does realise that this is subject to other factors like income and employment rate as they play a key role.

Gender

This is a binary variable that categorizes respondents as either male or female (Mndolwa, 2017). Gender is considered one of the determinants – among age, income and education – of financial inclusion. The disparities of gender in financial inclusion have been widely documented, with women often facing greater barriers to accessing formal financial services compared to men. By including gender as a control variable, the study aims to examine whether any observed effects of financial technology on financial inclusion are consistent across gender groups or whether there are differential impacts between men and women. The research aims to explore how included females are in both formal and informal financial environments. The expectated relationship is that there exists a gender gap in Zambian society and it trickles down to financial inclusion. A negative relationship in favour of men is expected, with more men being financially included than women.

Household Size

This is a demographic variable that brings into perspective the impact that household size has on the level of financial inclusion in Zambia. Larger households tend to have more expenses and this can impact disposable income available for saving/investing. However, this is subject to other factors like whether everyone in the home is employed or if it is a one-income household or does not have any income at all. A household with one income is expected to have less finances to particpate in financial options in comparison to a household that has two incomes with the same number of dependents. A negative relationship is expected with larger households being less financially inclusive, especially formally.

Marital Status

This control variable seeks to explore the financial beliefs and behaviors of individuals belonging to three groups, namely married, divorced/separated and single. A study by Lee and Kelley (2023) with similar variables (marital status) had findings that reveal a notable disparity in financial perceptions and behaviors among these groups. The study findings indicated that married men/women and single men exhibited greater adherence to healthy financial behaviors in comparison to single women (Lee & Kelley, 2023). The institution of marriage has consistently played a crucial role in the accumulation of wealth throughout an individual's lifespan (Linn, 2013; Vespa & Painter, 2011; Zagorsky, 2005). Conversely, being unmarried might be perceived as a sign of lower income and may entail financial disadvantages. Existing research indicates that married persons exhibit a higher propensity for accumulating money over the course of their lifetimes in comparison to their unmarried counterparts (Grinstein-Weiss et al., 2006; Linn, 2013). Previous studies have indicated that unmarried women exhibit a significantly higher propensity for experiencing financial stress in comparison to their married counterparts, who have effectively mitigated this stress through the institution of marriage (Kingston, 2013). Additionally, research has indicated that married persons exhibit a higher propensity for engaging in favorable saving behaviors in comparison to their single counterparts (Heckman & Hanna, 2015). Based on a comprehensive analysis of many studies, it is evident that marital status exerts an influence on financial conditions, such as financial resources and perceptions, as well as financial outcomes, including financial behaviors (Heckman et al., 2014). Zambia, being classified as a developing nation, exhibits a tendency to offer a greater range of formal financial alternatives to married individuals in comparison to their unmarried counterparts. Financial institutions may perceive married individuals as possessing greater financial stability compared to their unmarried counterparts. The expected relationship of this study is that married individuals are more financially included than divorced/separated and single individuals.

Region

The study also employs geopgraphical location as one of the variables to be assessed with financial inclusion. The distribution between rural and urban areas has the ability to influence the accessibility of financial services for individuals residing in these regions. The research conducted by Leyshon & Thrift (1995) and Collard et al., (2001) examines the factors that influence financial

inclusion and emphasize the impact of geographical factors, such as the absence of roads, on the exclusion of different social groups. They conclude that individuals residing in rural areas and remote locations from urban financial centers are more prone to financial exclusion. Some of the challenges in rural areas may range from poor road networks to limited internet connectivity. In a study exploring financial exclusion in the Central African Republic, the results show that living in a rural area is a driver of financial exclusion. The study took into account the differences between rural and urban areas and discovered that the rural area in the Central African Republic is penalized in terms of accessibility to financial services (Mokobongo et al., 2022). Zambia is no exception, sharing some of the challenges regarding infrastructure, internet access and education that have been explored by other authors. Morvant-Roux and Servet (2007) argue that providers can achieve cost savings by offering their services in metropolitan regions, which have a higher population density, due to the concept of economies of scale. Rural communities experience elevated transportation expenses and diminished financial stability (Claessens, 2006; Morvant-Roux and Servet, 2007). Leveraging these studies, geographical location has been identified as one of the key socio-demographic variables to be used. The expected relationship is a positive relationship between individuals in urban areas and financial inclusion and a negative relationship for those living in rural areas.

3.3.1 Estimation Approach

Considering the nature of the secondary data being used and the desired output, the best approach to estimate whether an individual is financially included or not is by using a logistic regression model. The model will allow for the determinants to be analysed. As Zambia seeks to enhance financial inclusion through digital means, insights gained from this logistic regression analysis contribute to evidence-based policymaking and targeted interventions. The praxis that will be used in the study are whether an individual is financially included or not. In order to analyse the determinants of financial inclusion, binary logistic regression will be used. A logit model is based on cumulative logistic distribution function. For basic regression function:

$$\boldsymbol{Y_i = \beta x_i + u_i} \qquad (1.0)$$

Where (Y_i) = 1 if the individual is financially included

and (Y_i) = 0 if the individual is not financially included

The probability of such a binary choice for all individuals is derived by

$$p_i = Pr(y_i = 1|x, \beta) = \Phi(\beta x_i) \quad (1.1)$$

Where pi is the probability of an individual being financially included. Therefore the probability of one not being financially included is

$$(1-p_i) = Pr(y_i = 0|x, \beta) = 1 - \Phi(\beta x_i) \quad (1.2)$$

The logit model uses logistic cumulative distribution function Φ .Given the logistic distribution, the probability can be specified as

$$Pr(y_i=1) = e^{\beta x_i} / (1+e^{\beta x_i}) \quad (1.3)$$

The logistic function specifies the odds ratio as

$$e^{\beta x_i} = \frac{Pr(yi=1)}{Pr(yi=0)} \quad (1.4)$$

By taking the natural logarithm on both sides of the equation yields a log odds ratio

$$Li = \ln\left(\frac{Pi}{1-Pi}\right) = \ln e^{\beta x_i} = \boldsymbol{\beta x_i} \quad (1.5)$$

Considering the logit model is in terms of probabilities, the model is estimated using maximum likelihood estimation method.

The logit equation for this study is

$$Li = \ln\left(\frac{Pi}{1-Pi}\right) = \ln e^{\beta x_i} = \boldsymbol{\beta x_i} \quad (1.6)$$

Where: $\boldsymbol{\beta x_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \ldots + \beta_n x_n}$

β0 represents the constant term. With regards to this study, this represents the country's fixed

effects on financial inclusion. **β1**, **β2 … βn** are the coefficents of the independent variables in the regression. The independent variables include financial literacy, financial advice, financial technology usage and socio-demographic variables, which include age, gender, marital status, region and household size.

Therefore the model implies the log odd ratio as

$$\log\left[\frac{FIi}{1-FIi}\right] = \mathrm{FI_i} \qquad (1.7)$$

Thus, the specific regression model applicable to this study will be:

$$FI = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon \qquad (1.8)$$

Where:

- FI is the dependent variable Financial Inclusion (formal and informal financial inclusion; i.e. financial services accessibility/ usage/ utilization)
- X_1: Financial Literacy
- X_2: Financial Advice
- X_3: Financial Technology Usage
- X_4: Age
- X_5: Marital Status
- X_6: Gender
- X_7: Region
- X_8: Household Size (HHS)
- ε is the error term

3.3.2 Reliability and Validity

Secondary data from the 2020 Zambia FinScope survey was used for the study. In order to analyse the data the statistical package that was used for the regression analysis was SPSS. This was crucial for examining the relationships between predictor and outcome variables. The validity of any survey depends on the statistical reliability of the sampling framework and the sampling approach

that was used has been explained in detail in sections 3.2.1 and 3.2.2. The detailed approach used for sampling increases the reliability and validity of the data used in the study. However, there may still be room for errors considering a sample is used as opposed to a population. There may be some biases with regards to some of the responses received from the respondents and this may cause selection bias as parts of the population may not have been captured. The study will adhere to all pertinent research ethics outlined in the UCT Code of Ethics for Research.

In spite of the reliability and validity of the data, there were some challenges when dealing with the data which may prove to be limitations to the study. Considering the data being used is a sample, this may cause some challenges with being representative of a population. Some answers to the questions that were asked may not correctly represent the population. These are some of the common downsides to using sample data. Some of the data also had gaps in how questions were answered by the respondents.

3.4 Conclusion

The chapter gives a comprehensive explanation of the sampling approach that was used on the secondary data. It further delves into the variables that have been selected for the study. The dependent variables split between formal financial inclusion and informal financial inclusion and the overall observation which is financial inclusion. It gives a detailed account of the individual independent variables by looking at how each of them relate to financial inclusion. There is reference to previous studies where these variables have been used and the expected results are detailed. A total of eight independent variables are used with five of them being socio-demographic variables. Age, marital status, gender, region and household size are the demographic variables used in the study. Financial literacy, financial advice and FinTech usage are the remaining independent variables.

The preferred estimation approach used in the study is then explained and the reasons for the choice of regression being that the expected output is binary. Logistic regression was the best approach for the estimation. In the last part of the chapter, some of the research limitations are explained while still highlighting the validity and reliability of the data being used in the study.

Table 2: Summary of variables

Variable	Measurement	Expected Relationship
	Dependent Variable	
Financial Inclusion (FI)	Dummy variable decoded as 1 if respondent has access to either formal or informal financial services, otherwise 0	-
Formal Financial Inclusion (FFI)	Dummy variable decoded as 1 if respondent has access to formal financial services, otherwise 0	-
Informal Financial Inclusion (IFI)	Dummy variable decoded as 1 if respondent has access to informal financial services, otherwise 0	-
	Independent Variable	
Financial Technology (FT)	Dummy variable equal to 1 if respondent uses financial technology, 0 otherwise	Positive (+)
	Control Variables	
Financially Literate	Dummy variable equal to 1 if respondent is financially literate, 0 otherwise	Positive (+)
Financial Advice	Dummy variable equal to 1 if respondent is financially adviced, 0 otherwise	Positive (+)
Age Categories	Dummy variable equal to: **1** if respondent is aged 26–35; **2** if respondent is aged 36–45; **3** if respondent is aged 46–55; **4** if respondent is aged 56–65; **5** if respondent is aged over 66 and zero otherwise.	Positive (+) and Negative (-)
Region	Dummy variable equal to 1 if respondent is located in a rural area, 0 otherwise	Negative (-)
Gender	Dummy variable equal to 1 if respondent is male, 0 otherwise	Positve (+)
Marital Status	Dummy variable equal to 1 if respondent is married; 2 if respondent is divorced/separated and 0 otherwise	Positve (+) and Negative (-)
Household Size	This represents household size ranging from 1 to 10 people	Negative (-)

CHAPTER FOUR: DISCUSSION OF RESULTS

Introduction

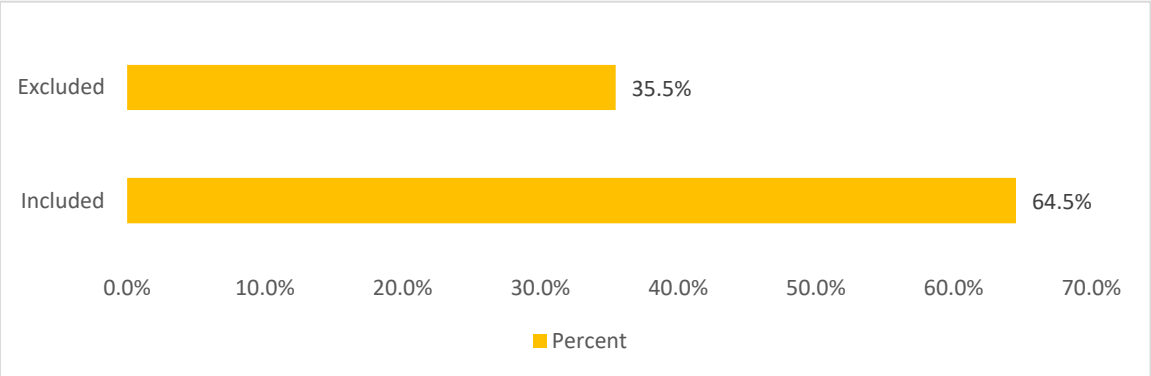
This chapter presents the results of the data analysis conducted to answer the research questions and objectives of this study. The data used for the analysis are obtained from the 2020 FinScope survey by the Bank of Zambia. The results are organized into three sections with the first section giving a detailed analysis of the demographic statitsics based on the data analysed. The second section gives a detailed account of the regression results for each of the variables. The third section summarises the chapter by concluding the key findings and relationships established for Zambia. The results are presented in tables and graphs, along with interpretations and discussions.

4.1 Demographic Characteristics

4.1.1 Financial Inclusion

64.53% of the respondents in the survey responded "Yes" to being financially included. This indicates that a significant portion of the surveyed group has access to financial products or services, such as bank accounts, credit cards, loans, mobile money, village banking or a saving group (see Figure 5). This is a combination of those that are both formally and informally included. On the other hand, 35.47% of the respondents are not financially included. This is a considerable portion and suggests that over one-third of the surveyed population does not have access to, or does not utilize, formal financial services. Besides that, the fact that over one-third of respondents are financially excluded could indicate socio-economic disparities or systemic barriers that prevent this segment from accessing financial services.

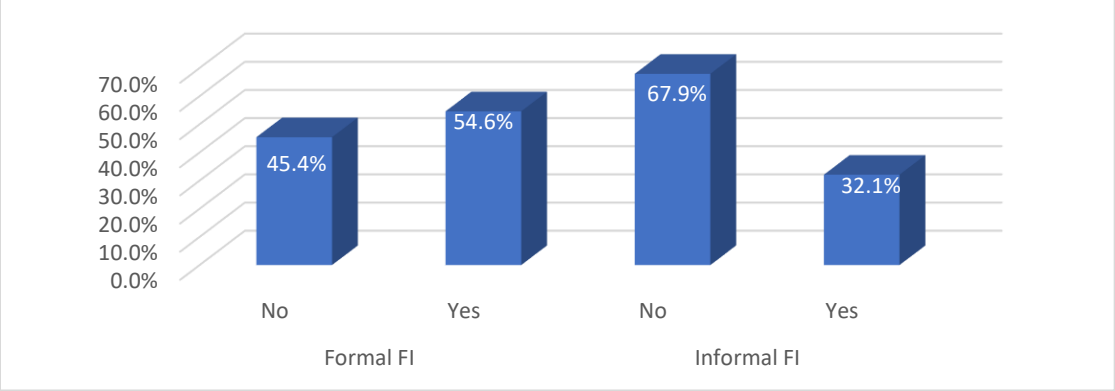
Figure 5: Financial inclusion



Source: Candidates estimates from research data

When respondents were questioned about whether they are formally or informally included, 45.4% (5 804) said they were not formally financially included, while 54.6% (6 977) said they were formally financially included. Formal financial inclusion represents financial systems and products offered by commercial banks and organizations that are regulated by central banks (see Figure 6), while informal financial services include services such as village banking, ROSCAs and Savings and Credit Co-operative Societies (SACCOs). However, a high percentage of the respondents (67.9%) said they were excluded from the informal financial sector. This means there is still a considerable percentage of individuals that are not actively participating in the financial sector. 2.11% of the respondents indicated that they were part of a village banking group while 6.79% indicated they were part of a money group (*Chilimba*). These are very low percentages and may explain the low participation in the informal financial sector.

Figure 6: Formal and informal financial inclusion

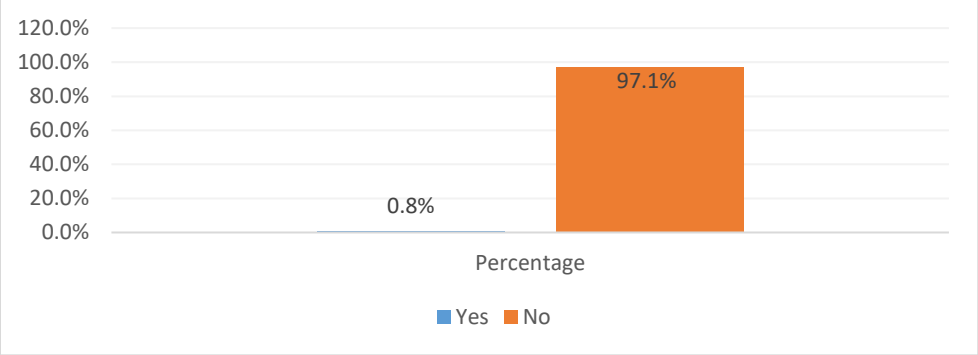


Source: Candidates estimates from research data

4.1.2 Financial Technology

Of the 12,781 respondents that were part of the survey, 12,414 did not use financial technology, which represents 97.1%. Financial technology comprisea a broad range of financial services that are accessed through digital channels, which include online payments, credit, savings, remittances and insurance. Some of these services in the Zambian context include mobile money, ATM usage, internet banking and so on. The vast majority of the surveyed population did not use online financial services, with only 0.8% using them frequently.

Figure 7: Finanical technology usage

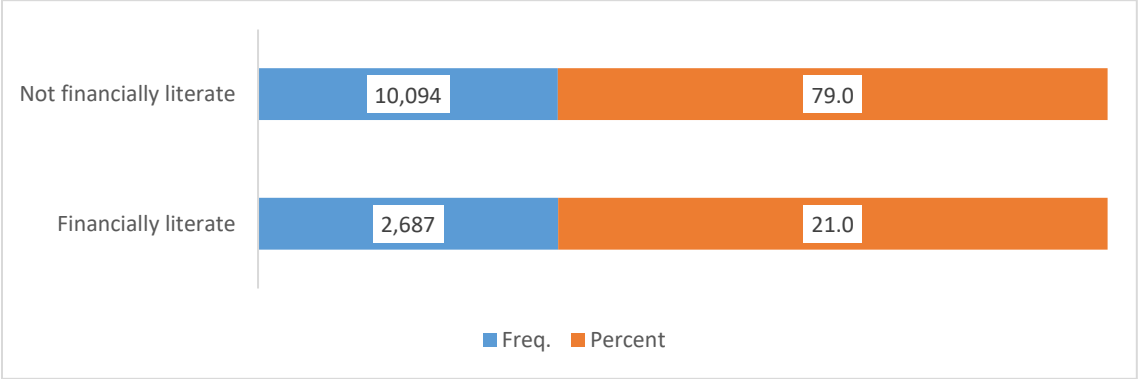


Source: Candidates estimates from research data

4.1.3 Financial Literacy

Only 21.0% of the respondents were found to be financially literate based on their responses to the questions asked during the survey. This suggests that just over one-fifth of the surveyed population understands basic financial concepts, tools, or skills. Financial literacy can encompass understanding concepts such as budgeting, interest rates, saving, investing, and basic financial decision-making. The vast majority – 78.98% of the respondents – were not financially literate. This indicates that nearly four out of every five individuals surveyed may lack knowledge or understanding regarding essential financial concepts or tools (see Figure 8). A lack of financial literacy can significantly impact individuals' ability to make informed decisions regarding savings, investments, loans, and other financial matters. It may also make them more vulnerable to scams, excessive debt, or unfavorable financial terms.

Figure 8: Financial literacy of respondents

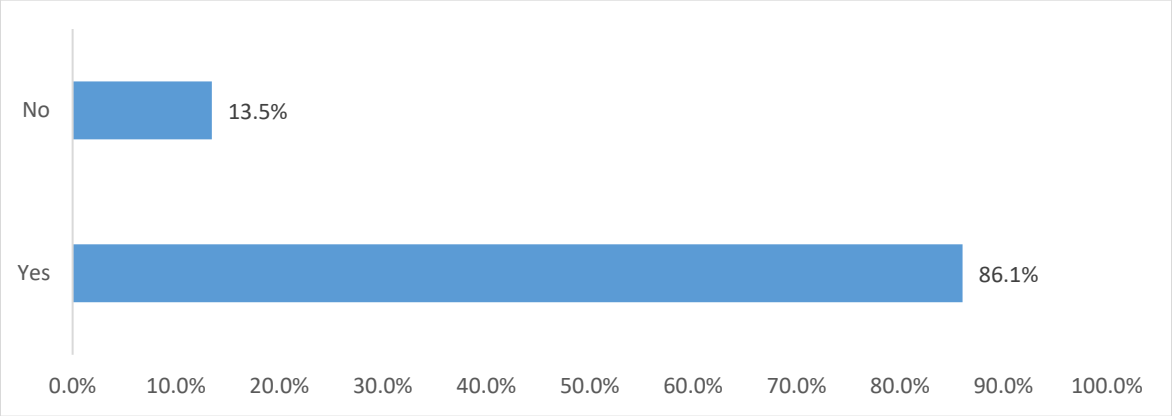


Source: Candidates estimates from research data

4.1.4 Financial Advice

A considerable amount of the respondents agreed to receiving financial advice. A total of 11 001 (86.07%) said "Yes" to receiving financial advice from either their colleagues, family members or people in their community. However, considering the low level of financial literacy that has been observed, it may be concluded that the financial advice received does not often translate into understanding of the financial sytems, services and products that are offered. This may prove to be a barrier to financial inclusion in Zambia as there may be a gap in how the financial advice is received and applied by the individuals.

Figure 9: Financial Advice

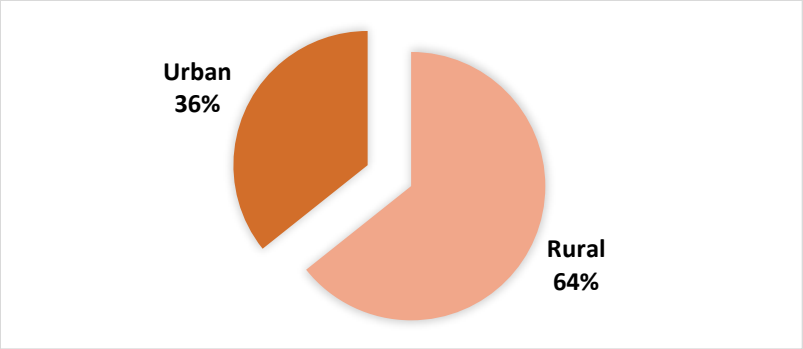


Source: Candidates estimates from research data

4.1.5 Region

In order to understand the extent to which Zambia is financially inclusive, location has a critical part to play. The distribution of the respondents between rural and urban areas revealed that 36% of the respondents were in urban areas while the remaining 64% were in rural areas in Zambia. The low level of financial literacy may also be attributed to the high percentage of respondents living in rural areas where road networks may be inaccessible in some cases and this may present low levels of education and accessiblity to financial services.

Figure 10: Percentage Distribution of Respondents by Region

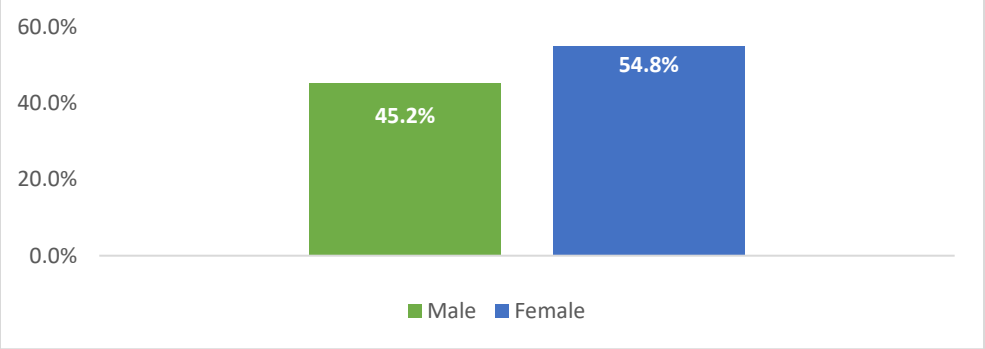


Source: Candidates estimates from research data

4.1.6 Gender

Results based on demographics showed that 45.16% (5,772) of the study participants in the sample were male and about 54.84% (7,009) of the other study participants were female. Therefore, the majority of the study participants were female relative to their male counterparts. This conveys a good understanding of how inclusive the Zambian financial system is for women in the population under focus.

Figure 11: Percentage Distribution (Male vs. Female)

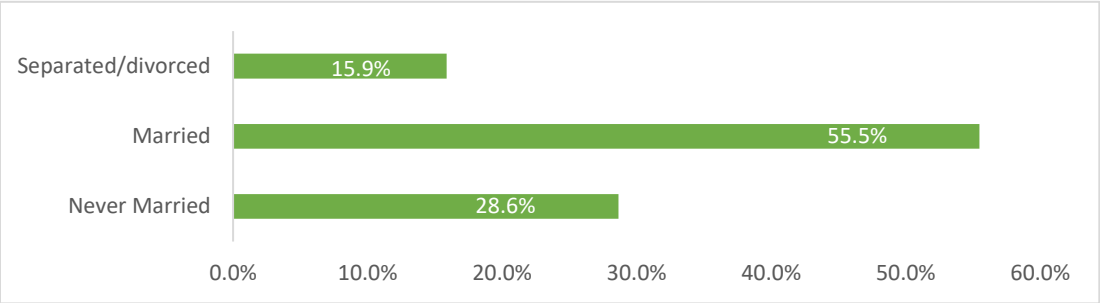


Source: Candidates estimates from research data

4.1.7 Marital Status

Of the 12,781 respondents, the largest percentage of the respondents were married representing 55.5%. The second largest group was those who had never been married, accounting for 28.6%. Other statuses such as being divorced, separated and widowed represented 15.9%.

Figure 12: Percentage Distribution of Marital status

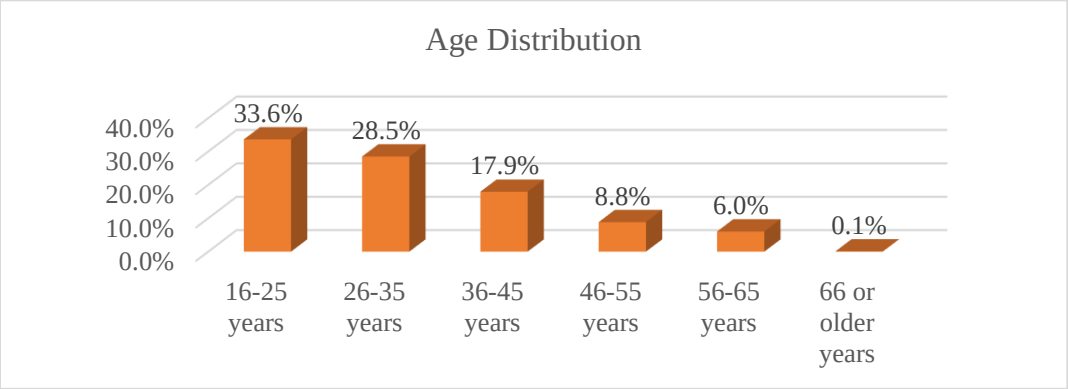


Source: Candidates estimates from research data

4.1.8 Age

In respect to individuals' age, there were 12,781 individual age data points. The average age of the participants was 34.5 years, suggesting that the sample consists of a relatively young population. Besides that, the standard deviation of 15.14 years means that the age distribution is moderately dispersed. It suggests that while the majority of the individuals were around the mean age, there was also a significant number of younger and older individuals. The minimum age that was used in this study was 16. This could indicate the legal minimum age for participation in the survey or study. On the other hand, the maximum age was 99, which provides a sense of the oldest individuals within the sample. The age distribution shows that the sample consists of a broad age range, with a focus on younger to middle-aged individuals.

Figure 13: Distribution of Respondents by age



Source: Candidates estimates from research data

33.6% of the surveyed individuals were between the ages of 16 and 25. This was the largest group in the study. The second largest group was individuals aged between 26 and 35 years who

accounted for 28.5%. 17.9% of the individuals were between 36 and 45 years old and 8.8% were between 46 and 55 years old. The lowest representation was by those older than 66 years who accounted for 0.1%, with those aged between 56 and 65 years accounting for 6%.

4.2 Regression Results

Three sets of regression models were estimated with three dependent variables made up of financial inclusion, formal financial inclusion and informal financial inclusion. This section will give a detailed review of the regression results. The model's R-squared value, which is a vital statistic, provides us with a quantified measure of how well our predictors explain the variability in financial inclusion; this has also been shared in the results. In addition, the regression coefficients signify the nature and strength of relationships between predictors and the dependent variable. Each coefficient paints a part of the larger narrative and will be discussed individually.

Financial Technology Usage

In exploring the relationship between financial technology and financial inclusion, the findings present a nuanced picture across different dimensions. The positive relationship between financial technology and overall financial inclusion, with an odds ratio of 1.44, suggests a 44.4% increase in the likelihood of being financially included for individuals using digital platforms for their financial services. Further delving into formal financial inclusion, the positive relationship, with an odds ratio of 1.52, signifies a high probability of formal financial inclusion for individuals using financial technology compared to those who do not. On the dimension of informal financial inclusion, the positive relationship, with an odds ratio of 1.09, indicates a modest increase in the likelihood of being informally financially included for individuals using financial technology services. All three observations did not show significant relationships to the 5% or 1% level.

In conclusion, while there is a consistent positive trend suggesting that individuals using financial technology are more likely to be financially included, the lack of statistical significance in all three relationships raises caution. It implies that, despite observable associations, the identified relationships between FinTech and overall financial inclusion, formal financial inclusion, and informal financial inclusion may not be considered robust or conclusive. The World Bank asserts that increased utilization of FinTech enhances financial inclusion (WBG, 2021). However, studies have demonstrated that in reality, the increased use of FinTech may not result in greater financial

inclusion. Instead, it can lead to greater inclusion of financial data (ADB 2016; ITU 2016; Malady 2016). French et al., (2021), when exploring the relationship between financial well-being and FinTech services usage through application usage, showed that while participants showed improved financial tracking and adeptness in handling unforeseen expenses, there was no substantiation of their inclination to consistently save in order to enhance their financial resilience. This shows that the access to FinTech services does not necessarily imply usage.

Financial Literacy

The coefficient of financial literacy is negative and significantly related to financial inclusion and formal financial inclusion at 1%. For informal financial inclusion, the coefficient of financial literacy is significant to the 5% level. This suggests that compared to individuals categorised as 'financially literate', those who are not financially literate have lower odds of being financially included. In a previous study carried out by Gorhmann et al. (2018) in which they delved into a cross-country approach to establish whether financial literacy affects financial inclusion, they discovered that while financial inclusion is typically addressed by improving infrastrucuture, financial literacy has a beneficial impact on financial inclusion and has a significant relationship with it. This aligns with the findings of this research which conveys an expected relationship – a more financially literate individual is more likely to be financially included. The inverse relationship emphasises the importance of financial literacy on financial inclusion in the Zambian context. The odds of financially illiterate respondents being financially included was 0.4944 less than financially literate respondents. In addition, the odds of financially illiterate respondents having access to formal financial services was 0.4165, which is lower than the odds of 0.8951 of an individual having access to informal financial services. This finding indicates that individuals with limited financial literacy are more inclined to utilize informal rather than formal financial services. Previous research has indicated a positive correlation between financial literacy and savings (Bernheim et al., 2001; Lusardi & Mitchell, 2009; Peng et al., 2007).This suggests that those who possess financial literacy or expertise may be more adept at managing the intricate computational aspects of financial decision-making, hence resulting in enhanced financial inclusion.

Financial Advice

Similar to financial literacy, an inverse relationship emerged between not receiving financial advice and financial inclusion. The p-value underscored the statistical significance of this connection. For each unit increase in individuals not receiving financial advice, there was a 66.6% reduction in the odds of financial inclusion. This pattern persisted in formal financial inclusion, where the odds decreased by 62% for those not receiving financial advice compared to the reference group. The significance of the p-value to the 1% level mirrored observations made in financial literacy. Furthermore, as the number of individuals without financial advice increased, informal financial inclusion diminished by 82% per unit increase, and the observed p-value highlighted the significance of this relationship at the 1% level. In essence, the regression results consistently affirm a significant inverse relationship between not receiving financial advice and both formal and informal financial inclusion within the data set. Collins and O'rourke (2010) and Agarwal et al. (2011) conducted research on the topic of household finance. These studies imply that financial counseling can assist individuals in developing better financial practices, as well as reducing their levels of debt and delinquency rates. The findings of this research are that, compared to those accessing formal financial services without receiving financial advice, those that use informal financial services have greater access to the financial products and services that they need because their low financial literacy causes them to seek financial advice. These findings on the dynamic relationship between financial advice and financial inclusion – particularly informal financial inclusion – supports findings from other research revealing that individuals who seek financial advice may use it as a substitute for financial literacy. Njanike and Mpofu (2024) found that financial advice had a positive and significant relationship with financial inclusion. Empirical results in studies above show that financial advice, which equips one with the requisite information to make a positive decision, is a crucial factor in the delivery of financial services. This aligns with the significance of the relationship established in this study.

Region

The relationship between geographical location and financial inclusion was explored as this is believed to play a role in understanding the extent to which Zambia is financially inclusive. Respondents were either categorized as being in a rural or urban area. The results showed a positive and significant relationship between region and financial inclusion. The odds of being financially

included increase for individuals in urban areas. The odds of financial inclusion are approximately 4.4091 times higher for individuals in the urban areas compared to the rural areas. The p-value is significant to the 1% level indicating that there is evidence to suggest a statistically significant relationship with the dependent variable – financial inclusion. This was the case with both formal and informal financial inclusion. According to the Consultive Group to Assist the Poor (2009), one of the main barriers to financial inclusion in rural areas is the great distances that rural residents must travel to reach a bank branch. This can contribute to lower levels of financial inclusion in these areas. Poor infrastructure and telecommunications, and heavy branch regulation, also restrict the geographical expansion of bank branches in rural areas compared to urban areas (CGAP, 2009).

The results were consistent with the relationship between formal financial inclusion and region. A positive and significant relationship was found to exist between indivudals in the urban region and formal financial inclusion. The odds of being formally financially included increased for individuals in urban areas. Considering the odds ratio is much greater than 1, it signifies that the odds of an individual being formally financially included in the urban group is 6.12 times higher than those in the rural group. This is consistent with the expectation that as urban areas have more access to financial services and products, it is highly likely that individuals in urban areas will be more financially included compared to those in rural areas. The p-value showed that the relationship between region and formal financial inclusion is significant to the 1%.

With regards to informal financial inclusion, a positive and significant relationship was observed with individuals in the urban region. The odds ratio shows that there is a 26% increase in informal financial inclusion for every unit increase of individuals in urban areas. The p-value is significant to the 1% level indicating a significant relationship with the dependent variable – informal financial inclusion. This finding is in line with studies by Aryeetey (2008), Gugerty (2007) and Guirkinger (2008) who have shown that informal financial intermediaries are popular among rural and urban dwellers. However, in comparison to the formal financial inclusion, the odds ratio shows lower odds of people in urban areas being included in informal financial services. The coefficient was 0.22, which is lower than the 1.81 observed with the formal financial inclusion relationship. The odds ratio was also lower at 1.26 compared to 6.12 on formal financial inclusion.

In conclusion, region does play a significant role in addressing financial inclusion. Individuals in

urban areas have a higher chance of being financially included than those in rural areas. However, most of these will be formally included than informally included. In spite of the lower odds ratio, region overall had a higher correlation than any of the other variables in the study. Both Allen et al. (2012) and Fungacova and Weill (2014) highlight the significance of urbanization, which has resulted in an increase in the number of people who have access to financial services primarily due to financial institutions that offer these services in the majority of urban areas.

Household Size (HHS)

The relationship between household size and financial inclusion was negative but significant to the 1% level for financial inclusion and formal financial inclusion. There was not enough evidence to suggest that a significant relationship exists between informal financial inclusion and household size. The odds of being financially included reduced as household size increased. The odds ratio was less than 1% and indicates that the event is less likely to occur between the groups. The odds of being financially included reduced by 98% for each unit increase in household size. This finding supports the conclusions drawn by Oluwasola and Alimi (2008) that individuals with a large family size, typically consisting of 11 members, tend to rely on borrowing to cover their consumption needs when they have limited or no income available for saving, investing, and engaging in productive activities. Consequently, these individuals experience reduced financial inclusion due to their limited disposable income. This is to say, the bigger the household, the less likely individuals are to be financially included. This relationship was consistent with formal financial inclusion where the odds of individuals being financially included reduced by 97% for every unit increase in household size. The findings of Oluwasola and Alimi's (2008) research further indicate that individuals belonging to bigger families exhibit a decreased likelihood of experiencing financial inclusion. In the case of informal financial inclusion, a negative and non-significant relationship was observed with household size. This shows that for an increase in household size, informal financial inclusion reduced. However, there was not enough evidence to suggest that a significant relationship exists between household size and informal financial inclusion.

Age

The results of the regression analysis using the 16–25 age group as a reference – this group had the highest number of individuals in the study – showed that the odds of being financially included

were highest for individuals aged between 36 and 45 for financial inclusion and informal financial inclusion. The 26–35 age group had the highest odds of being formally financially included. Compared to the reference group, the odds of being financially included increased by 44.4% for individuals in the 26–35 age group. After financial inclusion peaks for individuals aged 36–45, it starts to reduce. Firstly there is a 5.3% increase in odds for individuals aged between 56 and 65 years. For those aged 66 and older, a negative relationship is observed. This implies that older individuals were less likely to be financially included compared to those aged between 16 and 25. In terms of significance, all age groups were significant to the 1% level save for those aged 56–65 years of age. There is not enough evidence to suggest that a significant relationship exists between individuals aged between 56 and 65 and financial inclusion across all three observations.

Formal financial inclusion showed a similar pattern with the highest odds of financial inclusion being noted in the 26–35 age group. This means that the odds of an individual in this group being formally financially included increases by 53.8% per unit increase. As we graduate through the ages, the odds of formal financial inclusion reduced with the lowest being individuals older than 66. In terms of significance, relationships across all age groups were significant to the 1% level except for the age group 56–65 where no significant relationship was observed. An inverse but significant relationship was noted between individuals over the age of 66 and formal financial inclusion; there was a decrease in formal financial inclusion for individuals over the age of 66. According to Cyn-Young and Rogelio (2015), the presence of a significant portion of the population that is either too young or above the retirement age hinders their ability to receive financial services due to their lack of money.

The odds of being informally financially included were highest for individuals aged between 36 and 45. For individuals in the age group 46–55, the odds of being informally financially included increased by 24% for every unit increase in individuals. This was the second highest correlation that was noted. The third highest was the age group 26–35 who showed a 22% increase in informal financial inclusion for every unit increase. For individuals above the age of 66, an inverse relationship was noted, and this was consistent with the other two regressions that were run. There was not enough evidence to suggest that a significant relationship exists between individuals aged between 56 and 65 and financial inclusion.

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In conclusion, the age group 26–35 are more likely to be formally financially included while those between 36 and 45 are more likely to be informally financially included. The highest odds ratio (53.8%) and coefficient (0.4304) was observed between formal financial inclusion and the age group 26–35. Individuals over the age of 66 are likely to be the least financially included, both formally and informally. From the data set, the youth – individuals aged below 35 years of age – tend to be more active in the formal financial environment. As people age, they tend to be more active in the informal financial environment until their participation in both formal and informal financial inclusion starts to decline after 66 years of age. The study's findings align with Modigliani's life cycle theory (Deaton, 2005), which posits that individuals tend to reduce their consumption as they age. According to Carmen et al., (2014), this theory suggests that middle-aged individuals have a higher level of financial inclusion compared to older age groups

Marital Status

The regression analysis explored the relationship between marital status and financial inclusion across three groups, using those who have never been married as the reference group. The results revealed a significant relationship at the 1% level for both the divorced/separated and married groups. The odds for married individuals showed a remarkable 73.22% increase in financial inclusion compared to the reference category – 'never married'. For the divorced/separated group, the odds ratio was 1.2489, indicating a 24.89% increase in the odds of financial inclusion compared to the reference category. Enisan and Akinwumi (2019), in their study on the determinants of financial inclusion in Ondo State in Nigeria, found that 64% of individuals who were financially included were married. This aligns with the findings in this research.

Table 3 Regression results

Note: *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

	Financial Inclusion		**Formal Financial Inclusion**		**Informal Financial Inclusion**		
	Coefficient	*Odds Ratio*	*Coefficient*	*Odds Ratio*	*Coefficient*	*Odds Ratio*	**VIF**
Constant	0.7781*** (0.0987)	2.1773	0.7279*** (0.0974)	2.0707	-1.3409*** (0.0784)	0.2616	1.07
FINANCIAL TECHNOLOGY USAGE (REF_YES)	0.3670 (0.2920)	1.4434	0.4199 (0.2780)	1.5219	0.0862 (0.2108)	1.0900	1.09
FINLITERACY (REF_NOT)	-0.7044*** (0.0572)	0.4944	-0.8758*** (0.0547)	0.4165	-0.1109** (0.0488)	0.8951	1.02
FIN_ADVICE (REF_NO)	-0.4057*** (0.0580)	0.6665	-0.4682*** (0.0601)	0.6261	-0.1974*** (0.0598)	0.8208	1.08
REGION (REF_URBAN)	1.4837*** (0.0490)	4.4091	1.8115*** (0.0467)	6.1199	0.2283*** (0.0419)	1.2564	1.09
HHS	-0.0248*** (0.0084)	0.9755	-0.0276*** (0.0085)	0.9727	-0.0128 (0.0085)	0.9873	
AGE (REF-16-25)							1.69
26–35 YRS	0.3677*** (0.0579)	1.4444	0.4304*** (0.0580)	1.5379	0.2007*** (0.0560)	1.2223	1.69
36–45 YRS	0.3861*** (0.0686)	1.4712	0.3966*** (0.0681)	1.4868	0.3196*** (0.0647)	1.3766	1.42
46–55 YRS	0.2831*** (0.0845)	1.3272	0.2825*** (0.0839)	1.3265	0.2153*** (0.0800)	1.2402	1.32
56–65 YRS	0.0516 (0.0958)	1.0530	0.0550 (0.0969)	1.0565	0.1422 (0.0922)	1.1528	1.35
66 OR OLDER	-0.5354*** (0.1028)	0.5855	-0.3594*** (0.1084)	0.6981	-0.5208*** (0.1124)	0.5941	
Marital status (REF_NEVER MARRIED)							1.97
MARRIED	0.5494*** (0.0572)	1.7322	0.2448*** (0.0577)	1.2773	0.7100*** (0.0570)	2.0340	2.16
DIVORCED/SEPARATED	0.2223*** (0.0806)	1.2489	-0.0138 (0.0817)	0.9863	0.4674*** (0.0794)	1.5959	1.01
GENDER (REF_FEMALE)	-0.2270*** (0.0426)	0.7969	-0.3504*** (0.0423)	0.7044	0.1626*** (0.0409)	1.1765	1.07
LR χ^2	1889.73		2784.6		464.95		
Prob >χ^2	0.0000		0.0000		0.0000		
Pseudo R^2	0.1169		0.1623		0.0296		
Observations	12,458		12,458		12,458		

Source: Author's approximation derived from research data

Specifically examining formal financial inclusion, a significant positive relationship with a p-value of $p < 0.01$ was found for married individuals, with the odds of being formally financially included increasing by 1.28 times compared to those not married. Conversely, an inverse and insignificant relationship was observed for divorced/separated individuals, providing no evidence of a relationship between this group and formal financial inclusion. Enisan and Akinwumi's (2019) study showed that, from their financially included sample, only 12% were divorced – the majority were married. Their divorced category had the lowest number of financially included individuals.

Further analysis delved into informal financial inclusion, revealing a statistically significant relationship between both married and divorced/separated individuals and informal financial inclusion. Both relationships were significant to the 1% level. The highest odds ratio was observed for married individuals, indicating that they were 2.03 times more likely to be informally financially included than those who were not married. For respondents who were divorced/separated, there was a 59% increase in informal financial inclusion for every unit increase in the number of respondents in this category.

Married status significantly increases the likelihood of being financially included, according to Enisan and Akinwumi (2019). This indicates that married couples are more likely to be involved in the financial system. Due to the larger size of their families, married couples typically have higher financial demands. Therefore, individuals will necessitate additional financial aid, which may be more effectively obtained from conventional banking institutions. This study aligns with the overall findings on the relationship between financial inclusion and marital status in this research paper where married individuals had the highest significance and correlation with financial inclusion, both formal and informal financial inclusion.

Gender

Examining the impact of gender as a control variable in the regression analysis provides interesting insights into its relationship with financial inclusion across different dimensions. The reference category used for the analysis was females. In the context of overall financial inclusion, the results indicate an inverse relationship between financial inclusion and females. The odds of being financially included for women decrease with an odds ratio of 0.7969 per unit increase in females. This suggests that the odds of financial inclusion in the observed group (females) are less than in

the non-exposed group (males). Based on the World Bank's 2017 Global Financial Inclusion data, the percentage of males with bank accounts is 72%, whereas the percentage for women is only 65% (Demirgüç-Kunt et al., 2018). This disparity is particularly pronounced in economically disadvantaged nations. According to Demirgüç-Kunt et al. (2018), women make up two-thirds of the unbanked adults in Kenya. This is consistent with the findings in Zambia based on the FinScope data used for the study.

Specifically focusing on formal financial inclusion, females exhibit an inverse relationship, being less formally financially included compared to males. For every unit increase in the number of women, there is a notable 70.4% decrease in the number of women that are formally financially included, reinforcing the gender disparity in formal financial access. In a separate study, a cross-country gender analysis revealed a lower probability of women engaging in the utilization of formal financial services in comparison to men. The gender gap is particularly evident in developing nations characterized by high levels of poverty (Demirgüç-Kunt & Klapper, 2012).

However, when examining informal financial inclusion, the relationship with females is positive and statistically significant. The odds ratio of 1.17 indicates a 17% increase in informal financial inclusion for every unit increase in females. This relationship stands out as the highest among the three regressions conducted, emphasizing the significance of gender in shaping patterns of informal financial inclusion. The existing body of literature indicates that a significant proportion of informal financial intermediaries are predominantly comprised of female members (Aryeetey & Gockel, 1991; Aryeetey & Udry, 1995; Kedir & Ibrahim, 2011).

In conclusion, gender emerges as a crucial factor influencing financial inclusion dynamics. While an inverse relationship is observed in overall and formal financial inclusion, the positive and significant relationship with informal financial inclusion suggests a nuanced picture. These findings underscore the importance of gender-sensitive approaches in designing inclusive financial policies and interventions. It also reveals that females are more likely to be informally financially included than they are to be formally financially included. It brings into perspective some of the findings relating to the role that gender plays in addressing financial inclusion gaps in African countries including Zambia.

In summary, while a majority of the variables like financial literacy, financial advice, region, age,

and gender appeared to be statistically significant in explaining financial inclusion, FinTech usage showed associations that are not statistically robust in this analysis.

4.3 Conclusion on Regression Coefficient Results

This chapter focused on the analysis of the data collected. Measuring financial literacy and its relation to financial inclusion using the logistic regression yielded a vast number of results, which allowed for the research questions to be explored extensively. While some results were not in line with expectations, perhaps due to data limitations, some results were as expected. The analysis and findings in the chapter provided an opportunity to explore some of the drivers of financial inclusion in Zambia. The results in this chapter will be the basis of the conclusions and recommendations that will be given in the next chapter.

For the empirical analysis, secondary data from the 2020 Finscope Survey, gathered by Zambia Statistics in collaboration with the Bank of Zambia, was utilized. While this dataset offers valuable insights into various aspects of financial behavior, it had notable limitations, particularly concerning the usage of financial technology. The sample size for this specific area was relatively small, which may affect the robustness and generalizability of the findings. This limited sample size contributed to the skewed results that were observed, as it may not have adequately represented the broader population's use of financial technology.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the study, the conclusions based on the results obtained in the study and recommendations based on the conclusions arrived at in the study. The study delved into the evolving realm of FinTech and its potential to mitigate financial exclusion in Zambia. Although FinTech's global impact was evident, its specific implications for Zambian financial inclusion remained under-researched. The research zoomed in on Zambia's unique challenges and prospects in integrating FinTech innovations. Key areas of inquiry included FinTech's role in enhancing or diminishing financial accessibility, affordability, and service usability. Three central questions drove the study: how Fintech has contributed towards the advancement of financial inclusion in Zambia, the role of financial literacy in bridging the gaps of financial inclusion in Zambia and exploring sociodemographic factors and their impact on financial inclusion.

5.1 Discussion of the Results

5.1.1 Findings on the Impact of Financial Technology Usage on Financial Inclusion

Results obtained from the regression analysis on the relationship between financial technology usage and financial inclusion did not yield a significant relationship. This was consistent across all three regression analysis for financial inclusion, formal financial inclusion and informal financial inclusion. Analysing the data collected, only 0.8% of the respondents acknowledged using digital financial services, while 97.1% of the respondents said that they did not use technology for their financial needs. This is reflected in the regression results, which showed that a majority of the respondents do not utilize digital services in Zambia.

Considering that the study is focused on establishing the impact that the use of financial technology has on financial inclusion, the lack of significance between FinTech and financial inclusion is an interesting finding that cannot be explored in isolation. There may be various contributing factors, such as limited digital financial infrastructure. This may include limited internet connectivity, which would adversely impact the use of digital channels. Lack of digital literacy may also be a significant barrier. It is essential to perceive financial inclusion not just as a product of cutting-edge technology but as an interplay between modern innovations and traditional systems. Access to digital financial services does not guarantee usage. More focus needs to be placed on improving

the usage while also pushing for increased access even in rural areas.

5.1.2 Findings on the Impact of Financial Literacy on Financial Inclusion

The relationship between financial literacy and financial inclusion was explored for both formal and informal financial inclusive services. Financial literacy is often deemed a vital determinant of financial inclusion and this was evident from the results of the study. The reference was individuals who did not respond to being financially literate. The results were consistent across all three regressions – financial inclusion, formal financial inclusion and informal financial inclusion – showing a negative relationship with financial inclusion. The lowest coefficient was observed between formal financial inclusion and individuals who are not financially literate. The interpretation of this is that it is more likely that individuals who are less financially literate participate in the formal financial sector owing to limitations in financial literacy levels. The relationship between formal financial inclusion and individuals who are not financially literate had the lowest odds ratio, this means it is likely that individuals who are formally financially included are financially literate. An inverse relationship was also noted between individuals who are not financially literate and those that are not informally included.

The regression results are in line with some of the studies carried out by Lusardi and Mitchell (2014) who have stressed that financial literacy aids individuals in making informed decisions related to savings, investments, and borrowing, ultimately promoting greater financial inclusion. They argue that a lack of financial knowledge could be a significant impediment to participating effectively in financial markets. Similarly, a World Bank report (2013) highlighted the importance of financial literacy programs in enhancing financial inclusion. The report underscored the notion that well-informed consumers can better access and use financial products, contributing to overall financial stability and development.

5.1.3 Findings on the Impact of Financial Advice on Financial Inclusion

Research on the relationship between financial advice and financial inclusion highlights the crucial role of advice in fostering economic empowerment and inclusion. The results of this study reveal that a negative and significant relationship exists between financial inclusion – both formal and informal – and respondents who do not receive financial advice. The idea behind receiving financial advice is for individuals to have an understanding of basic financial concepts such as

budgeting, saving and investing. Furthermore, research indicates that access to financial advice can act as a catalyst for financial inclusion, particularly in under-served communities. By addressing informational gaps and promoting awareness of available financial services, advice plays a pivotal role in bringing marginalized individuals into the formal financial sector.

However, it is essential to note that the effectiveness of financial advice depends on its accessibility, relevance, and cultural sensitivity. Tailoring advice to specific demographic and cultural contexts is crucial to ensuring that its impact on financial inclusion is maximized. Considering that financial literacy is a long-term process that may require effort at individual, government and insititutional level, financial advice may be the stop gap measure to deliver knowledge to improve financial inclusion. Research conducted by Allgood and Walstad (2016), Khan et al. (2019), and Yoong and Hung (2010) has indicated that there is a higher demand for financial guidance in situations where individuals possess a lower degree of financial literacy. Financial assistance was found to be beneficial in facilitating improved financial decision-making in these instances (Liu et al., 2019).

In conclusion, the existing body of research underscores the positive correlation between financial advice and financial inclusion. This is consistent with the findings of the research in question where it was established that individuals who did not receive financial advice tended to be less inclusive across all three regressions.

5.1.4 Findings on the Impact of Region on Financial Inclusion

Region was one of the key demographic variables used in the study with the reference being all respondents who reside in urban areas. The regression results revealed that region had the highest coefficient for financial inclusion and formal financial inclusion while a smaller coefficient was observed between region and informal financial inclusion. All relationships across the three independent variables were positive and significant. From the results, in comparison to other variables, it is evident that region has the strongest relationship with financial inclusion, implying that it has a key role to play in this study. This echoes the dynamics of region and its effects on one's financial standing and activities.

Going by these findings, individuals in urban areas are more likely to be financially included – formally and informally – than inhabitants of a rural area. This is in line with the author's

expectation, owing to the fact that being in an urban area increases accessibility and proximity to financial services in Zambia. The possibility of improved infrastructure has a positive impact on financial inclusion, increasing access to formal financial services like ATMs, commercial banks and insurance companies. Urban areas are usually associated with higher levels of education and literacy and this could also be a contributor.

De Olloqui, Andrade, and Herrera (2015) argue that obstacles to achieving financial inclusion on a national scale are particularly evident in rural regions. The combination of low population density and low income levels presents a compelling argument for the presence of high operational expenses, which may not be appealing to major financial services providers. This issue is exacerbated by the relatively low rate of property ownership among the people, resulting in a dearth of collateral when seeking financing. Users possess constrained financial resources, hence limiting demand, while financial institutions offer services that are not fully aligned with the population's demands. Several studies have examined the correlation between rural population and financial inclusion further emphasizing the existence of a significant relationship between the two variables. The author of this dissertation elucidates this phenomenon by making a broad observation that as individuals venture into rural regions of a nation, there is a general decline in levels of financial inclusion.

This study's results resonate with the persistent narrative of economic structures and their influence on individual financial behaviors. The intimate relationship between region and financial inclusion is a mirror to the broader socio-economic fabric of society, highlighting the inherent disparities and the urgent need for inclusive policies. For policymakers, it is a reminder of the deep-rooted economic structures that need consistent attention to ensure equitable financial access for all.

5.1.5 Findings on the Impact of HHS on Financial Inclusion

A negative and significant relationship was observed between household size and financial inclusion. However, evidence to suggest a significant relationship between informal financial inclusion and household size did not exist. This means as household size increases, there is a corresponding decrease in the likelihood or extent of one being financially included.

The relationship between household size and financial inclusion may be inverse due to various reasons. It is common to find larger households in rural areas of Zambia and hence economies of

scale may be one of the contributors. Larger households may face challenges in accessing financial services due to the perception of higher financial risk associated with accommodating the needs of a larger group. Further, larger households tend to be more expensive to run/maintain and this could mean they have more limited financial resources per capita, potentially reducing their ability to engage with formal financial services driven by dilution of available income and assets among more household members.

According to Anyanwu (2014), a household's tendency to save money is ultimately determined by its consumption expenditures, which are influenced by its size. Khan et al. (2015) conducted a study examining the factors influencing rural household poverty in Pakistan, with a specific focus on the function of family socio-economic empowerment. The findings of their study indicated that an augmentation in the number of household members is positively associated with the likelihood of the home being categorized as impoverished. This outcome was contingent upon the lack of active engagement of family members in economic activities.

In conclusion, in spite of the significant relationship observed, there is a possibility that other barriers impacting households may exist like unemployment, financial literacy, infrastructure and low education levels. Research findings indicate that individuals who are the heads of households tend to allocate a bigger portion of their income towards supporting a larger number of individuals. Consequently, this often results in the household head having limited or no income available to cover essential expenses (Enisan & Akinwumi, 2019).

5.1.6 Findings on the Impact of Age on Financial Inclusion

The correlation between age and financial inclusion has been a focal point of investigation in various socio-economic studies. In this particular research, age emerges as a variable with variable influence on financial inclusion over a range of age groups. It was observed that the highest coefficient was for individuals aged between 36 and 45 years between age and financial inclusion. This means that individuals in this age group were most likely to be financially included. In terms of formal financial inclusion, the highest correlation was observed for individuals aged 26–35 years. This revealed that individuals tend to be more formally financially included between 26 and 45 years of age and then the inclusivity starts to reduce the older they get. There was not enough evidence to suggest that a significant relationship exists between individuals aged 56–65 years and

financial inclusion. Further, based on the results individuals older than 66 are less likely to be financially included (formally and informally).

In traditional economic models, age is often construed as a proxy for experience, with older individuals assumed to have better financial acumen and stability. Yet, as Lusardi and Mitchell (2014) explain, financial decision-making varies across age cohorts, shaped not just by the passage of time, but also by evolving societal norms, educational paradigms, and technological shifts. The researchers further emphasize the importance of recognizing the cultural contexts in which financial behaviors manifest. In certain cultures, for instance, older individuals might lean on familial support rather than formal financial structures, diluting the anticipated correlation between age and financial inclusion.

Furthermore, the influence of age on financial inclusion does not stand alone. It often intersects with the level of financial education. As Huston (2010) notes, older individuals who might not have had access to formal financial education could demonstrate patterns of financial behavior starkly different from younger, more educated cohorts. With the accelerating digitization of financial services, there is a conceivable generational divide in embracing digital financial tools. As observed by Arner, Barberis, and Buckley (2016), while younger individuals might be more inclined towards online banking and FinTech solutions, older generations who are less accustomed to digital innovations could exhibit reluctance.

Ultimately, the findings indicate a direct correlation between age and financial inclusion. Financial inclusion exhibits a positive correlation with age until it surpasses a specific threshold, at which point it begins to decline. The negative coefficient of the age group above 66 provides confirmation of this assertion. Several investigations (Peña et al., 2014; Hoyos et al., 2013) provide support for the result. As individuals grow older, they acquire knowledge about different financial goods and begin utilizing them till they reach a specific age, possibly towards retirement, at which point their interest diminishes.

5.1.7 Findings on the Impact of Marital Status on Financial Inclusion

A majority of the respondents in the data set were married (55%) while the remaining respondents were split between those who were divorced (15.9%) and those who had never been married (29%). The regression results revealed a positive and significant relationship between married

individuals and financial inclusion. Informal financial inclusion had the highest coefficient among the three independent variables. A study by Copestake et al. (2001) examining microcredit in Zambia discovered that marital status is an important variable, and there are some significant effects of training and marital status on business profits. It is believed that married indivduals are more likely to be financially responsible than those that are not married. Based on the results of the study, the findings are fairly aligned with expectations. In their study, Mhlanga and Denhere (2020) examined the factors influencing individuals' participation in the financial sector within the Southern African region. The researchers identified race, income, marital status, and gender as the primary determinants of financial inclusion in the sub-region.

The positive and significant relationship that exists between married individuals and financial inclusion means that there is a high possibility of an individual who is married to be financially included, both formally and informally, than one who has never been married. Married individuals tend to be more vested in planning for the future through saving and managing finances. They are also more likely to seek stable employment and income to provide for their families. These are potential drivers for the positive relationship with financial inclusion. In addition, financial institutions tend to have an inclination towards individuals who are married due to the perceived stability that comes with it.

A positive and significant relationship was found to exist between divorced/separated individuals and financial inclusion. However, there was not enough evidence to suggest that a relationship exists between this category and formal financial inclusion. Going by the data, individuals who are divorced/separated are more likely to be informally included than individuals who have never been married.

In conclusion, in the Zambian market, based on the sample data, married and divorced individuals are more likely to be financially included in comparison to the unmarried. This could be driven by cultural beliefs where a married person is considered more financially responsible than one who has never been married.

5.1.8 Findings on the Impact of Gender on Financial Inclusion

The role of gender in the quest for a financially inclusive environment cannot be ignored. In the study, the results of the logistic regression with the reference being females revealed that a

significant but negative relationship exists between gender, financial inclusion and formal financial inclusion. No significant relationship was found to exist between gender and informal financial inclusion. A majority of the respondents were female (54.8%). The negative coefficient for financial inclusion (-0.2270) suggests that, on average, women exhibit a slightly lower level of financial inclusion compared to their male counterparts. The relationship between gender and formal financial inclusion showed a similar pattern with a negative coefficient (-0.3504) significant to the 1% level. These findings align with previous studies that highlight gender-based differences in financial access. According to a study conducted by Mndolwa (2017) on factors contributing to gender disparities in financial inclusion, it was found that in Tanzania, women experience these disparities due to factors such as lower income, lower education levels, lower employment rates, and higher dependence on others compared to men. Given the discovery that employment had the greatest impact on boosting women's financial inclusion by 25%, these findings appear to align with the situation in Zambia and the connection between financial inclusion and gender. Numerous prior research has demonstrated a lower likelihood of financial inclusion among females (Allen et al., 2016; Aterido, Beck, & Iacovone, 2013; Demirgüç-Kunt et al., 2013; Ghosh & Vinod, 2017; Mohammed et al., 2017). In terms of financial services, a study of selected countries in sub-Saharan Africa by Aterido et al., (2013) finds that females are less likely to use formal financial services compared to males. In addition to the investigation into the utilization of formal financial services by individuals, Aterido et al., (2011) conducted a study examining the utilization of formal services by businesses owned by both males and females in sub-Saharan Africa. The findings of this study indicated that the disparity in financial inclusion between women and men can be attributed to variations in income, education, and formality status, rather than any inherent bias within the financial sector against women. Furthermore, Ghosh and Vinod (2017) contend that women's financial inclusion is limited by lower levels of education and wages. This assertion is supported by the findings of Demirgüç-Kunt et al. (2013), Allen et al. (2016), and Mohammed et al. (2017), who have documented evidence indicating that women tend to have lower levels of education.

With the results of the regression carried out, it has been observed that overall, women are less likely to be financially included. It is imperative to analyse the outcome with caution considering the vast research previously stated. There may be other factors at play and a further deep dive may need to be carried out to establish the drivers of the adverse relationship. Potential drivers for the

gender-based financial gap vary from low levels of financial literacy or cultural differences among women in comparison to their male counterparts (Grohmann, 2016; OECD, 2012).

While the regression analysis sheds light on the statistical associations between gender and financial inclusion, it is essential to acknowledge the correlational nature of these findings. Factors such as cultural norms, educational opportunities, and access to financial resources may contribute to the observed gender differences, these may be explored in future research to inform more nuanced policy recommendations aimed at fostering gender-inclusive financial practices.

In conclusion, the research provides valuable insights into the impact of gender on financial inclusion and builds on the existing literature, by contributing to the ongoing dialogue on gender disparities in financial access and underscores the importance of tailored strategies to promote financial inclusion for all.

5.2 Research Objectives and Findings of Analysis

5.2.1 Research Objective 1

The first research objective of the study was to explore the nature of the relationship between the usage of financial technology and financial inclusion in Zambia, examining how the adoption and utilization of FinTech solutions have influenced the level of financial access and inclusion in the country. Usage of financial technology was used because it encompases a broad range of financial services including, but are not limited to: digital payments, credit, savings, remittances, insurance and mobile financial services. Technology in this case makes reference to digital channels such as mobile phones, internet, ATMs, and POS terminals.

The study revealed that women were not as financially included as men in the sample group. The inverse and significant relationship that was observered was an indication of women being financially excluded, especially in the formal financial sector. In addition, there was not enough evidence to suggest that a relationship existed between Fintech usage and financial inclusion. This was an unexpected finding considering the use of mobile money, ATMs and POS terminals have been on the rise in Zambia. This may mean that aside from peer-to-peer transfers, there is more work that needs to go into driving use of FinTech services for other transactions like payments and insurance.

According to the majority of studies, financial technology is a significant catalyst for financial inclusion. Nevertheless, the relationship between FinTech and financial inclusion could vary based on the manner in which financial services, such as savings, credit, and insurance, are utilized, as well as the aspect of financial inclusion considered – access versus use. The usage of financial technology variable pertains to the manner in which technology is employed to provide financial services to the participants. The findings indicate that both rural and urban areas in Zambia have a substantial impact on financial inclusion. The fact that the majority of respondents resided in rural areas may have contributed to the low adoption of technology due to factors such as low income or education levels. A male in an urban area, between the age of 26 and 35 years of age has a high chance of being financially included. This reveals a number of gaps in the Zambia financial environment which can be viewed as opportunites for growth. To improve accessibility, infrastructure has to be improved. For both formal and informal financial services, there is a need for good road networks, stable internent connection and financial literacy to drive this agenda.

Overall, these findings provide a multifaceted view of how financial technology, traditional banking and various demographic variables interplay to shape financial inclusion in Zambia. The research paints a nuanced picture that acknowledges the complexity of the financial landscape in the country, thereby offering valuable insights for policymakers, financial institutions, and scholars who aim to enhance financial access and inclusion through FinTech. The results also provide a basis for further studies that might delve into other variations like income, for example, or a deeper study into the use of FinTech exploring frequency and the reasons for use or non-use or other contextual factors that could be influencing these relationships in Zambia.

5.2.2 Research Objective 2

The second research objective in the study was to investigate whether financial literacy has played a significant role in enhancing the quality and accessibility of financial services in Zambia. The results showed that financial literacy is a key part of driving financial inclusion in Zambia. It was observed that a negative but significant relationship exists between financial inclusion and individuals who are not financially literate. The likelihood of someone who lacks financial literacy being financially included gets lower per unit increase. Financial advice also plays a critical role in the drive towards financial inclusion hence a significant relationship was found to exist between financial advice and financial inclusion. This applies for both formal and informal financial

inclusion. Receiving financial advice and being financially literate should go hand in hand and the results were in line with expectation. An individual who receives financial advice is likely to be more knowledgeable about the financial products available to them. A weaker relationship was observed for informal financial services.

The prevalent belief that financial literacy is vital for inclusion holds in the sense that individuals in urban areas with more access to financial products and services had a high correlation with financial inclusion. The role of region cannot be omitted from the discussion due to the high relationship noted with financial inclusion, especially formal financial inclusion. Therefore, a female over the age of 66 and living in a rural area is less likely to be financially included than a male aged 36–45 living in an urban area. There is a need to further educate particpants in the informal sector on available financial products to help improve financial literacy and usage.

In conclusion, to answer the research objective, the study proves that for Zambia, financial literacy does play a significant role in the drive towards financial inclusion. For further studies, quality and accessibility can be assessed to evaluate the financial services that are available and potentially improve them to continue the drive towards financial inclusion.

5.2.3 Research Objective 3

The third research objective in the study was to explore the key factors that affect financial inclusion in Zambia – and their impact – and identify the biggest driver for financial inclusion based on the 2020 FinScope data. The relationship between financial technology and financial inclusion has been previously discussed. In a quest to provide a more focused study for researchers, various demographic factors and how they impact financial inclusion have been explored.

The strong relationship between region and financial inclusion established means location has a key role to play in whether an individual is financially included or not in Zambia. This may be driven by geographic disparities, indicating that urban areas have more favourable conditions or proactive measures in place. Access to formal financial services is higher in urban areas as most financial institutions are located in these areas due to the high cost of doing business in rural areas. Information asymmetry may drive the cost of doing business too high and financial institutions would rather focus their efforts in areas with less costs and higher returns. Based on the results, it can be concluded that there is a high participation of individuals in rural areas in informal financial

services like savings groups and village banks. This may either be due to lack of availability of options or a lack of understanding.

Financial literacy had the second highest coefficient as one of the key drivers, followed by marital status. It has been perceived in many cultures that 'Two is better than one'. This outlook may encompass financial planning or the general idea of just sharing a life with someone.

The results of the regression show that marital status does play a key role in driving financial inclusion in Zambia. This seems to be the theme across multiple studies across multiple regions. The data does reveal that married people are more likely to be financially included with the strongest relationship being observed in the informal financial sector. Being divorced/separated also plays a role but did not have a significant relationship with formal financial inclusion. This could be due to the fact, more often than not, individuals who are separated or divorced may not openly disclose this.

Age was an interesting variable as it showed different relationships across the different age groups and regression analyses. A negative but significant relationship was observed between financial inclusion and individuals over 66 years of age. This could be due to trust and cultural beliefs that may exist in the older generation and could also mean that this age group does not find the current financial product offering appropriate for them. Highest coefficients were observed for the age groups 26–35 for formal financial inclusion and 36–45 for informal financial inclusion. The relationships were significant and positive implying that age does have a significant role to play in financial inclusion in Zambia.

In conclusion, financial inclusion in Zambia is driven by various demographic variables. For this data set, the top four drivers were region, financial literacy, marital status and age.

5.3 Recommendations

Based on the findings and analysis of the results, some of the key recommendations follow:

- *Collect more data for future studies*. Gathering data in Zambia can be challenging. However, it is the best way to really appreciate the current state of financial inclusion and identify the gaps. Without a good representation of the starting point, setting policies and regulations to

foster growth in this area may prove futile. Due to the data limitations the conclusions drawn from this analysis were interpreted with caution, acknowledging that the findings may not have fully captured the nuances of financial technology usage across different demographic groups. Future research would benefit from larger, more representative samples to provide a clearer understanding of these trends.

- *Encourage more studies on financial inclusion in Zambia*. Thus far, there have been very limited studies carried out on financial inclusion. The fact that Zamiba is a developing economy means there is much room and potential for growth. However, more research studies have to be carried out to help with the agenda. Areas that can be covered include the behavioral aspect of individuals when it comes to financial inclusion – understanding why people behave the way they do and how their behavior influences their financial decisions. There are a variety of topics that can be explored to gain in-depth understanding and help drive the agenda towards a more financially inclusive environment.
- Financial institutions need to recognize the growing trend of mobile money platforms competing with traditional banking structures. They should:
    - enhance and integrate mobile banking features to match the convenience and user-friendliness of popular mobile money platforms.
    - educate the populace about the benefits of using both mobile money and traditional banking systems concurrently.
- *Cultivate strategic partnerships that can help facilitate financial education*. Riding on the back of low fintech usage, opportunity exists for awareness campaigns to help drive more understanding and widespread usage of these services.
- *Financial institutions should develop targeted products based on the available data analytics*. Different clients and age groups have different needs when it comes to financial services. There may be a gap in the current product offerings on the market and tailoring financial products and services to cater to the unique needs of various age demographics, taking into account cultural and social influences, can be a good way to improve participation in the formal financial sector.
- *Create platforms that support FinTech innovation*. Currently Zambia has been working, through the Ministry of Technology, towards creating a platform for innovation and creativity.

This is a very welcome initiative, and the participation of the formal financial sector would be a game changer. This could revolutionize the financial sector, especially if there is support from the central bank and the government. With the right technology, the right products can be delivered to the right audience.

- *The government needs to provide infrastructure in under-serviced areas*. This will promote the use of financial products and better the lives of people in these areas. Region was established to be one of the key drivers of financial inclusion in Zambia. The road networks in these areas can make it difficult for residents to access banks, mobile money booths or ATM services. Some may even lack the financial literacy to understand the value of the financial product offerings available to them. With poor road networks, accessibility as a key part of financial inclusion is not met, which potentially inhibits usage.
- *Implement financing initiatives*. Empower the productive capacity of poor communities, especially in rural areas.
- *Conduct further research on the outcomes of the increased use of DFS*. Some of these outcomes include savings, credit and even healthcare. Leveraging the experience in more advanced markets like Kenya and Uganda, such research can set the tone for a targeted approach to addressing the gaps identified, especially among women and people living in rural areas.

These recommendations, rooted in the study's findings, can provide a road map for Governement, Central Bank and financial institutions in Zambia to work together towards focused services to meet the population's needs and work towards a more inclusive financial landscape.

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APPENDICES

Appendix A

Empirical Table Analysis

Researchers	Focus/Title	Findings	Comments/Knowledge gap
Peterson K. Ozili (2018)	The impact of digital finance for financial inclusion and financial system stability	The study uses the Agency theory and determines that digital finance through financial technology has a positive impact on financial inclusion in emerging markets. The convenience that digital finance provides to low and variable income earners is more valuable in comparison to the high costs that come with conventional borrowing from regulated banks.	The study does not detail the technique or data that was used to arrive at the result/conclusion.
Arun and Kamath (2015)	Financial Inclusion: Policies and practices	The study aimed at measuring the adoption and degree of usage of financial products in India, South Africa and Australia. Firstly it was found that the sequence of interventions and experience in India in the arena of financial inclusion gave valuable insights and could guide future policy. In South Africa, the study revealed that regardless of the significant policy initiatives financial exclusion ratio was observed to increase. Australia showed that majority of the population is banked and this poses a challenge for government when formulating policies for the unbanked. it was confirmed that culture does	The study could have included suggested policies that will be focused on enhancing digital access to finance, ensuring sustainability of remote financial service delivery and culturally appropriate models for enhancing the financial capability for communities with lower literacy/numeracy, and cultural and language barriers

		play a significant role in the adoption of policy	
Sanistasya, Raharjo & Iqbal (2019)	The effect of financial literacy and financial inclusion on small enterprises perfromance in East Kalimantan	The research takes a quantitative approach and the data was analysed using partial least squares to assess the effect of financial literacy on enterprises (SEs) performance and the effect of financial inclusion on small enterprises (SEs) performance. The results showed a positive and significant effect of financial literacy on enterprises (SEs) performance and, financial inclusion positively affects the performance of small enterprises (SEs).	In relation to the study in question, the gap that was noted was on the impact of finanical literacy on individuals. The study was focused on small enterprises, the data smaple was also small and may have potentially skewed the results in the positive direction.
Bire, Sauw & Maria (2019)	The Effect of Financial Literacy towards Financial Inclusion through Financial Training	The results of the study showed that financial literacy has got a direct and significant impact on financial inclusion. Further, financial training has mediated the relationship between financial literacy and financial inclusion.	The sample size was considerably small and could have been larger as 54 respondents out of 119 MSMEs were used in the study. This has the ability to skew results and misrepresent the position
Kusumawati, Akmalia and Wardana (2022)	The Impact of Financial Literacy and Financial Technology on Financial Inclusion in Special Region of Yogyakarta, Indonesia	The study adopts a quantitative approach using 133 respondents in Special Region Yogyakarta, Indonesia using multiple linear regession. The results show that the financial literacy had no impact on financial inclusion. Financial technology has a positive and significant effect on financial inclusion in the community.	A larger sample would have greatly improved the results as the results from the goodness of fit test failed on majority of the index that were tested. Further, the sample was not representative of the province as majority of the sample was comprised of students and enterprenuers.

Chen and Yuan's (2021)	Financial Inclusion in China: An Overview'	The paper provides a thorough outlook of the state of financial inclusion in China has had significant progress recently and has gradually formed a unique and sustainable development path with supporting policies and regulations as well as rapid development and application of digital technology. While challenges remain, the experience of Chinese financial inclusion provides valuable lessons and research directions for policymakers and researchers	The research explored various relationships with financial inclusion but did not adopt some of the demographic factors that are pertinent world wide like gender and age. Considering these are fundamental parts of a financially inclusive society it would be helpful to give context on the demographics surrounding the distribution of financial services
Bongomin et al. (2016)	Social capital: mediator of financial literacy and financial inclusion in rural Uganda	The study's findings demonstrated that social capital served as the sole mediator of the relationship between financial literacy and financial inclusion of poor people in rural in Uganda. Financial literacy was not found to have a direct impact on financial inclusion save through the full mediation of social capital.	To obtain more information the research could have adopted an interview approach as opposed to a single approach using a questionnair. Further, a longitudinal study may have bene useful in to investigate the mediating impact of social capital spanning over a long period of time
Zins and Weill (2016)	The Determinants of Financial Inclusion in Africa	The study uses Global Findex data to analyse a total of 37 African countries and it finds that being an older male with more resources and education results in being more financially included. The highest contributor being education and income. It puts into evidence that mobile banking is driven by the same determinants as financial inclusion and therefore can be used for these groups of population. It however stresses that informal finance is not a substitute for formal	The study delves into the determinants of financial inclusion but tends to lean towards formal financial inclusion. In relation to the study in question, mobile banking requires internet access which is not a prioroity in the Zambian set up. The study does give insight to the determinants but the recommendations may not be applicable in Zambia where the participation in the formal financial service is limited and the access to internet services is even lower.

		finance in all aspects of financial inclusion in Africa.	
Chileshe (2019)	A review of Financial Inclusion in Zambia	The study adopts a quantitative approach using data from the 2005, 2009 and 2015 Finscope Surveys to establish the current form and nature of the state and trends in Zambia with regards to financial inclusion. The findings show that 59% of Zmabians were financially included of which 21% were as a result of the informal financial services. The finding was of importance due to the nature of policy efforts which are often associated with the formal financial sector.	The study uses microsoft excel to anlyse the data and uses percentage contribution for each of the variables. However, better correlation could have been established through the use of regression to establish in depth insight using descriptive and diagnostic tests. The diagnostic and descriptive tests would provide more insight on whether the average respondents are financially included or not. The recommendations of the study could have been more precise and less genric considering the demographic has been properly articulated, the recommendations should have streamlined the measures to be taken to improve the formal financial sector particpation alongside efforts to include informal sectors in policy efforts
Kawimbe (2020)	An Assessment of the impact of Mobile Financial Services on Financial Inclusion and Economic Development In Zambia	The research paper adopts a systematic review aimed at identifying the key issues and research gaps encompassing Mobile financial services and financial inclusion in Zambia.	While the study focuses on analysing existing literature, it fails to address some of the impediments of financial inclusion like accessibility, usage and availability. These tend to be key drivers of financial inclusion especially for a developing country like Zambia. In addition, it does not cover usage patterns which can give more insight to the impact that Mobile Financial services may have on financial inclusion.