Investigating the determinants of Digital Financial Inclusion in South Africa

by

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ABSTRACT

Digital Financial Inclusion has emerged as a prominent global agenda, necessitating an exploration of the transformative influence of technology on financial service accessibility. Previous research has attempted to uncover the true factors that impact Digital Financial Inclusion, however, there is further opportunity to better understand the underlying factors.

To contribute to the body of knowledge, this study seeks to uncover factors of successful Digital Financial Inclusion that may contribute towards the implementation of key strategies. To achieve this goal, the study employs a multidimensional financial inclusion framework that explores the impact of access, barriers, and usage on Digital Financial Inclusion. Additionally, it expands the framework to include digital readiness and financial literacy, enhancing the depth of the investigation.

Utilising a quantitative approach, data for the study was obtained through a self-administered online survey, yielding 231 valid responses for analysis. The Structural Equation Model (SEM) was used to investigate the relationship between user readiness, financial literacy, barriers, access, usage, and Digital Financial Inclusion. The findings indicate insufficient statistical evidence to suggest a significant relationship between user readiness, access and barriers, and Digital Financial Inclusion. However, the study underscores that financial literacy and usage have a positive and significant influence on Digital Financial Inclusion.

To enhance Digital Financial Inclusion, financial literacy and usage should be leveraged as key drivers for adoption. Additionally, policy makers, financial service providers and technology developers need to focus on targeted interventions, and inclusive regulatory frameworks.

KEYWORDS:

Digital Financial Inclusion, South Africa, Quantitative Analysis, User Readiness, Access, Barriers, Financial Literacy, Usage.

DECLARATION

I, Tshegofatso Betha, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Tshegofatso Betha Signature: 

Signed at Johannesburg.

On the 25th day of February 2024.

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This paper is dedicated to the loving memory of my late mother, and to my beloved father and sister, whom I both lost in 2023.Despite the challenges, the grace of God, along with the support from my supervisor, family, and friends, empowered me to persevere.

My father was a guiding light who instilled in me the courage to pursue my aspirations relentlessly. His unwavering love, support, and encouragement continue to inspire me, even in his absence.

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AVE - Average variance extracted

BNPL- Buy Now, Pay Later

CR - Composite reliability

ATM - Automated Teller Machine

CFA - Confirmatory Factor Analysis

FAS - Financial Access Survey

FICA- Financial Intelligence Centre Act

FSC- Financial Sector Charter

GDP - Gross Domestic Product

IMF - International Monetary Fund

NDP- National Development Plan

SARB - South African Reserve Bank

SASSA - South African Social Security Agency

SEM - Structural equation modelling

SPSS- Statistical Package for Social Science

UTAUT2 - Unified Theory of Acceptance and Use of Technology

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This quantitative study uses a multidimensional framework that includes digital financial services to investigate the factors that influence Digital Financial Inclusion.

1.2 Background of the study

Digital Financial Inclusion has gained significant attention globally, propelling itself onto the forefront of development agendas. During the 2010 G20 summit in Seoul, financial inclusion was acknowledged as one of the global development agenda matters (Zins & Weill, 2016). Moreover, the digitisation of financial services has been recognised as a powerful accelerator for Digital Financial Inclusion, unlocking access to a broader audience, particularly among the underserved population (Timermann & Gmehling, 2017).

The World Bank underscores global commitment, highlighting that 55 countries have pledged to prioritise financial inclusion since 2010, while over 60 countries have implemented or actively strategised to bridge the financial divide by leveraging technology to reach a broader demographic audience (Worldbank, 2022).

Digital Financial Inclusion can significantly expand access to banking services, especially in developing countries. To this point, G20 identifies four main principles to close the Digital Financial Inclusion gap, namely prioritising digital finance, balancing innovation risk, building a fair legal framework and developing robust infrastructure(Pearce et al., 2022).

On a national level, the South African Reserve Bank (SARB) has demonstrated its commitment to promoting Digital Financial Inclusion in the country in various ways, including but not limited to the development of the National Payment System Framework and Strategy Vision for 2025. Recognising its fundamental

role as the driver for economic growth and financial inclusion, the SARB designed the payments framework, which sets out a clear vision and objectives for the national payments system in South Africa(SARB, 2018). Complementing the National Payment System Framework is notably the National Development Plan (NDP) 2030, whose focus on eradicating poverty and inequality mirrors South Africa's commitment to creating a more inclusive society (National Planning Commission, 2013).

Financial inclusion, has no single, universally accepted definition, it is defined as "a development of novel methods to enable individuals at the base of the pyramid to access formal financial services and become part of the financial system" (Lal & Sachdev, 2015, p. 5). Accordingly, Ehrbeck et al. (2012) financial inclusion is about making financial services more accessible to a wider audience. Digital financial services, however, are an enabler for broader Digital Financial Inclusion. They provide a safer, accessible path to financial services, including to underserved groups (APEC,2022).

Informed by systematic literature reviews, this paper defines Digital Financial Inclusion as access to financial services through digital means, such as online and mobile banking. Agrawal and Jain (2019) define Digital Financial Inclusion as the equitable access and usage of formal financial services through digital channels. Similarly,Wang and He (2020) and Lu et al. (2022) emphasise that Digital Financial Inclusion, by leveraging technology to broaden access to financial services, can be a tool for alleviating poverty.

Digital access to finance among low-income groups can have a positive effect on economic activity (Bruhn & Love, 2009). In a later version of their research, Bruhn and Love (2014) state that it can favour disadvantaged and poor people, allowing them to increase their income and the probability of being employed. Additionally, it can contribute to alleviating poverty and boosting economic growth if determinants are well understood(Zins & Weill, 2016).

Kessler et al. (2017) argue that while the availability of financial services, and willingness to use products are all positive markers of economic and social improvement, it is crucial that they are mutually beneficial for both customers and

financial service providers to ensure sustainability. While access to finance can increase economic growth, access to credit expansion without supervision and appropriate implementation can increase financial stability risks (Sahay et al., 2015). This means that too much credit, high fees and inapt products could be counterproductive in that they could have adverse effects on poverty reduction, Gross Domestic Product (GDP) growth and other economic drivers(Kessler et al., 2017). It is therefore important to ensure that access to financial services, and usage thereof, is sustainable.

1.2.1 *Access and usage of financial services*

Achieving Digital Financial Inclusion involves accessing, using and sustaining at least one of the four products namely account (transactional account), savings, credit and insurance (Kessler et al., 2017).

In order to contextualise the discussion to the South African landscape, the following section delves into two specific financial products, namely transactional and credit facilities.

Account (Transactional)

Account ownership serves as a gateway to other financial products such as credit and savings. According to Demirguc-Kunt et al. (2022), account ownership refers to an account held at a regulated financial institution such as a bank or other financial institutions. The study reveals that although 1.4 billion adults remain unbanked, 85% of adults in South Africa have accounts, more than half make digital payments, and 20% made their first digital payment after the onset of COVID-19.

A prior study by Kessler et al. (2017) demonstrated a notable account penetration in South Africa, revealing that 70% of the population had an account at that juncture. However, the study brought attention to a significant issue, noting that individuals tended to withdraw funds immediately after depositing them into their bank account. Besides the findings, the Financial Sector Conduct Authority (2022) found that 81% of adults exhibit low usage of accounts, with 19%

withdrawing funds immediately after deposits. This perspective aligns with FinScope SA (2022), indicating that the majority of individuals preferred cash. The study attributed this to the unavailability of excess cash, high costs associated with using an account, and the lack of knowledge on using digital tools to access funds.

Credit facilities

There are currently 7837 registered credit providers in South Africa, but the incumbents maintain dominance, holding 82.6% of consumer debt as of 2020 (Financial Sector Outlook Study,2022). According to the National Credit Regulator (2022), credit applications increased by 6.02% in the quarter ending March 2022, with a rejection rate of 66.40%.

In 2021, the average rejection rate was 65% overall. Incumbents controlled 81% of credit during this period until quarter one of 2022, while the remaining share was distributed among retailers and non-bank financiers. This scenario implies that financial inclusion, specifically from a credit perspective, is relatively exclusive. The observation somewhat aligns with the findings of Kessler et al. (2017), who noted that credit adoption in the country is relatively low, which may lead to unsustainable growth in unsecured and informal credit.

Responding to the need for improved Digital Financial Inclusion across income groups, the financial industry has seen a proliferation of new Fintech start-ups in the market. According to Genesis (2019), there are over 200 Fintech start-ups in South Africa. The surge in Fintech start-ups presents opportunities for growth and inclusion of the population currently excluded from formal financial services.

Despite the state of incumbency, Fintech start-ups offer digital alternatives to credit that may be perceived to be more accessible and affordable. According to Bazarbash and Beaton (2020), the growth of marketplace lending opportunities has been partially triggered by inefficiencies and increased declines by traditional financial service providers. Among the reported Fintech start-ups in South Africa, 64% focus on the lending segment, offering solutions like Mobicred, a ‘Buy Now,

Pay Later' (BNPL) online credit solution, enabling consumers to purchase products online, and repay the loan over a short-term period (Genesis, 2019).

Considering these trends, the study seeks to explore the factors that influence successful Digital Financial Inclusion.

1.3 Research problem

Conclusions by Fouejieu et al. (2020) draw explicit insights, highlighting that improving access to financial services and improving Digital Financial Inclusion reduces income inequality. Echoing these insights, Bihari (2011) found that improving access to finance plays a crucial role in promoting economic growth and reducing poverty. This sentiment is further reinforced by Omar and Inaba (2020), who investigated the relationship between financial inclusion and poverty.

Digital Financial Inclusion is a global initiative with particular challenges in South Africa. Despite high account ownership, the overall usage and exposure to other financial products is relatively low. Additionally, despite the prevalence of financial services accessibility through digital channels such as mobile banking applications and internet banking, low-income groups remain heavily dependent on physical channels such as bank branches and ATMs to transact (Study, 2022). The study further indicates consumers' preferences highlight a strong inclination to physical channels with 81% using ATMs, followed by retail stores and bank branches. It is therefore crucial to understand the true determinants of successful Digital Financial Inclusion to design effective strategies that will promote higher levels of inclusion beyond transactional accounts.

Seminal works from Sarma (2008) and Chakravarty and Pal (2008) have been pivotal in shaping several financial inclusion frameworks through the development of indicators that measure banking services. While these studies focus on traditional banking services, they continue to inspire the current measurements in determinants of Digital Financial Inclusion literature. The multisided financial inclusion framework by Cámara and Tuesta (2017), used in this study, builds upon these foundations.

Nguena (2019), Demirgüç-Kunt and Klapper (2013), and Wachira and Kihiu (2012) have also made significant contributions to the global understanding of financial inclusion. Providing valuable insights into the impact of factors such as financial literacy, access, and individual characteristics on financial inclusion. Furthermore, Wentzel et al. (2013) highlight trust in technology as a significant barrier in South Africa, highlighting the need for an in-depth examination of determinants in the local context.

Authors such as Cámara and Tuesta (2017), and Rouse (2017) contribute immensely to the literature by offering appropriate measures for financial inclusion. Their work establishes a comprehensive foundation for measuring Digital Financial Inclusion in this study, considering both demand and supply factors.

A research gap exists in further establishing determinants relative to South Africa. Digital Financial Inclusion goes beyond account ownership, requiring consistent digital use of financial products (Monteverde & Chidambaram, 2018). Unveiling any underlying factors contributing to this phenomenon and bridging the gap in terms of knowledge will contribute extensively towards creating a more inclusive society.

1.4 Research objectives

The primary objective of this study is to examine the factors that lead to successful Digital Financial Inclusion. The key areas of interest are centred on the effects of user readiness, financial literacy, barriers, access, and usage on Digital Financial Inclusion. In alignment with the research problem indicated in section 1.3, the specific research objectives are outlined below.

1.4.1 *Examining whether user readiness could influence Digital Financial Inclusion.*

1.4.2 *Examining whether financial literacy could influence Digital Financial Inclusion.*

1.4.3 *Examining whether barriers to financial services could influence Digital Financial Inclusion.*

1.4.4 *Examining whether access to financial services could influence Digital Financial Inclusion.*

1.4.5 *Examining whether usage of financial services could influence Digital Financial Inclusion.*

1.4.6 *Exploring how individual characteristics moderate the relationships between variables.*

1.5 Rationale

Digital Financial Inclusion has emerged as a global catalyst for economic growth, making the investigation into its determinants significant and relevant. Within the South African context, Digital Financial Inclusion stands as a strategic pillar integral to the South African Financial Sector Development and Reform Program (Worldbank,2018).

Empirical evidence suggests a strong correlation between Digital Financial Inclusion and positive economic outcomes. Studies show that households with access to financial services exhibit greater resilience to unforeseen financial shocks (Demirguc-Kunt et al., 2022). Moreover, Omar and Inaba (2020) indicate that Digital Financial Inclusion is effective in reducing income inequality in developing countries. In the broader African context, an inclusive financial sector

contributes to increased income levels and reduced poverty(Agyemang-Badu et al., 2018).

In South Africa, Digital Financial Inclusion assumes particular significance in fostering economic growth, poverty reduction and mitigating income inequality. As noted by Chitimira and Ncube (2020), it can help reduce poverty, boost economic growth, improve financial stability and protect consumers from financial fraud and abuse.

The historical backdrop of apartheid policies led to the marginalisation of the majority of South Africans, leading to limited or non-existent access to financial services. As highlighted by Nanziri (2017), apartheid significantly and adversely affected the welfare of black South Africans due to limited access to financial services. The study posits that financial inclusion is associated with increased welfare in the country, particularly benefiting individuals in the lower quantiles of welfare distribution.

The rationale of this study is multifaced.

- **Developing key strategies:** Understanding the underlying factors of successful Digital Financial Inclusion may contribute towards the development of effective strategies to promote inclusion. Digital Financial Inclusion hinges on the effective application of financial literacy and usage. Using these factors to drive adoption, and building strategies centred on these pillars will expand reach significantly.
- **Conceptual Framework:** The utilisation of the conceptual framework that considers both demand (e.g., Usage) and supply (e.g., Access) dimensions enables the identification of the fundamental drivers of Digital Financial Inclusion.
- **Contextualisation to South Africa:** Examining the study within the context of South Africa enables the identification of specific challenges and opportunities.
- **Additional Contributions:** By incorporating financial Literacy and user readiness, the study aims to contribute to understanding their roles in

adoption, policy development and improved Digital Financial Inclusion programmes.

To this point, the study on gaining a deeper understanding of factors that lead to successful Digital Financial Inclusion is impactful from a societal and macroeconomic perspective.

1.6 Delimitations of the study

Initially, the study faces geographical constraints as it is restricted to South Africa. Secondly, the study adopts a self-administered approach, introducing inherent self-selection bias that could result in the omission of crucial individuals from the findings.

Accessibility challenges associated with the chosen mode of delivery potentially contribute to the exclusion of participants who may not have access to the internet. Lastly, the scope of the study is to identify factors for successful Digital Financial Inclusion and their significance. Future researchers can widen the scope to further expand on the impact of macroeconomic factors, and other factors that may influence Digital Financial Inclusion to achieve a more comprehensive analysis.

1.7 Definition of terms

Account ownership or Transactional account refers to ownership of an individual or jointly owned account at a regulated institution, such as a bank, credit union, microfinance institution, post office, or mobile money service provider (Demirguc-Kunt et al., 2022).

Automated Teller Machine(ATM) is a self-service machine that allows customers to perform basic financial transactions without the help of a bank representative(Okafor & Ezeani, 2012).

Barriers to financial inclusion, perceived by unbanked individuals, provide information about the obstacles that prevent them from using formal financial services (Cámara & Tuesta, 2017).

Credit refers to money borrowed from a formal financial institution based on the agreement that payment will be made in the future(Demirgüç-Kunt et al., 2020).

Digital Financial Inclusion refers to the equitable access and usage of formal financial services through digital channels (Agrawal & Jain, 2019)

Financial literacy refers to the knowledge and practical skills individuals have that enable them to manage their finances appropriately and make sound financial decisions (Klapper et al., 2015).

Financial service providers or financial institutions refer to any group of companies under common control whose exclusive or predominant activities consist of providing significant services in at least two of the three major financial sectors. The three sectors are commercial banking, investment banking, and insurance (Skipper, 2000).

FinTech (Financial Technology) is an industry made up of organisations using novel financial technology to support or enable financial services(Nicoletti et al., 2017).

Payments incorporate all methods of sending or receiving value (Monteverde & Chidambaram, 2018).

A **Savings account** refers to an account at a financial institution used to save money. An alternative is semi-formal savings through the use of savings clubs (Demirgüç-Kunt et al., 2020).

Usage refers to the utilisation of at least one formal financial service, enabling the making and receiving of payments, as well as storage of funds (Cámara & Tuesta, 2017).

User readiness is defined as the willingness and ability to use financial solutions(Armstrong, 2019).

1.8 Assumptions

Assumption 1: Socio-economic factors such as age, income, gender, and education can be used as moderating factors in the study.

Assumption 2: User readiness, financial literacy, barriers, access, and usage, provide a comprehensive measurement for the study.

Assumption 3: The Likert scale used is an appropriate tool for capturing participants' perceptions and attitudes.

Assumption 4: The findings can be generalised to the population of interest.

Assumption 5: Participants provided fair and honest responses to all questions.

1.9 Chapter Outline

This study comprises six chapters, which include an overview and an introduction to the study, setting the scene for subsequent chapters. The chapters are further organised as follows:

- Chapter 2 is the literature review, which conducts a critical analysis of existing literature, conceptual framework, and exploration of factors that influence Digital Financial Inclusion to establish a foundation for the research.
- Chapter 3 articulates the chosen research methodology, detailing the design approach, data collection procedures, and methods employed for data analysis.
- Chapter 4 presents the research findings, offering a comprehensive analysis of the data gathered.
- Chapter 5 summarises the primary outcomes of the study and engages in a comprehensive discussion of the empirical findings, providing connections between the research outcomes and existing literature.

- Chapter 6 proposes the recommendations for future research and serves as a concluding chapter that encapsulates the study's contributions and potential effects.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The initial segment of this section offers a brief overview of the evolution of financial inclusion in South Africa, delineating the role of financial institutions and government in advancing inclusion. The subsequent part revisits the factors of successful digital inclusion, while the concluding section delves into a deeper analysis of the conceptual framework.

2.2 Background on Digital Financial Inclusion Developments in South Africa

The banking landscape in South Africa is characterised by the presence of 18 commercial retail banks, 4 mutual banks, 5 cooperative banks, 13 local branches of foreign banks and 29 foreign banks with local representation (Financial Sector Outlook Study, 2022). Notably, the report highlights that despite the numerous entities in the sector, there is significant concentration with the largest four banks holding an 83% share of deposits, and 82.6% of consumer debt. This implies that a substantial portion of the population, estimated at 60.6 million according to StatsSA (2022a), is serviced by these major banks.

Figure 1 below illustrates the level of financial inclusion in South Africa, further solidifying the research problem presented in Chapter 1.

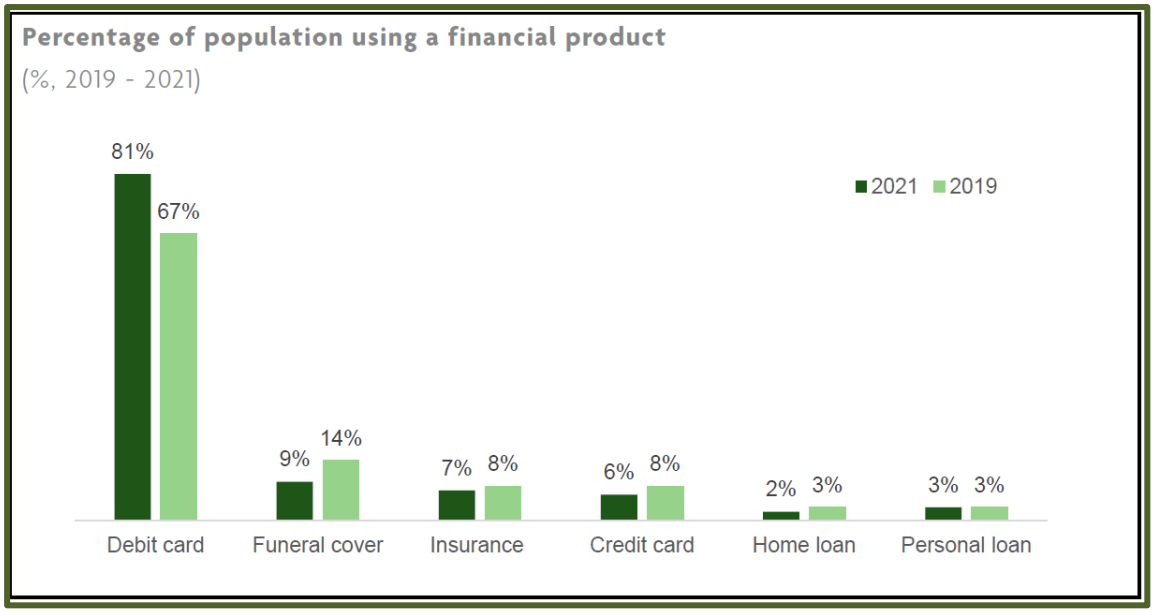

Figure 1: Penetration of banking products

Source: FSCA (2022, p. 24)

While widespread account ownership suggests progress in financial inclusion, the above illustration introduces concerns about the exposure to other financial products beyond a bank account. This phenomenon echoes trends, as noted by Demirguc-Kunt et al. (2022), where 85% of adults are banked yet lack access to broader financial services. Consequently, the Old Mutual Savings and Investment Monitor(2022) highlights the continued prevalence of informal savings and stokvels, particularly among lower-income groups.

Beyond basic accounts, credit utilisation focuses on consumption rather than strategic investments in areas such as business ventures or education(Kessler et al., 2017). Awareness of financial services apart from a bank account is relatively low, with most people only aware of store cards, lay-buys, and loans from micro-lenders from a credit perspective (Roberts et al., 2012). The author further states that, from a savings and investment perspective, awareness is high for retirement products and informal savings.

2.2.1 *The role of financial service providers*

Financial inclusion is the development of novel methods to enable individuals at the base of the pyramid to access formal financial services (Lal & Sachdev, 2015). Access to financial services is owned and largely facilitated by financial institutions that have made significant strides in promoting the inclusion of financial services, both traditionally and digitally.

One of the earliest initiatives developed by financial service providers in South Africa, with the support of the government, was the Mzansi account. The initiative was developed by banks in response to the concern from the government that development was slow in low-income segments. This forged the Financial Sector Charter (FSC), which was a social pact between government, financial service providers, and other core role players to transform the landscape and contribute towards creating a more inclusive sector (National Treasury, 2014).

As part of the financial service providers' commitment to achieving the development goals set, the Mzansi account was launched in October 2004 by South Africa's four major banks and Postbank, as a basic bank account for low-income populations(Villasenor et al., 2015). The account was described as appealing to individuals with basic but insufficient financial education (Kostov et al., 2014).

Demirgüç-Kunt and Klapper (2013), Allen et al. (2016) and Kumar Vaid et al. (2020) identified the lack of documentation as one of the barriers to financial inclusion. With the Mzansi account, the government equally understood the impact of removing this barrier to achieve inclusion. Accordingly, the decision was made to apply Exemption 17 to Mzansi account customers (National Treasury, 2014). This essentially allowed for an exemption under the Financial Intelligence Centre Act (FICA) where individuals could open the account without submitting proof of address as part of the 'Know Your Customer' requirements. The exception resulted in interested customers being allowed to open a Mzansi account with only their South African Identity document.

Kostov et al. (2014) investigated factors that influenced the decision to open a Mzansi account and found that basic literacy, understanding of financial terms

and aspirations for financial services had a significant impact on customers' decision to use the account. Individuals with basic literacy were more likely to open a Mzansi account. This school of thought is aligned with Demirguc-Kunt et al. (2022) who argue that users with less financial experience may struggle to use bank accounts effectively.

The Mzansi account was successful in terms of account take-up, however, usage was still relatively low (National Treasury, 2014). Although the Mzansi initiative was deemed to be successful, with banks reaching a target audience they had never pursued before the initiative, Louis and Chartier (2017) reported that 12 million South Africans were still unbanked. The author states that the initiative was a significant contributor to the extension of financial services, however, the lack of sufficient client literacy engagement and poor customer perception contributed immensely to the failure of the product.

2.2.2 *The role of Government*

Government policy has an important role to play in promoting financial inclusion, which can be defined as the ability of individuals to access appropriate financial products (House of Commons Treasury Committee,2006). The author further states that it is vital for government to take a leadership role in steering the financial service industry.

The Mzansi account initiative is an example of the impact that the government has on changing the financial landscape (National Treasurey,2014). A clear government policy was developed to extend access and usage of financial services to all South Africans to redress the skewed development created during apartheid.

Louis and Chartier (2017) on the other hand, argue that private-public initiatives to promote inclusion are designed as social responsibility initiatives, therefore, are not sustainable for solving longer-term financial inclusion. The author argues that financial inclusion should not be treated as a social responsibility tool but as part of longer-term strategic policies by public and private entities.

Furthermore, Ehrbeck et al. (2012) explore three roles in which government can have a significant impact namely; being the promoter of infrastructure, rule maker regarding that infrastructure and driver of volume. The author suggests that by focusing on these three elements, government can play a pivotal role in supporting financial service providers, ultimately expanding access to a wider demographic.

One of the prime examples demonstrating the South African government's role in increasing Digital Financial Inclusion was the introduction of the electronic payments system for social grants using SASSA (South African Social Security Agency) Mastercard in 2012. News24 (2013) reported that there were 10 million active SASSA Debit MasterCard holders, which was a major contributor to the growth of the banked population in South Africa.

Fanta et al. (2017) however, argued that while adoption from account ownership increased, the initiative did not contribute significantly to creating sustainable Digital Financial Inclusion as most recipients withdrew their funds as soon as they were deposited. Similarly, Donovan (2018) identified that users of the new system revealed a perception of reduced control over their money, with complaints suggesting the loss of physical possession of their money. This implies that financial education should have been the key focus in promoting the right behaviour and usage.

In recent years, the SARB (2018) published policy documents that may assist the government with the promotion of financial inclusion. The document details the pillars of the South African Financial Sector Development and Reform Program, which is set to assist the government in strengthening financial stability and promoting financial inclusion.

The more comprehensive view of the government's policy is outlined by the National Treasury (2020) in the Financial Inclusion policy document. The policy presents government's strategy for influencing regulatory frameworks, the development of the Financial Sector Code (FSC), and sector market practices. This document proposes a framework of key policy priorities, outlined below, designed to deepen financial inclusion within the country.

Key policy priorities

- Promote the beneficial use of transactional accounts.
- Build appropriate payment options to drive usage of financial services.
- Position remittances as a springboard for further financial inclusion.
- Support increased formal savings for low-income earners.
- Promote appropriate credit for assets and investment consumption.
- Promote appropriate, affordable, and quality insurance.
- Increase the financial inclusion impact of social grant distribution.
- Improve efficiencies in financial services' client onboarding.

The above-mentioned policy and initiatives are a testament to the South African government's commitment to increasing financial inclusion. Effective implementation holds the potential to significantly improve access to financial services, thereby generating a substantial positive impact on the nation's financial landscape.

2.3 Examining whether Financial Literacy could influence Digital Financial Inclusion

Financial Literacy, as a means to empower people to have greater access to financial services, is vital in making Digital Financial Inclusion a reality(Antony & Joseph, 2019).

2.3.1 *Financial Literacy*

Financial literacy is defined as the ability to make sound, informed financial decisions encompassed by financial knowledge, financial behaviour and financial attitudes (Morgan & Long,2020; OECD,2018). According to Demirguc-Kunt et al. (2022), two factors impede financial inclusion, namely low levels of financial literacy and limited access to financial services, whether digital or traditional. The authors' research findings found that a significant portion of unbanked individuals have concerns about using digital financial services without assistance. Similarly, FinScope SA (2022) reports minimal improvement in the financial wellbeing of

South Africans from 2020, implying a reduced ability to adequately use financial services.

As determined by Morgan and Long (2020), financial literacy has a positive and significant influence on financial inclusion. Consequently, individuals with higher financial literacy scores are more likely to have formal savings. Correspondently, Wachira and Kihiu (2012) initially established that the probability of a financially illiterate person remaining financially excluded would remain high. However, upon further analysis, the results of their study indicated that households' access to financial inclusion is not solely based on financial literacy. Instead, it is influenced by other factors, such as income levels, distance, and age. Likewise, Klapper et al. (2015) found that financial literacy is higher among the affluent, well-educated individuals, particularly those who actively utilise financial services.

This phenomenon triggered a further review of existing literature, and accordingly, it was found that other factors need to be considered with financial literacy to truly determine its influence on Digital Financial Inclusion. Research findings by Shen et al. (2018) revealed that financial literacy has a positive, significant relationship with Digital Financial Inclusion. Furthermore, the authors indicate that internet usage plays a multiple mediator role between financial literacy and Digital Financial Inclusion, so both can advantage Digital Financial Inclusion. Moreover, Prasad et al. (2018) recognise both awareness from a financial education perspective and accessibility of infrastructure, as key drivers of financial inclusion.

Aligned to the aforementioned studies, Gupta and Singh (2013) indicate that variations exist in determining the correlation between financial literacy and Digital Financial inclusion, and that results may be dependent on the country or even state. For example, the study by Yang et al. (2023) conducted in the Chinese context reveals that there is a direct positive and significant effect of financial literacy on Digital Financial Inclusion. Comparatively, Gupta and Singh (2013) and Prasad et al. (2018) indicate that in certain Indian cash-orientated states, financial literacy may not have a significant influence on Digital Financial Inclusion. However, the focus should be more on user- centric digital access to

financial services, behavioural intention and demonetisation driven by strategic policies.

Based on the literature reviewed, the below hypothesis will be tested.

Hypothesis: Financial literacy could have a positive influence towards Digital Financial Inclusion.

2.4 Examining whether barriers to financial services could influence Digital Financial Inclusion.

Barriers to Digital Financial Inclusion can be divided into voluntary and involuntary exclusion. Amidžic et al. (2014) identifies voluntary exclusion as the population that choose not to adopt financial services, while involuntary exclusion refers to individuals excluded from the formal financial sector because of insufficient income or excessive lending profiles.

2.4.1 *Barriers to Digital Financial Inclusion*

Behl and Pal (2016) examined the relationship between users' perception and the extent of mobile banking usage. The findings of the study revealed that perceived credibility harms the behavioural intention of individuals to use mobile banking. Likewise, Kumar Vaid et al. (2020) and Demirgüç-Kunt et al. (2020) identified other barriers. The research findings by Kumar Vaid et al. (2020) determined that trust has a significant impact on financial inclusion, whereas findings by Demirgüç-Kunt et al. (2020) revealed that lower income levels, perceived cost and distance have a negative and significant influence on financial inclusion.

In a recent study, findings by Demirguc-Kunt et al. (2022) corresponded to Kumar Vaid et al. (2020) as the authors determined trust to have a significant influence on financial inclusion, coupled with distance, lack of documentation and costs. Consistent with the aforementioned authors, Adeyemi et al. (2012) and Wale and Makina (2017) determined that barriers such as lack of documentation, high costs, lower levels of income and trust reduced the opportunity for Digital

Financial Inclusion. This implies that these barriers may have a negative and significant impact on overall inclusion.

While findings have been consistent across the studies, it is imperative to recognise the advancements in digital banking that may result in debates on whether the historically identified barriers are appropriate in the digital context. According to Akudugu (2013), distance has a negative influence on financial inclusion, however, digital banking has eliminated the need for individuals to travel to access financial services. This notion was supported by Kumar et al. (2020) where it was determined that distance did not have a direct impact on financial inclusion in the current format, where there are digital alternatives to brick and mortar.

In the presence of digital banking alternatives such as mobile banking, enabled by the internet, these barriers have minimal and in some cases no influence on financial inclusion(Cámara & Tuesta, 2014). Accordingly, where there is particular focus on digital connectivity, access to digital financial services and financial literacy, higher financial inclusion levels are supported(Ozili, 2018).

In South Africa, Mahalika et al. (2021) investigated the relationship between poverty and financial inclusion. Further analysis of their study unveiled that education levels, age and employment status moderate the relationship between the two constructs, which implies that initiatives by financial service providers to increase the level of financial inclusion must be tailored according to the demographical characteristics of individuals in the country. Similarly, Zins and Weill (2016) found that being a man, more educated and older to a certain extent, favoured higher financial inclusion. This finding has the same implication from a strategic policy perspective.

Considering the consistent findings across the aforementioned literature, and the uncertainty of whether the barriers identified are relevant in the digital environment, the below hypothesis will be tested.

Hypothesis: Barriers to financial services could have a negative influence towards Digital Financial Inclusion.

2.5 Examining whether Access to financial services could influence Digital Financial Inclusion

2.5.1 *Access*

The majority of studies on drivers of financial inclusion have focused on the traditional forms of access. Adil and Jalil (2020) describe access to financial services as the physical point of services offered by financial service providers. Their findings underscore the significance of ease of access and geographic location in affecting financial inclusion. Similarly, Kumar Vaid et al. (2020) posit that penetration, defined as the depth to which banks can provide financial services, has a significant influence on financial inclusion. Sanderson et al. (2018) connect an inclusive financial sector to the socio-economic development of Zimbabwe. Their findings indicate that distance, encompassing the distance to the nearest branch, post office, ATM, point of sale or mobile money agent, has a negative significant impact on financial inclusion.

On the other hand, Akudugu (2013) implores the consideration of other factors such as the lack of financial resources and trust, when addressing financial inclusion in the formal financial sector. This implies that focusing solely on accessibility without accounting for the adequacy of services and perceived value by users, hinders the ability to discern true significance. Likewise, the adequacy of services necessitates consideration to cost, transparency, customer experience at the point of sale and the optimisation of digital banking channels (Kessler et al., 2017).

While traditional access frameworks remain influential, there is a burgeoning body of literature that investigates the impact of access on Digital Financial Inclusion from a supply perspective. The study by Aziz and Naima (2021) in Bangladesh suggests a customer-centric digital migration approach to addressing digital access. The author finds that access is driven by financial

literacy and suggests equipping the underserved population with basic digital skills, through targeted initiatives facilitated by bank agents. Aziz and Naima (2021) further argue that although digital financial services have bridged a gap in physical access, digital access alone may not have a significant impact on Digital Financial Inclusion. Accordingly, the findings by Khera et al. (2021), suggest that policies to foster demand in these solutions will actively help increase Digital Financial Inclusion.

Some of the key enablers for access or adoption of digital financial services are internet connectivity and smart phone access(Karp & Nash-Stacey, 2015). According to Simon (2023), South Africa has an internet penetration of 72.3%, which increases the probability of increased access and usage. However, the Financial Sector Outlook Study (2022) reveals that consumers continue to use alternative modes of banking and cash despite increased efforts by financial service providers to expand the digital distribution channels for banking

Based on the reviewed literature, the hypothesis to be tested is stated below.

Hypothesis: Access to financial services could have a positive influence towards Digital Financial Inclusion.

2.6 Examining whether Usage of financial services could influence Digital Financial Inclusion

2.6.1 *Usage*

Demirgüç-Kunt et al. (2020) established that owning an account is the initial gateway to financial inclusion. Notably, their study identifies mobile money as a viable alternative to traditional banking. Consequently, recent years have observed a surge in mobile money adoption, with the number of registered mobile money accounts growing to 1.35 billion globally, an 18% increase from 2020 to 10 times more than in 2012 (Awanis et al., 2021).

Even though account ownership is a pivotal gateway to financial inclusion, Sethy (2016) and Shen et al. (2018) highlight the critical role of utilisation. Similarly, both studies find that usage has a positive, significant impact on financial inclusion, and emphasise the importance of using these services adequately. Besides the findings, Shen et al. (2018) recognise that internet usage and financial literacy moderate the relationship between usage and financial inclusion.

While Ozili (2021) further underscores the positive impact of usage on financial Inclusion, the author finds that the combined use of credit cards with increased formal account ownership contributes to reduced risk and improved efficiencies. Mehrotra and Yetman (2015), however, caution against the increased risk associated with greater use of credit, if unregulated. The same concerns are echoed by Kessler et al. (2017) where the authors argue that sustainable financial inclusion needs to ensure that credit growth does not outpace Gross Domestic Product(GDP) growth. These risks, however, are mitigated when credit is offered in the formal financial sector, as it is highly regulated.

Wale and Makina (2017) investigated the influence of individual characteristics on usage in selected Sub-Saharan economies. Their results unmasked that account usage was significantly higher among African males, with age, high income and higher education levels demonstrating positive, significant results. In comparison, conflicting evidence stemmed from a South African study by the Worldbank (2018) which revealed that women were more likely to have access to and use formal financial services as opposed to men. In addition, the study's findings identified age, location, and race as significant factors affecting financial inclusion.

Moving beyond demographics, Kabir et al. (2017) and Kumar Vaid et al. (2020) explored the role of perceived usefulness in shaping individuals' attitudes towards using financial services. Both studies found a positive relationship between perceived usefulness and financial inclusion, however, did not provide further insights on moderating factors, which was a key limitation (Wale & Makina, 2017).

Building upon existing literature and aligning with the hypothesis to be tested in this study, Nandru and Rentala (2020) found that usage has a positive, significant impact on financial inclusion. These findings further support the importance of investigating the effect of usage on Digital Financial Inclusion in the South African context.

Based on the literature reviewed, the hypothesis that will be tested is stated below:

Hypothesis: Usage of financial services could have a positive influence towards Digital Financial Inclusion.

2.7 Determinants of successful Digital Financial Inclusion

Financial services empower individuals by enabling them to manage their money effectively, plan for the future and build resilience against unexpected events (Sotomayor et al., 2018). Successful Digital Financial Inclusion should provide equal access to individuals across all income groups. It is also imperative that the recipients or rather users of financial services see it as useful, and an enabler for a better life.

While the significance and contribution of Digital Financial Inclusion is widely acknowledged, it is imperative to get a deeper understanding of the factors that lead to successful Digital Financial Inclusion. Previous literature delves into these determinants as authors such as Akudugu (2013) identify age, literacy levels, wealth, class, distance to institutions, lack of documentation, and lack of trust for formal institutions as determinants of financial inclusion. Morgan and Long (2020) on the other hand, demonstrated the positive impact of financial literacy on both financial inclusion and savings.

Socio-demographic such as age, gender and income are drivers of financial inclusion according to a study done by Nandru et al. (2021), while Sotomayor et al. (2018) identified proximity and remoteness of financial systems, education levels and good economic standing of the individual as the drivers.

Authors investigating both the demand and supply factors have observed significant effects. Nandru and Rentala (2020), the demand side of financial inclusion consists of physical proximity, availability, ease of access, affordability, and usage. On the supply side, factors identified are the size, geographic outreach and demographic outreach of banks(Adil & Jalil, 2020).

In 2017, The Boston Consulting Group created a framework that shows the different facets of financial inclusion, further supporting that there is a demand, supply, and environmental side to consider. The demand side of the model focuses on the customers' needs and culture, while the supply side focuses on financial services, distribution channels, risk management, information technology and operations (Kessler et al., 2017).

Despite the developments made globally to understand the drivers for successful Digital Financial Inclusion, there is no evidence of a universal framework. The attempts to measure financial inclusion through multidimensional indices are scarce and incomplete (Cámara & Tuesta, 2014).

2.8 Conceptual Framework

The conceptual model for this study is depicted in Figure 2 below. This model draws from concepts discussed earlier, and was adapted from a study conducted by Cámara and Tuesta (2017), who built upon existing indices to measure financial inclusion. The framework has been modified for application in this study.

Their study utilises independent variables including access, barriers, and usage, which are subsequently transformed into measurable metrics.

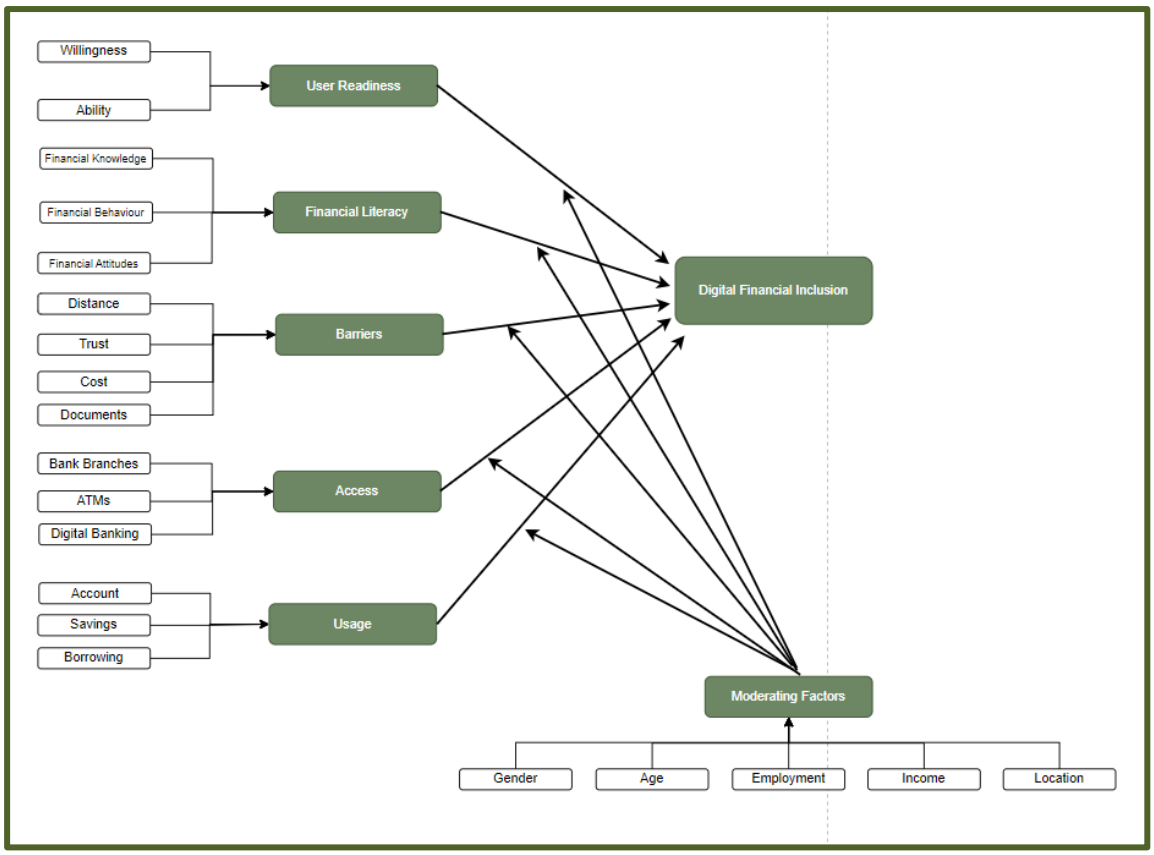

Figure 2: Digital Financial Inclusion Framework

Source: Compiled by Author (2024)

Adapted from Cámara and Tuesta (2017, p. 6)

For this study, the conceptual framework will be adapted to incorporate financial literacy, recognising its pivotal role in facilitating informed decision-making. Antony and Joseph (2019), Birochi and Pozzebon (2016), Van Hove and Dubus (2019) and Wachira and Kihiu (2012) state that financial literacy is seen as a tool to empower individuals to access financial services effectively.

A South African study by Roberts et al. (2012) noted that while awareness of bank accounts was high, usage of credit, insurance and savings remained low, suggesting a possible lack of financial literacy among respondents. However, Nanziri and Olckers (2019) revealed a positive correlation between financial literacy and savings accounts, particularly in pension and mutual funds.

The framework is further enhanced to encompass digital user readiness, derived from the Digital Divide Framework. The construct measures individuals' ability and willingness to use financial services. Some studies suggest that user readiness has a significant impact on credit use, and that while there may be a favourable attitude towards credit in low-income groups, higher outstanding debt in previous years may affect their ability to get further credit (Zhu & Meeks, 1994).

Stavins (2000) finds that increased credit availability reduces the likelihood of delinquency, with income and marital status significantly affecting willingness to use credit. Conversely, Kim and DeVaney (2001) contend that education levels significantly influence both willingness and usage of credit cards, asserting that highly educated individuals are more likely to use credit.

Demographics such as age, gender, income, and education will be applied as moderating factors. According to Cámara and Tuesta (2017), the use of socio-economic factors is further supported by the framework, as variables such as usage are conditioned by factors such as cultural habits and income. The application of moderating factors is further supported by the Unified Theory of Acceptance and Use of Technology (UTAUT2) adoption model that articulates the importance of using moderators such as age, gender, and experience as moderating factors when measuring adoption and usage (Tamilmani et al., 2021).

2.8.1 *Foundation of the framework*

There have been several conceptual frameworks developed by various authors in an attempt to measure financial inclusion. Kumar Vaid et al. (2020) developed a conceptual model representing the determinants of successful financial inclusion, where the authors tested nine constructs namely, outreach, penetration, availability, technology, financial literacy, perceived benefits of use, trust, and income adequacy to determine their significance on financial inclusion.

The study found that all constructs have a positive and significant impact on financial inclusion, although with varying degrees. The study, however, did not use moderating factors such as age, or income to better understand the relationship between the constructs identified.

In a different study done by Zins and Weill (2016), the authors assessed the impact of socioeconomic factors such as gender, age, income and education on financial inclusion. The authors used ownership of bank accounts, savings accounts, and credit as key indicators in determining financial inclusion. Similarly, Nandru et al. (2021) tested individual characteristics such as gender, age, income, education and employment, however, the study used these as moderating factors in two independent variables accessibility and usage.

The Multidimensional Financial Inclusion Framework came into existence as the authors found existing indices to be incomplete and subject to methodological problems (Cámara & Tuesta, 2017). The authors proposed the use of both demand-side dimensions (usage and barriers) and supply-side conditions (access) in the framework.

The model integrates factors from multiple frameworks, with the supply side influenced by Honohan (2008), Sarma (2008), Amidžic et al. (2014) and (Chakravarty & Pal, 2008). Sarma (2008) and Chakravarty and Pal (2008) applied non-parametric methods, while Amidžic et al. (2014) applied parametric methods, arguing against equal weighting for all variables.

Earlier attempts by Chakravarty and Pal (2008) at creating a framework for financial inclusion followed an axiomatic approach to constructing financial inclusion indicator. As part of creating an index, the authors used three indicators to measure the use of banking services namely, the percentage of adults with a bank account, the percentage of adults with a loan and the percentage of adults with a savings account. Chakravarty and Pal (2008) further represented access by using geographic branch and ATM penetration.

Sarma (2008) did a study in the same period to develop a financial inclusion index, also following a multidimensional approach. Although the indicators used were similar to Chakravarty and Pal (2008), Sarma (2008) combined credit and deposit information in the representation, which Cámara and Tuesta (2017) represented separately as the author argued the importance of defining and measuring the indicators separately to ensure correctness.

The key indicators used in the authors' model are banking penetration, which is represented by the number of people with a bank account, availability of branches (per 1000 population) and ATMs (per 1000 people).

Upon observation, the key difference between the two authors is that Sarma (2008) does not consider geographic and demographic indicators in the measurement of availability, which may be seen to present limitations in the findings. Both Sarma (2008) and Chakravarty and Pal (2008) applied non-paramedic methods by choosing weights exogenously (Cámara & Tuesta, 2017).

The author also considered work done by Amidžic et al. (2014) who applied parametric methods to their framework. The author argued that assigning equal weighting to all variables carried the assumption that the impact of all variables on financial inclusion are equal.

The original framework is based on the index of the Financial Access Survey (FAS) database of the International Monetary Fund (IMF) and applied the below indicators.

- Access: The percentage of adults who have an account at a formal financial institution.
- Usage: The percentage of adults who use a formal financial institution to save or borrow money.
- Quality: This variable measures the affordability, accessibility, and availability of formal financial services.

Due to the lack of data on Quality, the study by Amidžic et al. (2014) presented limitations. For this purpose, Cámara and Tuesta (2017) also omitted this indicator in their study.

The demand side of the framework is represented by barriers and usage, which can be traced to the analysis conducted by (Demirgüç-Kunt & Klapper, 2013).

In the attempt to identify factors that contribute to financial inclusion, Demirgüç-Kunt and Klapper (2013) examine variables such as access to a bank account, use of a bank account, borrowing and savings at a financial institution, as well as

the use of insurance. The author finds that financial inclusion is low in many countries, particularly in low-income countries.

Furthermore, the author focuses on identifying barriers to financial inclusion and finds that documentation, cost, and distance are some of the biggest barriers among unbanked individuals. Additionally, the study finds that financial inclusion varies within countries, with the poor, the illiterate, and women being less likely to have access to and use financial services.

Cámara and Tuesta (2017) argue for the superiority of a parametric index for cross-country and temporal comparability, emphasizing the importance of employing both demand and supply-side factors to measure financial inclusion.

2.9 Conclusion of Literature Review

The literature review above provides evidence of a better understanding of financial inclusion, and the discovery of a suitable framework that will aid in appropriately measuring Digital Financial Inclusion in the context of South Africa.

The following hypotheses will be tested as part of this study.

2.9.1 User readiness could have a positive influence towards Digital Financial Inclusion.

2.9.2 Financial literacy could have a positive influence towards Digital Financial Inclusion.

2.9.3 Barriers to financial services could have a negative influence towards Digital Financial Inclusion.

2.9.4 Access to financial services could have a positive influence towards Digital Financial Inclusion.

2.9.5 Usage of financial services could have a positive influence towards Digital Financial Inclusion.

CHAPTER 3. RESEARCH METHODOLOGY

This section provides a high-level overview of the research approach and design that was used to collect, process, and analyse data to achieve the objectives of the study. This is followed by the outline of the sample selected, sampling methods, and a brief discussion of the quality assurance measures that were employed to ensure the reliability and validity of the study. The section concludes with a high-level overview of the statistical tool used to analyse the relationships between variables.

3.1 Research approach

This chapter outlines the research approach that was followed in the study to examine the hypotheses stated in Chapter 2. The research approach that was taken for this study is the deductive research method, which is underpinned by the rule that the researcher works from theory to hypotheses, analysing data to add or contradict theory(Soiferman, 2010). This method was appropriate to this study as it is typically used in quantitative studies, which is supported by positivists who favour a hypothetico-deductive procedure(Khaldi, 2017).

Using the selected approach, the study started by reviewing existing literature, forming hypotheses, conducting analysis and then confirming or refuting findings. The quantitative approach was appropriate for this study as it enabled hypotheses to be tested quantitatively, through the collection and analysis of large amounts of data (Schindler, 2018).

Drawing from insights provided by the abovementioned authors, this study adopted a quantitative research approach.

3.2 Research design

Schindler (2018) finds that self-administered surveys are beneficial as they are cost-effective, allow expended geographic coverage, rapid data collection, and offer fast access to participants. Additionally, Simon (2023) indicates a substantial internet user base of 43.48 million in South Africa, with an internet

penetration of 72.3%. Consequently, a self-administered online survey was deemed suitable to procure data efficiently.

The survey allowed for data to be collected, stored, and visualised online while providing the participants the flexibility to complete the questionnaire at a time convenient for them. Furthermore, the chosen research design enabled wider reach from a geographical perspective.

While the same sentiments are found by Nayak and Narayan (2019), the authors warn that online surveys may pose challenges, such as sampling errors, non-respondent characteristics, maintenance of confidentiality, and ethical issues.

Based on the research objectives and hypotheses tested, the selected design was appropriate, facilitating outreach to a broader audience and ensuring participant anonymity. This decision was reinforced by Sue and Ritter (2012), who observed that online surveys were well suited for testing hypotheses and reaching a wider audience.

The study utilised primary data to investigate the hypotheses outlined in Chapter 2 and the survey was divided into two parts. In the initial section, participants were queried regarding the variables within the contextual framework presented in Figure 2. Subsequently, the second part of the survey provided participants the opportunity to complete their demographic information.

While several studies by Nandru et al. (2021), Zins and Weill (2016) and Mhlanga and Denhere (2020) explored the determinants of financial inclusion using secondary data from the World Bank's Global Findex data base, this study departs from this approach due to limitations such as inflexibility of variables, obsolete data, incompatibilities and generalisability.

3.3 Data collection methods

The Likert scale allows respondents to choose a response that best characterised their level of disagreement or agreement to each statement presented (Joshi et al., 2015). In this study, participants were asked to rate their level of agreement

on a 6-point Likert scale, to reveal specific dimensions of their attitudes towards the factors being queried.

Likert (1932) constructed the scale as a means to capture definable attitudes on an ordinal scale. The author argued the importance of offering participants clear and distinct options to choose from, to ensure accurate measurements of attitudes and meaningful conclusions. Likert (1932) used a 5-point Likert scale where participants were asked to respond indicating whether they strongly approved, neither approved nor disapproved, disapproved, or strongly disapproved.

Despite its widespread adoption, the Likert scale has sparked debate among researchers regarding its optimal application. Specifically, the literature reveals conflicting views on whether even or odd numbered scales are more effective. Joshi et al. (2015) recommends a larger spectrum of choices to give participants more independence, and to empower them to express their experiences more accurately.

Gwinner (2006) found that researchers who preferred the 5-point Likert scale perceived that participants may feel neutral about a given topic, and removing the neutral midpoint may introduce respondent bias. Comparatively, Nemoto and Beglar (2014) state that the neutral or middle category does not conform to the fundamental continuum of the scale, and may cause statistical issues when doing analysis. Researchers who preferred the 6-point Likert scale argued the importance of respondents committing to either a negative or positive response to avoid ambivalent answers.

This view is consistent with Taherdoost (2019) who identified that a 6-Likert scale would be more suitable where the respondent needs to provide either a negative or response.

Seeking in depth responses into the respondents' perceptions, this study employed a 6 Likert scale.

3.4 Population and sample

The target population refers to all the members who meet the particular criteria specified for a research investigation (Alvi, 2016). The target population of the study is described below.

3.4.1 *Population*

This study focused on South African residents, aged 18-65 who are fluent and literate in English. According to StatsSA (2022b), South Africa's population stands at 60.6 million, with a gender distribution of 51% females to 49% males. Simon (2023) reported an internet penetration of 72.3% in South Africa. Consequently, the study only focused on individuals with internet access, as it utilised an online self-administered survey as its mode of delivery.

3.4.1 *Sample*

Sample size determination is the technique of electing the number of observations to include in a sample (Singh & Masuku, 2011). Jackson (2003) indicates that higher values of observations per parameter ratio have a positive effect on some measures, and Kline (2023) provides sample size guidelines, classifying 100 as small, 200 as medium, and recommending samples exceeding 200 to achieve a fairly large size. Moreover, Hooper (2012) recommends a sample size of at least 200 participants.

In addition, Israel (1992) provides three criteria to be considered for determining sample size, a -+5% level of precision, a 95% confidence level and a variability of 50%.

To estimate the sample size required, the below assumptions were made.

- The margin of error, which can be accepted, is 5%.
- The confidence level required is 95.
- The population size is 60.6 million.
- The response distribution is 50%

To be in a position to make reliable conclusions, the target sample size was 385, aiming for a minimum response rate of 52% (200).

Software used for calculation: Raosoft (2023)

3.4.2 *Sampling method*

Sampling methods are broadly classified into two categories, being probability sampling and nonprobability sampling (Schindler, 2018). In probability sampling, each individual in the population has an equal chance of being selected for the study, while in nonprobability sampling, the probability that a subject is selected is unknown and may result in selection bias (Acharya et al., 2013). In a study done by Yang et al. (2006), the authors found that theoretically, probability sampling was preferred however, the majority of International Business Studies relied on nonprobability studies. Cost, time and application are the biggest drivers for nonprobability sampling over probability sampling (Schindler, 2018).

For this purpose, this study used nonprobability sampling and employed convenience sampling. This allows members of the target population that meet practical criteria such as easy accessibility, availability given time and willingness to participate to be included in the study(Etikan et al., 2016). Despite arguments by Andrade (2021) that studies conducted on convenience sampling methods pose external validity threats, other authors argue that the use of larger samples rather than using single-subject approaches allows for greater generalisation(Emerson, 2015).

3.5 The research instrument

The primary data collection instrument that was used in this study is a self-administered online survey that was divided into six sections as identified in Appendix A. Section A represents questions regarding the Digital Financial Inclusion construct, and Sections B to F represent the questions that relate to the hypotheses being tested. Lastly, Section G represents the demographic profiles, such as gender, age, province, income, education, and employment status. The survey was designed to prioritise the core questions first to ensure that even if

participants abandoned survey prematurely or leave demographic information incomplete, authors could draw meaningful inferences despite partial responses.

For the survey, a 6-Likert scale was employed from Nemoto and Beglar (2014), who endorses the use of the 6-Likert scale for increased measurement precision. The scale allowed the participant to select between strongly disagree, disagree, slightly disagree, slightly agree, agree, and strongly agree.

3.6 Procedure for data collection

The process followed for the distribution of the survey was conducted in two phases. The self-administered online survey was piloted with a smaller target audience, including family and friends, who fit the target population. Pilot testing ensured clarity and conciseness of the questions and validated the survey's functionality. Based on initial observations, the necessary adjustments were made to optimise the process for participants.

Following a successful pilot, the survey was distributed using social media and messenger applications, such as WhatsApp. Additionally, the Registrar sent it to the relevant University of the Witwatersrand distribution lists, aligned to the target population.

3.7 Data analysis strategies and interpretation

The below section provides a high-level overview of the data analysis process that was followed as part of the study.

3.7.1 *Data cleaning and coding*

Upon collection of data using Qualtrics, the data was imported to the Statistical Package for Social Science (SPSS) which is defined as "a computer software that performs statistical procedures" (Bryman & Cramer, 2005, p. 4). A thorough data cleaning process was conducted, examining the responses for missing values.

Based on the 367 responses collected, a thorough data cleaning process was conducted, examining the responses for missing values. This resulted in a final sample of 231 responses (63% completion rate), which allowed analysis to proceed without imputation.

3.7.2 *Descriptive statistics*

Descriptive statistics offer insights into the central tendency of the data (Conner & Johnson, 2017). Moreover, they allow for data to be characterised and summarised in an organised manner(Kaur et al., 2018). Fisher and Marshall (2009) refer to descriptive statistics as the numerical and graphical techniques used to organise, present, and analyse data. The authors further state that the type of descriptive statistics used to describe a variable in a sample is dependent on the level of measurement that has been used.

In this study, descriptive statistics was used to probe the demographic characteristics of the respondents, explore the Digital Financial Inclusion construct, as well as to examine the central tendency of the data.

3.8 Quality Assurance

The section outlines the quality assurance procedures utilised to assess reliability and validity of the study.

3.8.1 *External validity*

External validity refers to whether causal relationships can be generalised to different measures, persons, settings, and times (Steckler & McLeroy, 2008). To ensure that the study met external validity, the study focused on two of the main criteria used for external validity.

- **Identification of scope conditions:** One of the steps in establishing external validity is the identification of the theoretical population, and the accessible population through the determination of the sample. Without clear theoretical populations, the generalisability and validity of research

findings become difficult to assess, as the inferences drawn from the data become unclear in their applicability (Findley et al., 2021). Section 3.4 provides an outline of the theoretical and accessible population accordingly.

- **Generalisation:** Findley et al. (2021) refer to generalisation as the validity of an inference based on a sample drawn from a defined population. Although the nonprobability sampling method chosen for this study can limit generalisation as cautioned by Onwuegbuzie (2000), increasing the sample size can increase the probability of generalisation. The sample size used for this study was over 200, which is considered a large and appropriate size (Kline, 2023).

3.8.2 *Internal validity*

Internal validity is concerned with whether the conclusions drawn about a demonstrated experimental relationship truly imply cause(Schindler, 2018). Essentially, it refers to the extent to which the study accurately measures cause and effect between variables. This study employed the 6 Likert scale, providing suitable options closer to the respondents' view reduces the role of ambiguity (Joshi et al., 2015).

The validity of the constructs was assessed using Confirmatory Factor Analysis (CFA), conducted using IMB Amos version 25.

3.8.3 *Reliability*

The study followed three approaches to check reliability of the research instruments, namely Cronbach’s alpha test, composite reliability test (CR) and average variance extracted (AVE) test.

The Cronbach’s alpha test was used to examine the reliability of the scale. According to Ursachi et al. (2015), a rule of 0.6-0.7 indicates an acceptable level of reliability, and 0.8 or greater a very good indicator. Kumar Vaid et al. (2020)

and Nandru and Rentala (2020) both obtained a reliability score above the accepted 0.70 in similar studies.

In line with the authors' methodology, this study assessed the internal consistency of each factor using Cronbach's alpha, aiming to ensure all values fall within the acceptable range. Hooper (2012) emphasises the importance of rerunning the model during this exercise, as values higher or lower than Cronbach's alpha must be validated and potentially deleted in SPSS.

Furthermore, the study applied composite reliability(CR) which assesses whether constructs consistently measure the same underlying concept or construct (He, 2009). Applying the Fornell and Larcker (1981) guidelines that composite reliability <0.60, the study observed items within constructs were more correlated to the items within other constructs.

Lastly, the average variance extracted (AVE) indicator was utilised to determine the degree to which a construct explains the variance in its associated indicators, relative to the variance attributable to measurement error. According to Afthanorhan (2013), an AVE value of 0.50 and higher aligns with strong convergent validity , which shows that constructs explains more than half of its indicators variances.

Confirmatory Factor Analysis (CFA) was conducted in IBM Amos version 25 to assess the reliability of the constructs, verifying their internal coherence and stability.

3.9 Structural Equation Modelling (SEM)

Structural equation modelling (SEM) is a statistical multivariate statistical technique that is used to analyse relationships between one or more variables (Ullman & Bentler, 2012). According to Hoyle (1995), the statistical technique is a comprehensive approach to testing hypotheses among observed variables. Following the initial Confirmatory Factor Analysis (CFA) where specific constructs were deemed unsuitable for further testing and analysis, the pruned constructs

were fitted into the structural equation model using constructs determined to be valid and reliable.

This method was employed in this study because of its ability to analyse and evaluate complex relationships. Additionally, it combines the strengths of Confirmatory Factory Analysis(CFA), and multiple regression (Fan et al., 2016). The hypotheses were therefore tested using structural equation modelling (SEM).

3.10 Ethical consideration

Ethics approval was granted before any data collection commenced. This study upholds the highest standard that complies with the policies of the University of the Witwatersrand. The study is rated as minimal risk, and the data collected is used for the intended purpose only. Consent to partake in the study was explicit, which resulted in 7 participants not providing consent, therefore opting out of the research.

Participants were not requested to provide any personal information such as names, surnames, or identity numbers. The raw data will be stored for future analysis for a period of 10 years, on a password-protected computer. Data retention period on SPSS is aligned with the license and rules set by the University of the Witwatersrand.

3.11 Possible limitations and challenges of the study

- The study was subjected to time constraints, which affected overall participation.
- The results of the study are tilted towards higher income groups, which may impede the opportunity to yield findings that can be generalised to the overall population of South Africa.
- The data was collected at a point in time which may not provide the opportunity to observe changes overtime.

CHAPTER 4. PRESENTATION OF RESULTS / FINDINGS

4.1 Introduction

This chapter presents the analysis of the data obtained from respondents in the current study, starting with the demographic data to understand the composition of the respondents. Secondly, descriptive statistics (Annexure D) are provided to offer insights into the trends observed among the respondents. Subsequently, quality assurance measures are presented to ensure reliability and validity. Finally, the Structural Equation modelling (SEM) outputs are utilised to make statistical inferences regarding the determinants of Digital Financial Inclusion.

367 responses were received from the survey; however, all incomplete responses were eliminated from the analysis. To be in a position to make reliable conclusions, the target sample size was determined to be 200. The final sample size with no missing data was 231(63% of responses), therefore, no imputation was necessary.

4.2 Demographic characteristics

4.2.1 *Gender distribution of respondents*

Gender distribution among respondents was 59% female, 40% male and 1% preferring not to disclose. The skewness towards female participants shown in Figure 3 below mirrors the demographics of South Africa, where 51% are female (StatsSA, 2022a).

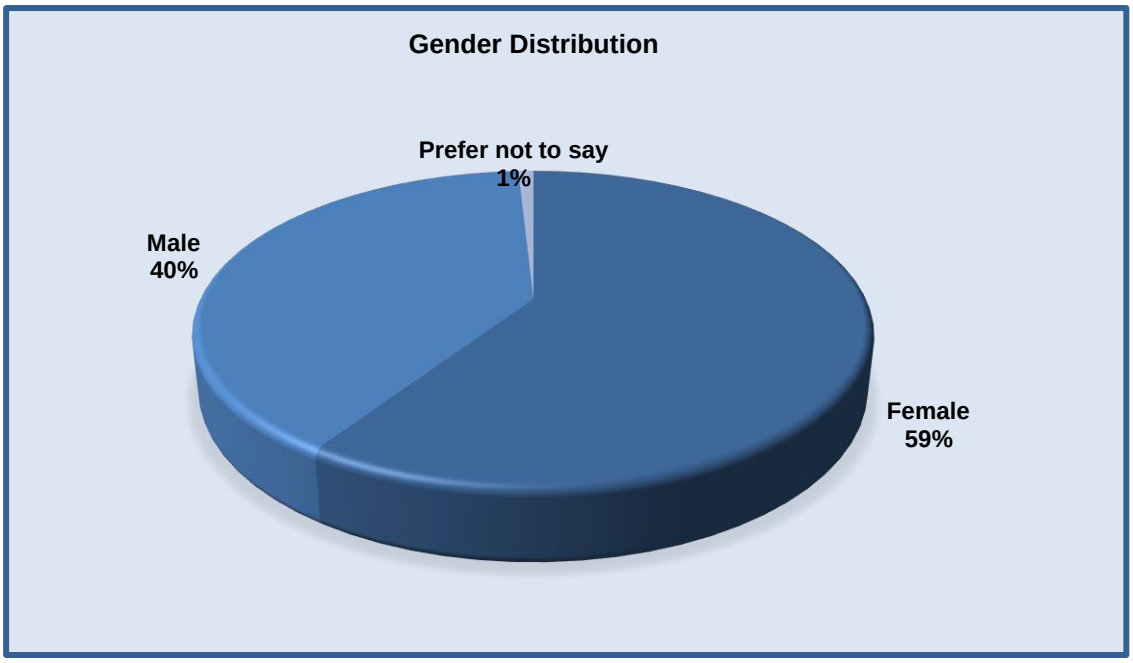

Figure 3: Gender Distribution

Source: Compiled by Author (2024)

4.2.2 *Age distribution of respondents*

Figure 4 depicts the age breakdown of the respondents, with the largest groups falling in the 18-29(39%) and 30-39(40%) age ranges. The 40-49 age group represents 16% of respondents, while representation declining sharply for older groups (4% for 50- 59 and 1% for 60 years and older).

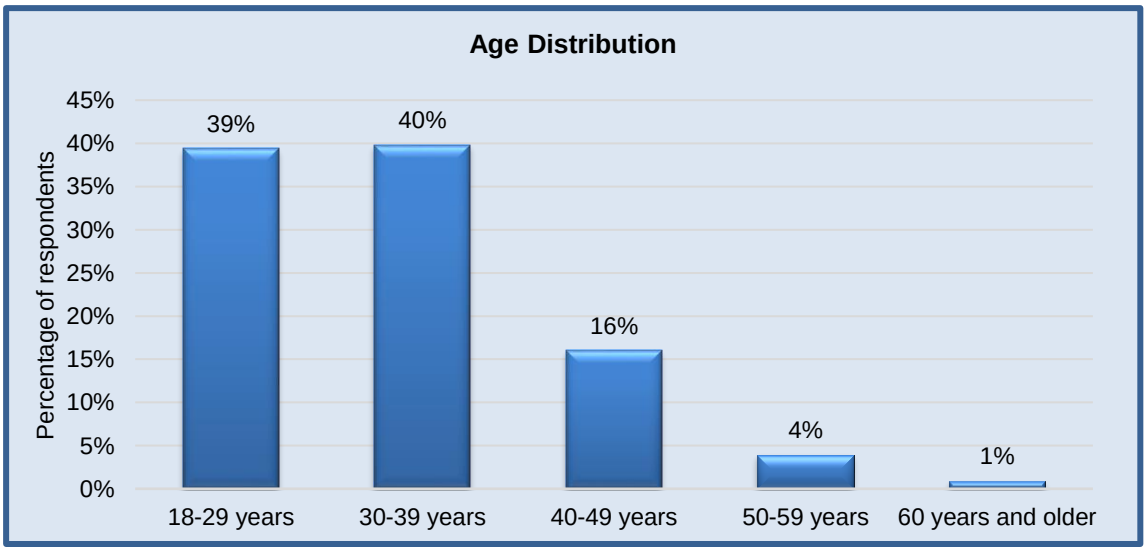

Figure 4: Age Distribution

Source: Compiled by Author (2024)

4.2.3 *Employment distribution of respondents*

The majority of respondents in the sample were full-time employees, constituting 61% of the total. Students also represented a significant portion at 33%. Part-time employees made up 3%, followed by self-employed individuals at 2%. Notably, 1% of the respondents reported that they were unemployed. This distribution provides valuable insights into the occupational diversity of the sampled population, which can be essential for interpreting research findings in various contexts. The results are presented in Figure 5.

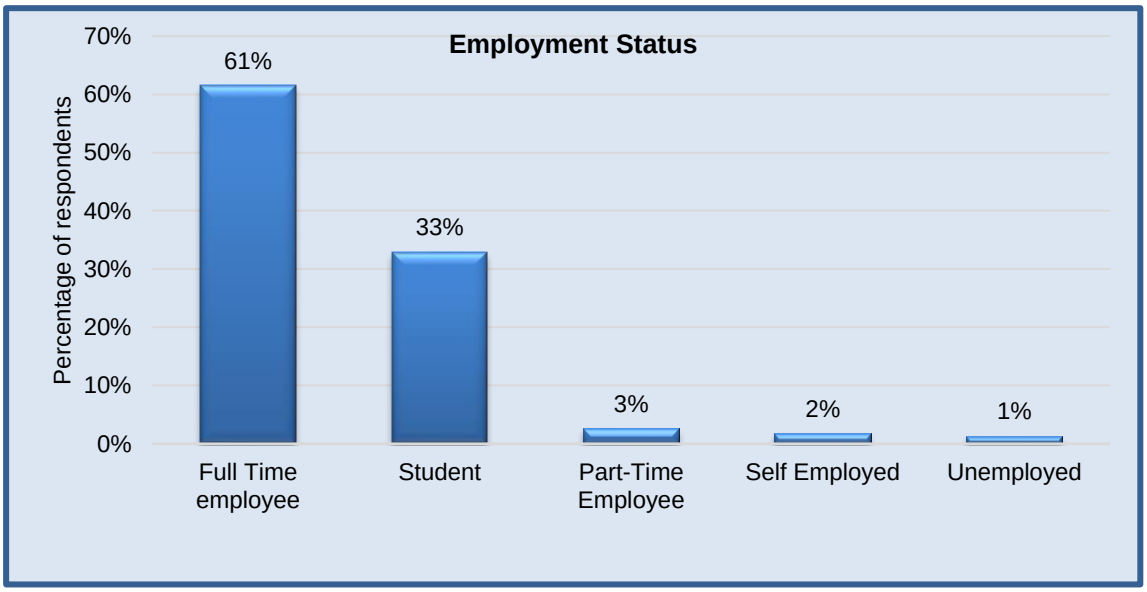

Figure 5: Employment Status

Source: Compiled by Author (2024)

4.2.4 *Highest Qualification distribution*

It can be noted that 3 in every four respondents had at least an undergraduate degree, with less than 1% having achieved below Matric as their highest attained qualification.

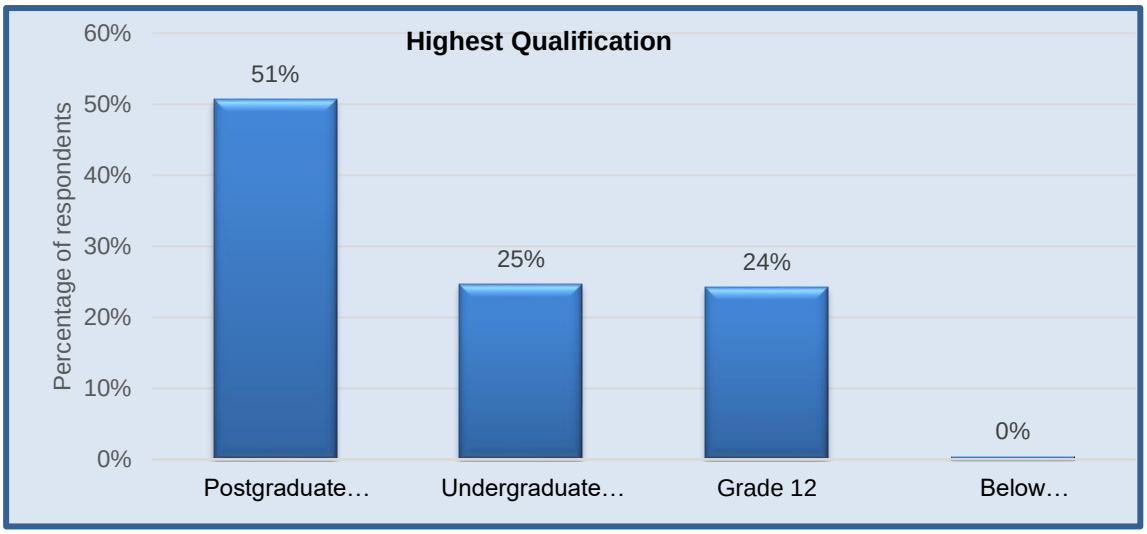

Figure 6: Highest Qualification

Source: Compiled by Author (2024)

4.2.5 *Income Distribution of Respondents*

The results illustrated in Figure 7 show that 34% of the respondents earned a gross monthly income of more than R600 000 per annum.

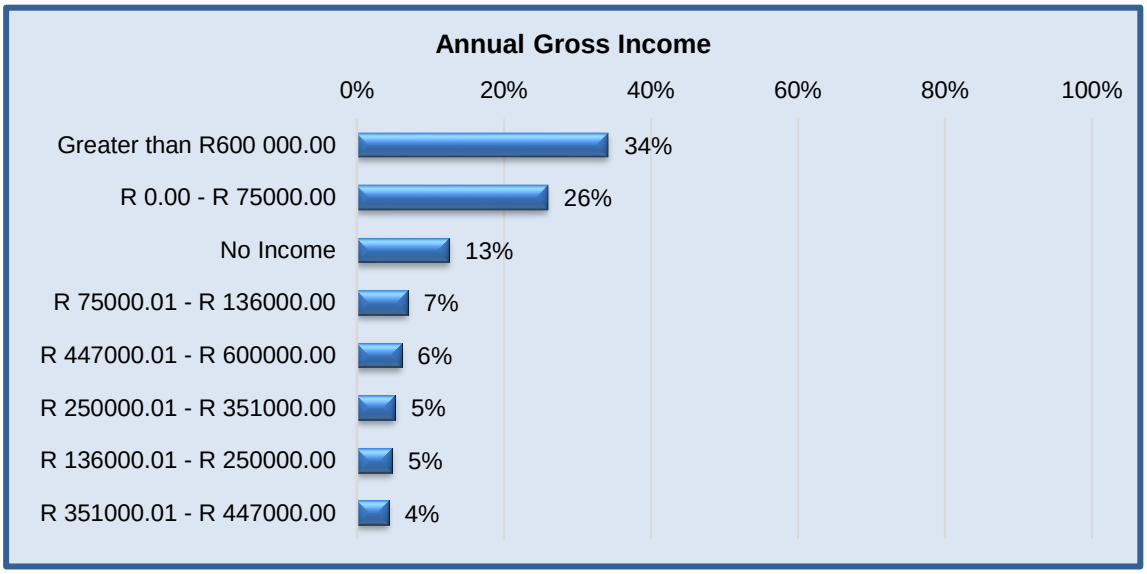

Figure 7: Annual Gross Income

Source: Compiled by Author (2024)

4.2.6 *Distribution of Respondents by Province*

Gauteng emerged as the most prevalent province, with 81% of the respondents residing there. This closely mirrors the geographical distribution of the population, considering that Gauteng accounts for the largest share of South Africa's population within the province, constituting 26.6% (StatsSA, 2022a). North West followed at a distant second with 6%, while 5% of the respondents hailed from Limpopo. The results are illustrated in Figure 8.

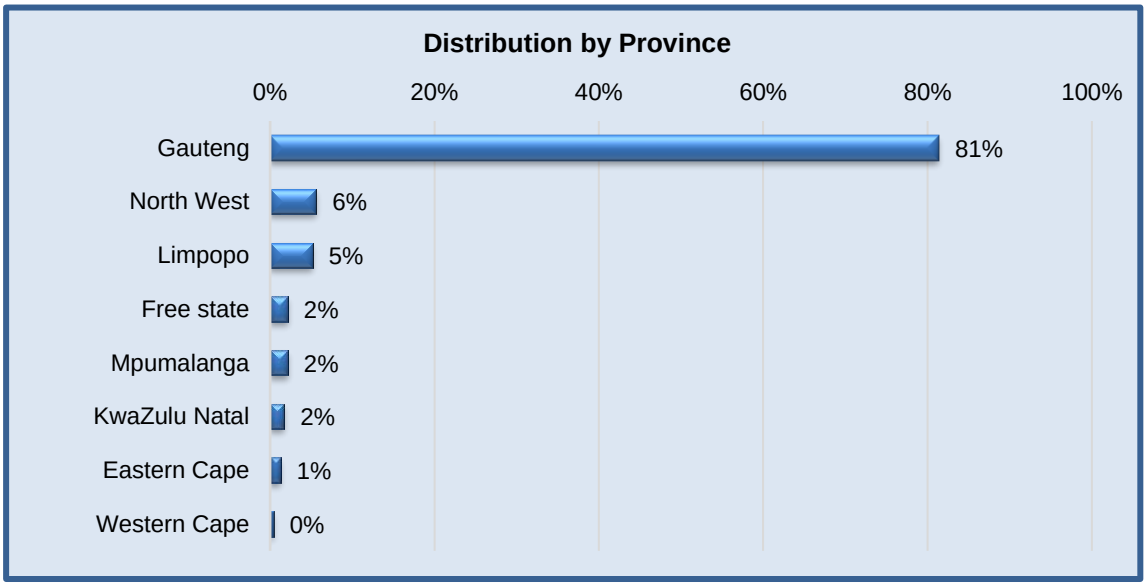

Figure 8: Distribution by Province

Source: Compiled by Author (2024)

4.3 Digital Financial Inclusion

4.3.1 *Digital Access to financial products and services*

The findings in Figure 9 indicated that 97% of respondents had a bank account (Cheque or Savings Account) accessed digitally. Additionally, 74% had a savings account, emphasising the prevalence of interest-bearing accounts for saving money. Over half of the respondents (52%) have availed themselves of loan facilities, including credit cards, overdrafts, personal loans, or other loan types.

A smaller percentage of respondents (11%) reported using other financial products not specified in the study. There was another 1% of participants that stated that they did not have any financial product or service.

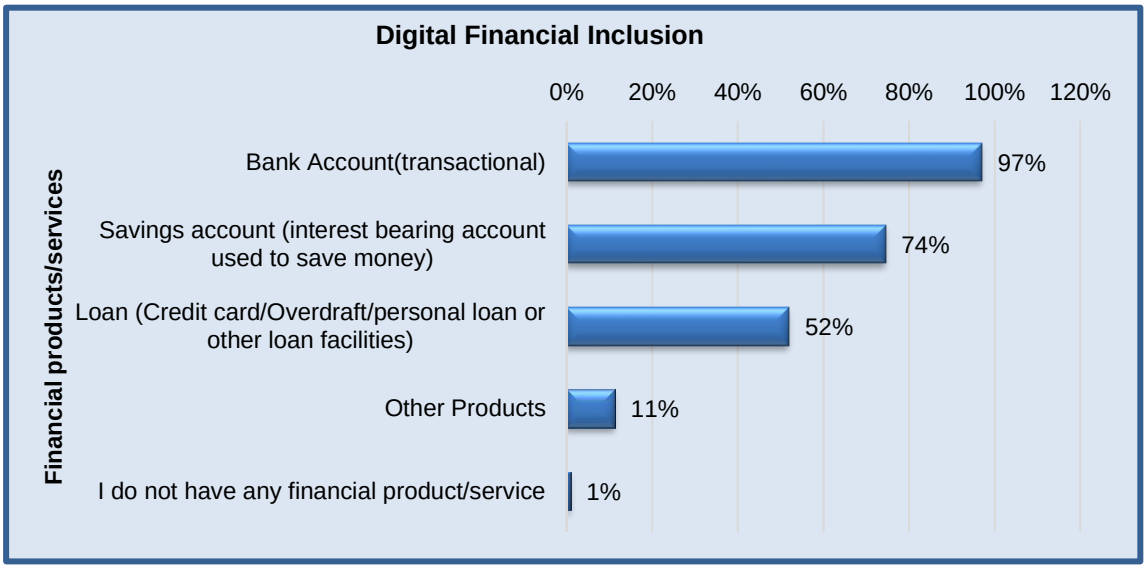

Figure 9: Digital Financial Inclusion

Source: Compiled by Author (2024)

4.3.2 *Frequency of Digital Financial Product Usage*

Three in every four respondents (75%) use their digital financial products and/or services daily or weekly, while 1 in every 5 (16%) use these products every month. Aligned to a survey done by the Financial Sector Outlook Study(2022) , the distribution shows that individuals in the higher income bracket show the most frequency of usage.

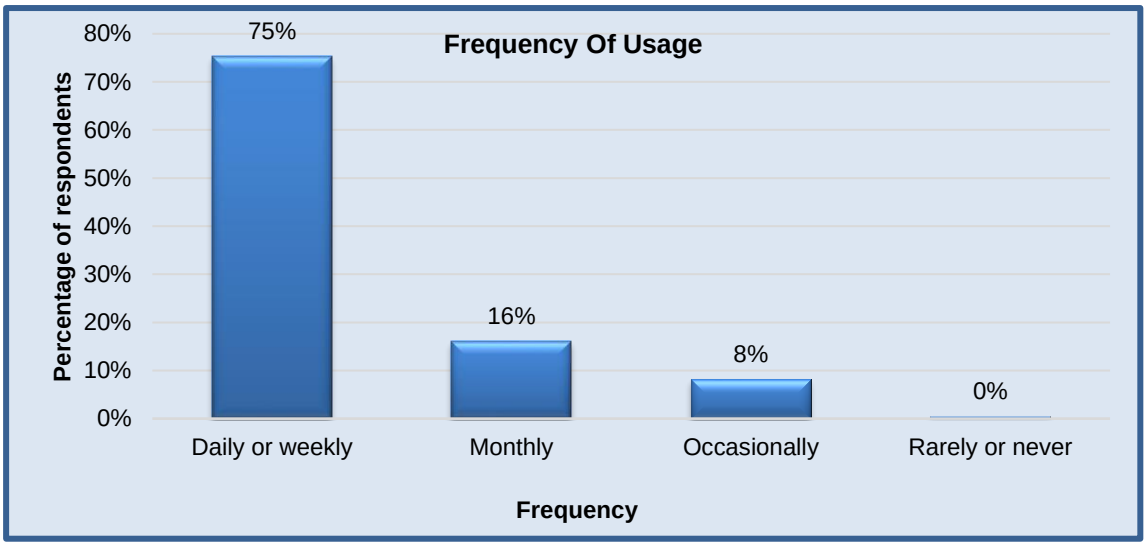

Figure 10: Frequency of Digital Financial Product Usage

Source: Compiled by Author (2024)

4.3.3 *Respondents' Perception of Factors driving Digital Financial Inclusion*

The availability of financial products and services is considered the most important factor in promoting digital access, with 76% of respondents expressing its significance. Financial literacy, or financial education, closely follows, with 75% of respondents recognising its importance. Affordability is also a key factor, as indicated by 65% of respondents. Income is identified as a factor by 39% of respondents, indicating that the financial well-being of individuals is a consideration but not as dominant as the aforementioned factors.

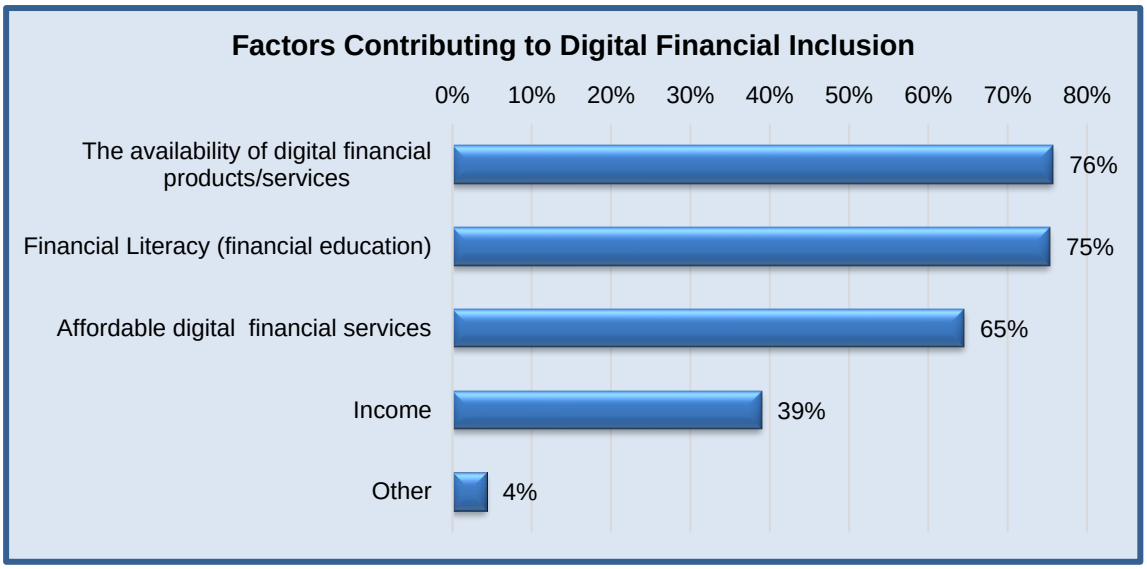

Figure 11: Factors driving Digital Financial Inclusion

Source: Compiled by Author (2024)

4.4 Validity and Reliability

4.4.1 *Hypothesised Confirmatory Factor Analysis (CFA) Model*

The reliability and validity of the constructs were evaluated through Confirmatory Factor Analysis (CFA), performed using IBM Amos version 25. The hypothesised CFA model is depicted in Figure 12 below.

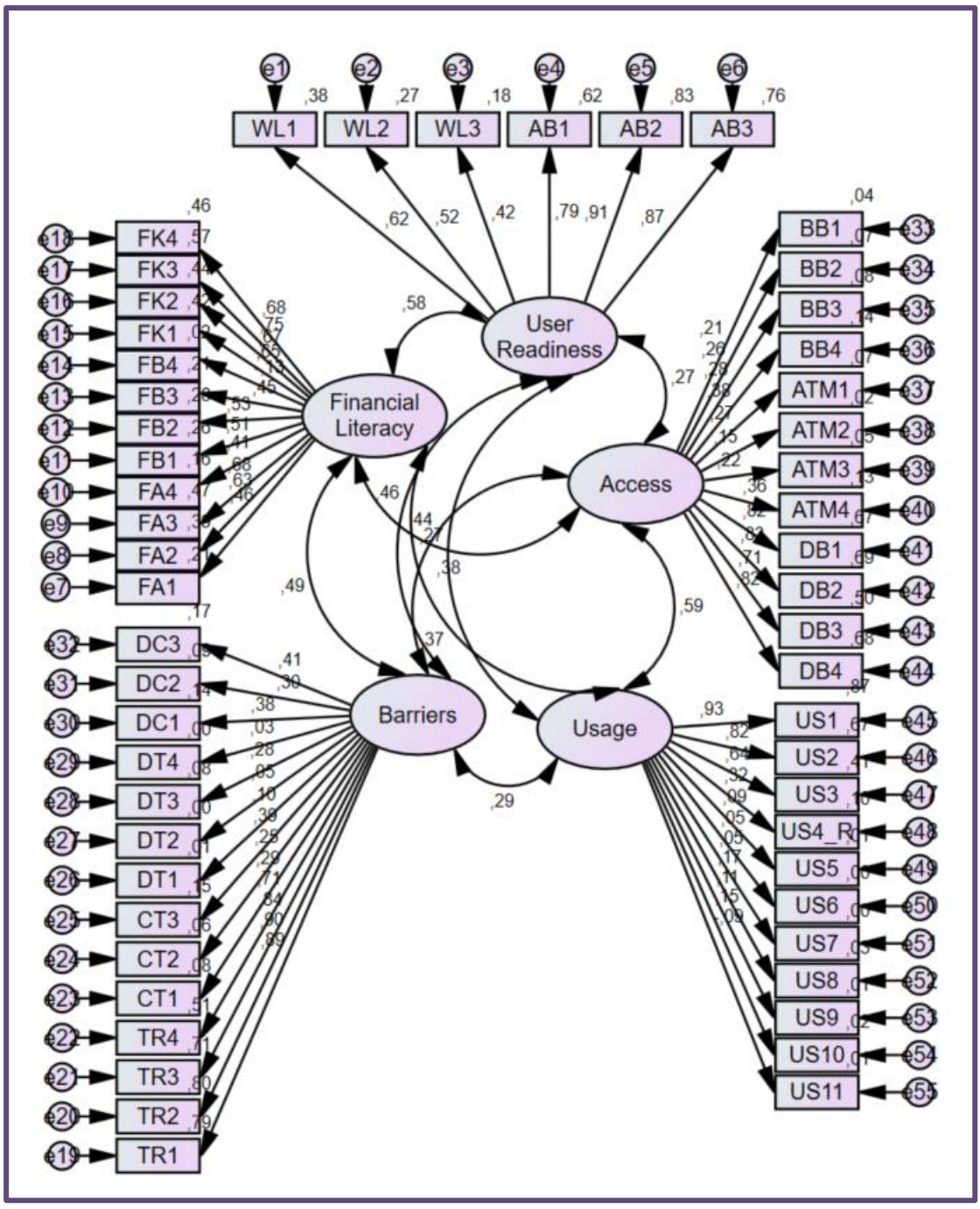

Figure 12: Confirmatory Factor Analysis (CFA) Model

Source: Compiled by Author (2024)

The results presented in Table 1 below demonstrate that there were convergent validity problems for the financial literacy, barriers, access, and usage constructs

as the average variance extracted (AVE) values were less than the minimum required value of at least 0.5, as noted by (Cheung et al., 2023).

There was also an issue with divergent validity as the diagonal elements of the Fornell and Larcker (1981) criterion for usage (0.440), financial literacy (0.569), and access (0.512) were less than the off-diagonal correlations for other constructs. This indicates that the items within these constructs were more correlated to the items within the other constructs. Additionally, there was loading for those items, resulting in the pruning of the model to improve both convergent and divergent validity.

Construct	CR	AVE	MSV	MaxR (H)	Barriers	Usage	Financial Literacy	Access	User Readiness
Barriers	0.765	0.257	0.239	0.923	**0.507**				
Usage	0.544	0.194	0.343	0.904	,286	**0.440**			
Financial Literacy	0.830	0.324	0.341	0.870	,489	,369	**0.569**		
Access	0.760	0.262	0.343	0.890	,439	,586	,380	**0.512**	
User Readiness	0.851	0.505	0.341	0.914	,460	,267	,584	,273	**0.711**

Table 1:CR, AVE, MSV, MaxR(H) and Fornell-Larcker Criterion Values–Hypothesised Model

Source: Compiled by Author (2024)

Additionally, several factor loadings detailed in Appendix B fell below the minimum requirement of at least 0.3, necessitating exclusion for further analysis.

4.4.2 *Pruned Confirmatory Factor Analysis (CFA)*

The pruned model after removing items that had low factor loading and cross-loading is presented in Figure 13.

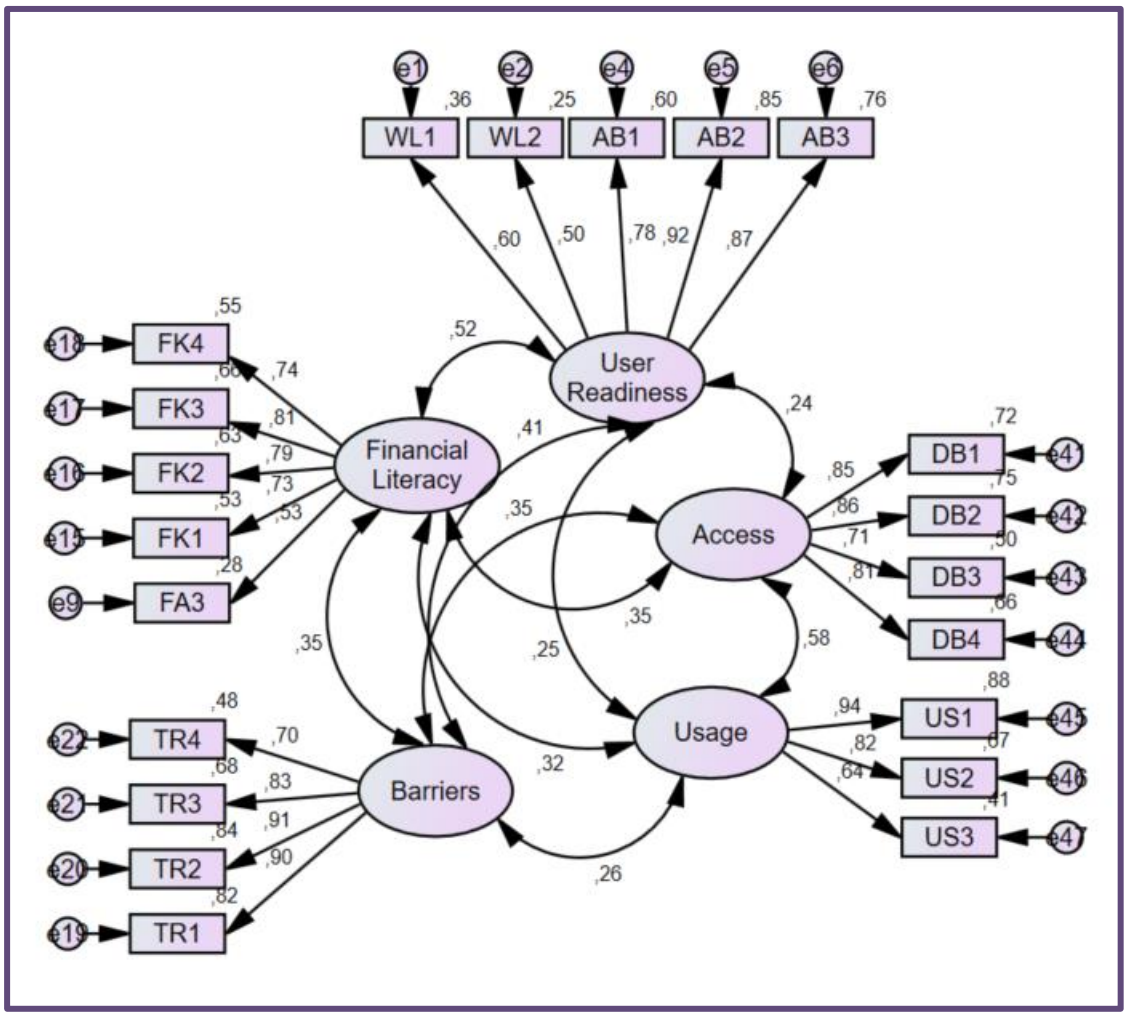

Figure 13: Pruned Confirmatory Factor Analysis (CFA)

Source: Compiled by Author (2024)

The items retained after model pruning the model are presented in Appendix C. All the items were loading highly into their respective constructs. Additionally, it can be noted that there was convergent validity after model pruning, as all

constructs exhibited average variance extracted (AVE) values surpassing the minimum acceptable threshold of 0.5.

Divergent validity was also evident, as per the Fornell and Larcker (1981) criterion, whereby diagonal elements were greater than the off-diagonal correlations with other constructs. This indicates that the items within each construct were more correlated among themselves than they were correlated to items within other constructs. Furthermore, all the MSV values were less than the AVE values, confirming that there was divergent validity.

The results revealed that all constructs exhibited high and acceptable reliability, as evidenced by composite reliability (CR) values exceeding 0.7. This indicates that the user readiness, barriers, access, usage, and financial literacy constructs were both valid and reliable.

	CR	AVE	MSV	MaxR (H)	User Readiness	Barriers	Usage	Financial Literacy	Access
User Readiness	0.862	0.566	0.274	0.919	**0.752**				
Barriers	0.905	0.706	0.172	0.927	,415	**0.840**			
Usage	0.846	0.652	0.332	0.909	,251	,256	**0.808**		
Financial Literacy	0.847	0.531	0.274	0.865	,523	,346	,325	**0.728**	
Access	0.884	0.657	0.332	0.895	,241	,353	,576	,347	**0.810**

Table 2: CR, AVE, MSV, MaxR(H) and Fornell-Larcker Criterion Values - Pruned Model

Source: Compiled by Author (2024)

The model fit indices for the pruned model, as shown in Table 3 below, fell within the acceptable range for a good model fit or slightly below the acceptable range.

Consequently, it can be concluded that the modified model demonstrated a satisfactory fit to the provided data.

Absolute Fit Indexes	Acceptable Value	Value	Outcome
GFI	>0.9	0.871	Slightly outside the acceptable range
AGFI	>0.9	0.833	Slightly outside the acceptable range
RSMEA	<0.08	0.069	Acceptable
NFI	>0.9	0.877	Slightly outside the acceptable range
NNFI (TLI)	>0.9	0.919	Acceptable
CFI	>0.9	0.931	Acceptable
CMIN/DF	< 5	2.0962	Acceptable

Table 3: Model Fit Indices

Source: Compiled by Author (2024)

4.5 Descriptive statistics and Correlation analysis

Further descriptive analysis was conducted based on the pruned model, and results are displayed in Table 4 below. Usage, with a mean of 5.57 ± 0.58, received the highest rating among the constructs. Following closely, access had a mean of 5.41 ± 0.70, and user readiness was next with a mean of 4.95 ± 0.88. Barriers obtained a mean of 4.64 ± 0.97, and financial literacy was rated slightly lower with a mean of 4.57 ± 1.05. It is important to note that Digital Financial Inclusion, with a mean of 2.35 ± 0.86, utilised a different scale, making its mean not directly comparable to the other constructs.

The correlation analysis indicated that user readiness, barriers, access, usage, financial literacy, and Digital Financial Inclusion all have positive correlations with each other, indicating that as one variable increases, the others also tend to increase. User readiness (r=0.217), barriers (r=0.164), access(r=0.189), usage (r=0.309) and financial literacy(r=0.275), all had a significant correlation to Digital Financial Inclusion.

Correlations	Descriptive Statistics		Pearson's Correlation					
	Mean	Std. Deviation	1.	2.	3.	4.	5.	6.
1.User Readiness	4.95	0.88	1					
2.Barriers	4.64	0.97	.425***	1				
3.Access	5.41	0.70	.263***	.346***	1			
4.Usage	5.57	0.58	.188***	.168**	.477***	1		
5.Financial Literacy	4.57	1.05	.443***	.329***	.291***	.286***	1	
6.Digital Financial Inclusion	2.35	0.86	.217***	.164**	.189***	.307***	.275***	1

***P < 0.001, , **P < 0.05, *P < 0.1 and correlation is significant at that level.

Table 4: Descriptive Statistics and Correlation Analysis

Source: Compiled by Author (2024)

4.6 Hypothesis testing using Structural Equation Model (SEM)

A Structural Equation Model (SEM) was fitted with the constructs that were retained in the pruned Confirmatory Factor Analysis (CFA) model. The Digital Financial Inclusion construct was determined using the number of digital financial products that a respondent had access to, ranging from Transactional accounts, Credit cards, Savings accounts, and other accounts. Thus, Digital Financial

Inclusion could take values from 0 to 4, with a higher value indicating a higher Digital Financial Inclusion. The SEM model is presented in Figure 14.

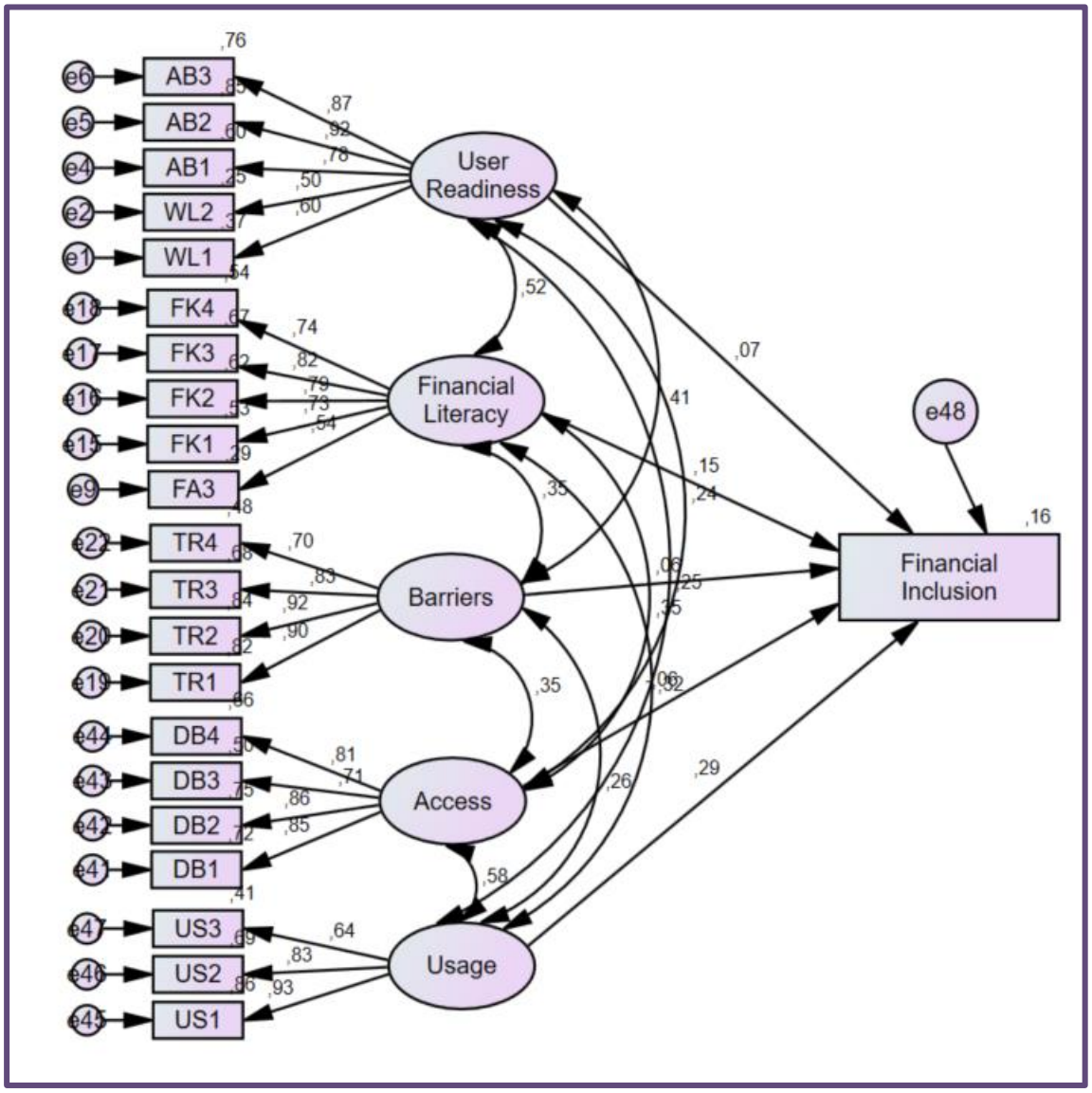

Figure 14: Structural Equation Model (SEM)

Source: Compiled by Author (2024)

The results presented in Table 5 below, depicts an r-square value of 0.158, which indicates that 15.8% of the variation in Digital Financial Inclusion can be explained by user readiness, financial literacy, access, barriers, and usage.

Hypotheses / Path Analysis	Hypothesis	Standardized Estimates	T-value	P-Value	R-Square
User Readiness → Digital Financial Inclusion	H1	,067	,819	,413	0.158
Financial Literacy → Digital Financial Inclusion	H2	,153	1,775	,076*	
Barriers → Digital Financial Inclusion	H3	,061	,820	,412	
Access → Digital Financial Inclusion	H4	-,056	-,639	,523	
Usage → Digital Financial Inclusion	H5	,291	3,404	0.000***	
SEM Fit Indices: x^2 = (408.604); x^2/df = 2.095; RMSEA = .069; CFI = .926, TLI = .912; AGFI = .828; GFI = .868; NFI = .869, ***P < 0.001, **P < 0.05, , *P < 0.1					

Table 5: Structural Equation Model (SEM) Regression Results

Source: Compiled by Author (2024)

4.7 Results: Hypothesis H1

H1: User readiness could have a positive influence towards Digital Financial Inclusion.

The findings displayed in Table 5 indicate that user readiness (β = 0.067, t-value = 0.819, p-value = 0.413) had an insignificant influence on Digital Financial Inclusion. Despite the coefficient for user readiness (β = 0.067) being above zero, its effect deemed insignificant as the p-value exceeded 0.05. Consequently, there was insufficient evidence, at 5% significance level, to support the notion that user readiness could have a positive influence towards Digital Financial Inclusion.

The null hypothesis could not be rejected. Thus, it can be concluded that there is no significant relationship between user readiness and Digital Financial Inclusion. The study suggests that being prepared or willing to use digital financial services may not inherently result in enhanced Digital Financial Inclusion.

4.8 Results: Hypothesis H2

H2: Financial literacy could have a positive influence towards Digital Financial Inclusion.

The outcomes presented in Table 5 show that financial literacy (β = 0.153, t-value = 1.775, p-value = 0.076) had a positive and statistically significant influence on Digital Financial Inclusion at a 10% significance level. The positive effect stemmed from the coefficient of financial literacy (β = 0.153) being greater than zero. This suggests a 1% improvement in financial literacy corresponds to a 0.153% advancement in Digital Financial Inclusion. The influence was significant at a 10% significance level, as the p-value fell below 0.1.

Consequently, the null hypothesis was rejected in favour of the alternative hypothesis at 10% significance level. Hence, it can be inferred that financial literacy could have a positive influence on Digital Financial Inclusion.

4.9 Results: Hypothesis H3

H3: Barriers to financial services could have a negative influence towards Digital Financial Inclusion.

Barriers to financial services presented in Table 5 (β = 0.061, t-value = 0.820, p-value = 0.412) had an insignificant influence on Digital Financial Inclusion. Although the coefficient for barriers to financial services (β = 0.061) was greater than zero, the influence was insignificant since the p-value was greater than 0.05.

This implies insufficient evidence at a 5% significance level to suggest that barriers to financial services could have a negative influence towards Digital Financial Inclusion. The null hypothesis could not be rejected. Thus, it can be concluded that there is no relationship between barriers and Digital Financial Inclusion.

Barriers to financial services were found to have an insignificant influence on Digital Financial Inclusion. This suggests that overcoming barriers alone may not be sufficient to drive increased Digital Financial Inclusion.

4.10 Results: Hypothesis H4

H4: Access to financial services could have a positive influence towards Digital Financial Inclusion.

The results presented in Table 5 show that access to financial services (β = -0.056, t-value = -0.639, p-value = 0.523) had an insignificant influence on Digital Financial Inclusion. Although the coefficient for access to financial services (β = -0.056) was less than zero, the influence was insignificant since the p-value was greater than 0.05. This means that there was no sufficient evidence at a 5% significance level to suggest that access to financial services could have a positive influence towards Digital Financial Inclusion. The null hypothesis could not be rejected. Thus, it can be concluded that there is no relationship between access to financial services and Digital Financial Inclusion.

The results indicated an insignificant influence of access to financial services on Digital Financial Inclusion. The study suggests that, at least within the examined context, the availability of financial services may not directly translate to increased Digital Financial Inclusion.

4.11 Results: Hypothesis H5

H5: Usage of financial services could have a positive influence towards Digital Financial Inclusion.

The outcomes detailed in Table 5 demonstrate that usage of financial services (β = 0.291, t-value = 3.404, p-value 0.001 had a positive and significant influence on Digital Financial Inclusion. The influence was positive since the coefficient for Usage of financial services (β = 0.291) was greater than zero.

This suggests that a 1% improvement in usage of digital financial services could result in a significant improvement in Digital Financial Inclusion.

Furthermore, the significance of this influence is underscored by the p-value being less than 0.05, indicating that the null hypothesis was rejected in favour of the alternative hypothesis. Thus, it can be concluded that the usage of financial services has a positive, significant influence on Digital Financial Inclusion.

The study unveiled a positive and significant influence of the usage of financial services on Digital Financial Inclusion. This implies that individuals actively using financial services contribute to higher levels of Digital Financial Inclusion.

4.12 Summary of Results

In summary, while usage of financial services and financial literacy were identified as positive drivers of Digital Financial Inclusion, other factors such as access, barriers and user readiness did not show significant influence within the examined context. These findings emphasise the complex nature of Digital Financial Inclusion and highlight the need for a more nuanced understanding of the factors contributing to its success. Future research should delve deeper into the specific dynamics to inform more targeted strategies for promoting Digital Financial Inclusion.

Following the findings outlined in chapter 4, the following chapter seeks to discuss findings in comparison with existing literature.

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS

5.1 Introduction

This chapter provides a comprehensive discussion of the research findings, contextualised within existing literature, the hypotheses development in Chapter 2 and the findings delineated in chapter 4.

Based on the descriptive statistics and correlation analysis presented in Table 4, usage emerged with the highest rating, followed closely by access and user readiness. Barriers and financial literacy rated slightly lower in comparison. Notably, Digital Financial Inclusion utilised a different scale, making its direct comparison with other constructs challenging.

The correlation analysis revealed that user readiness, financial literacy barriers, access, and usage all have a positive correlation with each other, indicating that an increase in one variable tends to correspond with an increase in the others. Specifically, all constructs demonstrated significant correlations with Digital Financial Inclusion.

The below delves into the intricate relationship between user readiness, financial literacy barriers, access, and usage and their influence on Digital Financial Inclusion. While the study provides valuable insights into these relationships, it is important to acknowledge and integrate perspectives of other researchers who have explored similar research.

This study finds no evidence of a significant between user readiness and Digital Financial Inclusion, which aligns to Zhu and Meeks (1994) and Behl and Pal (2016), however, contradict findings by the authors by attributing the adoption of digital financial services to user readiness as the studies find a positive, significant relationship between user readiness and Digital Financial Inclusion.

This study's findings pertaining to financial literacy resonate with a recent study by Yang et al. (2023) in demonstrating a positive and significant influence of

financial literacy on Digital Financial Inclusion. In comparison, authors such as Gupta and Singh (2013) and Fauziah et al. (2021) challenge these findings, arguing that alternative factors may at play.

In essence, this chapter aims to incorporate perspectives from prior studies that not only correlate with the findings of this study, but also offer diverse viewpoints, thereby enhancing comprehensive understanding of the intricate dynamics involved.

5.2 User readiness and Digital Financial Inclusion(H1)

The findings of the study did not prove a statistically significant influence of user readiness on Digital Financial Inclusion. Although the coefficient for user readiness could suggest a positive relationship, the influence was still insignificant. Based on the results, there is no sufficient evidence that suggests that user readiness could have a positive influence on Digital Financial Inclusion

The findings of the study are consistent with those of Zhu and Meeks (1994), whose study revealed that there was no significant evidence that user readiness influenced credit use. Contrary to these findings, a study by Behl and Pal (2016) indicated that adoption of digital financial services is largely driven by user readiness and that user readiness has a positive impact on Digital Financial Inclusion. This could be attributed to the differences in the how constructs are defined. Where this study used willingness and ability to measure user readiness, Behl and Pal (2016) defined it as the perception of users in their study.

These views are further supported by Mahmud et al. (2023) who found that adequate user readiness was critical for broader adoption of Digital Financial Inclusion. The author further stated that, while adoption is largely driven by user readiness, open innovation within the financial services ecosystem would also drive adoption.

The findings of this study strongly imply that other variables may have a more substantial impact on Digital Financial Inclusion. Such variables may include but are not limited to perceived value, supported by Barbu et al. (2021) where the

authors' findings show that perceived value significantly affects Digital Financial Inclusion. This is because customers are more loyal whereas suppliers of digital financial services are proactive in offering value to users. Other factors shared by respondents in this study were the cost of data and internet access. The view is shared by Bayar et al. (2021) who found that access and penetration of mobile phones and internet access can significantly improve Digital Financial Inclusion by enabling access to digital financial services.

In summary, this study's results suggest an insignificant influence of user readiness on Digital Financial Inclusion. This is supported by the statistical analysis illustrated in Chapter 4. Through literature review, however, findings suggest that the construct of user readiness can be further developed to be inclusive of other actors that may provide a different outcome, allowing nuanced interpretation of these findings for future research.

5.3 Financial Literacy and Digital Financial Inclusion(H2)

This study finds that financial literacy has a positive and significant influence on Digital Financial Inclusion at a 10% significance level. These findings are consistent with recent studies by Yang et al. (2023) and Ariana et al. (2024) who find that financial and digital literacy have a direct, positive and significant impact on overall financial inclusion.

What is interesting is that in both studies, the impact of financial literacy is significant, especially amongst disadvantaged groups. This implies that the impact of financial literacy may be more significant in the underserved population. Furthermore, it's important to note that while Ariana et al. (2024) suggest a parallel effect where both financial literacy and digital literacy independently influence Digital Financial Inclusion, Yang et al. (2023) suggests a serial effect where Digital Financial Inclusion is also an enabler for financial literacy and usage of digital literacy tools.

Contrary to this study's findings, Gupta and Singh (2013), and Fauziah et al. (2021) found that financial literacy has no significant impact on Digital Financial Inclusion. The studies were done in Indonesia and India respectively, and both challenged the assumption that low literacy rates affect Digital Financial Inclusion as authors found that there is no significant impact.

Accordingly, Noor et al. (2020) fall within the same vein as the authors stating that while shallow levels of financial literacy may cause poor financial decisions, it may not be the direct reason for lower levels of Digital Financial Inclusion. Kasozi and Makina (2021) partially align with this notion that higher literacy levels may affect financial decisions, however, on the contrary, find a direct positive significance to Digital Financial Inclusion.

Seemingly, Bongomin et al. (2016) found that financial literacy alone may not be enough to improve Digital Financial Inclusion. The authors found that social capital, however, acts as a mediator and that the influence of financial literacy on Digital Financial inclusion, is channelled through social capital. This theory is further supported by Lontchi et al. (2022) whose findings showed that while financial literacy alone does not have a significant impact on Digital Financial Inclusion, its significance increases when social capital is introduced.

George and Pathanamthitta (2020) similarly highlight that although financial literacy has an impact on Digital Financial Inclusion, demonetisation can trigger interest in digital financial tools. This implies that suppliers of traditional banking services would need to migrate most services to digital to increase adoption and learning. This would be prevalent in countries such as India, where the use of cash is still prevalent. According to Prasad et al. (2018), government and financial service providers can only increase Digital Financial Inclusion by investing in driving both financial literacy and accessibility. This suggests that Digital Financial Inclusion in such countries cannot be driven by financial literacy alone.

In this study, the effect of moderating factors was tested as displayed in Appendix E, and results showed that none of the six moderating factors had an impact on the results. A similar study in Lao shows that while financial literacy has a positive effect on Digital Financial Inclusion statistically, moderating factors such as

income and education have no effect on the outcome as individuals with a higher financial literacy score are more financially included, regardless of income or age(Morgan & Long, 2020).

In Uganda, factors such as age, gender, income, and education influence financial literacy and Digital Financial Inclusion and change the impact of each variable.

These finds are valuable and highlight the importance of going beyond financial literacy when addressing issues of Digital Financial Inclusion or the lack thereof. Further analysis and studies are needed to unpack the complex relationships and causation effects of literacy to continue building a more inclusive financial system.

5.4 Barriers and Digital Financial Inclusion(H3)

This study's findings regarding barriers' significance on Digital Financial Inclusion showed that barriers did not have a significant impact on Digital Financial Inclusion. Upon further analysis however, it was revealed as shown in Appendix E that age, income, and experience moderate the relationship between barriers and Digital Financial Inclusion, for example, individuals with lower income and experience, and higher age were found to be less able to overcome barriers to Digital Financial Inclusion than the other groups.

Previous research explored various factors that impact Digital Financial Inclusion, with barriers being mostly studied in non-digital contexts. According to Kumar et al. (2020), similar factors studied, such as distance, documents and income that sum up barriers, do not show a direct impact on Digital Financial Inclusion. The author urges consideration of psychological and cultural barriers due to their potential for significant impact. The same school of thought is found in a recent study which shows that money-oriented cultures tend to use digital services, and therefore have more of an impact on Digital Financial Inclusion (Neves et al., 2023).

Aligned to this study, Chamboko (2022) and Tok and Heng (2022) identified the need to have a multifaceted approach to removing barriers to Digital Financial

Inclusion, focusing on gender and age. This implies that age and gender are moderating factors in the relationship between barriers and Digital Financial Inclusion solutions. This view is further supported by Lanie (2017) who finds that educational level and income affect the relationship positively.

Damra et al. (2023) indicated that trust made up the construct that represents barriers. The authors found that the relationship is non-linear, suggesting that while trust may have an impact on Digital Financial Inclusion, the results change as the level of trust changes. Low levels of trust are associated with lower levels of inclusion and vice versa.

5.5 Access and Digital Financial Inclusion(H4)

In this study, the analysis of respondents did not provide sufficient evidence to suggest that access could have a positive and significant influence on Digital Financial Inclusion, contrary to previous research by as Adil and Jalil (2020) and Kumar Vaid et al. (2020).

Access was primarily considered from a supply perspective. Karp and Nash-Stacey (2015) find that merely offering financial services does not guarantee an improvement in Digital Financial Inclusion. The authors argue that greater access can have a positive influence on Digital Financial Inclusion only if factors such as internet access, usage, income levels and employment are improved.

In a prior study, Ramji (2009) suggested that access may have a positive significance on digital financial services, however, cautioned that access alone may not be enough to achieve Digital Financial Inclusion. The author indicates that access has to be accompanied by training and incentives to encourage active usage, particularly among underserved populations. Similarly, Nandru et al. (2016) state that access offered by service providers encourages usage, thus establishing a positive relationship with Digital Financial Inclusion.

5.6 Usage and Digital Financial Inclusion(H5)

Evidence from this study reveals that there is a clear, statistically positive, and significant relationship between the usage of digital financial services and Digital Financial Inclusion. These findings suggest that increased usage and engagement in financial service activities lead to a greater degree of inclusion. The findings are consistent with Allen et al. (2012) and Agyekum et al. (2016) who emphasise the positive impact of usage on increased financial inclusion.

In both this study and previous research, access to financial products, from the user and supplier sides, is recognised as a catalyst for usage. This implies that usage can only occur where there are increased levels of inclusion in both traditional and digital financial products.

Naumenkova et al. (2019) find that while usage can increase financial inclusion, innovative financial systems and alternative channels for banking can bridge the gap to Digital Financial inclusion, where financial literacy and infrastructure are catered to. A similar view is shared by Shen et al. (2018) who finds that usage has a positive relationship with financial inclusion in mainland China. The authors' emphasis, however, is the role of internet access as an enabler for usage. Without those variables, accompanied by financial literacy, heightened Digital Financial Inclusion cannot be achieved. Other authors have also noted the potential of usage as a means to increase financial inclusion, however, expand on other factors that need to be considered that act as enablers of usage.

Siddik et al. (2014) argue that, while the use of mobile banking can increase financial inclusion in Bangladesh, perceived cost and risk may affect overall adoption. Durai and Stella (2019) refer to the need for these channels to be convenient, easy to use and cost-effective for them to have a positive and significant influence on Digital Financial Inclusion.

While this study did not identify any factors that moderate the relationship between usage and financial inclusion, Fungáčová and Weill (2015) found that higher income, better education, and being male and older are associated with

greater usage of accounts. These findings are, however, not supported by the other studies that were reviewed.

5.7 Conclusion

This chapter emphasises the complexity of Digital Financial Inclusion, and the need to consider various factors beyond those studied. Although the results unveiled a positive and significant influence of financial literacy and usage on Digital Financial Inclusion, the statistical evidence failed to demonstrate a comparable influence of the other constructs. This suggests that the broader dynamics remain nuanced and warrant further exploration.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter serves as a conclusion and highlights the contributions and implications for policy makers, technology developers and financial service providers.

6.2 Observations: User readiness could influence Digital Financial Inclusion

The research objective of the study was to examine whether user readiness could influence Digital Financial Inclusion. The investigation yielded valuable insights that have allowed the study to conclude the relationship between user readiness and Digital Financial Inclusion. The findings reveal that no evidence suggests a relationship between user readiness and Digital Financial Inclusion, which challenges existing literature. Comparisons to prior research such as (Behl & Pal, 2016) revealed differences in constructs that measure user readiness. While this study considered willingness and ability to measure user readiness, the authors identified user perceptions to be a more appropriate measure.

These differences are vital to the body of knowledge and highlight the nuanced nature of measuring constructs. Other findings suggest that perceived value may be more substantial in measuring user readiness. Nevertheless, delving into the construct of user readiness in its current format contributes to a better understanding of factors that influence Digital Financial Inclusion. The results suggest an insignificant impact, challenging conventional perspectives. These findings contribute to the existing body of knowledge and provide a foundation for future research to refine the construct of user readiness and explore additional variables influencing Digital Financial Inclusion.

6.3 Observations: Financial Literacy could influence Digital Financial Inclusion

The examination of the influence of financial literacy on Digital Financial Inclusion in this study revealed a positive and significant impact. These results challenge conventional assumptions and contradict previous studies conducted in Indonesia and India by Gupta and Singh (2013) and Fauziah et al. (2021) respectively.

The examination of moderating factors in this study did not reveal any significant impact on the relationship between financial literacy and Digital Financial Inclusion. This aligns with a study in Lao, indicating that factors such as income and education may not influence the outcome, as higher financial literacy scores result in greater financial inclusion, regardless of income or age (Morgan & Long, 2020).

The findings underscore the complexity of the relationship between financial literacy and Digital Financial Inclusion, emphasising the need for further analysis and studies. It suggests that addressing Digital Financial Inclusion requires a multifaceted approach that goes beyond financial literacy alone. This study contributes to the ongoing discourse and sets the stage for future research to delve deeper into the intricate dynamics of literacy and its implications for building a more inclusive financial system.

6.4 Observations: Barriers to financial services could influence Digital Financial Inclusion

The investigation into the influence of barriers on Digital Financial Inclusion in this study reveals that barriers to financial services do not have a statistically, negative, and significant influence on Digital Financial Inclusion. However, a nuanced perspective emerged through further analysis, revealing that age, income, and experience play moderating roles in the relationship between barriers and Digital Financial Inclusion.

Specifically, the findings indicate that individuals with lower income and experience, and higher age, face greater challenges in overcoming barriers to Digital Financial Inclusion, compared to other groups. This nuanced understanding adds depth to the study's findings and emphasises the need to consider individual characteristics when addressing barriers.

Previous research has predominantly explored factors affecting Digital Financial Inclusion, often within non-digital contexts. Consistent with Kumar et al. (2020), this study highlights that factors like distance, documentation, and income, collectively representing barriers, may not directly affect Digital Financial Inclusion. However, it suggests that psychological and cultural barriers, as advocated by the author, could significantly influence Digital Financial Inclusion, aligning with recent research indicating the impact of money-oriented cultures on digital service usage (Neves et al., 2023)

Trust emerges as a key construct representing barriers in this study, aligning with Damra et al. (2023). The author finds that while trust may have a non-linear impact on Digital Financial Inclusion, the relationship changes with varying levels of trust. Low levels of trust are associated with lower levels of inclusion, emphasising the importance of cultivating trust in digital financial systems.

In summary, the study contributes to understanding the nuanced relationship between barriers and Digital Financial Inclusion, emphasizing the role of individual characteristics as moderating factors. The findings underscore the need for a holistic and tailored approach to addressing barriers, considering factors such as age, income, gender, and trust. This study provides valuable insights for future research and the development of targeted strategies to enhance Digital Financial Inclusion.

6.5 Observations : Access to financial services could influence Digital Financial Inclusion

The investigation in this study concludes that there is no relationship between access and Digital Financial Inclusion. Despite contrasting findings in literature reviews, particularly from studies such as Adil and Jalil (2020) and Kumar Vaid

et al. (2020) discussed in Chapter 2, the empirical evidence from this study contradicts these results.

The study's conceptualisation of access primarily adopts a supply-side perspective, aligning with Karp and Nash-Stacey (2015) who argue that financial services offered by providers alone may not be sufficient to improve Digital Financial Inclusion.

In summary, the study contributes by challenging existing literature findings and providing evidence that, in the South African context, access does not demonstrate a positive, significant influence on Digital Financial Inclusion. The study underscores the need for nuanced perspectives on access, recognising the importance of complementary factors such as training, incentives, and improvements in internet access and usage. These insights contribute to the ongoing discourse on how best to achieve Digital Financial Inclusion, emphasising the multifaceted nature of the challenges and the necessity for tailored strategies.

6.6 Observations: Usage of financial services could influence Digital Financial Inclusion

The evidence from this study unequivocally establishes a clear, statistically positive, and significant relationship between the usage of financial services and Digital Financial Inclusion. The findings align with research by Allen et al. (2012) and Agyekum et al. (2016) , both of whom underscore the positive impact of usage on enhancing financial inclusion. The common thread across these studies is the acknowledgement that usage is contingent upon access to financial products and digital infrastructure from the supplier side.

In conclusion, the study contributes by providing robust evidence affirming the positive link between the usage of digital financial services and Digital Financial Inclusion. These insights emphasise the pivotal role of access, infrastructure, and financial literacy in fostering usage, thereby promoting financial inclusion. The study's nuanced understanding of these relationships adds valuable depth to the ongoing discourse on achieving comprehensive Digital Financial Inclusion.

6.7 Exploring individual characteristics

Based on the findings that age, income and experience moderate the relationship between barriers and Digital Financial Inclusion, it can be concluded that the objective of exploring how individual characteristics moderate the relationship between variables has been partially met. While some aspects of the objective were fulfilled, further research may be needed to fully understand the moderating effects across variables.

6.8 Recommendations

The study underscores the pivotal role of financial literacy and usage in promoting Digital Financial Inclusion. Service providers should focus on enhancing the accessibility, ease of use, and affordability of digital financial services.

6.8.1 *Institutions of Learning*

Financial literacy was found to have a positive influence on Digital Financial Inclusion. Educational institutions should collaborate with industry stakeholders to integrate practical digital financial literacy components into curricula. Addressing the specific needs identified in this study can better prepare individuals for the digital financial landscape. Crain (2013) argues the importance of teaching financial literacy in universities and finds that only 37 schools have personal financial literacy as an elective course. Similarly, Jacobsen and Correia (2019) indicate that students who are not business majors are not exposed to financial literacy courses.

This implies that this could potentially affect further adoption and active usage of financial solutions. In recent years, there have been collaborations between universities and the private sector to promote financial literacy as a means to promote inclusion. According to NKU (2023), the university partnered with the

National Endowment for Financial Education to increase financial literacy, particularly among lower income groups.

6.8.2 *Information technology Services*

User readiness exhibited an insignificant influence on Digital Financial Inclusion. Technology developers should focus on creating user-friendly interfaces, considering the diverse backgrounds and preferences of potential users. Conducting user readiness assessments can guide the development of intuitive digital financial solutions. Brazil's Pix retail instant payment system is an example of a user friendly, customer centric initiative that can be created through leveraging technology and existing systems. According to Duarte et al. (2022), the infrastructure is built on the central bank's foundational role and provides a lower cost alternative to traditional banking. Additionally, it is convenient, offers instant availability for the beneficiary and is available 24 hours per day (Patra, 2021).

6.8.3 *Government and policy makers*

Barriers identified in the study impact Digital Financial Inclusion, with age, income, and experience acting as significant moderating factors. Additionally, past literature provides a different perspective on how barriers are viewed, introducing the lack of documents as a barrier to Digital Financial Inclusion. Policymakers should consider targeted interventions addressing barriers, particularly for older individuals and those with lower income and less experience. Regulatory frameworks should evolve to promote inclusive digital financial environments. Through the Aadhaar programme, which is a system build in 2009 to provide biometric identity, the private sector has managed to leverage this to increase Digital Financial Inclusion by removing the authentication and document barrier, allowing seamless payments to be made through the integration of government services (D'Silva et al., 2019).

In Rwanda, the development of the national payment system has significantly increased the adoption and usage of financial services. Ntukanyagwe and Deya

(2024) find that regulatory and legal frameworks to support the initiative enabled the adoption and usage of electronic payments among individuals.

6.8.4 *Financial Service Providers*

While the investigation has demonstrated the significant concentration of the South African financial services sector, with a small number of established institutions dominating the market share, it is imperative to contemplate strategies for both maintaining and actively expanding the market to foster Digital Financial Inclusion.

Given the positive correlation between financial literacy and usage with Digital Financial Inclusion, financial services providers must leverage these constructs as catalysts to enhance adoption and usage of financial services.

This can be achieved through two primary avenues:

- Invest and prioritise initiatives that equip individuals with financial literacy skills and provide integrated money management support. According to the Young Leaders of Americas Initiative (2023), short courses such as the Fundamentals of Personal Money Management help promote financial literacy and equip participants with tools that enable informed decision making. In South Africa, the First National Bank (FNB) exemplifies financial literacy integration into its core value proposition. FNB helps actively guide customers in managing spend and debt, empowering them to gain control of their finances (FNB, 2024).This approach can further increase usage, and exposure to other financial products as debt free customers gain surplus funds for savings, investment, and wealth creation.

- As discussed in Chapter 1, opportunities for Fintechs arise from inefficiencies and limited financial inclusion. Financial service providers can leverage collaborations with Fintechs to expand their reach and address customer centric concerns. According to Shevlin (2023) approximately 500 community banks and credit unions are actively

investing in Fintech startups, highlighting the potential of such partnerships.

6.9 Suggestions for further research

Future research should consider investigating the impact of nuanced user readiness, considering different demographic and socioeconomic factors. This could include assessing the influence of cultural perceptions, educational backgrounds, and personal preferences on the adoption of digital financial services.

Furthermore, longitudinal studies can be conducted to explore the dynamic nature of financial literacy and its developing relationship with Digital Financial Inclusion. This can be done with consideration to the interplay of factors such as changing economic landscapes, educational interventions, and the emergence of new financial technologies.

Researchers can consider qualitative research to delve deeper into the nature of barriers to Digital Financial Inclusion, and explore psychological and cultural dimensions, assessing how perceptions and attitudes affect individuals' ability to overcome barriers. To add to the body of knowledge, further studies can be done to understand access by examining both supply and demand-side factors that comprehensively investigate the role of internet access, usage patterns, income levels, and employment in fostering Digital Financial Inclusion. Additionally, future research can incorporate a broader regional perspective, which will provide comparative insights and enhance generalisability of the findings. To elevate the intellectual rigor, further research can integrate a wider range of theoretical frameworks and conduct a more critical analysis of intersections between digital financial services and socio-economic impacts. Future researchers can also consider broadening the scope to investigate the impact of technological advancements across diverse demographic groups or assess the efficacy of policy interventions aimed at promoting digital financial inclusion.

In conclusion, while this study has contributed valuable insights, it opens avenues for further research by revealing nuanced relationships and highlighting the need

for more targeted investigations. Future research efforts can build upon these recommendations, ensuring a deeper understanding of the multifaceted dynamics surrounding Digital Financial Inclusion.

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Table 6:Consistency table: research objectives, hypotheses, data collection and data analysis

RO #	State Research Objective	Hyp #	Hypothesis	Data collection detail	Data analysis method
1	Define Digital Financial Inclusion	N/A	N/A	Survey Section A	Descriptive analysis
1.4.1	Examining whether User Readiness could influence Digital Financial Inclusion.	H1	User readiness could have positive influence towards Digital Financial Inclusion.	6 Likert Scale Section B	Confirmatory Factor Analysis (CFA) Structural Equation Modelling (SEM)
1.4.2	Examining whether Financial Literacy could influence Digital Financial Inclusion.	H2	Financial Literacy could have a positive influence towards Digital Financial Inclusion.	6 Likert Scale Section C	Confirmatory Factor Analysis (CFA) Structural Equation Modelling (SEM)

RO #	State Research Objective	Hyp #	Hypothesis	Data collection detail	Data analysis method
1.4.3	Examining whether barriers to financial services could influence Digital Financial Inclusion	H3	Barriers to financial services could have a negative influence towards Digital Financial Inclusion.	6 Likert Scale Section D	Confirmatory Factor Analysis (CFA) Structural Equation Modelling (SEM)
1.4.4	Examining whether access to financial services could influence Digital Financial Inclusion.	H4	Access to financial services could have a positive influence towards Digital Financial Inclusion.	6 Likert Scale Section E	Confirmatory Factor Analysis (CFA) Structural Equation Modelling (SEM)
1.4.5	Examine whether usage of financial services could influence Digital Financial Inclusion.	H5	Usage of financial services could have a positive influence towards Digital Financial Inclusion.	6 Likert Scale Section F	Confirmatory Factor Analysis (CFA) Structural Equation Modelling (SEM)

RO #	State Research Objective	Hyp #	Hypothesis	Data collection detail	Data analysis method
1.4.6	Explore how individual characteristics moderate the relationships between variables.	N/A	N/A	Demographic Profile Section G	Descriptive analysis Regression

APPENDIX A: Questionnaire

Section A: Digital Financial Inclusion

Digital financial products and services are financial products and services that are accessed and delivered through digital channels, such as the internet, mobile devices, and other electronic platforms.

Are you aware of the different types of digital financial products/services available in South Africa?

- Yes, but only a few specific ones.
- I am familiar with a wide range of financial products/services.
- I am not aware of any financial products/services.

Which digital financial products/services do you have?

- Bank account (Cheque or Transactional Account)
- Loan (Credit card/Overdraft/personal loan or other loan facilities)
- Savings account (interest bearing account used to save money)
- I do not have any financial products/services.
- Other

How frequently do you use financial products and/or services digitally?

- Rarely or never
- Daily or weekly
- Monthly
- Occasionally

Which factor(s) do you consider important in determining Digital Financial Inclusion in South Africa?

- The availability of financial services (e.g., financial products, banks, ATMS, digital banking channels).
- Financial Literacy (financial education)

- Income
- Affordable financial services
- Other

Section B: User Readiness

For each of the below questions, please select the response that best characterises how you feel about the about the statement.

	Strongly disagree	***Disagree***	***Slightly disagree***	***Slightly agree***	***Agree***	***Strongly agree***
Category: Willingness						
WL1: Effective banking services and channels motivate me to use financial services.	1	2	3	4	5	6
WL2: I believe that using financial services can help me achieve my	1	2	3	4	5	6

financial goals.						
WL3: Banks are more reliable than money lenders	1	2	3	4	5	6
Category: Ability						
AB1: I understand the basics of financial products and services.	1	2	3	4	5	6
AB2: I am able to read and understand financial documents	1	2	3	4	5	6
AB3: I am able to use financial services.	1	2	3	4	5	6

Section C: Financial Literacy

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
Category: Financial attitude						
FA1: Financial literacy is important me.	1	2	3	4	5	6
FA2: I feel confident to make financial decisions.	1	2	3	4	5	6
FA3: I set up financial goals and strive to achieve them.	1	2	3	4	5	6
FA4: I believe that Financial Planning is important.	1	2	3	4	5	6

Category: Financial behaviour						
FB1: I have a monthly budget.	1	2	3	4	5	6
FB2: My bills are always paid on time.	1	2	3	4	5	6
FB3: Before I buy something, I consider whether I can afford it.	1	2	3	4	5	6
FB4: I often use my loan or funds from my savings to help me through the month.	1	2	3	4	5	6
Financial Knowledge						
FK1: I understand how banks charge interest rates.	1	2	3	4	5	6

FK2: I understand the concept of compound interest.	1	2	3	4	5	6
FK3: I understand the concept of Time Value of Money.	1	2	3	4	5	6
FK4: I have a good understanding of Money Management.	1	2	3	4	5	6

Section D: Barriers

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
Category: Trust						
TR1: I trust banks with my money.	1	2	3	4	5	6

TR2: Banks are reliable.	1	2	3	4	5	6
TR3: I trust banks' product/service offerings.	1	2	3	4	5	6
TR4: I feel banks have adequate safety measures to ensure I am protected.	1	2	3	4	5	6
Category: Cost						
CT1: Banking fees are affordable.	1	2	3	4	5	6
CT2: Banks offer loans at low interest rates	1	2	3	4	5	6
CT3: I use Digital banking/ self-service channels to avoid high banking fees.	1	2	3	4	5	6

Category: Distance						
DT1: I use a bank that has a branch located near me.	1	2	3	4	5	6
DT2: I use a bank that has an ATM located near me.	1	2	3	4	5	6
DT3: I use a bank that has Digital Banking/Self-service channels	1	2	3	4	5	6
DT4: I use a bank that allows me to make cash withdrawals at my local supermarket.	1	2	3	4	5	6
Category: Documents						
DC1: Documentatio	1	2	3	4	5	6

n allowed me to access a financial product or service.						
DC2: I will get the required documentation for financial services, no matter how difficult it is	1	2	3	4	5	6
DC3: I can easily access the documents required for financial services.	1	2	3	4	5	6

Section E: Access of Financial Services Products

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
BB1: There is a branch near me.	1	2	3	4	5	6
BB2: Branch operating hours are	1	2	3	4	5	6

suitable to me.						
BB3: Bank staff are available to help with transaction processes.						
BB4: Branch offers a variety of financial products and services.	1	2	3	4	5	6
Category: ATMs						
ATM1: There are adequate number of ATMs near me	1	2	3	4	5	6
ATM2: I can use the ATM to do my banking.	1	2	3	4	5	6
ATM3: The ATM location is secure.	1	2	3	4	5	6

ATM4: The ATM is simple and convenient to use.	1	2	3	4	5	6
DB1: Digital banking is easily accessible to me.	1	2	3	4	5	6
DB2: Digital banking allows me to manage my finances.	1	2	3	4	5	6
DB3: Digital banking is a suitable alternative to face-to-face banking.	1	2	3	4	5	6
DB4: Digital banking has a variety of products and services useful to me.	1	2	3	4	5	6

Section F: Usage of Financial Services products

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
US1: I use my account to receive income/deposits.	1	2	3	4	5	6
US2: My account has been used in the last 6 months.	1	2	3	4	5	6
US3: I use my account at least once per month to pay bills, make purchases and payments.	1	2	3	4	5	6
US4: I withdraw most of my money as soon as it is deposited.	1	2	3	4	5	6
US5: I have more than 1 loan (e.g.,	1	2	3	4	5	6

Credit card, loan)						
US6: I make use of a loan at least once per month.	1	2	3	4	5	6
US7: I only use my loan for emergencies	1	2	3	4	5	6
US8: I am able to repay my loans on time.						
US9: I make monthly contributions to my savings account.	1	2	3	4	5	6
US10: I have made contributions to my savings account at least once in the last 6 months.	1	2	3	4	5	6
US11: I regularly make withdrawals from my	1	2	3	4	5	6

savings
account.

Section G: General Information

In this section, you will be asked to complete general background information.

Gender

Male	Female	Non- binary	Transgender

Province (Please answer based on your permanent residence)

Gauteng	North West	Eastern Cape	Limpopo	Western Cape	Northern Cape	KwaZulu Natal	Free state	Mpumalanga

Highest Qualification

Below Grade 12	Grade 12	Undergraduate Qualification	Postgraduate Qualification

Employment Status

Student	Unemployed	Full Time Employee	Part-Time Employee/	Self Employed

			Seasonal Employee	

Gross Income Per Annum

- R 0.00 - R 75000.00
- R 75000.01 - R 136000.00
- R 136000.01 - R 250000.00
- R 250000.01 - R 351000.00
- R 351000.01 - R 447000.00
- R 447000.01 - R 600000.00
- Greater than R600 000.00

APPENDIX B: Factor Loadings – Hypothesised Model

			Estimate
WL1	<---	User Readiness	,616
WL2	<---	User Readiness	,523
WL3	<---	User Readiness	,420
AB1	<---	User Readiness	,787
AB2	<---	User Readiness	,909
AB3	<---	User Readiness	,869
TR1	<---	Barriers	,887
TR2	<---	Barriers	,895
TR3	<---	Barriers	,840
TR4	<---	Barriers	,715
CT1	<---	Barriers	,288
CT2	<---	Barriers	,246
CT3	<---	Barriers	,389
DT1	<---	Barriers	,099
DT2	<---	Barriers	,051
DT3	<---	Barriers	,283
DT4	<---	Barriers	,033
DC1	<---	Barriers	,380
DC2	<---	Barriers	,298
DC3	<---	Barriers	,414
BB1	<---	Access	,206
BB2	<---	Access	,258
BB3	<---	Access	,281

BB4	<---	Access	,375
ATM1	<---	Access	,269
ATM2	<---	Access	,146
ATM3	<---	Access	,220
ATM4	<---	Access	,357
DB1	<---	Access	,821
DB2	<---	Access	,833
DB3	<---	Access	,706
DB4	<---	Access	,822
US1	<---	Usage	,931
US2	<---	Usage	,821
US3	<---	Usage	,637
US4_R	<---	Usage	,321
US5	<---	Usage	,094
US6	<---	Usage	,049
US7	<---	Usage	,055
US8	<---	Usage	,173
US9	<---	Usage	,108
US10	<---	Usage	,147
US11	<---	Usage	-,085
FA2	<---	Financial Literacy	,627
FA3	<---	Financial Literacy	,683
FA4	<---	Financial Literacy	,405
FB1	<---	Financial Literacy	,511
FB2	<---	Financial Literacy	,526

FB3	<---	Financial Literacy	,453
FB4	<---	Financial Literacy	-,128
FK1	<---	Financial Literacy	,648
FK2	<---	Financial Literacy	,666
FK3	<---	Financial Literacy	,752
FK4	<---	Financial Literacy	,682
FA1	<---	Financial Literacy	,463

Source: Compiled by Author (2024)

APPENDIX C: Final construct composition, Cronbach's Alpha, CR and AVE

		Factor Loading	Cronbach's alpha	CR (composite reliability)	AVE (average variable extracted)
User Readiness			**.855**	**.862**	**.566**
WL1	Effective banking services and channels motivate me to use financial services.	,604			
WL2	I believe that using financial services can help me achieve my financial goals.	,501			
AB1	I understand financial products and services.	,776			
AB2	I am able to read and understand financial information.	,923			
AB3	I am able to use financial products and services.	,872			
Barriers			**.902**	**.905**	**.706**
TR1	I trust banks with my money.	,905			

TR2	Banks are reliable.	,915			
TR3	I trust banks' product/service offerings.	,827			
TR4	I feel banks have adequate safety measures to ensure I am protected when using their services.	,696			
Access					
DB1	Digital banking is easily accessible to me.	,850	**.625**	**.884**	**.657**
DB2	Digital banking allows me to manage my finances.	,865			
DB3	Digital banking is a suitable alternative to face-to-face banking.	,705			
DB4	Digital banking has a variety of products and services useful to me.	,812			
Usage					
US1	I use my account to receive income/deposits.	,938	**.799**	**.846**	**.652**
US2	My account has been used in the last 6 months.	,819			

US3	I use my account at least once a month to pay bills, make purchases and payments.	,637			
Financial Literacy			**.841**	**.847**	**.531**
FA3	I set up financial goals and strive to achieve them.	,531			
FK1	I understand how banks charge interest rates.	,729			
FK2	I understand the concept of compound interest.	,794			
FK3	I understand the concept of Time Value of Money.	,814			
FK4	I understand the concept of Money Management.	,739			

Source: Compiled by Author (2024)

APPENDIX D: Descriptive Statistics

Min=1; Max= 6

User readiness - Descriptive statistics

Item	Question	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree	Mean	Std. Deviation	Median	Mode
WL1	Effective banking services and channels motivate me to use financial services.	6%	2%	3%	11%	41%	38%	4.94	1.287	5	5
WL2	I believe that using financial services can help me achieve my financial goals.	3%	3%	2%	16%	43%	32%	4.90	1.151	5	5
WL3	Banks are more reliable than money lenders.	3%	2%	6%	11%	42%	35%	4.95	1.164	5	5
AB1	I understand financial products and services.	3%	3%	3%	14%	50%	27%	4.89	1.086	5	5
AB2	I can read and understand financial information.	2%	2%	3%	14%	49%	29%	4.94	1.055	5	5
AB3	I can use financial products and services.	2%	1%	3%	7%	56%	32%	5.09	.938	5	5

Financial Literacy- Descriptive statistics

Item	Question	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree	Mean	Std. Deviation	Median	Mode
FA1	Financial literacy is important to me.	1%	0%	0%	5%	32%	62%	5.52	.785	6	6
FA2	I feel confident to make financial decisions.	1%	0%	4%	21%	48%	26%	4.93	.882	5	5
FA3	I set up financial goals and strive to achieve them.	3%	3%	6%	26%	42%	21%	4.64	1.117	5	5
FA4	I believe that Financial Planning is important.	1%	1%	1%	1%	30%	66%	5.56	.804	6	6
FB1	I have a monthly budget.	3%	13%	8%	21%	37%	19%	4.32	1.368	5	5
FB2	My bills are always paid on time.	1%	4%	5%	17%	36%	37%	4.94	1.123	5	6
FB3	Before I buy something, I consider whether I can afford it.	3%	4%	4%	14%	38%	38%	4.93	1.215	5	5[a]
FB4	I often use my loan or funds from my savings to help me through the month.	12%	21%	13%	16%	26%	12%	3.59	1.626	4	5

FK1	I understand how banks charge interest rates.	5%	9%	10%	23%	31%	23%	4.35	1.412	5	5
FK2	I understand the concept of compound interest.	6%	8%	3%	14%	36%	32%	4.63	1.483	5	5
FK3	I understand the concept of Time Value of Money.	6%	11%	9%	17%	26%	30%	4.37	1.560	5	6
FK4	I understand the concept of Money Management.	1%	4%	4%	16%	45%	29%	4.89	1.078	5	5

Barriers- Descriptive statistics

Item	Question	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree	Mean	Std. Deviation	Median	Mode
TR1	I trust banks with my money.	3%	3%	5%	20%	45%	23%	4.72	1.140	5	5
TR2	Banks are reliable.	3%	3%	8%	17%	50%	19%	4.67	1.125	5	5
TR3	I trust banks' product/service offerings.	2%	3%	7%	29%	46%	13%	4.53	1.037	5	5
TR4	I feel banks have adequate safety measures to ensure I am protected when using their services.	3%	2%	6%	23%	47%	19%	4.64	1.126	5	5

CT1	Banking fees are affordable.	12%	18%	21%	30%	16%	3%	3.29	1.329	3	4
CT2	Banks offer loans at low interest rates	24%	28%	18%	21%	7%	2%	2.67	1.353	2	2
CT3	I use Digital banking/ self-service channels to avoid high banking fees.	4%	5%	6%	18%	40%	27%	4.66	1.302	5	5
DT1	I chose my bank because it has a branch located near me.	16%	22%	9%	13%	29%	12%	3.55	1.713	4	5
DT2	I chose my bank because has an ATM located near me.	17%	22%	11%	13%	24%	13%	3.45	1.726	4	5
DT3	I chose my bank because it has Digital Banking/Self-service channels.	5%	4%	5%	9%	36%	41%	4.90	1.362	5	6
DT4	I chose my bank because it allows me to make cash withdrawals at my local supermarket.	10%	16%	10%	14%	29%	21%	3.97	1.671	4	5
DC1	I have the required documents to open a bank account.	1%	0%	1%	3%	36%	58%	5.48	.817	6	6
DC2	I will get the required documentation for financial services, no matter how difficult it is	1%	6%	3%	18%	48%	25%	4.80	1.082	5	5
DC3	I can easily access the documents required to get a loan or savings account (e.g., Payslip, proof of address).	2%	3%	4%	11%	39%	40%	5.02	1.155	5	6

Access- Descriptive statistics

Item	Question	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree	Mean	Std. Deviation	Median	Mode
BB1	There is a bank branch my house or my workplace.	8%	16%	6%	12%	37%	22%	4.21	1.612	5	5
BB2	Branch operating hours are suitable to me.	7%	11%	12%	16%	39%	16%	4.15	1.488	5	5
BB3	Bank staff are available when I need help with financial services or products.	3%	5%	8%	20%	46%	18%	4.56	1.178	5	5
BB4	Branch offers a variety of financial products and services.	0%	1%	6%	17%	53%	23%	4.90	.883	5	5
ATM1	There are enough ATMs near me.	5%	6%	8%	13%	44%	24%	4.56	1.362	5	5
ATM2	I can use the ATM to do my banking.	3%	3%	6%	15%	48%	23%	4.71	1.197	5	5
ATM3	The ATM location is secure.	2%	6%	13%	29%	36%	15%	4.36	1.167	5	5
ATM4	The ATM is simple and convenient to use.	0%	1%	2%	11%	56%	30%	5.12	.751	5	5
DB1	Digital banking is easily accessible to me.	0%	1%	1%	3%	32%	62%	5.52	.745	6	6

DB2	Digital banking allows me to manage my finances.	0%	1%	3%	3%	37%	56%	5.44	.788	6	6
DB3	Digital banking is a suitable alternative to face-to-face banking.	0%	3%	2%	7%	31%	57%	5.38	.905	6	6
DB4	Digital banking has a variety of products and services useful to me.	0%	1%	2%	9%	38%	49%	5.32	.830	5	6

Usage- Descriptive statistics

Item	Question	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree	Mean	Std. Deviation	Median	Mode
US1	I use my account to receive income/deposits.	0%	0%	1%	3%	35%	61%	5.56	.614	6	6
US2	My account has been used in the last 6 months.	0%	0%	0%	1%	29%	69%	5.67	.523	6	6
US3	I use my account at least once a month to pay bills, make purchases and payments.	1%	0%	4%	3%	29%	64%	5.48	.874	6	6
US4	I withdraw most of my money as soon as it is deposited.	36%	31%	11%	9%	9%	5%	2.39	1.502	2	1

US5	I have more than 1 loan (e.g., Credit card, loan)	35%	15%	2%	6%	26%	16%	3.19	2.017	2	1
US6	I make use of a loan at least once per month.	45%	23%	8%	7%	13%	5%	2.35	1.629	2	1
US7	I only use my loan for emergencies.	29%	14%	7%	13%	24%	13%	3.28	1.863	4	1
US8	I am able to repay my loans on time.	16%	5%	3%	9%	34%	33%	4.39	1.792	5	5
US9	I make monthly contributions to my savings account.	5%	9%	10%	22%	31%	23%	4.35	1.436	5	5
US10	I have made contributions to my savings account at least once in the last 6 months.	6%	11%	5%	10%	35%	32%	4.53	1.568	5	5
US11	I regularly make withdrawals from my savings account.	16%	14%	13%	21%	24%	13%	3.61	1.643	4	5

Source: Compiled by Author (2024)

APPENDIX E: Regression Weights – Moderation Results

The results revealed that age, income, and experience moderate the relationship between barriers and Digital Financial Inclusion.

			Estimate	C.R.	P
User Readiness	→	Digital Financial Inclusion	,061	,526	,599
Financial Literacy	→	Digital Financial Inclusion	,211	1,773	,076
Access	→	Digital Financial Inclusion	-,140	-1,189	,235
Barriers	→	Digital Financial Inclusion	,034	,383	,702
Usage	→	Digital Financial Inclusion	,342	3,497	***
User Readiness x Age	→	Digital Financial Inclusion	,054	,520	,603
Barriers x Age	→	Digital Financial Inclusion	,208	1,963	,050
Access x Age	→	Digital Financial Inclusion	,066	,587	,557
Usage x Age	→	Digital Financial Inclusion	-,070	-,762	,446
Financial Literacy x Age	→	Digital Financial Inclusion	-,084	-,895	,371
User Readiness x Gender	→	Digital Financial Inclusion	,040	,430	,668
Barriers x Gender	→	Digital Financial Inclusion	,058	,704	,481
Access x Gender	→	Digital Financial Inclusion	-,061	-,732	,464

Usage x Gender	→	Digital Financial Inclusion	-,028	-,379	,705
Financial Literacy x Gender	→	Digital Financial Inclusion	,005	,056	,956
User Readiness x Income	→	Digital Financial Inclusion	-,002	-,016	,987
Barriers x Income	→	Digital Financial Inclusion	,459	3,489	***
Access x Income	→	Digital Financial Inclusion	-,053	-,459	,646
Usage x Income	→	Digital Financial Inclusion	-,113	-1,023	,306
Financial Literacy x Income	→	Digital Financial Inclusion	,079	,721	,471
User Readiness x Education	→	Digital Financial Inclusion	-,045	-,329	,742
Barriers x Education	→	Digital Financial Inclusion	,049	,582	,560
Access x Education	→	Digital Financial Inclusion	,078	,805	,421
Usage x Education	→	Digital Financial Inclusion	,029	,376	,707
Financial Literacy x Education		Digital Financial Inclusion	-,129	-1,130	,258
Financial Literacy x Experience		Digital Financial Inclusion	,115	,953	,341
Usage x Experience		Digital Financial Inclusion	,177	1,464	,143
Access x Experience		Digital Financial Inclusion	,055	,407	,684
Barriers x Experience		Digital Financial Inclusion	-,613	-3,735	***
User Readiness x Experience		Digital Financial Inclusion	,094	,667	,505

Source: Compiled by Author (2024)